	INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Project Title:	Calhoun Street Housing Development
Case No.	Environmental Assessment EA 25-02 Tentative Tract Map TTM 39051 Conditional Use Permit 390 Planned Unit Development
Assessor's Parcel No.	612-260-010
Lead Agency Name and Address:	City of Coachella – Planning Division 53990 Enterprise Way Coachella, CA 92236
Project Location:	Southwest corner of Calhoun Street and Avenue 49
Project Sponsor's Name and Address:	Rod Vandenburg Pacific Modern Builders LLC P.O. Box 3075 Rancho Mirage, CA 92270
General Plan Designation(s):	General Neighborhood
Zoning:	General Neighborhood (G-N)
Contact Person:	Adrian Moreno, Associate Planner City of Coachella 53990 Enterprise Way Coachella, CA 92236
Phone Number:	(760) 398-3502 EXT. 118
Date Prepared	November 2025

Table of Contents

CHAPTER 1: INTRODUCTION 4
CHAPTER 2: ENVIRONMENTAL ANALYSIS AND DETERMINATION 17
I. AESTHETICS 20
II. AGRICULTURAL AND FORESTRY RESOURCES 23
III. AIR QUALITY 26
IV. BIOLOGICAL RESOURCES 35
V. CULTURAL RESOURCES 42
VI. ENERGY 47
VII. GEOLOGY AND SOILS 55
VIII. GREENHOUSE GAS EMISSIONS 63
IX. HAZARDS AND HAZARDOUS MATERIALS 68
X. HYDROLOGY AND WATER QUALITY 73
XI. LAND USE AND PLANNING 80
XII. MINERAL RESOURCES 82
XIII. NOISE 83
XIV. POPULATION AND HOUSING 89
XV. PUBLIC SERVICES 91
XVI. RECREATION 95
XVII. TRANSPORTATION 97
XVIII. TRIBAL CULTURAL RESOURCES 107
XIX. UTILITIES AND SERVICE SYSTEMS 110
XX. WILDFIRE 118
XXI. MANDATORY FINDINGS OF SIGNIFICANCE 120
CHAPTER 3: MITIGATION MONITORING & REPORTING PROGRAM 123

LIST OF EXHIBITS

Exhibit 1 Regional Location Map 7
Exhibit 2 Project Vicinity Map 8
Exhibit 3 Project Location Map 9
Exhibit 4a Tentative Tract Map No. 39051 – North Section 10
Exhibit 4b Tentative Tract Map No. 39051 – South Section 11
Exhibit 5a Conceptual Landscape Plan – North Section 12
Exhibit 5b Conceptual Landscape Plan – South Section 13
Exhibit 5c Conceptual Landscape Plan – Park 14
Exhibit 5d Conceptual Landscape Plan – Plants & Community Elements 15
Exhibit 6 Liquefaction Susceptibility 58

LIST OF FIGURES

Figure II-1 California Important Farmland Finder, California Department of Conservation, accessed July 2024. 24
Figure XIII-1 General Plan CNEL Levels 84

LIST OF TABLES

Table 1-1 Project Information 5
Table III-1 Ambient Air Quality Criteria Pollutants and Health Impacts 27
Table III-2 South Coast AQMD Air Quality Significance Thresholds 28
Table III-3 Project Land Use Assumptions for CalEEMod 29
Table III-4 Maximum Daily Construction-Related Emissions (pounds per day) 30
Table III-5 Maximum Daily Operational-Related Emissions (pounds per day) 31
Table III-6 Localized Significance Thresholds Emissions (pounds per day) 33
Table IV-1 Special Status Species Potentially Occurring on the Project Site 37
Table VI-1 Imperial Irrigation District Generation Resource Portfolio 47
Table VI-2 Project Construction Equipment Fuel Consumption Estimates 49
Table VI-3 Construction Worker Fuel Consumption Estimates 50
Table VI-4 Project Operational Annual Electricity Consumption 51
Table VI-5 Project Operational Annual Natural Gas Consumption 51
Table VI-6 Project Operational Annual Transportation Gasoline Consumption 52
Table VIII-1 Description of Major Greenhouse Gases 63
Table VIII-2 Projected GHG Emission Summary 66
Table X-1 Project Water Demand 77
Table X-2 Project Wastewater Generation 77
Table XIII-1 Noise Levels from Construction Equipment and Phases 86
Table XIII-2 Hours for Construction Activities 87
Table XIII-3 Hours for Property Maintenance Activities 87
Table XIII-4 Permitted Sound Levels for Fixed Noise Sources 87
Table XV-1 Project Student Generation 93
Table XVII-1 Intersection Analysis Locations 99
Table XVII-2 Intersection Analysis for Existing (2024), EAP (2026), EAPC (2026) Conditions 99
Table XVII-3 Intersection Analysis for Existing (2024) Conditions 100
Table XVII-4 Project Daily Trip Generation 101
Table XVII-5 Intersection Analysis for EAP (2026) Conditions 102
Table XVII-6 Intersection Analysis for EAPC (2026) Conditions 102
Table XVII-7 Project Fair Share Contributions to Impacted Intersections 105
Table XIX-1 Project Water Demand 114
Table XIX-2 Project Wastewater Generation 115
Table XIX-3 Project Estimated Solid Waste Generation 116

APPENDICES

Appendix A Calhoun Street Housing Development CalEEMod Report ..... A
Appendix B Calhoun Street Housing Development Biological Resources Report ..... B
Appendix C Calhoun Street Housing Development Cultural Resources Report C
Appendix D Calhoun Street Housing Development Preliminary Hydrology Report ..... D
Appendix E Calhoun Street Housing Development Preliminary Water Quality Management Plan E
Appendix F Calhoun Street Housing Development Traffic Impact Analysis ..... F
Appendix G Calhoun Street Housing Development Vehicle Miles Traveled Screening Assessment ..... G

CHAPTER 1: INTRODUCTION

Project Location

The proposed Calhoun Street Housing Development is a Planned Unit Development (PUD) for a single-family residential project (referred to hereafter as Project and/or proposed Project). The Project is located on the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella, Riverside County, California (Exhibits 1- 3), and is bounded along the west perimeter by lands within the City of Indio. The site encompasses 39.98 acres and is identified as Assessor's Parcel Number (APN) 612-260-010. Single-family residential land uses occur to the north, south and west of the Project site. Across Calhoun Street on the east side, there is vacant lot of a similar size to the proposed Project. The new residential neighborhood to the west occurs in the City of Indio.

Throughout much of the 20th century, the Project site and surrounding lands were under agricultural use, with the Project site serving as a date grove. As the population has grown along with the need to diversify the economy, the City has transitioned certain agricultural areas to other uses and has established 17 Subareas to guide future planning. The Project site is located in the City's Subarea 1, West Coachella Neighborhoods, where the current land use designations include General Neighborhood and Suburban Neighborhood.[1] The site has been partially cleared, although many date palms remain scattered throughout 75% of the parcel while the northeast corner of the parcel is graded and barren.

Project Description

The Project site currently has a land use and zoning designation of "General Neighborhood" in the City's General Plan 2035 Update (General Plan) which allows for single- and multi-family residences. Multi-family residences are to be constructed in a "house-form" such as duplexes, rowhouses, and garden apartments. Residential neighborhoods encourage small blocks, parks and green spaces, and walkability or short drives to services such as schools and shopping. Between 7 and 25 dwelling units per acre are permitted in General Neighborhood areas.[2] The applicant proposes a PUD that would permit flexible standards for smaller lot sizes and a higher density for a private gated community. The PUD requires the completion of a conditional use permit (CUP), which will establish the land use regulations and minimum development standards for the development, to be approved by the City's Planning Commission.

The gross acreage for the Project parcel is 39.98 acres. With 1.21 acres of right of way dedications, the net parcel area is 38.77 acres. The applicant proposes to subdivide the Project site for a future build out of a private, gated residential community containing 257 single-family homes and a public park with a total area of 3.53 acres – 3.13 acres for recreational open space and a 0.40-acre landscaped retention basin.

The residential use consists of 144 lots each encompassing a minimum of 3,400 sf, and 113 lots each encompassing a minimum of 4,050 sf. The lots will be eligible for Accessory Dwelling Units (ADU) and Junior Dwelling Units (JADU).

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1 City of Coachella General Plan Update 2035, Land use and Community Character, updated April 2015.

2 City of Coachella General Plan Update 2035, Land Use, Compatible Uses and Designations, Table 4-1, General Plan Designations Summary, updated April 2015.

The Architectural style of the homes will be determined through an architectural review application at a later date. This Initial Study assumes that the houses proposed will conform to the minimum standards established in the Project PUD.

The 3.13-acre recreational area of the park includes a tot lot, basketball court, ramadas with picnic tables, a turf grass area, and a small parking lot. Connected to the south side of the park is a 0.40-acre retention basin that is partially landscaped with turf grass for recreational use and encircled by a decomposed granite trail. The public can access the park from Calhoun Street by either entering the parking lot at the north end or the trail at the south end. A security fence surrounding the park will prevent public access to the residential section of the Project.

Two vehicular access points include one located on the north side from Avenue 49 and one on the east side from Calhoun Street. The proposed Project would include right-of-way allowances for future road improvements. Currently, Avenue 49 east of Calhoun is designated as a Primary Arterial, but west of Calhoun to Jackson Street Avenue 49 is an unimproved path. For 1,300 linear feet from Calhoun Street to the Project's northwest corner, the applicant proposes 84-foot-wide full-street improvements including curbs, gutters, and sidewalks on both sides. At buildout, Avenue 49 street improvements would include 46 feet of travel lanes with curbs and gutters, six-foot sidewalks on both sides, and a 26-foot-wide landscaped area along the Project site Avenue 49 frontage.

Along 1,300 linear feet of Calhoun Street from the intersection of Avenue 49 to the southeast corner of the Project, the applicant proposes half-width improvements consisting of new pavement, curb, gutter, undergrounding of existing overhead utilities, new streetlights, a six-foot-wide sidewalk, and a 26-foot-wide landscape setback along the Project site frontage. Exhibits 4a and 4b show the Tentative Tract Map No. 39051 and Exhibits 5a – 5d provide the Conceptual Landscape Plan for the development. Full details of the street improvements are discussed in the Section XVII Transportation.

Four retention basins will accept all on-site flows from a 100-year storm event. A fifth basin located at the northwest corner of the Project would accept off-site flows from Avenue 49. The basins will be landscaped to maintain openness and reduce visual massing of the development.

Table 1-1
Project Information

Total Project Area	39.98 ac (gross) 38.77 (net), 1,688,821 sf
Residential Lots	257 lots
144 lots	40 ft wide (3,600 sf)
113 lots	45 ft wide (4,050 sf)
Landscaped Common Areas	
Public Park	3.13 ac (136,343 sf includes parking lot)
Five Retention Basins	2.82 ac (122,839 sf)

Utilities and Service Providers

The following agencies and companies will provide service to the project site:

1. Sanitary Sewer: Coachella Water Authority and Sanitary District
2. Water: Coachella Water Authority and Sanitary District
3. Electricity: Imperial Irrigation District (IID)
4. Gas: Southern California Gas Company
5. Telephone: AT&T, MCI, SBC, Frontier, Sprint
6. Trash Disposal: Burrtec Waste and Recycling Services

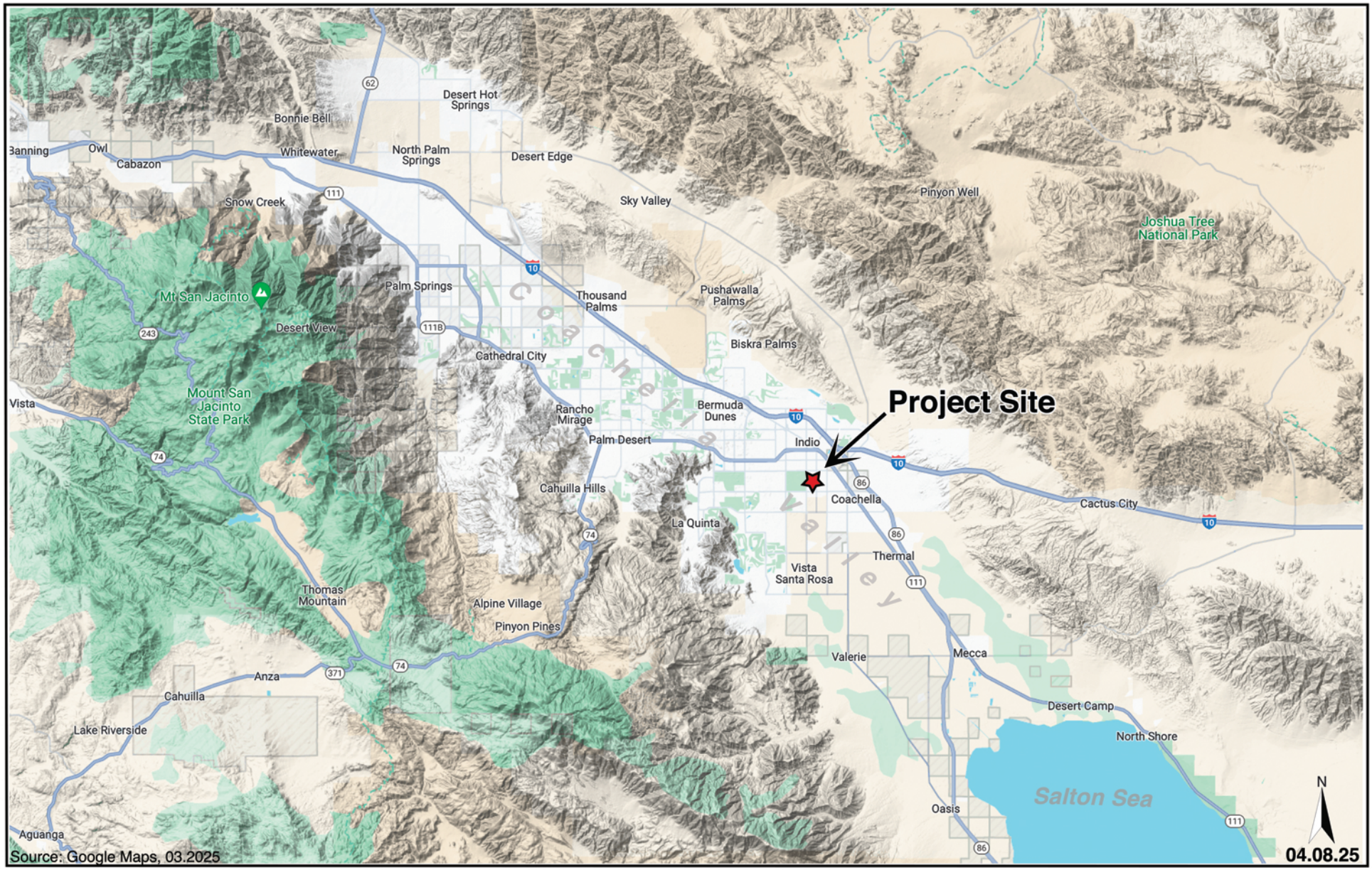
Existing facilities for these utilities occur adjacent to the Project site as there are developed neighborhoods north and south of the parcel. Extensions from the Project site to these facilities would be constructed in existing, disturbed rights-of-way and therefore would not impact the native environment.

Surrounding Land Uses:

North: Avenue 49 (unimproved), Suburban Neighborhood – single-family residences
South: Suburban Neighborhood – single-family residences
East: Suburban Neighborhood – vacant lot
West: City of Indio, Suburban Neighborhood – single-family residences

Other public agencies whose approval is required.

None.



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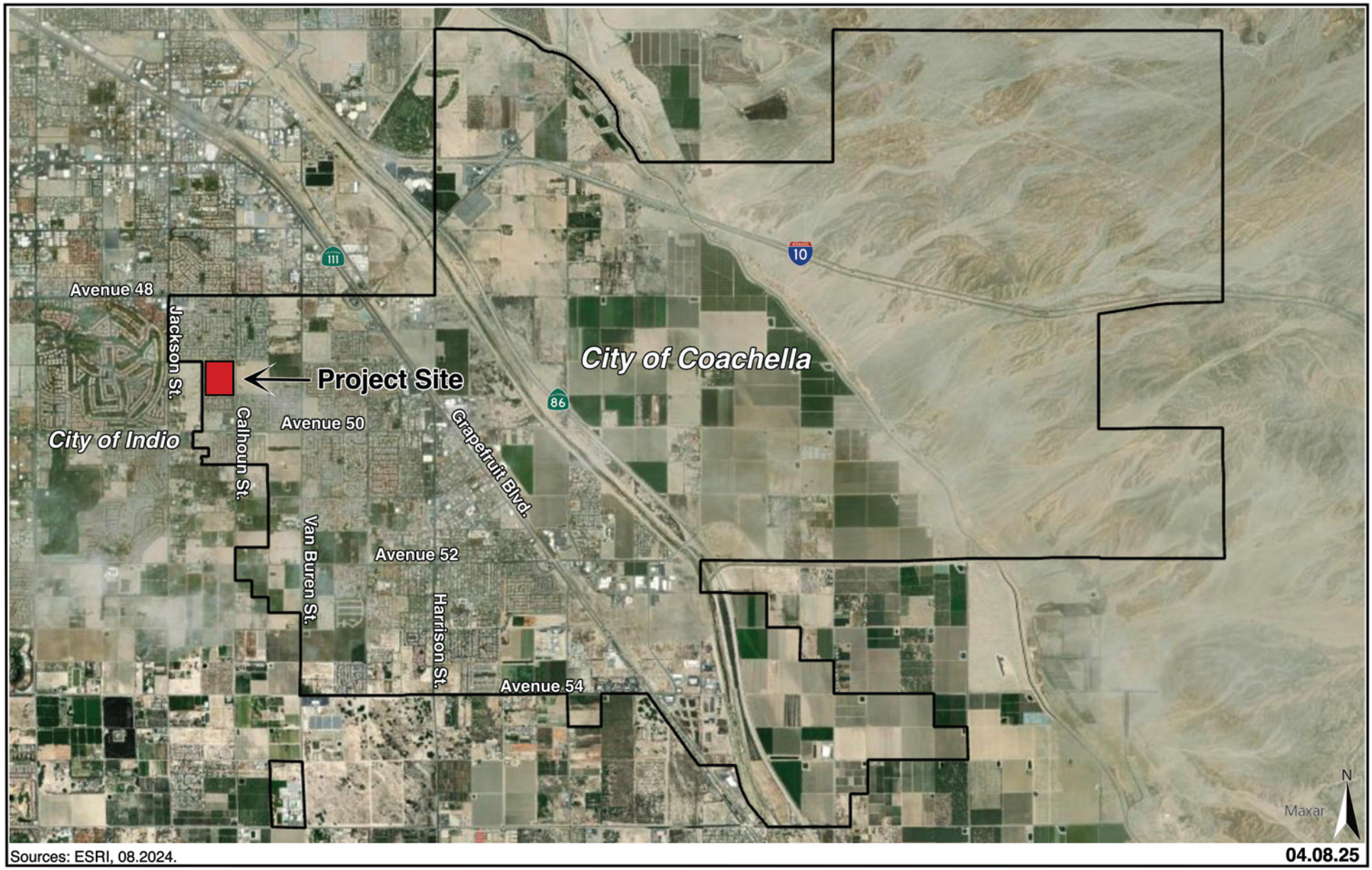
Regional Location Map
Calhoun Street Housing Development
Coachella, California

Exhibit
1



Sources: ESRI, 08.2024.

04.08.25

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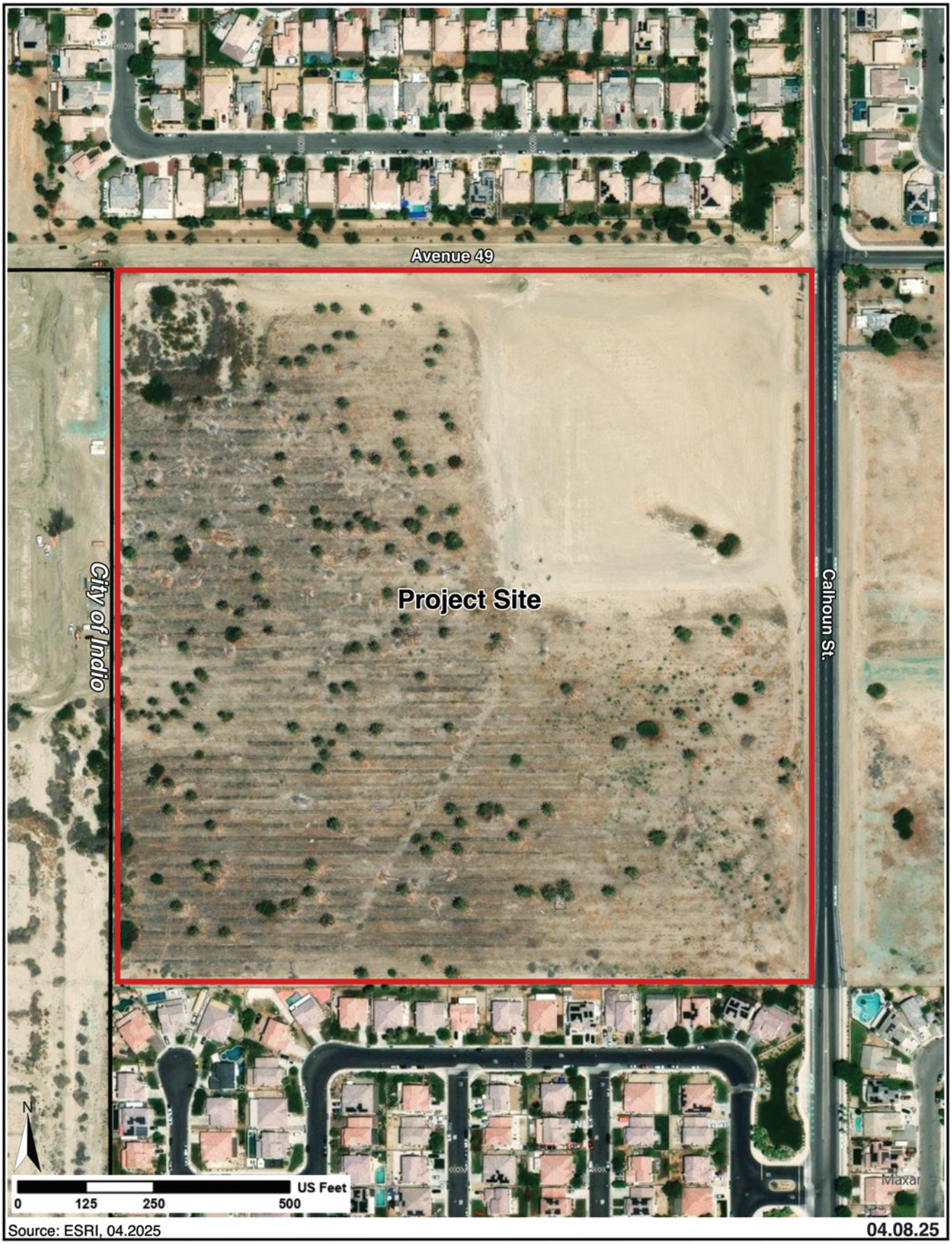
Project Vicinity Map
Calhoun Street Housing Development
Coachella, California

Exhibit
2



Source: ESRI, 04.2025

04.08.25

Project Location Map
Calhoun Street Housing Development
Coachella, California

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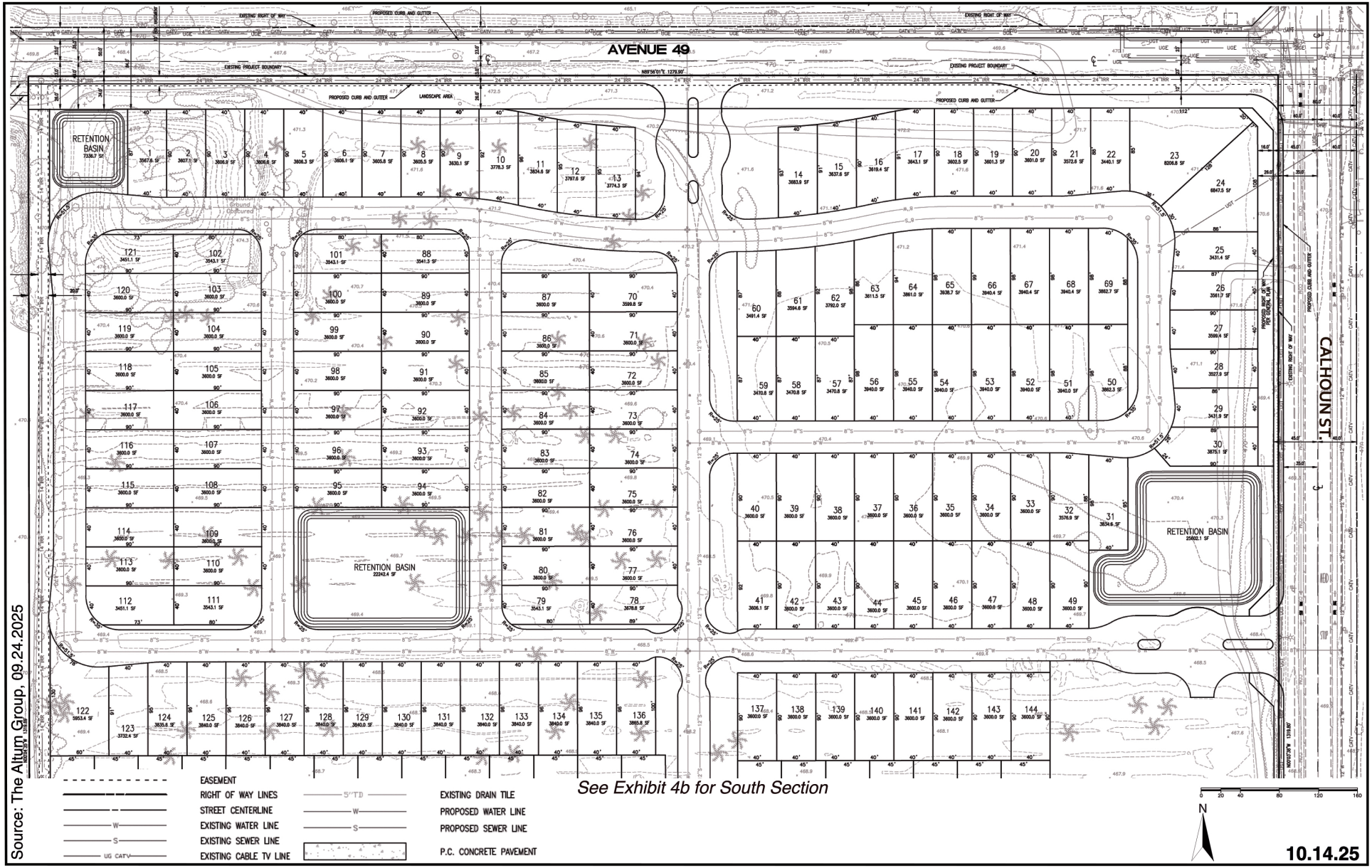
Exhibit

3



Source: The Altum Group, 09.24.2025

10.14.25

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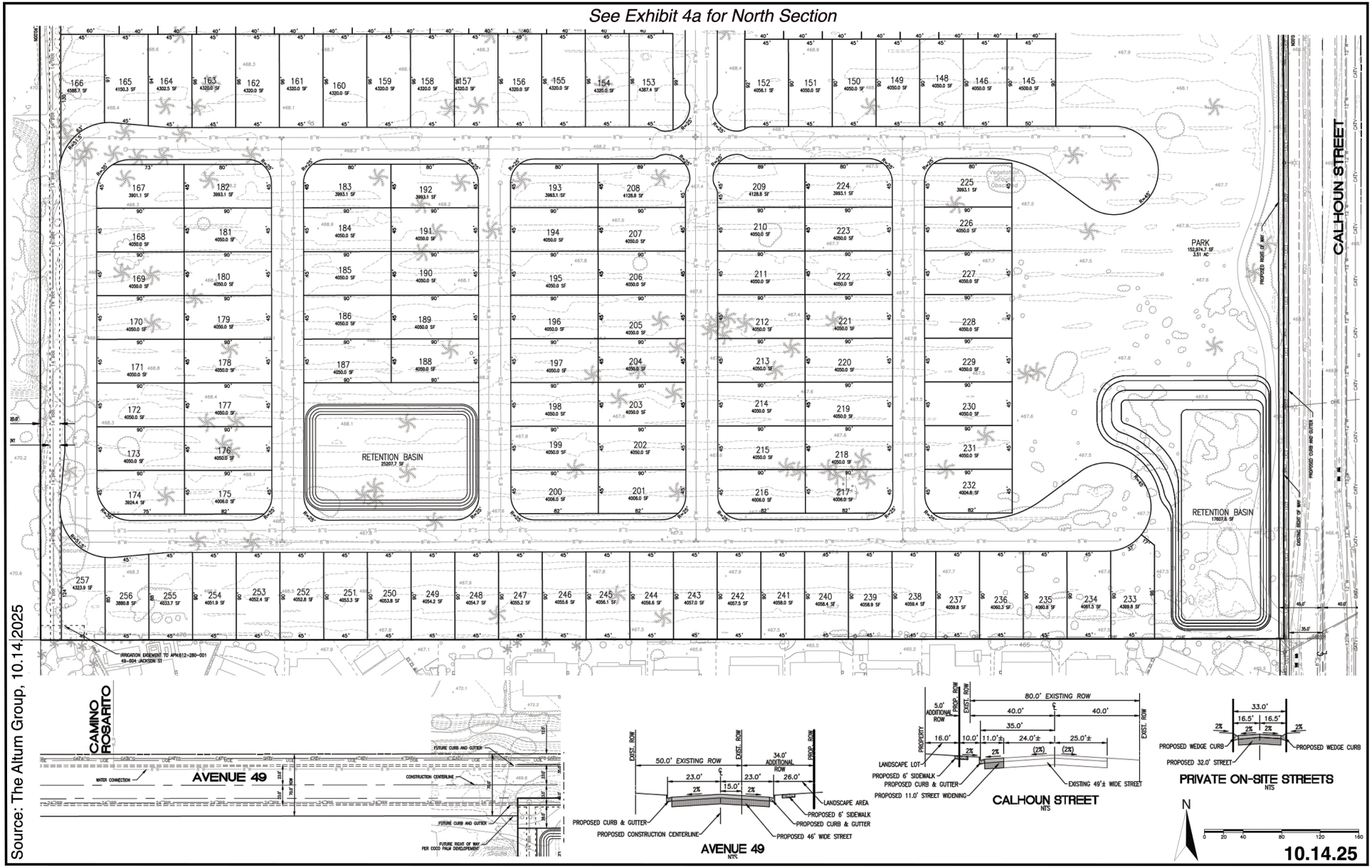
Tentative Tract Map No. 39051 - North Section
Calhoun Street Housing Development
Coachella, California

Exhibit
4a



Source: The Altum Group, 10.14.2025

TERRA NOVA®
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Tentative Tract Map No. 39051 - South Section
Calhoun Street Housing Development
Coachella, California

Exhibit
4b

Source: Russell MacDonald, RLA, 10.01.2025

- Neltuma odorata — Honey Mesquite
- Parkinsonia floridum — Blue Palo Verde
- Chilopsis linearis — Desert Willow
- Phoenix dactylifera — Date Palm
- Larrea tridentata — Creosote
- Caesalpinia pulcherrima — Red Bird of Paradise
- Encilia farinosa — Chuparosa
- Justicia californica — Chuparosa
- Simmondsia chinensis — Jojoba
- Lantana x. 'New Gold' — New Gold Lantana
- Fouquieria splendens — Ocotillo
- Hesperaloe parviflora — Red Yucca
- Agave americana — Century Plant
- Calliandra haematocephala — Pink Powder Puff
- Bougainvillea 'Barbara Karst' — Barbara Karst Bougainvillea

NOTES:

ALL PLANTS TO RECEIVE DRIP IRRIGATION.

IRRIGATION SHALL BE DESIGNED IN ACCORDANCE WITH CVWD REQUIREMENTS.

ALL RETENTION AREA WATER SPILLWAY COBBLE TO BE 4"-8" "COPPER CANYON".

ALL PLANTING AREAS TO BE 3/4" GRAVEL 'COPPER CANYON'.

1/4" DECOMPOSED GRANITE ON PARK TRAIL ONLY SEE PARK ENLARGEMENT PLAN.

N

10.14.25

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Conceptual Landscape Plan - North Section
Calhoun Street Housing Development
Coachella, California

Exhibit

5a

See Exhibit 5a for North Section

Neltuma odorata
Honey Mesquite

Parkinsonia floridum
Blue Palo Verde

Chilopsis linearis
Desert Willow

Phoenix dactylifera
Date Palm

Larrea tridentata
Creosote

Caesalpinia pulcherrima
Red Bird of Paradise

Encilia farinosa
Chuparosa

Justicia californica
Chuparosa

Simmondsia chinensis
Jojoba

Lantana x. 'New Gold'
New Gold Lantana

Fouquieria splendens
Ocotillo

Hesperaloe parviflora
Red Yucca

Agave americana
Century Plant

Calliandra haematocephala
Pink Powder Puff

Bougainvillea 'Barbara Karst'
Barbara Karst Bougainvillea

NOTES:

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1/4" DECOMPOSED GRANITE ON PARK TRAIL ONLY SEE PARK ENLARGEMENT PLAN.

N

Source: Russell MacDonald, RLA, 10.01.2025

10.14.25

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Conceptual Landscape Plan - South Section
Calhoun Street Housing Development
Coachella, California

Exhibit

5b

RAMADAS / CLASSIC RECREATION SYSTEMS /MESA MODEL

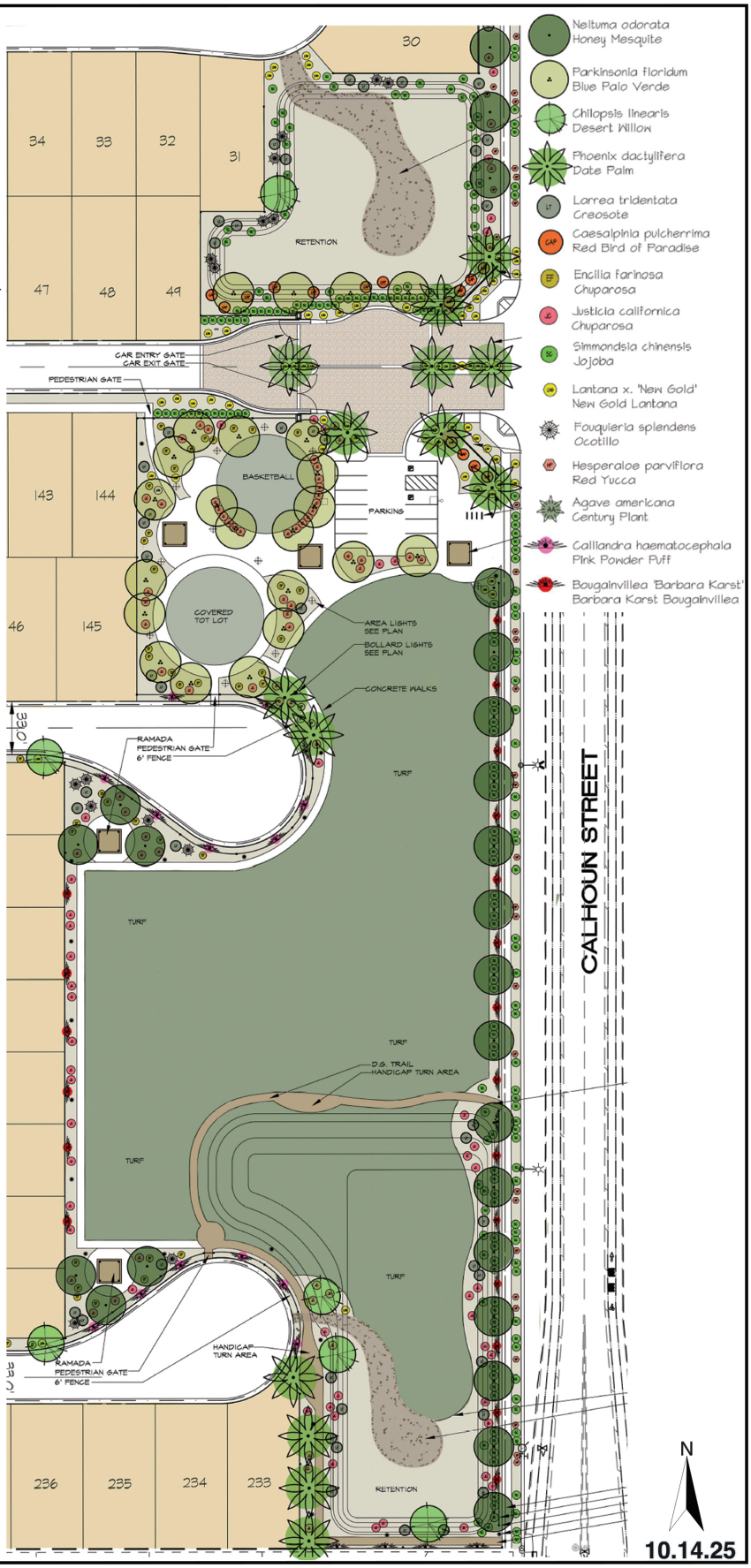
TOT LOT / WILLYGOAT /
GRANITE MOUNTAIN PLAY SYSTEM / QTY 1

RAMADA PINIC TABLES / GLOBAL INDUSTRIAL 6'
MODEL #WB694553GN / QTY 5

BIKE RACKS / MONMADE / A2 TRANSITION BIKE RACK

CONCRETE AREA AROUND TOT LOT AND RAMADAS
BROOM FINISH WITH ALTERNATING PANELS

HALF COURT BASKETBALL



Source: Russell MacDonald, RLA, 10.01.2025

10.14.25

Exhibit

5c

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Conceptual Landscape Plan - Park
Calhoun Street Housing Development
Coachella, California

HONEY MESQUITE

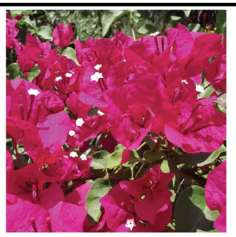
BLUE PALO VERDE

DESERT WILLOW

DATE PALM

CENTURY PLANT

PINK POWDER PUFF



BOUGAINVILLEA

CREOSOTE

RED BIRD OF PARADISE

BRITTLEBUSH

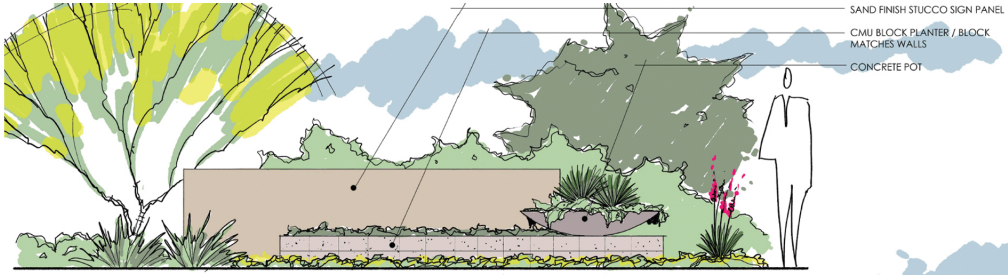
CHUPAROSA

JOJOBA

YELLOW LANTANA

OCOTILLO

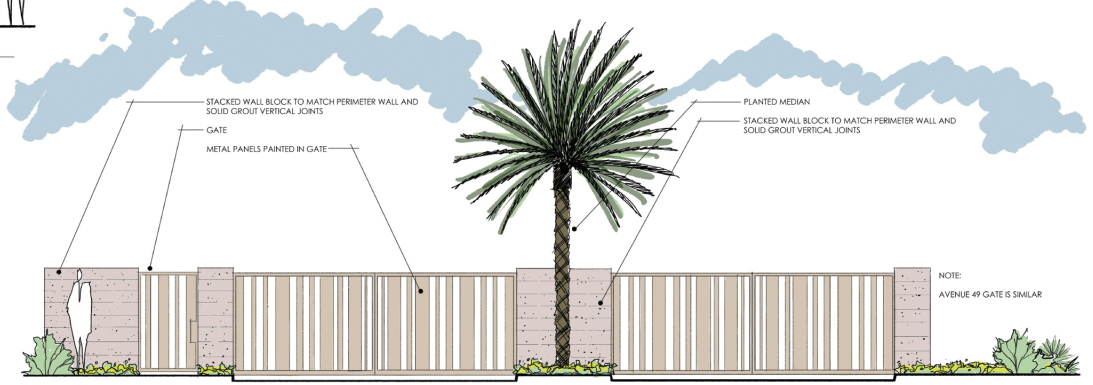
RED YUCCA



ENTRY SIGN PANELS

SW BOULDER / 'COPPER CANYON / 4"-8" and 1"-3"

SW BOULDER / 'CALIFORNIA GOLD' FINES
PARK TRAIL TO HAVE SAME AND COMPACTED



CALHOUN ENTRY GATE

Source: Russell MacDonald, RLA, 10.01.2025

10.14.25

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Conceptual Landscape Plan - Plants & Conceptual Entry Design
Calhoun Street Housing Development
Coachella, California

Exhibit
5d

Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agricultural and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology/ Soils	☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials
☐ Hydrology/ Water Quality	☐ Land Use/ Planning	☐ Mineral Resources
☐ Noise	☐ Population/ Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities/ Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

CHAPTER 2: ENVIRONMENTAL ANALYSIS AND DETERMINATION

DETERMINATION: The City of Coachella Planning Department finds

On the basis of this initial evaluation: Adjust check box as appropriate

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

■ I find that although the proposed project could have a significant effect on the environment there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Adrian Moreno
Associate Planner
City of Coachella

Date

PURPOSE OF THIS INITIAL STUDY

This Initial Study has been prepared consistent with CEQA Guidelines Section 15063, to determine if the project, as proposed, may have a significant effect upon the environment. Based upon the findings contained within this report, the Initial Study will be used in support of the preparation of a Mitigated Negative Declaration.

EVALUATION OF ENVIRONMENTAL IMPACTS

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

    a) Earlier Analysis Used. Identify and state where they are available for review.
    b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures, which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:
    a) The significance criteria or threshold, if any, used to evaluate each question; and
    b) The mitigation measure identified, if any, to reduce the impacts to less than significance.

I. AESTHETICS Except as provided in Public Resources Code Section 21099, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?			✓	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				✓
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			✓	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			✓	

Environmental Setting

The City of Coachella lies in the low desert region of central Riverside County at the eastern end of the Coachella Valley. The City sits sixty-eight feet below sea level in a geographic feature known as the Salton Basin. Mountain ranges surrounding the Coachella Valley include the San Jacinto and Santa Rosa Mountains to the west and southwest with the highest peaks from 8,000 feet to over 10,800 feet; and the Little San Bernardino Mountains, including Joshua Tree National Park, along the northeast boundary with peaks ranging from 5,000 feet to over 11,000 feet. The Salton Sea, California's largest inland body of water, lies in the Salton Basin just south of the City. Major transportation corridors such as the I-10 freeway, State Highway 86S and Highway 111 connect the City of Coachella to nearby cities and communities. The City is undergoing a transition from a primarily agricultural-based economy to a medium-sized city that hosts an array of commercial and retail services, industrial activity, and residential neighborhoods all surrounded by productive agricultural lands.

The Project site is located in the City's General Plan Subarea 1, West Coachella Neighborhoods, which is a region of the City that has been transitioning from agricultural use to residential use. Residential subdivisions and vacant lots are interspersed with active agricultural parcels, as is the case immediately surrounding the Project site. To the north, west and south of the Project site are single-family neighborhoods. The new Dolfina residential project abutting the west side is located in the City of Indio, and is nearing the end of construction. Finally, on the east side of Calhoun Street

there is a vacant lot of a similar size to the Project site, which is also surrounded by single-family residential uses and a date palm grove.

The Project site had previously been the site of a date palm grove as evidenced by the remnant date palms remaining on the property along with scattered ruderal vegetation. The northeast corner has been and graded and cleared of all vegetation. Ultimately, build out of the project site will result in a single-family residential development consisting of 257 homes, common landscaped areas, and a 3.13-acre park. The Aesthetic impacts of the project are discussed in the following paragraphs.

Discussion of Impacts

a) Less Than Significant Impact. From the Project site, the lower foothills of the Santa Rosa Mountains to the southwest are approximately 5.5 miles away, and the lower foothills of the Little San Bernardino Mountains are about 9 miles to the northeast. Views of these mountain vistas are currently partially obstructed by existing development. From a distance, viewers on the site can see the middle and upper slopes of both ranges over the rooftops of the surrounding homes and nearby date palm groves, however, at close range, the homes and sound walls block these scenic vistas.

The General Neighborhood land use designation for the Project site allows for single- and two-story homes with heights not to exceed 17 and 35 feet respectively, as does the Suburban Neighborhood land use encircling the Project site. Three-story residential structures are permitted in Neighborhood Center land uses and cannot exceed 45 feet.[3] At buildout, the Project's footprint would align with neighboring residential standards in height, structure, and design. As described above, from a distance, the southwestward facing views of the Santa Rosa Mountains from north and east of the subject property would be partially impeded where viewers would retain sight of the middle to upper slopes, but the lower foothills would be obstructed. Similarly, northeast views of the lower foothills of the Little San Bernardino Mountains from south and west of the subject property would be obstructed, but viewers south of the Project site would still be able to see the upper slopes. Views directly to the south and to the east would not be affected, since the Project would be behind these viewsheds. The City's height restrictions for single-family homes would restrict the impacts to scenic vistas so that scenic vistas would not be completely blocked by viewers from a distance.

The Project's potential impacts to scenic vistas are in line with viewshed impediments from existing neighboring development. Scenic vistas of the Santa Rosa Mountains to the southwest and of the Little San Bernardino Mountains to the northeast would be partially obstructed by the Project, but not completely removed, therefore the impacts to scenic vistas would be less than significant.

b) No Impact. The proposed site is not located along a state scenic highway and does not contain any scenic resources, including trees, rock outcroppings or historic buildings. No impact to these resources will occur.

c) Less Than Significant Impact. The Project is planned within an area of the City that has been undergoing a transition from agricultural use to residential use, and the current Zoning designation for the Project parcel is General Neighborhood, while surrounding properties are designated as Suburban Neighborhood zoning. The future buildout, including 257 single-family

[3] Property and Development Standards, Coachella Municipal Code §17.13.030 and 17.14.030, June 26, 2024.

residences with landscaped drainage areas, and a 3.13-acre park are consistent with the City's zoning designations for this parcel and the surrounding parcels. Buildings, landscaping, pathways, streets, and sounding walls will align with City development standards, as modified by the PUD, that include appropriate setbacks, drought-tolerant landscaping, and elevated design elements which will assimilate with existing residential development.

Proposed street improvements for the quarter-mile extents along Calhoun Street and Avenue 49 will improve existing conditions, and add parkway landscaping to the viewshed

The Project would comply with the City's residential development standards and would not conflict with the scenic quality of nearby residential neighborhoods. Impacts to the visual character of the surrounding environment would be less than significant.

d) Less than Significant Impact. The gradual transition from agricultural use to residential use in this Subarea of the City has resulted in an overall increase in nighttime light from sources such as interior home lighting emitting from windows, exterior home security lighting, landscape lighting, automobile headlights, and street lighting.

Construction-Related Impacts
Construction activities would occur during the day and there would be no need to apply nighttime security lighting on the Project site. Construction activities would not introduce new sources of light or glare.

Operational-Related Impacts
While the subject property currently contains no light sources, the Project buildout would introduce additional sources of nighttime light from security lighting, landscape and pathway lighting, street lighting, and interior home lighting seen from windows. Daytime glare may also be expected from windows. However, the Project's sources of lighting and glare would be consistent with and not exceed light and glare emissions from existing nearby development. The Project would adhere to the City's lighting requirements and would not produce light and glare upward into the sky. Project impacts from additional sources of light and glare would be less than significant.

Mitigation Measures: None required.

Monitoring: None required.

Sources: City of Coachella General Plan 2035 Update; Coachella Municipal Code, June 2024.

II. AGRICULTURAL AND FORESTRY RESOURCES				
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				✓
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				✓
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				✓
d) Result in the loss of forest land or conversion of forest land to non-forest use?				✓
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				✓

Environmental Setting

Agriculture lies at the heart of Coachella's historic identity and will continue to be a contributor to the local economy far into the future. As the City grows, certain agricultural areas have been protected from future development while other areas have been converted to residential, commercial and industrial uses. Today, the protected agricultural designations, Agricultural Rancho and Rural Rancho, are found outside the City limits in the City's eastern sphere of influence. The Project site has been designated as a General Neighborhood land use and zone, and sits within the City's Subarea 1, West Coachella Neighborhoods, an area on the west side that has gradually been converted from agricultural use to residential use. Impacts to agricultural resources are discussed here.

Discussion of Impacts

a-e) No Impact.
Conversion of Farmland:
According to Google Earth Imagery, the subject property had been graded and unused between 1985 and 2002. By 2002, rows of date palms had been planted on 75% of the site, with the northeast corner remaining barren. By 2019, irrigation and cultivation of the palms appear to have ceased, leaving leftover palms dispersed across the parcel. This change of land use on the Project site is consistent with the City's economic expansion and the transition of certain agricultural lands to residential, commercial and industrial uses.

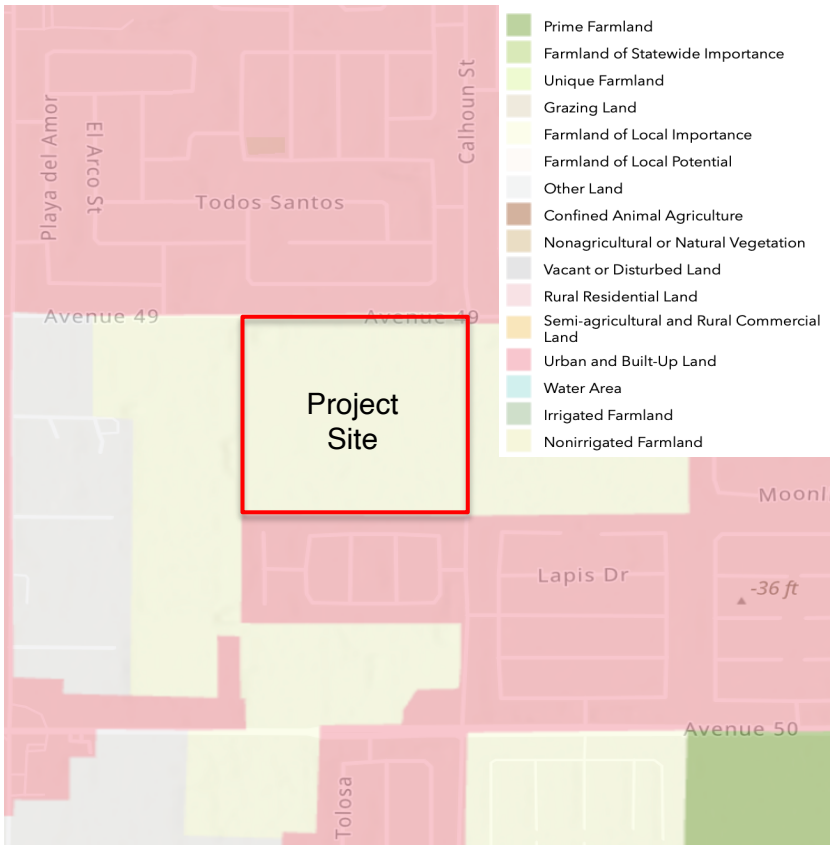


Figure II-1 California Important Farmland Finder, California Department of Conservation, accessed July 2024.

The California Important Farmland Finder identifies the Project site as Farmland of Local Importance, which the County of Riverside classifies as an area that would be Prime or Statewide Important Farmland, but lacks irrigation water, and also as an area that produces major crops, but not Unique crops. The vacant lots to west and east of the Project site are also classified as Farmland of Local Importance, and lands north and south of the subject site are classified as Urban and Built-Up Land. Figure II-1 shows the Project site on the California Important Farmland Finder in relation to adjacent properties. The Project would not impact the ability to cultivate crops on neighboring parcels, nor would the Project convert any Prime, Unique or Statewide Important farmland to non-agricultural use.

Williamson Act: As previously stated, the Project site is zoned for single-family residential development under the General Neighborhood zoning designation and is not under a Williamson Act contract. Therefore, the proposed development would not conflict with any agricultural designation. No impact is anticipated.

Timberland Production:
Neither the General Plan nor the Zoning map for the City of Coachella includes any Forestry or Forest Production designations. The City is located 68 feet below sea level in an arid desert region that does not support the growth of forests, and as such, there would be no conversion of timberland zones.

Loss of Forest:
Again, the City has no Forestry or Forest Production designations or areas. Therefore, the Project would not impact or cause the loss of any forest lands.

Other Changes in the Existing Environment:
Buildout of the Project includes 257 homes and street improvements to Avenue 49 on the north and Calhoun Street on the east which would not impact neighboring uses or cause any conversion of agricultural activity in the vicinity. No additional impacts to the existing environment would result to nearby agricultural uses.

Mitigation Measures: None required.

Monitoring: None required.

Sources:
City of Coachella General Plan 2035 Update

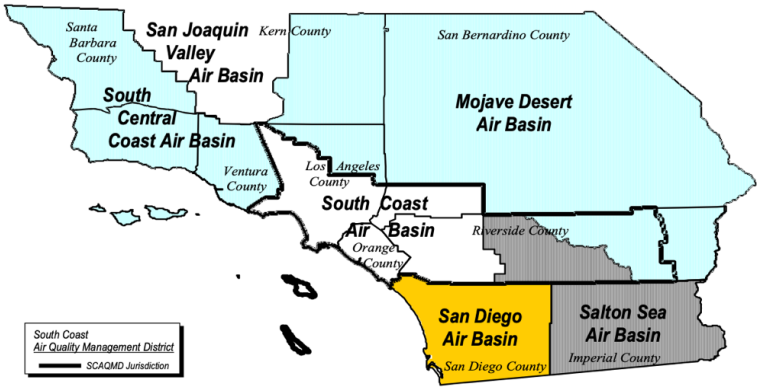
City of Coachella Zoning Map

California Department of Conservation Farmland Mapping and Monitoring Program

III. AIR QUALITY				
Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?				✓
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?			✓	
c) Expose sensitive receptors to substantial pollutant concentrations?			✓	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			✓	

Environmental Setting

The state of California is divided into fifteen air basins, each defined by local topography, climate, and regional air quality issues. The City of Coachella lies within the Coachella Valley Planning Area, which is an air quality management district (AQMD) subregion within the topographic boundary of the Salton Sea Air Basin (SSAB). The SSAB encompasses all Imperial County and the central portion of Riverside County, where the Coachella Valley and the City lie.



Source: South Coast Air Quality Management District, Draft Final 2022

In the State of California, there are 35 air quality regulatory agencies that establish emission thresholds and monitor air quality the air basins. The South Coast Air Quality Management District (SCAQMD) is the regulatory agency that controls and monitors emissions from stationary sources within most of Riverside County, portions of San Bernardino County and Los Angeles County, and all of Orange County. The SCAQMD monitors emissions via 37 permanent monitoring stations, conducts inspections, and drafts air quality management plans to guide governments and businesses in reducing emissions. The Coachella Valley Planning Area is subject to the 2022 SCAQMD Air Quality

Management Plan. Three local monitoring stations in Palm Springs, Indio, and Mecca provide daily and annual emissions data throughout the Coachella Valley.

Ambient air quality standards (AAQS) are a set of emissions thresholds that are designed to protect human health and environmental factors. An ambient air quality standard specifies the maximum amount of a pollutant that can be present in the air during a specific period of time and not cause harmful effects on the most sensitive members of the community and natural resources. If that pollutant's concentration in the air is at or below the threshold, then the area is said to be in attainment, while non-attainment areas experience pollution levels above the AAQS thresholds.

According to the Environmental Protection Agency, the Coachella Valley Planning Area is classified as a nonattainment zone for ozone (O_3) and particulate matter (PM_{10}). Ozone pollution in the Coachella Valley Planning Area can be traced primarily to the flow of photochemical smog contaminants from the South Coast Air Basin to the west. High levels of PM_{10} pollution result from the arid environment, the ubiquitous presence of sand and dust combined with agricultural activity which is concentrated in the southeastern end of the Coachella Valley where the City of Coachella resides. Due to the nonattainment status, the Coachella Valley Planning Area is subject to the 2003 Coachella Valley PM_{10} State Implementation Plan (CV PM_{10} SIP), in order to bring the Planning Area into compliance with the National Ambient Air Quality Standards (NAAQS) PM_{10} threshold.

Ambient air quality standards for the SCAQMD are subject to federal guidelines known as National Ambient Air Quality Standards (NAAQS), as well as state guidelines referred to as California Ambient Air Quality Standards (CAAQS). Each set of AAQS focuses on certain criteria pollutants which together include the following list of pollutants. Table III-1 explains properties of each criteria pollutant.

Table III-1
Ambient Air Quality Criteria Pollutants and Health Impacts

Criteria Pollutant	Emissions Sources	Health Effects
Oxides of Nitrogen (NO_x)	A yellow-brown colored gas that forms when nitric oxide, emitted primarily from burning of petroleum gas, combines with atmospheric oxygen.	- Lung damage - Breathing difficulties
Reactive/Volatile Organic Compounds (ROG/VOC)	Primary pollutants that form secondary pollutants such as Ozone, or photochemical smog, when they react with ultraviolet sunlight in the atmosphere.	- Eye, nose and throat irritation - Headaches - Dizziness, fatigue - Allergic skin reaction
Ozone (O_3)	A secondary pollutant resulting from hydrocarbons and oxides of nitrogen, emitted by cars, solvents, factories and pesticides, reacting in the presence of sunlight.	- Difficulty breathing, chest pains, aggravate lung diseases such as asthma, emphysema, and chronic bronchitis. - Shortness of breath, coughing, and lung damage with prolonged and chronic exposure.

Table III-1
Ambient Air Quality Criteria Pollutants and Health Impacts

Criteria Pollutant	Emissions Sources	Health Effects
Particulate Matter (PM_{10}) and Fine Particulate Matter ($PM_{2.5}$)	Fugitive dust particles with a width of 10 microns down to 2.5 microns. Emitted from construction activity, vehicles driving on unpaved roads, industrial smokestacks, wildfires. Particles may occur as liquids or solids.	- Cause damage to the respiratory system. - Aggravate respiratory illnesses. - Symptoms: Coughing, asthma, heart attacks, premature death.
Oxides of Sulfur (SO_x)	Colorless and pungent gas emitted from coal and oil power plants, refineries, and diesel engines.	- Irritates eyes, nose, and airways. - Causes shortness of breath, tightness of chest. - Asthma patients are at high risk of developing more severe issues.
Carbon Monoxide (CO)	Colorless and odorless gas emitted from the incomplete combustion of all fossil fuels including oil, coal, and natural gas.	- Interrupts the delivery of oxygen to the brain. - Causes dizziness, headaches, and nausea.
Lead (Pb)	Emitted from metals processing facilities, combustion of leaded fuel, manufacturing of lead-acid batteries.	- Damages the nervous system, and kidneys. - Interferes with developmental and reproductive systems.
Hydrogen Sulfide (H_2S)	A rotten egg-smelling gas emitted from geothermal power plants, petroleum production, and sewage treatment plants.	- Causes headaches and skin irritation. - Damages the respiratory system.

Sources: South Coast AQMD CEQA Handbook (1993), updated March 2023; SCAQMD Final 2022 Air Quality Management Plan, Appendix 1: Health Effects (2022)

Table III-2 below provides the maximum daily emissions thresholds for a project's construction and operation per the SCAQMD CEQA Handbook.

Table III-2
South Coast AQMD Air Quality Significance Thresholds

Criteria Pollutant	Construction	Operation
Oxides of Nitrogen (NO_x)	100 lbs/day	55 lbs/day
Reactive/Volatile Organic Compounds (ROG/VOC)	75 lbs/day	55 lbs/day
Particulate Matter (PM_{10})	150 lbs/day	150 lbs/day
Fine Particulate Matter ($PM_{2.5}$)	55 lbs/day	55 lbs/day
Oxides of Sulfur (SO_x)	150 lbs/day	150 lbs/day
Carbon Monoxide (CO)	550 lbs/day	550 lbs/day
Lead (Pb)	3 lbs/day	3 lbs/day

Source: South Coast AQMD CEQA Handbook (1993), updated March 2023

Forecast modeling of construction and operational emissions for the Project was calculated using the California Emissions Estimator Model (CalEEMod) Version 2022.1, a modeling software application used in quantifying emissions associated with land development projects in California. The model calculates criteria pollutant emissions, including CO, PM_{10}, $PM_{2.5}$ and the ozone precursors ROG and NO_x, in addition to greenhouse gas equivalent emissions.

A CalEEMod analysis was conducted in November 2025 and was based on the most recent Project site plan which included 257 units on a net area of 37.28 acres, a 3.53-acre park with retention basin, common landscaped areas, four additional landscaped retention basins, asphalt streets, and 2,517 daily trips. CalEEMod accounts for landscaping and driveway hardscape for residences. Table III-3 provides a summary of the Project's land use data that was applied to the model. The detailed CalEEMod report for the Project is available in Appendix A.

Table III-3
Project Land Use Assumptions for CalEEMod

Project Land Use	Area Data
Total Project Area	39.98 ac (gross) 37.28 ac (net), 1,623,916.8 sf
Residential Lots	257 lots, 976,050 sf
Landscaped Areas (Park + Retention Basins)	5.95 acres 259,182 sf
Hardscape (Streets + Parking Lot)	397,247 sf (390,048 sf + 7200 sf)
Daily Trips[1]	2,517

1. Daily Residential Trips are based on the ITE Land Use Code 223. See Calhoun Street Traffic Analysis prepared by Urban Crossroads, September 6, 2024.

Discussion of Impacts

a) No Impact. A project's impacts on air quality would be significant if the project does not conform to, or if it obstructs, an applicable Air Quality Management Plan. Within the Coachella Valley Planning Area, projects are subject to the 2022 SCAQMD Air Quality Management Plan (AQMP). SCAQMD works closely with local governments and actively cooperates with federal and state agencies to establish pollution emissions thresholds and guidelines for controlling emissions. The 2022 SCAQMD AQMP defines strategies to control and reduce air pollution emissions from stationary and mobile sources. The 2022 AQMD was prepared with cooperation between SCAQMD, the California Air Resources Board (CARB) and the Southern California Association of Governments (SCAG) and is based in part on regional land use planning, population growth forecasting, and transportation modeling. In conformance with SB 375, SCAG prepares a Regional Transportation Plan/Sustainable Communities Strategy every four years to analyze regional development patterns and integrate policies and programs to reduce emissions. The most current report, Connect SoCal 2024, includes the most recent regional land use planning and forecast analyses, and projects that are consistent with these analyses are also consistent with the AQMP.

The City's land use and zoning designation for the Project site is "General Neighborhood," which permits single- and multi-family residential projects with densities between 7 and 25 units per acre. Residential neighborhoods encourage small blocks, parks and green spaces, and walkability or short drives to area services such as schools and shopping. The proposed subdivision conforms to these

land use requirements and is consistent with the City's General Plan. Furthermore, the proposed uses have been factored into SCAG's Connect SoCal 2024 report and the 2022 AQMP.

In conclusion, although the Proposed Project would result in air emissions, as discussed below, it would not conflict with or obstruct the implementation of an applicable air quality plan because its residential characteristics were included in the development of regional plans. No conflicts with or obstructions to the implementation of the applicable air quality plan are expected.

b) Less Than Significant Impact. The Project will have a significant impact if it causes a considerable net increase of any criteria pollutant for which the Coachella Valley Planning Area is in nonattainment per federal or state ambient air quality standards.

Currently, the Coachella Valley is designated as extreme nonattainment for the 2008 and 8-hour ozone standard, severe for the 2015 8-hour ozone standard, and serious for the 1987 PM_{10} standard.[4] In response to these designations the SCAQMD adopted a series of attainment plans beginning in 1987. The most current attainment plans are:

- Coachella Valley Attainment Plan for the 2008 8-Hour Ozone Standard, October 2024
- 2003 Coachella Valley PM_{10} State Implementation Plan

Construction Emissions:

For purposes of analysis, it is assumed that construction will occur over a three-year period with completion in early 2029. The construction period includes all aspects of project development, including site preparation, grading, building construction, paving, and application of architectural coatings. Applicable standard requirements and best management practices include, but are not limited to, the implementation of a dust control and management plan in conformance with SCQAMD Rule 403.1, proper maintenance and limited idling of heavy equipment, phased application of architectural coatings and the use of low-polluting architectural paint and coatings per SCAQMD Rule 1113.

As shown in Table III-4, given that criteria pollutant thresholds will not be exceeded, and standard best management practices will be applied during construction, impacts associated with air emissions during construction will be less than significant.

Table III-4
Maximum Daily Construction-Related Emissions (pounds per day)

Construction Emissions	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Daily Maximum[1]	71.4	29.3	29.7	0.07	9.15	5.14
SCAQMD Thresholds	75	100	550	150	150	55
Exceeds?	No	No	No	No	No	No

1. Standard dust control measures have been applied to the PM emissions.
2. All other emissions are maximum daily unmitigated estimates.

Source: South Coast AQMD CEQA Handbook (1993), updated March 2023.

[4] EPA Greenbook, California Nonattainment/Maintenance Status for Each County by Year, April 2025.

Operational Emissions:

Operational emissions are ongoing emissions that will occur over the life of the project. They include area source emissions, emissions from energy demand (electricity), and mobile source (vehicle) emissions. According to the September 2024 Traffic Analysis prepared for the Project (Appendix F), typical single-family detached units generate an average of 9.43 trips per day. The Traffic Analysis analyzed the potential for 259 units, marginally higher than the currently proposed Project, and determined that they would generate 2,442 daily trips. The public park could potentially generate up to 75 trips per day. Total daily trips would be 2,517. Table III-5 provides a summary of forecasted emissions during the operation of the Calhoun Street Housing Development. As shown below, operational emissions will not exceed daily SCAQMD thresholds of significance for any criteria pollutants for operations. Impacts related to operational emissions are expected to be less than significant.

Table III-5
Maximum Daily Operational-Related Emissions (pounds per day)

Operational Emissions	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Daily Maximum[1]	32.4	4.7	67.0	0.1	10.1	2.7
SCAQMD Thresholds	75	100	550	150	150	55
Exceeds?	No	No	No	No	No	No

1. Standard dust control measures have been applied to the PM emissions.
2. All other emissions are maximum daily unmitigated estimates.

Source: South Coast AQMD CEQA Handbook (1993), updated March 2023.

Cumulative Contribution: Non-Attainment Criteria Pollutants

If a project indirectly ushers in additional criteria pollution emissions by encouraging an increase in the number of vehicles traveling along a new roadway, for example, and thus causes a cumulative net increase in emissions, then the project may cause a significant cumulative impact. Given the dispersing nature of pollutant emissions and aggregate impacts from nearby jurisdictions, cumulative air quality is evaluated on a regional scale. As previously mentioned, the Coachella Valley Planning Area is a nonattainment zone for PM_{10} and ozone. Any development resulting in emissions of PM_{10}, ozone, or ozone precursors will, to some extent, contribute to the existing regional non-attainment.

The SCAQMD does not currently provide thresholds of significance for the cumulative emissions of multiple projects. A project's potential cumulative contributions can instead be analyzed using the criteria for project-specific impacts. Assuming an individual development generates less than significant construction and operational emissions, then the project would not generate a cumulatively considerable increase in non-attainment criteria pollutants and its impacts would be considered to be less than significant. As shown in Tables III-4 and III-5, emissions resulting from the proposed Project's construction and operational phases are expected to be below the thresholds of what SCAQMD considers to be cumulatively considerable.

Mandatory standard best practices will be applied during construction, including dust control measures in accordance with SCAQMD Rule 403, as well as the use of low VOC content in architectural coatings per SCAQMD Rule 1113. California Building Code requirements for energy efficiency, and improving technology for automobiles will also reduce air emissions in the future.

Therefore, while the Project will contribute to incremental increases in emissions, the impacts on regional PM_{10} and ozone levels are not anticipated to be cumulatively considerable.

Summary:
As shown above, both construction and operation of the proposed Project will result in criteria emissions that are below the SCAQMD significance thresholds, and neither would violate any air quality standard or contribute substantially to an existing or projected air quality violation. Overall, impacts related to construction and operation will be less than significant and are not cumulatively considerable from a non- attainment standpoint.

c) Less Than Significant Impact. A Project will have a significant impact if it exposes sensitive receptors to substantial pollutant concentrations. Sensitive receptors are defined as members of the population who are potentially more sensitive to air pollutants due to age and health condition. Sensitive receptors include schools, playgrounds, childcare centers, retirement homes, hospitals and residences. SCAQMD provides a Localized Significance Thresholds (LST) analysis to determine whether a project will pose significant air quality impacts on nearby sensitive receptors. LST thresholds are provided for distances of 25, 50, 100, 200 and 500 meters between a project site and a sensitive receptor. Per the SCAQMD, LST analysis is designed for projects up to five acres in size or projects that involve up to five acres of daily disturbance during construction. While the proposed the Project contains 39.98 acres, fewer than five acres would be disturbed on any given day during construction.[5]

The nearest receptors include two adjacent residential neighborhoods; one occurs on the east side of the Project site, and the other slightly closer receptor, is approximately 12 meters from the south perimeter. Based on the Project's size and proximity to the nearest sensitive receptor, the 5-acre site tables at a 25-meter distance (nearest measurement option in LST table) were used for air quality analysis. Table III-6 shows on-site emission concentrations for Project construction will not exceed LST thresholds for carbon monoxide, nitrogen oxides, and particulate matter. Overall, the impacts will be less than significant.

[5] South Coast AQMD, "Fact Sheet for Applying the CalEEMod to Localized Significance Thresholds," https://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf, accessed April 4, 2025.

Table III-6
Localized Significance Thresholds Emissions (pounds per day)

Pollutant	CO	NOx	PM_{10}	$PM_{2.5}$
Construction				
Maximum Emissions	**29.7**	**29.3**	**9.15**	**5.14**
SCAQMD LST Threshold	2,292.00	304.00	14.00	8.00
Exceed?	**No**	**No**	**No**	**No**
Operation[1]				
Maximum Emissions	**14.5**	**0.136**	**0.0067**	**0.0051**
SCAQMD LST Threshold	2,292.00	304.00	4.00	2.00
Exceed?	**No**	**No**	**No**	**No**

Source: CalEEMod model, version 2022.1
LST Threshold Source: LST Mass Rate Look-up Table, SCAQMD.
1. Operational emissions that affect sensitive receptors are limited to on-site area emissions. Energy and mobile emissions occur off-site and are excluded from the total.

Health Impacts

The SCAQMD is the local implementing and enforcing agency for the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (commonly known as AB 2588), which established a statewide program for the inventory of air toxic emissions from specifically identified individual facilities as well as requirements for risk assessment and public notification of potential health risks. The SCAQMD requires the preparation of an operational HRA for “facilities” associated with high levels of toxic air contaminants. The eight categories of identified sources of TACs include high-traffic freeways and roads, distribution centers, rail yards, ports, refineries, chrome plating facilities, perchloroethylene dry cleaners, and large gas stations. The Project neither proposes the development of any such facilities, nor is it situated in proximity to any such facility.

As shown in Tables III-4 and III-5, construction and operation of the Proposed Project will result in criteria emissions that are below the SCAQMD significance thresholds, and would neither violate any air quality standard nor contribute substantially to an existing or projected air quality violation. In addition, localized emissions will be less than significant.

With today’s technology, it is not scientifically possible to calculate the degree to which exposure to various levels of criteria pollutant emissions will impact an individual’s health. There are several factors that make predicting a Project-specific numerical impact difficult:

- Not all individuals will be affected equally due to medical history. Some may have medical pre-dispositions and diet and exercise levels tend to vary across a population.
- Due to the dispersing nature of pollutants, it is difficult to locate and identify which group of individuals will be impacted, either directly or indirectly.
- There are currently no approved methodologies or studies to base assumptions on, such as baseline health levels or emission level-to-health risk ratios.

Due to the limitations described above, the extent to which the Project poses a health risk is uncertain but unavoidable. It is anticipated that impacts associated with carbon monoxide, nitrogen oxides and particulate matter will be less than significant overall, and that health effects will also be less than significant.

d) Less Than Significant Impact. If the Project results in the emissions of objectionable odors that adversely affect a substantial number of people, then the Project would have a significant impact. Land uses which are likely to generate odors, other than agricultural operations, which are exempted, include chemical plants, composting operations, dairies, fiberglass molding, landfills, refineries, rail yards, and wastewater treatment plants.[6]

Short term odors associated with paving and construction activities could be generated by the Project's construction; however, any such odors would be quickly dispersed below detectable levels as distance from the construction site increases, and would occur for short time periods during the construction phase only.

At buildout, the residential units and park will generate typical odors, including cooking odors, but will not generate objectionable odors. Therefore, impacts from objectionable odors are expected to be less than significant.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

CalEEMod Version 2022.1

City of Coachella General Plan Update 2035, April 2015

Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024

EPA Greenbook

South Coast AQMD, "Fact Sheet for Applying the CalEEMod to Localized Significance Thresholds"

South Coast AQMD Air Quality Significance Thresholds, revised March 2023

[6] SCAQMD Guidance Document, Chapter 2: Air Quality Issues Regarding Land Use.

IV. BIOLOGICAL RESOURCES **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		✓		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?				✓
c) Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				✓
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		✓		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			✓	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?			✓	

Environmental Setting

The Coachella Valley occurs within the Colorado Desert, a warmer and drier ecological subregion of the larger Sonoran Desert ecoregion. The Colorado Desert subregion is bounded by the Colorado River to the east, the Mojave Desert ecoregion to the north, and the Little San Bernardino, San Jacinto, and Santa Rosa Mountain ranges to the west. The majority of the Colorado Desert sits between -275 feet and 3,000 feet in elevation, while the highest elevations are found at the top of Mt. San Jacinto (10,835 feet) and Mt. San Gorgonio (11,499 feet). The City of Coachella is situated in the lower elevation range of the Valley at approximately -68 feet. Average daytime temperatures in

the Project area range from 107 degrees Fahrenheit in the summer down to 71 degrees in January and average annual rainfall is two inches. The environmental extremes have led to the evolution of highly specialized desert species, some of which are endemic to the region. Development throughout the Coachella Valley is guided by regulations meant to protect remaining habitats for diminishing and endangered biological resources.

Coachella Valley Multiple Species Habitat Conservation Plan

The City of Coachella and the Project site are located within the boundaries of the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP), a regional plan that allows for economic development in a manner that also preserves twenty-seven different natural communities and protects twenty-seven endangered native species across 1.2 million acres of Riverside County. The CVMSHCP establishes specific conservation areas where habitat, ecological processes, and/or wildlife corridors are protected from development activity. The Project site is 3.5 miles from the East Indio Hills Conservation Area, and the Santa Rosa and San Jacinto Mountains Conservation Area is 4.6 miles southwest.

The following discussion of impacts is based on the March 2024 Biological Resources Assessment and Coachella Valley Multiple Species Habitat Conservation Plan Consistency Analysis Report by WSP USA Environment and Infrastructure, Inc. (referred to as "Report") for the Project site.[7] Biologists conducted an exhaustive literature review to ascertain special status species that are known to occur within a five-mile radius of the Project site. A field assessment of the Project site and the Project vicinity, a 500-foot radius around the site, was conducted on foot on February 29, 2024. All site conditions including weather, topography and soil, signs of animal activity, and resident plant species were recorded. A full copy of the Report is available in Appendix B.

Discussion of Impacts

a) Less Than Significant Impact With Mitigation Incorporated. Beginning approximately in 1932, the Project site hosted a date palm grove, which was replaced by different row crops in the early 1950s. Subsequently, date palms were again planted on the site by 1959 and again removed between 1984 and 1996. The site remained fallow until just prior to 2002 when date palms were replanted, but the northeast corner remained fallow. A small irrigation reservoir was installed at the northwest corner. The General Plan land use had changed to General Neighborhood and the date palm garden was once again abandoned by 2019.

Rows of leftover untended palms remain on the south and western portion of the site along with underground piping, and the northeast corner, which was never planted, remains graded, scraped and completely barren. Sparse perennial vegetation has colonized intermittently throughout 75% of the parcel, particularly under the remnant palms and in the northwest corner where the irrigation pond was located. Trash from minor dumping and off-road vehicle tracks are visible. Residential neighborhoods north and south of the Project site are separated by walls. West of the site is a vacant lot that may soon be developed as a residential area, and east, across Calhoun Street, there is a vacant lot with one single-family residence.

[7] "Biological Resources Assessment and Coachella Valley Multiple Species Habitat Conservation Plan Consistency Analysis Report for Calhoun Street and Avenue 49 Residential Development Project," WSP USA Environment & Infrastructure, Inc., March 19, 2024.

Plants Observed

The subject site was inspected for plant communities and species. Native perennial vegetation observed on the site includes quailbush (*Atriplex lentiformis*), arrow-weed (Pluchea sericea), common sunflower (*Helianthus annuus*) and blue palo verde (*Parkinsonia florida*). Non-native and invasive species mixed in with the native vegetation that were noted include puncture vine (*Tribulus terrestris*), amaranth (*Amaranthus sp.*), cheeseweed (Malva parviflora), Sahara mustard (*Brassica tournefortii*), Mexican palo verde (*Parkinsonia aculeata*), saltcedar (*Tamarisk ramosissima*), and Bermuda gras (*Cynodon dactylon*). The presence of the above listed species does not represent a special-status vegetation community. Moreover, the Project site contains no natural wetlands, or riparian vegetation communities.

Vertebrates Observed

Wildlife and signs of wildlife (such as tracks, scats, feathers, burrows, owl pellets) observed on the Project site during the site survey included 14 birds, two mammals, and one reptile. None of species observed are considered to be special status species and all commonly occur in the region as either residents or migrants. Several of the representative bird species observed were mourning dove (*Zenaida macroura*), Eurasian collard dove (*Streptopelia decaocto*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), common raven (*Corvus corax*), verdin (*Auriparus flaviceps*), northern mockingbird (*Mimus polyglottos*), house finch (*Haemorhous mexicanus*), and white-crowned sparrow (*Zonotrichia leuscophrys*).

Mammal species noted were Botta's pocket gopher (*Thomomys bottae*) and California ground squirrel (*Otospermophilus beecheyi*). The one reptile species recorded was the side-blotched lizard (*Uta stansburiana*).

Special Status Species

The literature review of the Project vicinity, which includes the Project site and a five-mile radius, generated a list of 68 special status species that have the potential to occur in the vicinity. Twenty of these 68 special status species have the potential to occur on the Project site, many of which would occur during foraging and therefore would not be directly impacted by the Project. See Table IV-1 for summaries of these 20 species, and see the Report in Appendix B for the full list.

Table IV-1
Special Status Species Potentially Occurring on the Project Site

Special Status Species	Probability to Occur on the Project Site
• Abrams' Spurge (*Euphorbia abramsiana*)	• **Very Low:** Remnant marginally suitable habitat is very limited, disturbed and largely stabilized. Only small, insignificant pockets of sandy soils present. Site just below/at edge of elevational range of species. • Not covered by MSHCP.
• Cooper's Hawk (Accipiter cooperii)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging:** Occurs and was observed. • Not covered by MSHCP.
• Golden Eagle (Aquila chrysaetos)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Low.** Marginally suitable habitat present. • Not covered by MSHCP.

Table IV-1
Special Status Species Potentially Occurring on the Project Site

Special Status Species	Probability to Occur on the Project Site
• Burrowing Owl (Athene cunicularia)	• **Nesting: Low.** Marginally suitable habitat intermittently present. Suitable California Ground Squirrel burrow detected. • **Foraging: Low.** If present onsite or on other suitable lands to the east of the subject site. • Fully covered by CVMSHCP
• Ferruginous Hawk (Buteo regalis)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Low.** During winter migration only. • Not covered by MSHCP.
• Costa's Hummingbird (Calypte costae)	• **Nesting: Moderate.** Suitable nesting habitat present (palo verde). • **Foraging: Occurs.** Observed. • Not covered by MSHCP.
• Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Very low.** Occurs in many habitats during migration. • Fully covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.
• Prairie Falcon (Falco mexicanus)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Moderate.** May nest or winter nearby and forage over site.
• Loggerhead shrike (*Lanius ludovicianus*)	• **Nesting: Very Low.** Suitable nesting habitat very limited. • **Foraging: Moderate.** May nest or winter nearby and forage onsite. • Not covered by CVMSHCP
• Black-tailed Gnatcatcher (Polioptila melanura)	• **Nesting: Moderate.** Suitable nesting habitat present (palo verde). • **Foraging: Low.** May forage or move through site from nearby areas. • Not covered by CVMSHCP
• Vermilion Flycather (Pyrocepalus rubinus)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Low.** If nesting nearby. • Not covered by CVMSHCP
• Crissal Thrasher (Toxostoma crissale)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Very Low.** If nesting nearby. • Fully covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.
• Le Conte's Thrasher (Toxostoma lecontei)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Very Low.** If nesting nearby, but suitable habitat not observed on adjacent lands. • Fully covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.
• Least Bell's Vireo (Vireo bellii pusillus)	• **Nesting: Absent.** Suitable nesting habitat lacking. • **Foraging: Low.** Migration only. • Fully covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.

Table IV-1
Special Status Species Potentially Occurring on the Project Site

Special Status Species	Probability to Occur on the Project Site
• Western Mastiff Bat (Eumops perotis californicus)	• **Nesting: Absent.** Roosting habitat lacking. • **Foraging: Low.** May forage over site if roosting nearby. • Fully covered by CVMSHCP.
• Western Yellow Bat (Lasiurus xanthinus)	• **Nesting: Absent.** Roosting habitat lacking. • **Foraging: Low.** May forage over site if roosting nearby. • Fully covered by CVMSHCP.
• Pocketed Free-tailed Bat (Nyctinomops femorosaccus)	• **Nesting: Absent.** Roosting habitat lacking. • **Foraging: Low.** May forage over site if roosting nearby. • Not covered by CVMSHCP.
• Palm Springs pocket mouse (*Perognathus longimembris bangsii*)	• **Very low:** Only small, remnant patches of marginal potentially suitable habitat present. Site disturbance and past agricultural practices further reduce the likelihood of occurrence. • Fully covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.
• Coachella Valley round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*)	• **Very low**: Preferred habitat lacking. Species has beenknown to occur in disturbed and converted habitats. • Fully covered by CVMSHCP
• American Badger (Taxidea taxus)	• **Very Low**: Although disturbed, site potentially suitable. No burrows or signs observed. • Not covered by CVMSHCP, but the subject site is not within designated critical habitat for this species.

The Report determined that due to the grading and cultivation of date palms in the past, and the more recent off-road vehicular activity and dumping of trash, the Project site has been greatly altered from its natural state, and thus the probability for special status species to occur on the site is significantly reduced. Further reducing the likelihood that special status species may reside there are the neighboring residential developments to the north and south, and the grading of the vacant lots to the east and west.

Existing vegetative scrub and date palms found on the Project site could potentially be used by both resident and migratory nesting birds, many of which are not special status species, but all are protected under the Migratory Bird Treaty Act (MBTA) and the California Fish and Game Code (FGC). The MBTA prohibits the taking of migratory birds which includes killing, capturing, selling, trading, and transport. "Under the MBTA, it is illegal to destroy a nest that has eggs or chicks in it, or if there are young birds still dependent on the nest for survival.[8] Similarly, California Fish and Game Code section 3503 stipulates that, "It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Section 3503.5 states, "It is unlawful to take, possess, or destroy any birds in the orders Falconiformes

[8] Bird Nests, US Fish and Wildlife Service, accessed July 2024, https://www.fws.gov/story/bird-nests#:~:text=This%20law%20says%3A%20"No%20person,has%20eggs%20or%20chicks%20in.

or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto."[9] Since nesting habitat occurs on the Project site, impacts to nesting birds would be significant. To avoid potentially significant impacts to nesting birds, a nesting bird survey is required, and explained below in BIO-1.

Western burrowing owls are protected under the MBTA and by the US Fish and Wildlife Service as a Bird of Conservation Concern (BCC). Additionally, as of October 10, 2024, the California Fish and Game Commission designated the western burrowing owl as a candidate species for listing. While the candidacy is under review by the CDFW, the species receives full California Endangered Species Act (CESA) protections which prohibit the "taking" of individuals. Although the species is covered by the CVMSHCP, taking of this species is not permitted. No burrowing owls, or signs of burrowing owls were observed during the site survey, however, suitable habitat and burrows suitable for burrowing owls were observed on the Project site. Burrowing owls could potentially relocate to the Project site between the time of the site survey and the start of construction due to their attraction to open dry areas and agricultural sites. As the species roosts and nests underground, burrowing owls are particularly sensitive to ground disturbance, therefore the Project presents a potentially significant impact to the species, which would require mitigation as described below in BIO-2.

With implementation of mitigation measures BIO-1 and BIO-2 to protect potentially occurring nesting birds and burrowing owls, impacts to potentially occurring candidate, sensitive, or special status species would be reduced to less than significant levels.

b, c) No Impact. The Project site has been graded and cultivated with date palms for 20+ year followed by approximately five years of fallowing. There are no riparian habitats, wetlands, marshes, vernal pools, or other sensitive communities that are protected by US Fish and Wildlife Service or the California Department of Fish and Wildlife occurring on the Project site. There would be no impacts to any such natural community by this Project.

d) Less Than Significant Impact With Mitigation Incorporated. The Project site is in a residential suburban area isolated from other undeveloped natural areas by residential development to the north and south, the graded, vacant lots to the east and west, and Calhoun Street forming the east boundary. The leftover date palms and intermittent ruderal vegetation may provide nesting habitat for birds moving through the area. Take avoidance surveys, explained below as BIO-1 and BIO-2, would be required to reduce potential impacts to nesting birds and burrowing owls to less than significant levels.

e, f) Less Than Significant Impact. The Project would not conflict with any with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Likewise, the Project would not conflict with an adopted habitat conservation plan, natural community conservation plan, or any other approved local, regional, or state habitat conservation plan.

The City of Coachella is a signatory to the CVMSHCP and therefore the Project is required to pay a Development Mitigation Fee, which would reduce potential Project impacts to CVMSHCP-covered species. Neither CVMSHCP modeled habitats for covered species, nor designated wildlife corridors or biological linkages occur on the Project site. Two CVMSHCP Conservation Areas occur near the City, but not adjacent to the Project site. The East Indio Hills Conservation Area is approximately 3.5

[9] California Code, Fish and Game Code 3503 and 3503.5, last updated January 1, 2023.

miles east of the site, and the Santa Rosa and San Jacinto Mountains Conservation Area is 4.6 miles southwest. Aside from the Development Mitigation Fee, no additional mitigation measures are required to comply with the CVMSHCP. With the implementation of the City's fee payment requirement, potential impacts would be less than significant.

Mitigation Measures:

BIO-1 Bird nesting season for resident birds in Southern California occurs between February 1 and August 31. To avoid impacts to nesting birds, all vegetation clearing, ground disturbance, and construction activity should be scheduled between September 1 and January 31 if possible. If construction occurs during the nesting season, a certified avian biologist must conduct a pre-construction nesting bird survey (NBS) immediately prior to scheduled construction activity. If active nests are identified, the biologist will demarcate a no-work buffer zone(s) around the active nest(s) and check the nest site(s) weekly until the young birds fledge and the nest(s) become inactive. The buffer zone size would be based on the nesting species, its sensitivity to disturbance, nesting stage and the expected intensity and duration of disturbance. No ground or vegetation disturbance shall occur within the nest site buffer zone(s) until the qualified biologist determines that the young have successfully fledged, and the nest is inactive. Per CDFW recommendations, a buffer of 500 feet shall be set for listed species and birds of prey, and a buffer of 100 to 300 feet shall be set for unlisted songbirds.

BIO-2 To ensure that no burrowing owls have moved to the Project site since the biological site survey was conducted, avoidance surveys of the Project site must be conducted immediately preceding development, in compliance with the CDFW Staff Report for Burrowing Owl (2012) protocols. The first survey should occur 14-30 days prior to initiating ground disturbance activities, and the second survey should take place withing 24 hours of ground disturbance. Should burrowing owls be detected, CDFW shall be contacted as soon as possible to determine the next course of action. CDFW must grant permission to relocate burrowing owls.

Mitigation Monitoring:

BIO-A The Project applicant shall complete preconstruction surveys and provide them to the City prior to issuance of any permit allowing ground disturbance on the Project site. Results of the preconstruction surveys are to be kept on file at City Hall.

Responsible Parties: Project applicant, Project biologist, Planning Department, City Engineer

Sources:

"Biological Resources Assessment and Coachella Valley Multiple Species Habitat Conservation Plan Consistency Analysis Report for Calhoun Street and Avenue 49 Residential Development Project," WSP USA Environment & Infrastructure, Inc., March 19, 2024

Bird Nests, US Fish and Wildlife Service, accessed July 2024

California Code, Fish and Game Code 3503 and 3503.5, last updated January 1, 2023

V. CULTURAL RESOURCES Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?		✓		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?		✓		
c) Disturb any human remains, including those interred outside of formal cemeteries?				✓

Environmental Setting

Under CEQA, the term, "cultural resources," encompasses a broad range of artifacts spanning prehistoric and historic eras that are comprised of traces or remains of humans and human cultures who lived in California. Sites may contain archaeological artifacts, belonging to indigenous and non-indigenous cultures. Archaeological resources may include items such as tools, carvings, structures, and sites, that are associated with a scientifically recognized important prehistoric or historic event or culture and that contain important scientific research value. Cultural resources also include "historic" resources, which are associated with the more recent built environment such as old houses, structures, roads, walls, etc. In addition, cultural resources include traditional cultural places, objects, records and manuscripts. "Tribal resources" refer to a specific class of cultural resources that are significant to California Native American Tribes. These resources are discussed further in Section XVIII, Tribal Cultural Resources.[10]

Per CEQA, cultural resources that are significant are then labeled as "historical" resources and warrant a certain level of protection from a project's impacts. An historical resource may be prehistoric or historic in age and may be archaeological and/or significant to a California Native American Tribe. The lead agency may consider resources to be historically significant if they meet criteria for listing in the California Register of Historical Resources, which contains all resources listed in the National Register of Historic Resources. Section 15064.5 of the CEQA Guidelines defines a historical resource as the following[11]:

1) A resource that is listed in or determined to be eligible by the State Historical Resources Commission for listing in the California Register of Historical Resources is historically significant.

2) A resource is considered to be historically significant if is included in a local register of historical resources, as defined in section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements of section 5024.1(g) of the Public Resources Code.

[10] "Guidelines for Determining the Significance of and Impact to Cultural Resources: Archaeological, Historic, and Tribal Cultural Resources," Society for California Archaeology, April 2020.

[11] "Determining the Significance of Impacts to Archaeological and Historical Resources," California Code of Regulations, Title 14 §15064.5

3) Any object, building, structure, site, place, record, or manuscript which a lead agency determines to be historically significant in the architectural engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be a significant historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

4) Finally, a lead agency may determine that a resource is historically significant even if it has not been previously listed in or determined to eligible for listing in the California Register of Historical Resources and is not already included in a local register of historical resources, or previously identified in a historical resources survey.

The following discussion of Project area and impacts is based on the "Historical/Archaeological Resources Survey Report for Assessor's Parcel No. 612-260-010," prepared in May 2024 by CRM TECH (referred to as "Report"). Appendix C contains a complete copy of the Report. Researchers conducted an historical and archaeological records search, historical background research, an intensive site survey, and contacted local Native American representatives.

Records Search

A records search at the Eastern Information Center (EIC) at the University of California, Riverside for previously documented resources was conducted on February 26, 2024 by a CRM TECH archaeologist. The records search found that that no cultural resources had been discovered or recorded on and adjacent to Project site. However, within a one-mile radius of the Project site, 59 previous studies on tracts of lands were completed between 1980 and 2020. These studies noted 42 historical/archaeological resources, 21 of which were prehistoric and of Native American origin. None of these previously recorded resources were found on or adjacent to the Project site and therefore are not pertinent to this discussion.

Native American Consultation

The Native American Heritage Commission (NAHC) stated on March 11, 2024 that the results of the Sacred Lands File search found no Native American resources at the Project site, but noted that the absence of data does not preclude the presence of artifacts on the site that have yet to be discovered.

Project archaeologists contacted representatives of the Torres Martinez Desert Cahuilla Indians and the Cabazon Band of Mission Indians. The Cabazon Band has not responded to the consultation request. Gary Wayne Resvaloso, Jr. of the Torres Martinez Desert Cahuilla Indians requested additional archaeological field work on the Project site with Torres Martinez participation due to the possibility that buried cultural remains may occur beneath the surface of the Project site. A copy of the letter is provided in Appendix 2 of the Report.

Field Survey

Project archaeologists in tandem with a Native American monitor from the Torres Martinez Desert Cahuilla Indian tribe conducted an intensive-level field survey of the Project site. The team walked parallel northeast-southwest transects spaced 50 feet apart to complete a visual inspection of the Project site surface. No historical resources of prehistoric or historic eras were identified during the site survey. Past repeated excavation of the soil and cultivation of date palms and other row crops indicated that the Project site has been extensively disturbed.

Prehistoric Setting

The City and the surrounding Coachella Valley are the central home of the Desert Cahuilla People. The Cahuilla People have inhabited the Coachella Valley and surrounding mountains for thousands of years. Earliest evidence of prehistoric human activities dates from the Paleoindian Era (10,000 to 8,000 years ago) and consists of "very simple stone tools, 'cleared circles, rock rings, [and] some geoglyph types.'" The Early Archaic Period (8,000 to 4,000 years ago), and Late Archaic Period (4,000 to 1.500 years ago) are identified by "groundstone artifacts." The Late Prehistoric Era (1,500 to 250 years ago) provides the most materials from early human civilization. Ceramics are frequently recorded from this era.

Cahuilla life in the Coachella Valley during the Holocene Epoch, a geologic timeframe beginning at the end of the last ice age about 11,700 years ago, was influenced by the intermittent presence of Ancient Lake Cahuilla, followed by its desiccation and absence. The lake filled in the Salton Basin, the southeast end of the Coachella Valley and the Imperial Valley, when the Colorado River would temporarily turn from its usual course to the Gulf of California north toward the Salton Basin. Lakeshore mineral deposits along the lower Santa Rosa foothills up to 42 feet above sea level suggest that the Project site would have been underwater during these periodic Colorado River inundations, but may also have aligned with the receding shoreline. Artifacts from Cahuilla presence around the ancient lakeshore include "brown and buff ware ceramics, groundstone and projectile point types, ornaments, and cremation remains."[12]

Ethnohistoric Setting

Traditional Cahuilla territory shares a border with that of the Serrano in present-day Joshua Tree National Park to the north, stretches from the Colorado River to the east over to the San Jacinto Mountains and the San Gorgonio Pass to the west and includes the Santa Rosa Mountains to the south. Three distinct areas – the low desert of the Coachella Valley, the higher desert of the San Gorgonio Pass area, and the higher elevation mountains – separated the Cahuilla nation into three geographically distinct groups: Desert Cahuilla, Western (or, Pass), and Mountain Cahuilla. While actual population data is difficult to establish, the Cahuilla may have numbered between 3,600 to 10,000 living in many villages throughout the Coachella Valley, Pass area, and the mountain ranges. Today, nine bands of Cahuilla are officially recognized across these three groups.

Cahuilla family groups associated with one of two moieties, the Tuktum (Wildcat) or the Istam (Coyote), and were organized along patrilineal lines. Cahuilla are a Takic-speaking people who traditionally relied on hunting and gathering. Local wildlife and plants provided food, medicine, and materials needed for clothing, cooking, shelter, and hunting. Acorns, mesquite beans, cacti, pinyon nuts, yucca, agave, and fan palms were commonly used.

The Spanish Mission System began in California in 1776, however, due to the remoteness of their territories in the mountains and deserts, many of the Cahuilla remained out of reach of the Mission System until 1819 when an outpost, or Asistencia, of the San Gabriel Mission was built in the Redlands area. Thus began the forced transition of many Cahuilla from their traditional homelands and lifestyles to Spanish Mission lifestyle and labor. The late 1800s saw the arrival of the railroad and non-Native agriculturalists who were given traditional Cahuilla lands by the federal government to convert into farmland.

[12] "Historical/Archaeological Resources Survey Report for Assessor's Parcel No. 612-260-010," CRM TECH, May 2024.

Historic Setting

The earliest European explorers arrived to the Coachella Valley in 1823 seeking a route to Yuma, Arizona. The hot and arid desert climate precluded most non-Native people from exploring the low desert until more established trails, and eventually the Southern Pacific Railroad (1876), were established. During the 1870s, the railroads brought farmers and other land prospectors to the West to claim land under the Homestead Act of 1862 and the Desert Land Act of 1877. The availability of land and the presence of plentiful groundwater launched agriculture as the dominant economic engine of eastern Riverside County and Imperial County.

Discussion of Impacts

a, b) Less Than Significant Impact with Mitigation Incorporated. During the most recent inundation of Ancient Lake Cahuilla in the 1730s, when the high stand of the shoreline is documented as being 42 feet above sea level, the Project site would have been under water for a time, but eventually would have been exposed and become part of the shoreline as the lake dried. In this region, many recorded Native American resources are associated with the receding Ancient Lake Cahuilla lakeshore.

At the beginning of the 20th century, a north-south road connecting Indio to the village of Toro, currently part of the Torres Martinez Reservation, ran through the middle of the Project site. By 1932, the road disappeared, and a date palm garden covered the Project site, and by the 1950s, the date palms had been replaced by other row crops. Between 1953 and 1959, date palms were again planted on the site only to be again removed between 1984 and 1996. The site remained fallow until before 2002, when date palms were replanted, but the northeast corner remained fallow. A small irrigation reservoir was installed at the northwest corner. The date palm garden was once again abandoned by 2019.

The above-described results of the Historical/Archaeological Resources Report state the records search, the historical background research and the field survey found that neither historical nor archaeological resources of any type were previously recorded or recently identified on the Project site. The surface of the site has been extensively graded and cultivated since the 1930s which indicates that there is a low probability of discovering cultural resources on the surface. However, the subsurface has not been researched for historical and archaeological cultural resources. CRM Tech recommended that an archaeologist monitor grading and excavation activities to assure that subsurface resources would not be impacted. In addition, as described in Section XVIII, the Torres Martinez requested the presence of a Tribal monitor. As a result, CUL-1 Mitigation Measure as described below will be implemented.

The implementation of this mitigation measure would ensure that potentially significant impacts to buried historical and archaeological resources would be reduced to less than significant levels. Please also see Section XVIII, Tribal Cultural Resources for further discussion of Tribal concerns.

c) No Impact. No human remains or cemeteries were identified as occurring on the Project site. The grading and agricultural activities since the 1930s reduce the likelihood of discovering human remains at this location. Should any human remains be found during the construction phase, California Health and Safety Code § 7050.5 requires that all excavation activity must stop, and the County Coroner must inspect the site. If the remains are identified as those of a Native American individual by the Coroner, the NAHC is informed and required to contact the Most Likely Descendant.

The descendant will recommend the appropriate next step. This state law requirement would ensure that the Project would not impact any human remains.

Mitigation Measures:

CUL-1 Tribal Resource Discovery and Documentation

A Cultural Resources Monitoring and Discovery Plan (Plan) will be prepared by the Project archaeologist in collaboration with ACBCI and provided to the City and ACBCI prior to the issuance of grading permits for the property.

The Plan will require that a qualified archaeological and Tribal monitor from ACBCI be present during all ground-disturbing activities within the Project site. Monitoring requirements and locations should be defined along with resource discovery protocols and guidance for reducing or terminating site monitoring in the case that no artifacts are identified, or that documentation finds that ground disturbance will occur in soils with more potential for discovering artifacts. Should an artifact be discovered, all construction activity within 100 feet of the discovery shall stop until the qualified archaeologist can evaluate the significance of the artifact and make a determination whether further study is necessary. Should the artifact be found to be significant under CEQA, an archaeological treatment plan and further data recovery may be required.

If the qualified archaeologist and ACBCI monitor determine that on-site reburial is the appropriate measure to be taken for the artifact(s) discovered on the Project site, they will recommend a location to the City and project proponent. That location will be described and recorded as an easement in favor of ACBCI on the property in perpetuity prior to the completion of the first house on the property. This is confidential information, and the exact nature of this area will not be called out on the grading plans.

Monitoring:

CUL-A The Project archaeologist shall provide the City with a copy of the Cultural Resources Monitoring and Discovery Plan prior to the issuance of any ground disturbing permit on the site. The Plan will be prepared in collaboration with ACBCI. Within 30 days following the completion of monitoring activities, the Project archaeologist shall provide the City with a report of monitoring activities.
Responsible Parties: Project Archaeologist, City Planning Department, City Engineer.

Sources:

"Historical/Archaeological Resources Survey Report for Assessor's Parcel No. 612-260-010," prepared by CRM TECH, May 21, 2024.

"Guidelines for Determining the Significance of and Impact to Cultural Resources: Archaeological, Historic, and Tribal Cultural Resources," Society for California Archaeology, April 2020.

"Determining the Significance of Impacts to Archaeological and Historical Resources," California Code of Regulations, Title 14 §15064.5.

"The Cahuilla People," Augustine Band of Cahuilla Indians, 2018, accessed March 28, 2024.

VI. ENERGY Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			✓	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			✓	

Environmental Setting

Imperial Irrigation District: Electricity is supplied to the eastern portion of the Coachella Valley, including the City of Coachella, by the Imperial Irrigation District (IID). IID is the sixth largest electric utility in California, as measured by peak load of 1,152 megawatts in 2023, and provides power to over 163,000 customers in Imperial County and portions of Riverside and San Diego counties.[13] Electricity is purchased from various power generators and distributed along IID's transmission corridors to customers. As of 2018 IID has phased out coal from its energy portfolio, has increased its reliance on renewable energy and is planning for greater storage capacity. Table VI-1 shows the most current energy source portfolio for IID.

Table VI-1
Imperial Irrigation District Generation Resource Portfolio

Energy Source	Power Plant Type	Number of Generation Facilities	Mega Watts (MW)
Natural Gas & Diesel	gas turbine and steam turbine	16	655.3
Solar	photovoltaic farms	15	188
Geothermal	steam turbine	4	117
Hydroelectric	hydropower turbine	11	106
Biomass	steam turbine	1	45
Nuclear	steam turbine	1	14
Battery Storage	from hydroelectric power	2	60
Total			**1,185.3**
Source: 2024 Integrated Resource Plan, Imperial Irrigation District, April 2024			

Southern California Gas: Natural gas is provided to the City by Southern California Gas (SoCalGas) and is used for home heating, water heating, laundry dryers and gas stoves. More than 90% of the natural gas consumed in California is sourced from Texas and New Mexico, and the SoCalGas transmission network consists of storage facilities and pipelines. Southern California Gas is

[13] Imperial Irrigation District, 2024 Integrated Resource Plan, April 2024.

committed to reducing greenhouse gas emissions by supporting the development of renewable natural gas (RNG) resources. Unused methane that is released from landfills, composted food waste, dairies, and wastewater treatment plants can be captured and transported along existing SoCalGas gas pipelines. SoCalGas offers assistance to individual consumers, such as a wastewater treatment plant, to convert its by-products into methane for use at its own site.

California State Standards: To reduce energy consumption and pollution emissions, the State of California has enacted several laws and building codes to guide the construction and operations of commercial and residential development. The California Code of Regulations (CCR) Title 24, Part 6, "California's Energy Efficiency Standards for Residential and Nonresidential Buildings," (Energy Code, or Title 24) was established in 1978 and is updated regularly. In 2007, Title 24, Part 11, also known as the Green Building Standards Code (CALGreen) was added to the CCR. Together the Energy Code and CALGreen address all stages of building construction from the planning process to the end use, and set standards for reducing energy and water use, for materials recovery and conservation, and reducing construction and operational impacts on the local environment.

The Renewable Portfolio Standard required electricity providers to derive 33% of their electricity from renewable sources by 2020. Senate Bill 100 furthered this target by requiring 60% of electricity to be derived from renewable sources by 2030 and 100% by 2045.

Senate Bill 375 established new planning processes to facilitate coordination between land use planning, regional transportation plans and funding priorities with the goal of reducing regional vehicle miles traveled (VMT) and thus reducing transportation energy use and greenhouse gas emissions.

City of Coachella Climate Action Plan

In April 2015 the City adopted a Climate Action Plan (CAP) to help implement General Plan policies and programs aimed at reducing greenhouse gas emissions via the reduction of energy consumption, vehicle miles traveled, resource consumption and the generation of waste. In order to meet the State AB 32 GHG reduction target in effect at that time, the CAP estimated that the City would need to reduce greenhouse gas emissions by 5.1 metric tons of carbon dioxide equivalent ($MTCO_2e$) per person, or a total of 786,993 $MTCO_2e$ citywide.[14] Emissions reductions would stem from sectors including, but not limited to greater energy efficiency achievements, reduction of solid waste, installation of renewable energy systems, increases in the amount of open space and shade vegetation, and the growth of alternative transportation systems. The City's CAP has not been updated since its initial adoption.

The analysis of energy consumption impacts is based on the CalEEMod detailed report generated in November 2025 (see Appendix A). Details of the Project parameters are provided in Table III-3 of the Air Quality Section. The Calhoun Street Subdivision Traffic Analysis dated September 2024 (see Appendix F) was also used to estimate impacts from energy consumption during the operational phase. The Traffic Analysis accounted for daily trips from 259 homes, which provides a more conservative estimate than the daily trips resulting from the current 257 homes.

[14] Coachella Climate Action Plan, Table 7, Greenhouse Gas Reductions and Proposed Targets (2020 and 2035), April 22, 2015.

Discussion of Impacts

a) Less Than Significant Impact. Energy would be used during the approximately three-year construction phase and the long-term operational phase.

Construction Phase

During construction, the Project would use energy during site preparation, grading, building construction, paving, and architectural coating. Electricity would be used to operate a temporary construction office which would require lighting, climate control, and electricity to power office equipment. To operate construction equipment and worker transportation, the primary sources of energy would consist of petroleum fuels including gasoline and diesel fuels. Table VI-2 provides fuel consumption estimates for the construction phasing timeline of the Project. Construction equipment schedules, equipment power ratings, and load factors were programmed into CalEEMod. The aggregate fuel consumption rate for all equipment is estimated at 18.5 horsepower hour per gallon (hp-hr-gal.), per the California Air Resource Board's (CARB's) Carl Moyer Program Guidelines (2017).[15] CalEEMod assumes all construction equipment is diesel powered. Total fuel consumption for construction activities is estimated to be 81,147 gallons of diesel fuel.

Table VI-2
Project Construction Equipment Fuel Consumption Estimates

Phase	Duration (Days)	Equipment	HP Rating	Qty	Usage Hours	Load Factor	HP-hrs/day	Fuel Consumption
Site Preparation	35	Rubber Tired Dozers	367	3	8	0.4	3,523	6,666
		Tractors/Loaders/Backhoes	84	4	8	0.37	995	1,882
Grading	100	Graders	148	1	8	0.41	485	2,624
		Excavators	36	2	8	0.38	219	1,183
		Tractors/Loaders/Backhoes	84	2	8	0.37	497	2,688
		Rubber Tired Dozers	367	1	8	0.4	1,174	6,348
Building Construction	500	Forklifts	82	3	8	0.2	394	10,638
		Generator Sets	14	1	8	0.74	83	2,240
		Cranes	367	1	7	0.29	745	20,135
		Welders	46	1	8	0.45	166	4,476
		Tractors/Loaders/Backhoes	84	3	7	0.37	653	17,640
Paving	60	Pavers	81	2	8	0.42	544	1,764
		Paving Equipment	89	2	8	0.36	513	1,664
		Rollers	36	2	8	0.38	219	710
Architectural Coating	85	Air Compressors	37	1	6	0.48	107	490
							TOTAL Construction Equipment Fuel Demand (Gallons Diesel Fuel)	**81,147**

- The aggregate fuel consumption rate for all equipment is estimated at 18.5 horsepower hour per gallon (hp-hr-gal.), per the California Air Resource Board's (CARB's) Carl Moyer Program Guidelines (2017), Table D-21 Fuel Consumption Rate Factors. (The Carl Moyer Program Guidelines Volume I: Program Overview, Program Administration and Project Criteria, approved by the California Environmental Protection Agency Air Resource Board on April 27, 2017. https://ww2.arb.ca.gov/sites/default/files/2020-06/2017_cmpgl.pdf)
- CalEEMod outputs provide Phase, Duration, Equipment, HP Rating, Quantity (number of equipment), Usage Hours, and Load Factor.
- Fuel consumption = [(Usage Hours x Qty.) x Load Factor] x HP Rating/18.5 x Number of Days

[15] "Fuel Consumption Rate Factors, Table D-21," Carl Moyer Program Guidelines, Volume I: Program Overview, California Environmental Protection Agency Air Resources Board, June 20, 2017, https://ww2.arb.ca.gov/sites/default/files/classic/msprog/moyer/guidelines/2017/2017_cmpgl.pdf.

The estimated amount of fuel consumed by construction worker trips is provided below in Table VI-3. Construction phase duration, trip type, number of worker trips per day and average trip lengths are provided by the CalEEMod model. The U.S. Department of Energy Alternative Fuels Data Center provides the average vehicle fuel economy estimates.[16] For this analysis, it is assumed that the majority of worker trips would be by car (24.4 mpg), hauling trips would be by Class 8 trucks (6.45 mpg, diesel), and vendor trips would be by delivery trucks (7.7 mpg, diesel). The total amount of fuel that will potentially be consumed by construction workers, vendors, and haulers traveling to the Project site during construction is 57,012 gallons.

Table VI-3
Construction Worker Fuel Consumption Estimates

Phase	Duration (Days)	Trip Type	Worker Trips/ Day	Trip Length (Miles)	VMT	Avg. Fuel Economy (mpg)	Fuel Consumption (gallons)
Site Preparation	35	Worker	18	18.5	11,655	24.4	478
		Vendor	1	10.2	357	7.7	46
Grading	100	Worker	20	18.5	37,000	24.4	1,516
		Vendor	1	10.2	1,020	7.7	132
Building Construction	500	Worker	92	18.5	851,000	24.4	34,877
		Vendor	27	10.2	137,700	7.7	17,883
Paving	60	Worker	15	18.5	16,650	24.4	682
		Vendor	3	10.2	1,836	7.7	238
Architectural Coating	85	Worker	25	18.5	28,305	24.4	1,160
TOTAL Construction Worker Vehicle Fuel Demand (Gallons of Gasoline)							**38,713**
TOTAL Construction Vendor Vehicle Fuel Demand (Gallons of Diesel)							**18,299**
Total							**57,012**

- The average vehicle fuel economy estimates were derived from the U.S. Department of Energy Alternative Fuels Data Center. For purposes of this analysis, it is assumed that the majority of worker trips are by cars (24.4 miles per gallon (mpg), gasoline), hauling trips are by Class 8 trucks (6.4 mpg, diesel), and vendor trips are by delivery trucks (7.7 mpg, diesel). (Average Fuel Economy by Major Vehicle Category, last updated January 2024. U.S. Department of Energy. https://afdc.energy.gov/data/10310)
- CalEEMod outputs provide Phase, Duration, Trip Type, Worker trips/day, Trip Length.

In total, the Project is estimated to use 138,159 gallons of fuel during the construction phase. The construction phase is temporary, the fuel demand represents a "single-event" and does not pose an on-going demand. Compliance with CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation will help to reduce impacts on energy consumption by the Project's construction activities.[17] The Regulation aims to reduce idling, retire older less fuel-efficient equipment, encourage greater use of renewable diesel, and standardize additional fuel reduction tactics. The temporary duration of the construction phase and mandatory compliance with California Air Resources Board's (CARB) Off-Road Regulation of diesel-fueled equipment ensures that the Project will have a less than significant impact on energy consumption relating to the wasteful use of resources.

[16] U.S. Department of Energy, "Average Fuel Economy by Major Vehicle Category," Alternative Fuels Data Center, updated January 2024, https://afdc.energy.gov/data/10310?page=2.

[17] California Air Resources Board, In-Use Off-Road Diesel-Fueled Fleets Regulation, 2024.

Operational Phase

Energy consumption during the operational phase would stem from the use of appliances, electronics, lighting, HVAC systems, and exterior systems such as and irrigation and outdoor lighting. The homes would be constructed in compliance with the 2022 California Building Energy Efficiency Standards (or the Building Code in effect at the time that building permits are issued) which include mandatory guidelines per the California Energy Code, Title 24, Part 6. The California Green Building Code, Title 24, Part 11, defines voluntary energy efficiency standards. Requirements include the installation of rooftop solar for all new single-family homes, double-paned windows, light-colored building materials, and the use of the most effective wall and ceiling insulation, and the highest-rated air conditioning systems, and many other standards. The State's Energy Code also includes water efficiency standards. Title 20 of the California Energy Code, Appliance Efficiency Regulations, defines minimum efficiency levels for household appliance, electronics, and plumbing equipment. The Project would be subject to these regulations.

The population of the City of Coachella is approximately 43,173,[18] and by the year 2045, the population could potentially expand to 129,300.[19] This growth will increase the demand for electricity, natural gas, and transportation fuels. According to the City's 2035 General Plan Update EIR, on an annual basis, the Project could potentially account for 0.68% of the City's electricity demand for residential/commercial/industrial uses, and 1.67% of the City's single-family residential demand for natural gas. Tables VI-4 and VI-5, compare the proposed Project's estimated annual electricity and natural gas demand to the City's forecasted 2035 energy demand as detailed in the City's 2035 General Plan Update EIR.

Table VI-4
Project Operational Annual Electricity Consumption

Land Use	Electricity Use (kWh/yr)
Single Family Housing – Project Annual Demand	2,381,507
City's 2035 Demand for Residential/Commercial/Industrial Uses	348,918,091
Project's % of City's 2035 Demand	**0.68%**

Sources:
1. CalEEMod 2022.1 (Full report is available in Appendix A).
2. City of Coachella General Plan Update EIR, Table 4.14-3, Electricity and Natural Gas Use Projections.

Table VI-5
Project Operational Annual Natural Gas Consumption

Land Use	Natural Gas (Therms/yr)
Single Family Housing – Project Annual Demand	90,689
City's 2035 Demand for Residential Single Family Use	5,444,162
Project's % of City's 2035 Demand	**1.67%**

Sources:
1. CalEEMod 2022.1 (Full report is available in Appendix A).
2. City of Coachella General Plan Update EIR, Table 4.14-3, Electricity and Natural Gas Use Projections.

[18] California Department of Finance Table E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024 with 2020 Census Benchmark, May 2024.

[19] Southern California Association of Governments, "Demographics and Growth Forecast Technical Report," 2020-2045 RTPSCS.

Transportation Energy Demand

To model the number of daily trips generated by the Project and vehicle miles traveled (VMT), the Institute of Transportation Engineers (ITE) estimation was applied. Per ITE, the residential land use (210) is expected to generate 9.43 trips per residence per day, and the park would generate approximately 75 trips per day.[20] The Project could generate a total of 2,499 trips per day. Based on the number of residences, the ITE land use code, and the daily park trips, the CalEEMod analysis estimates that 911,957 total annual trips could result in 5,188,049 VMT annually.

For purposes of analysis, the 24.4 mpg figure is applied to the Project's annual VMT, which calculates to a total of 126,588,396 gallons of fuel that could be consumed annually by Project residents and park users.

The Project's forecasted VMT and fuel demand are compared to the total 2024 VMT generated within the South Coast Air Quality Management District's Salton Sea Air Basin as provided by California Air Resources Board Emission Factor (EMFAC). The Project's operational annual gasoline demand would equate to 0.143% of the Air Basin's most current annual gasoline consumption. Table VI-6 provides a comparison of the Project's estimated annual gasoline consumption and the Salton Sea Air Basin 2024 annual consumption.

Table VI-6
Project Operational Annual Transportation Gasoline Consumption

Land Use	Annual VMT	Gasoline (gallons/yr)
ITE Residential Land Use (210) – 257 units + Park	5,073,042	123,782,225
Park	115,007	2,806,171
Project Total Annual Demand	5,188,049	126,588,396
SCAQMD Salton Sea Air Basin Demand	3,628,036,125	88,524,081,450
Project's % of Air Basin Annual Demand	**0.14%**	**0.143%**

Sources:
1. CalEEMod 2022.1 (Full report is available in Appendix A).
2. CARB EMFAC, Scenario Analysis, 2025 Total Daily VMT for SCAQMD Salton Sea Air Basin – 9,939,825 VMT

The operational phase would result in increased vehicle trips by residents and park users, but the increase compared to the surrounding region is incremental. The Project is within two miles of the City's downtown area where shopping and many other services are located. The City's commitment to providing more alternative, non-motorized transportation routes, as outlined in the Mobility Element of the General Plan, would help ensure that the Project's increase in transportation would reduce potential impacts to energy use.[21]

Energy efficiency standards have demonstrated a net savings of billions of dollars, and millions of metric tons of carbon emissions.[22] The above-described State building and appliance efficiency standards along with the City's alternative transportation policies ensure that the Project would not

[20] Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.

[21] City of Coachella General Plan 2035 Update, Mobility Element, April 22, 2015.

[22] Office of Energy Efficiency and Renewable Energy, "Why Building Energy Codes?", Building Energy Codes Program, accessed June 12, 2024, https://www.energycodes.gov/why-building-energy-codes#:~:text=Building%20energy%20codes%20represent%20a,of%20avoided%20CO2%20emissions .

result in wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

b) Less Than Significant Impact. In addition to the California Building Energy Efficiency Standards, and the City's Mobility goals and policies, the City's General Plan includes a Sustainability and Natural Environment element which prescribes goals and policies for new and existing development to ensure that as the City grows, the energy and water use do not exceed available resources.[23]

Goal 2 discusses policies for harnessing more renewable energy, efficient building orientation to reduce western sun exposure, and Title 24 construction standards.

Goal 3 addresses the need to conserve water resources through drought tolerant landscaping, technologies, the use of recycled water, retention basins, and more to benefit both the community and the environmental.

Goal 4 specifically addresses need for energy efficiency through green building design for existing and new buildings.

In 2015, the City of Coachella adopted a Climate Action Plan (CAP) to ensure that its General Plan and future growth would comply with state and regional GHG reduction targets. The CAP designated greenhouse gas emissions targets of 49% below 2010 emissions by 2035. Achieving this goal would require continual increases in energy efficiency for all buildings and lighting, increasing renewable energy use, adding more shade and shade trees, and upgrading transportation corridors to provide non-motorized vehicle routes. The Project will be reviewed to assure compliance with CAP measures for residential development, and will be required to comply with the Building Code, including energy efficiency standards, to assure compliance with energy reduction strategies. These requirements will assure that the Project's energy impacts remain less than significant.

The City of Coachella in partnership with the Coachella Valley Association of Governments (CVAG) developed the "Eastern Coachella Valley's Action Plan for Climate Resilience" (Action Plan) in 2019. The Action Plan identifies strategies where Eastern Coachella Valley communities can seek funding to pay for climate resilience projects. Many of these projects would lead to a reduction of energy use by increasing energy efficiency of buildings, providing additional shade, boosting area active transportation plans, offering home weatherization programs for low-income communities, installing water efficient appliances, and more.[24]

The Project would comply with local, regional, and state renewable energy and energy efficiency plans The City's General Plan and Climate Action Plan, the Eastern Coachella Valley's Action Plan for Climate Resilience, and the commitments by SoCalGas and Imperial Irrigation District to bolster sources of renewable energy, would all restrict the potential impacts on energy use by the Project. The Project's impacts would be less than significant.

[23] Sustainability and Natural Environment Element, General Plan Update, City of Coachella, April 22, 2015.

[24] "Eastern Coachella Valley Action Plan for Climate Resilience," prepared by Dudek, June 2019.

Mitigation Measures: None required.

Monitoring: None required.

Sources:
CalEEMod 2022.1

Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024
California Air Resources Board, In-Use Off-Road Diesel-Fueled Fleets Regulation, 2024

California Department of Finance, Table E-5 Population and Housing Estimates for Cities, Counties and the State, 2020-2024 with 2020 Census Benchmark, May 2024

California Energy Commission, Title 20 and Title 24

City of Coachella General Plan 2035 Update

City of Coachella General Plan 2035 Update EIR

Coachella Climate Action Plan, Table 7, Greenhouse Gas Reductions and Proposed Targets (2020 and 2035), April 22, 2015.

"Demographics and Growth Forecast Technical Report," 2020-2045 RTPSCS, Southern California Association of Governments

Imperial Irrigation District, 2024 Integrated Resource Plan, April 2024
Southern California Gas

U.S. Department of Energy, "Average Fuel Economy by Major Vehicle Category," Alternative Fuels Data Center, updated January 2024

VII. GEOLOGY AND SOILS **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				✓
ii) Strong seismic ground shaking?			✓	
iii) Seismic related ground failure, including liquefaction?			✓	
iv) Landslides?				✓
b) Result in substantial soil erosion or the loss of topsoil?			✓	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			✓	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				✓
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				✓
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				✓

Environmental Setting

Seismicity and Faulting

The Coachella Valley lies within the northwestern portion of a larger topographic feature known as the Salton Trough (also referred to as the Salton Sink, and the Salton Basin), which is a northwest-southeast trending structural depression extending from the Banning Pass to the Gulf of California. The Salton Trough is approximately 130 miles long by 70 miles wide and is dominated by the underlying Southern San Andreas Fault (SSAF) system running along the eastern/northeastern edge of the Coachella Valley and through the east edge of the City of Coachella. For several million years, the Salton Trough has been subsiding while sediment eroding from the adjacent mountain ranges which form the northeast and the southwest Valley boundaries fills in the Coachella Valley floor. From the west toward the east, the San Bernardino Mountains, Little San Bernardino Mountains and the Indio Hills form the north/northeast boundary of the Coachella Valley. The San Jacinto Mountains and the Santa Rosa Mountains extend along the south/southwest side of the Valley.

Most earthquakes that occur in southern California result from the strike-slip motion between the North American and Pacific tectonic plates. At a rate of about two inches per year, the North American plate is sliding southwest while the Pacific plate is sliding northwest. The San Andreas Fault, an 800-mile fault extending from Bombay Beach on the east shore of the Salton Sea to Cape Mendocino on the northern California coast, facilitates about 70% of this tectonic movement. The San Andreas Fault zone is made up of multiple fault strands splintering off the main tectonic fault, and in the Coachella Valley, the SSAF zone splits into strands known as the Banning Fault, the Mission Creek Fault, and the San Jacinto Fault Zones. According to a 2023 paper by the Scripps Institution of Oceanography, the SSAF experienced a major earthquake approximately every 180 years over the last 1,000 years. However, the last major earthquake in the Coachella Valley region of the SSAF was 300 years ago, leading analysts to assume that accumulated stress between the plates could result in a magnitude 7.8 earthquake.[25]

Soils

Soils in the City of Coachella are comprised of a mix of eroded sediments from the surrounding mountain ranges that have filled in the Valley floor over several million years. Presently, sediments deposited by water drainage (alluvial), or carried by wind (aeolian) are made up of fine silts, clay, gravel, and sand. Toward the southeast end of the Coachella Valley, soils contain higher amounts of very fine-grained lake (lacustrine) deposits and salts from repeated cycles of Colorado River inundation forming Ancient Lake Cahuilla.[26]

Liquefaction

Liquefaction occurs when seismic ground shaking causes groundwater pressure to increase and fully saturate the the upper layers of soil causing the soil to become a fluid-like mass and lose stability or bearing strength. This occurs within the upper 50 feet of the ground surface in loose fine-grained to medium-grained sandy/silty soils. Ramifications can include damage to buildings and structures and subsurface infrastructure. Liquefaction leads to other ground failure conditions such as lateral spreading, flow failure, ground oscillation, and ground lurching.

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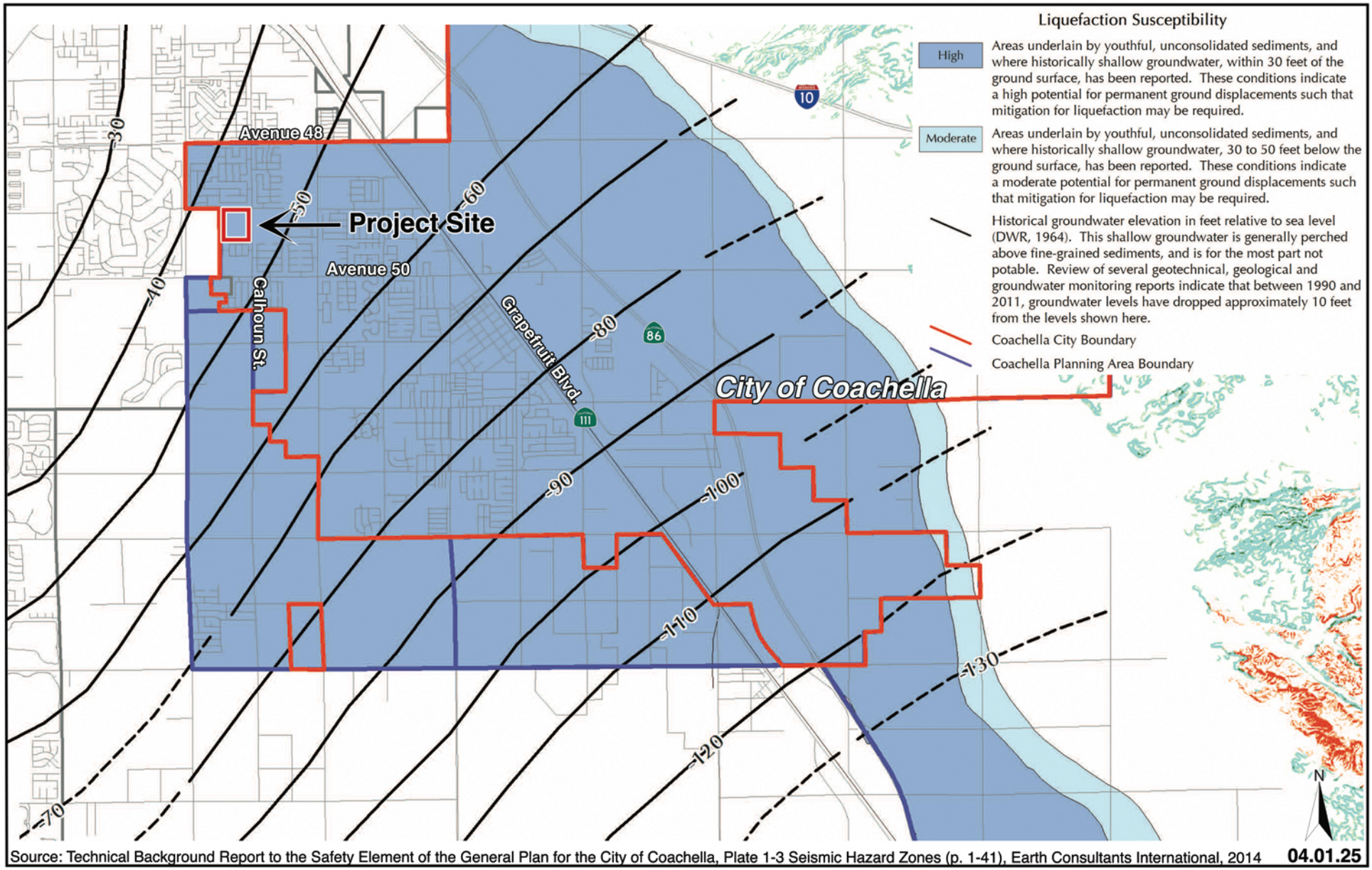
25 "California's Salton Sea May Be Staving off Earthquakes As It Disappears," Scripps Institutions of Oceanography, University of California San Diego, June 7, 2023.

26 Existing Conditions, City of Coachella General Plan 2035 Update, April 2015.

Three geologic conditions need to be met for liquefaction to occur: long duration of ground shaking; the presence of young, loose, unconsolidated sediments; and the presence of groundwater within 50 feet of the surface. All three conditions may potenitally be met in the City of Coachella. Nearby active faults such as the Southern San Andreas or San Jacinto may experience earthquake events. Soils in the City west of the Whitewater River/Coachella Valley Stormwater Channel are made up of young unconsolidated sand, silt with clay and gravel. Although the water table fluctuates depending on the rate of extraction versus the rate of recharge, it is within 50 feet of the surface in portions of the City. Also, perched water, which is non-potable groundwater that occurs between the surface and an impermeable layer of clay that sits above the deeper aquifer can contribute to liquefaction. The east end of the Coachella Valley contains the clay layer and perched water. Exhibit 6 of this report shows Plate 1-3 from the Background Technical Report for the General Plan Safety Element, which describes the portion of the City that is highly susceptible to liquefaction.[27] The Project site is located within this area.

[27] Technical Background Report to the Safety Element of the General Plan for the City of Coachella, Plate 1-3 Seismic Hazard Zones (p. 1-41), Earth Consultants International, 2014.



Source: Technical Background Report to the Safety Element of the General Plan for the City of Coachella, Plate 1-3 Seismic Hazard Zones (p. 1-41), Earth Consultants International, 2014

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TERRA NOVA®
PLANNING & RESEARCH, INC.

Liquefaction Susceptibility
Calhoun Street Housing Development
Coachella, California

Exhibit
6

Ground Subsidence

The gradual settling or sinking of the ground surface can occur as smaller local collapses or broader regional lowering of the ground occurs. A diverse range of causes commonly stem from both natural phenomenon such as earthquakes, and human activities such as construction, water and mineral extraction, as is common in southern California. Ground subsidence in the Coachella Valley has been associated with excessive groundwater pumping and the greatest extent has occurred in the central portions of the valley between Indian Wells and the Lake Cahuilla reservoir. The Coachella Valley Water District and the Desert Water Agency are primarily responsible for addressing the over-pumping and overdraft condition that has caused ground subsidence. A program of groundwater recharge has been underway for several decades and has slowed or overdraft and has slowed or stopped subsidence in most areas where it had occurred. The replenishment sites have seen an increase groundwater in storage.

Paleontological Resources

Paleontological resources are the fossilized remains of prehistoric plant and animal life dating more than 10,000 years ago, near the end of the last Pleistocene glaciation period and the beginning of the Holocene epoch. Fossil remains including bones, teeth, shells, and plant leaves are typically discovered in the geologic deposits where they were buried, although erosion can expose fossils to the surface.

The City's Planning Area contains four different rock types with varying levels of paleontological sensitivity: Ocotillo Conglomerate (low sensitivity), Palm Springs Formation (high sensitivity), Lake Cahuilla Sediments (high and undetermined sensitivity), Holocene Alluvium (low sensitivity).

Discussion of Impacts

a, i) No Impact. A fault rupture occurs when movement on a fault breaks through the surface of the Earth. Fault ruptures can range from one inch to fifty miles or more. While the City Planning Area is near the SSAF, which could potentially generate a magnitude 7.8 earthquake, there are no active faults on or near the Project site. According to the California Department of Conservation's Earthquake Hazards Zone Application (EQ Zapp), the Project site is located 3.18 miles southwest of the SSAF. Since there are no active faults on the Project site or in the near vicinity, no impacts from fault ruptures are expected.

a, ii) Less Than Significant Impact. The City's General Plan estimates that the City could be severely impacted if a major earthquake event occurred along the section of the SSAF that extends through the City's eastern planning area. The Project site is located 3.18 miles southwest of the fault zone and would be susceptible to considerable ground shaking should a major earthquake occur. The San Jacinto Fault Zone, approximately 17.6 miles southwest, is considered to be more active and could produce a magnitude 6.6 earthquake along certain segments, which could cause ground shaking in the City.

Buildings can be engineered to withstand a certain intensity of ground shaking. The Project is subject to the City's Municipal Code §15.66 Seismic Hazard Mitigation.[28] The General Plan also requires all new structures to designed with the most current California Building Code including provisions for

[28] Coachella, California Code of Ordinances §15.66, "Seismic Hazard Mitigation."

seismic loads, lateral forces and grading.[29] These standard requirements are designed to reduce the impacts of ground shaking to structures and people. Compliance with the most current state and local design standards would ensure that the impacts associated with ground shaking would be less than significant.

a, iii) Less Than Significant Impact. Liquefaction of soil may occur when a site contains soils that are particularly susceptible to liquefaction such as unconsolidated sandy and silty soil. Liquefaction also requires strong seismic shaking and the presence of groundwater within 50 feet of the surface. The California Department of Water Resources monitors groundwater wells in the Coachella Valley and provides data via a Current Groundwater Levels interactive map application. On March 7, 2024 the groundwater depth was recorded as 78.80 feet at a well located approximately 1.5 miles southwestof the Project site near the corner of Monroe Street and Avenue 50. On March 12, 2024 groundwater depth of 31.00 feet was recorded at a well located approximately 2.5 miles northeast of the Project site at Tyler Street and Avenue 48.[30] As discussed above, the region of the City of Coachella west of the Whitewater River/Coachella Valley Stormwater Channel is susceptible to liquefaction. The 2014 Technical Background Report to the Safety Element provides exhaustive research detailing the soil, groundwater and seismic conditions that lead to potential liquefaction in the City and provides an official Seismic Hazards Map that may be applied to projects in the City (see Exhibit 6).[31]

The General Plan Safety Policy 1.6 requires a liquefaction assessment study for any project located within the defined liquefaction susceptibility area "to be conducted in accordance with the provisions in the Seismic Hazards Mapping Act and the most recent version of the California Geological Survey's Special Publication 117: Guidelines for Evaluating and Mitigating Seismic Hazards in California." Furthermore, Policy 1.7 requires the implementation of mitigation measures to "all habitable structures, bridges, roadways, major utility lines and park improvements as a condition of approval" in areas where the geotechnical studies determine that the soil is susceptible to liquefaction.[32] The City will require the submittal of a geotechnical analysis concurrent with building plans, to address site- and project-specific conditions. This analysis will include recommendations, including over-excavation and soil compaction, foundation design and structure, to assure that liquefaction, if it occurs, is mitigated.

As the geotechnical assessment, soil mitigation and Project design requirements are met, the potential impacts resulting from seismic activity which result in liquefaction or associated ground failure will be less than significant.

a, iv) No Impact. The Project site is located on a relatively flat, low-lying central region of the Salton Trough where the soil consists of fine sand, silt and clay. The nearest hillside is the Santa Rosa Mountains foothills, 4.5 miles to the southeast. The Project site is not susceptible to landslides and no impacts from landslide events are anticipated.

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29 Safety Element, City of Coachella General Plan 2035 Update, April 22, 2015.

30 California's Groundwater Live: Current Groundwater Levels, California Department of Water Resources, accessed July 2024.

31 "Plate 1-3 Seismic Hazard Zones," Technical Background Report to the Safety Element, City of Coachella, Earth Consultants International, 2014.

32 Safety Element, City of Coachella General Plan 2035 Update, April 22, 2015.

b) Less Than Significant Impact. Development of residential neighborhoods including site preparation, grading, construction of building structures can cause soil erosion via wind and water. To control fugitive dust emitted from the Project site, the applicant must prepare a fugitive dust control plan to be approved by the City prior to obtaining grading and construction permits.[33] The fugitive dust control plan will implement one or more best available control measures as defined by the Coachella Valley Fugitive Dust Control Handbook.[34] To control erosion resulting from stormwater, the applicant must provide proof that the Project complies with State permitting for stormwater discharges from construction activities prior to obtaining the grading or construction permits from the City.[35] To implement this requirement, the City will require the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) concurrent with submittal of grading and improvement plans.

Post construction, the Project site will be stabilized by landscaping, roadways, and structures which will control dust and soil erosion from storm events. Stormwater flows will be controlled by the Project design which will have incorporated Best Management Practices as defined by the Project WQMP (Appendix E) to prevent soil erosion during storms.

With implementation of the fugitive dust control measures and stormwater best management practices, impacts from soil erosion during construction and operational phases will be reduced to less than significant levels.

c) Less than Significant Impact. The surface soil of the Project site is composed mainly of fine-grained sand, silt and clay that resulted from lacustrine deposits of Ancient Lake Cahuilla and distal fan deposits carried by streams bringing eroded material from upper elevations. The soil type is not prone to lateral spreading or collapse, nor is this soil type susceptible to on- or off-site landslide events.

However, as discussed above in impacts section (a.iii), the Project site occurs in an area that is susceptible to liquefaction due to the proximity to an earthquake fault zone, the soil type, and potentially also due to the perched groundwater level should it rise to at least 50 feet below the surface. Plate 1-3 of the Background Technical Report for the Safety Element should be regarded as the official liquefaction susceptibility map. Pursuant to the State's Seismic Hazards Mapping Act, projects occurring withing a State-delineated Seismic Hazard Zone for liquefaction must be evaluated by a Certified Engineering Geologist and/or a Registered Geotechnical Engineer. Furthermore, the project review conducted by the City must be performed by geologists and engineers with the same credentials and experience.

As described above, the City will review the geotechnical analysis and the required remediation prior to issuing construction permits. The engineering analysis and subsequent steps to prevent liquefaction would ensure that impacts resulting from potentially unstable soils would be less than significant.

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33 Coachella, California Code of Ordinances, §13.16.340, "Stormwater Quality Management Plan and BMPs."

34 "Rule 403.1 Supplement Fugitive Dust Control Requirement for Coachella Valley Sources," South Coast Air Quality Management District, April 2004.

35 Coachella, California Code of Ordinances, Chapter 8.20, "Fugitive Dust Control."

d) No Impact. Clay minerals can expand in size as the amount of moisture increases in the soil. Expansion can cause the ground to swell which can result in damage to buildings, structures, roadways, and other surface features. The soil found on the Project site contains a mix of fine- to medium-grained sand, silt and clays that have been deposited by wind and by periodic river flooding as well as remnant lakebed sediment. The soil composition of the Project site is not prone to expansion and, therefore, associated impacts are not expected to occur.

e) No Impact. The Project site will be served by the City of Coachella Sanitation Division, and as such, there are no plans to install septic systems. The area is currently served by 8-inch and 12-inch wastewater effluent lines on Calhoun Street. The infrastructure will be extended to serve the proposed residential community. Therefore, there will be no Project impacts from the use of septic tanks or alternative wastewater systems.

f) No Impact. The potential for discovery of paleontological resources on the Project site is low as there are no records of any such discoveries in the nearby vicinity of the City's Planning Area. The Project occurs within an area of the City designated as an area of undetermined sensitivity. The Project is not expected to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. There would no impacts.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

City of Coachella General Plan 2035 Update, April 2015

City of Coachella General Plan 2035 Update, Technical Background Report to the Safety Element "Plate 1-3 Seismic Hazard Zones," Earth Consultants International, 2014

City of Coachella General Plan 2035 Update EIR, June 2014

Coachella, California Code of Ordinances §15.66, "Seismic Hazard Mitigation"

Safety Element, City of Coachella General Plan 2035 Update, April 22, 2015

California Geological Survey
"California's Salton Sea May Be Staving off Earthquakes As It Disappears," Scripps Institutions of Oceanography, University of California San Diego, June 7, 2023.

California's Groundwater Live: Current Groundwater Levels, California Department of Water Resources.

VIII. GREENHOUSE GAS EMISSIONS Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			✓	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?				✓

Environmental Setting

The lower troposphere of the Earth's atmosphere contains a mix of gases that sustain life. Greenhouse gases (GHGs) comprise a small percentage, 0.04%, of these tropospheric gases and trap just enough heat to maintain a relatively constant and livable air temperature. Even small alterations in this composition are well documented via proxy and direct climate measurements.

Human activities including the burning of fossil fuels, clearing native vegetation, altering landscapes to accommodate hardscapes and built environments all emit additional GHGs and reduce the Earth's ability to cycle and sequester carbon resulting in exponential net increase in atmospheric GHG levels. While no one development project can have a globally significant impact on greenhouse gas increases, the cumulative impacts of regional development can result in locally significant environmental changes, which in turn contribute to wider climatic changes. Hence, the state and local jurisdictions have adopted policies and thresholds that cap GHG emissions and mandate mitigations when needed to ensure new land uses minimize their impacts.

The major greenhouse gases present in the atmosphere and increased by human activities are described in Table VIII-1.

Table VIII-1
Description of Major Greenhouse Gases

Greenhouse Gas	Emissions Sources	Global Warming Potential	Atmospheric Lifetime
Carbon Dioxide (CO_2)	Next to water vapor, carbon dioxide is the most abundant GHG. Human activities emit CO_2 when burning fossil fuels and burning and removing forests and other vegetation. Looking back 800,000 years prior to the Industrial Revolution, the level of CO_2 in the atmosphere never climbed above 300 parts per million. Today we measure CO_2 at 419.81 parts per million.	1	1,000s of years

Table VIII-1
Description of Major Greenhouse Gases

Greenhouse Gas	Emissions Sources	Global Warming Potential	Atmospheric Lifetime
Methane (CH_4)	Methane is the third most abundant GHG in the atmosphere. It is released during the extraction, refining, and burning of fossil fuels, and the burning and clearing of native vegetation. Raising of livestock, decay of organic waste, and landfills also emit methane.	25	About 10 years
Nitrous Oxide (N_20)	Like carbon dioxide and methane, nitrous oxide naturally occurs in the atmosphere. It is also released by agricultural activities and agricultural chemicals, fossil fuel combustion, wastewater treatment and industrial processes.	298	More than 100 years
Fluorinated Greenhouse Gases	Chlorofluorocarbons (CFCs), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur Hexafluoride (SF_6) Together these 30 different gases are referred to as fluorinated GHGs. F-GHGs are solely emitted as by-products of industrial processes such as aluminum and semi-conductor manufacturing and used as refrigerants and aerosol propellants.	Between 12 and 22,800	Tens to thousands of years

Sources: Overview of Greenhouse Gases, Environmental Protection Agency, accessed March 2025, https://www.epa.gov/ghgemissions/overview-greenhouse-gases; Global Warming Potentials, IPCC Fourth Assessment Report, 2007.

The 2016 Senate Bill 32 (SB 32) requires California to reduce overall greenhouse gas emissions by 40% below 1990 levels by the year 2030. This bill furthers the mandates of the prior 2006 Assembly Bill 32 which required the state the reduce GHG emissions to 1990 levels by 2020. Going beyond SB 32 is the 2022 Scoping Plan proposed by the California Air Resources Board (CARB) which sets forth a plan to achieve statewide 100% carbon neutrality by 2045.

The City of Coachella is under the jurisdiction of the SCAQMD, the local agency that determines pollution emissions standards from stationary sources. The CARB determines emissions standards for mobile sources for the entire state. In 2015 the City of Coachella adopted a Climate Action Plan (CAP) to ensure that its General Plan and future development would comply with the original 2006 AB 32 goals, CARB's 2022 Scoping Plan, and SCAQMD's GHG emissions thresholds.

City of Coachella Climate Action Plan

In April 2015 the City adopted a Climate Action Plan (CAP) to help implement General Plan policies and programs aimed at reducing greenhouse gas emissions via the reduction of energy consumption, vehicle miles traveled, resource consumption and the generation of waste. In order to meet the State AB 32 GHG reduction target in place at the time, the CAP estimated that to achieve a target of 49% below 2010 by 2035, the City would need to reduce greenhouse gas emissions by 5.1 metric tons of carbon dioxide equivalent ($MTCO_2e$) per person, resulting in a per person emission rate of 4.2 $MTCO_2e$, or a total of 786,993 $MTCO_2e$ citywide.[36] Emissions reductions would stem from sectors including, but not limited to greater energy efficiency achievements, reduction of solid waste,

[36] Coachella Climate Action Plan, Table 7, Greenhouse Gas Reductions and Proposed Targets (2020 and 2035), April 22, 2015.

installation of renewable energy systems, increase the amount of open space and shade vegetation, and the growth of alternative transportation systems. The City's CAP has not been updated since its initial adoption.

Greenhouse Gas Thresholds

Since each GHG affects the atmosphere differently, for purposes of project analysis, GHG emissions are converted to carbon dioxide equivalencies and measured in metric tons ($MTCO_2e$). When evaluating potential GHG emissions from proposed non-industrial projects, SCAQMD applies a tiered approach. If a project does not conform to at least one of the tiers described below, the project's impacts would be considered significant.

Tier 1: Consider whether the project qualifies for any applicable exemption under CEQA. If the project qualifies for an exemption, then the project is not significant and no other action is required.

Tier 2: Consider whether the project complies with a local greenhouse gas reduction plan that is at minimum consistent with AB 32.

Tier 3: Consider whether the project is below an absolute threshold of either 10,000 $MTCO_2e$/year for industrial projects or 3,000 $MTCO_2e$/year for residential projects.

Tier 4: Consider whether the project is below a set performance threshold. This threshold is yet to be set and is not recommended for analysis at this time.

Tier 5: Consider whether off-site mitigation would reduce the project's GHG emission impacts to less than the proposed screening level.

Discussion of Impacts

a) Less Than Significant Impact. If the Project generates greenhouse gas emissions in excess of the established thresholds, either directly or indirectly, then the Project's impact would be significant. As stated above, project-based impacts are compared against the SCAQMD tiered greenhouse gas emissions thresholds. Emissions generated by the proposed Project are measured against Tier 3, 3,000 $MTCO_2e$/year for residential and commercial projects.

A CalEEMod analysis was conducted in November 2025 and was based on the most recent Project site plan which included 257 units on a net area of 37.28 acres, a 3.53-acre park with retention basin, common landscaped areas, four additional landscaped retention basins, asphalt streets, and 2,517 daily trips. CalEEMod accounts for landscaping and driveway hardscape for residences. Table III-3 provides a summary of the Project's land use data that was applied to the model. The detailed CalEEMod report for the Project is available in Appendix A.

The CalEEMod analysis that forms the basis for this discussion was generated in November 2025 For analysis purposes, a three-year build out timeframe was assumed for the construction of 257 homes, the 3.13-acre park, streets, retention basins, and common area landscaping. CalEEMod accounts for landscaping and driveway hardscape for single family residences. Table III-3 in the Air Quality section provides details of the CalEEMod inputs, and a full copy of the report is provided in Appendix A.

Construction and Operation

Since SCAQMD does not provide GHG construction thresholds for projects, the total amount of CO_2e emissions from the construction phase of the Project is amortized over 30 years to estimate the CO_2e emissions over a one-year operational cycle. Upon buildout, six emissions source categories would contribute either directly or indirectly to operational greenhouse gas emissions including area emissions (pavement and architectural coating off-gassing) building energy usage, mobile energy usage, solid waste disposal, water usage, and refrigeration. Table VIII-2 summarizes annual construction and operational greenhouse gas emissions and then compares the Project's total annual emissions, 2,683 $MTCO_2e$, to the SCAQMD Tier 3 threshold. The Project would not exceed the 3,000 MT/YR CO2e standard for residential and commercial projects. Therefore, Project construction and operation activities would have a less than significant impact on greenhouse gas emissions.

Table VIII-2
Projected GHG Emission Summary
(Metric Tons per Year)

Construction	CO_2e (MT/YR rounded)
3 Years	1,548
30-Year Amortized*	52
Operation	**CO_2e (MT/YR rounded)**
Area	3.2
Energy	986
Mobile	1,291
Waste	344
Water	34
Refrigeration	1.2
Total Operational	2,659
Total Annual Operational (30-Year amortized + Operational)	**2,711**
SCAQMD Annual Threshold	3,000
Exceeds?	No

*Buildout construction emissions were amortized over 30 years then added to buildout operational GHG emissions.
Source: CalEEMod 2022.1

b) Less than Significant Impact. A project is considered to have a significant impact if it conflicts with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. As described above, the City of Coachella adopted a Climate Action Plan (CAP) in 2015 to ensure that its General Plan and future growth would comply with state and regional GHG reduction targets. According to the City's 2015 CAP, the total direct and indirect 2010 GHG emissions emitted by the City was 382,787 $MTCO_2e$. Of the seven community sectors evaluated

for this figure, the Transportation sector, which included gas and diesel fueled vehicles, accounted for 54% of the City's total emissions, or 206,909 $MTCO_2e$. If the City continues with business as usual (BAU), and implements no GHG reduction strategies, by 2035 the total Coachella emissions would reach 1,543,672 $MTCO_2e$. The 2015 CAP proposes emissions reductions of 49% below 2010 emissions, which would reduce annual emissions to 756,679 $MTCO_2e$ by 2035. The City's greatest reduction potential relies on various strategies to reduce Land Use and Transportation emissions.

Per the most current Project site plan, the development could potentially add 1,077 residents to the City based on an estimated average household size of 4.19.[37] This would result in a Project-per capita GHG emission rate of 2.49 $MTCO_2e$. Again, as described above, the CAP found that in order to achieve the GHG reduction target of 49% below 2010 by 2035, City residents would need to emit no more than 4.2 $MTCO_2e$ by 2035. The per capita GHG emissions impacts resulting from the build out of the Project comply with this goal and are therefore consistent with the emissions reduction targets established by the CARB 2022 Scoping Plan for Achieving Carbon Neutrality and SCAG's 2024 RTP/SCS, which are all consistent with California's AB 32 and SB 32. Based on this analysis, the proposed Project subdivision and future build out will not conflict with and would not significantly impact an applicable plan, policy or regulation with the purpose of reducing GHG emissions.

Mitigation Measures: None required.

Monitoring: None required.

Sources:
City of Coachella General Plan 2035 Update, April 2015

Coachella Climate Action Plan, April 2015

California Emissions Estimator Model (CalEEMod) Version 2022.1

South Coast Air Quality Management District, Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans, December 2008.

[37] E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024, California Department of Finance, released May 1, 2025.

IX. HAZARDS AND HAZARDOUS MATERIALS Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			✓	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			✓	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				✓
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				✓
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				✓
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				✓
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?				✓

Environmental Setting

As the human population grows, so grows our use of hazardous substances for industrial, agricultural, and domestic activities. Likewise, our exposure to myriad forms of hazards increases. Prior to the 1970s, federal and state laws governing the transportation, application and disposal of toxic and hazardous substances were either lax, insufficient, or non-existent. Past and current landmark

investigations have led to numerous legislative actions to control and properly manage hazardous materials. Today, development is subject to requirements ranging from local ordinances to federal laws.

The City of Coachella has historically been a major agricultural hub for the Coachella Valley and despite recent land use conversions to urban and industrial uses, 33% of the City's land, in the south and east regions of the City's Planning Area, remains under agricultural use, and nearly 30% of the jobs are still in the agricultural sector.[38] Fertilizer and pesticide applications can pose public health risks via air transport and infiltration into surface and groundwater sources.

There are hazardous materials producers, waste generators, disposal sites, and clean-up sites in the City of Coachella. The majority, not all, of these business and sites are located along Grapefruit Boulevard and Harrison Street and in the Downtown area. Small waste generators may be smaller businesses such as dry cleaners, auto repair shops, stores, hospitals, or metal plating shops that generate between 100 and 1,000 kilograms of waste per month. Large generators produce more than 1,000 kilograms per month and can include chemical manufacturers, gas stations, military installations and munitions manufacturing plants. The three large waste generators, Armtec Defense Products, Inc. on Avenue 53 and Tyler Street, Peter Rabbit Farms on Grapefruit Boulevard and the Chevron Station on Dillon Road, are located between two and three miles from the Project site.

The discussion of impacts from hazards and hazardous materials is based on the 2014 Technical Background Report for the Safety Element, California Office of Environmental Health Hazard Assessment (OEHHA), Department of Toxic Substances Control (DTSC), the State Water Resource Control Board GeoTracker, and the Riverside County Department of Environmental Health. According to these sources, there are no large hazardous materials generators or clean-up sites within two miles of the Project site.

Discussion of Impacts

a, b) Less Than Significant Impact. The Project proposes to construct 257 single-family residences, a community pool, a community park, and landscaped open spaces on a currently vacant parcel.

Construction Phase: Construction would necessitate the transporting of potentially hazardous materials such as paints, solvents, concrete and asphalt. The use of heavy equipment that would consume limited quantities of diesel fuel and oil would be required. During construction, a staging area would be identified where equipment and construction supplies would be stored, pursuant to City and Cal OSHA standards. Should any spillage or leakage of hazardous substances occur, it would occur in this staging area where it could be contained and cleaned. The construction phase is temporary, and the use of hazardous materials would not be in quantities that would pose risks to public health or environmental health. Impacts from the transport, handling and disposal of hazardous materials related to construction are expected to be less than significant. The containment of construction-related hazardous materials to a staging area where an accidental release of a hazardous substance to the environment would be quickly remediated reduces potential impacts to less than significant levels.

[38] City of Coachella General Plan 2035 Update, April 2015.

Operational Phase: As a residential community, a certain limited amount of toxic or hazardous chemicals may be used to maintain the community pool, landscaping, or to clean public areas. The amount of chemicals stored on site by the community facilities operators would be in small quantities and would not pose a public or an environmental health risk. For purposes of proper disposal, businesses must comply with federal and state laws by classifying their waste products and follow guidelines for the appropriately sized very small or small quantity generator.

Residential units are anticipated to use and dispose of toxic and hazardous materials such as cleaners, landscaping chemicals, paints, oil, batteries, lightbulbs and electronic waste, collectively known as household hazardous waste (HHW). Residents may store small quantities of potentially hazardous materials at their homes, and the disposal of HHW would be subject to State and County guidelines and carried out by Burrtec, Inc., the waste management company contracted by the City. Burrtec, Inc. provides educational materials online regarding residential hazardous waste disposal and offers curbside pick-up of certain materials. Residents may also drop-off anti-freeze, batteries, oil and paint (ABOP) at the Burrtec Coachella Valley Transfer Station on Landfill Road in Coachella.

State and County regulatory oversight regarding the transport, handling, and disposal of hazardous materials ensure that the construction and operational phases of the Project would generate less than significant impacts. The use of hazardous materials in small quantities during construction and operational phases and the use of a construction staging area would contain potential accidental releases to the environment and reduce their impacts to less than significant levels.

c) No Impact. The Project development will result in 257 single-family homes, retention basins and a park. This type of development is not expected to generate or emit hazardous materials or acutely hazardous substances or produce waste that would jeopardize a school.

The two schools closest to the Project site are the Imagine Dual Language Charter School, 0.71 miles south on Calhoun Street, and Cesar Chavez Elementary School, located 1.75 miles east on Avenida De Oro. Since neither school is within a quarter mile of the Project and the Project will not emit or release hazardous materials and waste that would pose a health risk to a school, there will be no impacts from the Project.

d) No Impact. Government Code Section 65962.5 is also known as the Hazardous Waste and Substances Sites, or Cortese List. The California Environmental Protection Agency (CalEPA) annually compiles this list of hazardous materials release sites based on data from the DTSC, the California Department of Health Care Services (DHCS), and the State Water Resources Control Board (WRCB). In the City of Coachella, there is one state response site, Foster-Gardener, Inc., located 1.75 miles east of the Project site. Foster-Gardener produces pesticides, herbicides, and fertilizers for agricultural application. The site has been remediated, the groundwater has been tested with acceptable levels of contaminants being present, and residential use of the site has been prohibited.

One other Cortese Listed site in the City is US Auto Salvage, a scrap metal recycling facility located 1.14 miles northeast of the Project site. The soil surface was determined to contain unhealthy levels of contaminants including lead, copper, zinc, and PCB. The site is under review.

There are no hazardous materials or waste sites on or near the proposed Project site. The Project site is not included in the Cortese List. Thus, the Project site would not pose any impacts associated with hazardous materials sites.

e) No Impact. The Project site is located 3.66 miles northwest of the Jacqueline Cochran Regional Airport, and 1.9 miles northwest of the Airport Influence Area boundary. Due to this distance, the Project area is not in an airport safety hazard zone and no excessive noise for people living or working at the Project site would occur. There would be no impacts associated with the nearby airport.

f) No Impact. The Project site is located at the southwest corner of Avenue 49 and Calhoun Street. One driveway access point will occur on the north side of the Project at Avenue 49, and another driveway access point will be located on the east side at Calhoun Street. Calhoun Street is a north-south Collector route which connects Avenue 49 and Avenue 50. Avenue 49 is designated as a Primary Arterial, and Avenue 50, which is 0.4 miles south of the proposed east driveway, is a Major Arterial.[39] Presently, Avenue 49 west of Calhoun to Jackson Street is an unimproved path. The Project proposes improvements to the 0.25-mile section of Avenue 49 between Calhoun and the Project site's west boundary in order to convert this section of the street to a Primary Arterial. Project access points on Avenue 49 and Calhoun Street will not alter the City's current circulation pattern or interfere with the City's emergency response and evacuation plans, since both are planned City roadways, and their improvement will expand the City's roadway system.

Project review by the Police and Fire Departments will be necessary to assure that the Project's driveways and streets would accommodate emergency vehicles. Traffic management during the Project's construction will be implemented so that the Project will not interfere with the City's emergency response plan or emergency evacuation plan. The Project is not expected to impact the implementation of or physically interfere with the City's emergency response plan or emergency evacuation plan.

g) No Impact. The City of Coachella is not at risk of experiencing wildland fires and does not contain any fire hazard severity zones.[40] Likewise, the proposed Project, being in an urban residential area of the City, is not susceptible to wildfires. No impacts from exposing people or structures to wildfires in the Project area are expected. Wildland fire is discussed more thoroughly below in Section XX, Wildfire.

Mitigation Measure: None required.

Monitoring: None required.

Sources:
City of General Plan 2035 Update, April 2015

Technical Background Report to the Safety Element, City of Coachella General Plan 2035 Update, Earth Consultants International, 2014.

[39] City of Coachella General Plan 2035 Update, Mobility Element, April 2015.

[40] Fire Hazard Severity Zone Viewer, California Department of Forestry and Fire Protection, updated April 1, 2024.

California Office of Environmental Health Hazard Assessment (OEHHA)

Envirostor, California Department of Toxic Substances Control (DTSC)

State Water Resource Control Board GeoTracker

Riverside County Department of Environmental Health

CalFire Fire Hazard Severity Zones Map Viewer

X. HYDROLOGY AND WATER QUALITY Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			✓	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			✓	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:			✓	
i) result in substantial erosion or siltation on- or off-site;			✓	
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;			✓	
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or			✓	
iv) impede or redirect flood flows?			✓	
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?				✓
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?				✓

Environmental Setting

Domestic Water

The Coachella Valley Groundwater Basin is the main source of municipal, or domestic, water for the entire Coachella Valley and is managed by six different water agencies: Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), Indio Water Authority (IWA), Mission Springs Water District (MSWD), and the Myoma Dunes Mutual Water Company (MDMWC). Local rainwater and snowmelt have filled the basin with water over a period of several million years, but human activities continue to pump more water than can be naturally

recharged. CVWD and DWA have supplemented recharge efforts by importing and percolating Colorado River water into the basin. Both agencies also supplement irrigation water with recycled wastewater.

The Coachella Valley Groundwater Basin is comprised of several subbasins which are divided by faults. Fresh water for the City's residential, commercial and industrial uses is sourced from the East Indio Subbasin, which is part of the larger Indio Subbasin. CVWD, IWA and CWA collectively manage the East Indio Subbasin.

Currently, the CWA serves the area west of Grapefruit Boulevard and smaller industrial/commercial corridor north of Avenue 48, while the largely agricultural use to the east is served by the Coachella Canal and privately owned wells. CWA delivers municipal freshwater, collects wastewater, and manages local drainage. Six wells with a total pumping capacity of 11,400 gpm, or 16.5 MGD are owned and operated by the City. Three storage reservoirs provide a total storage capacity of 10.5 MG (million gallons). The distribution network includes 120 miles of pipeline with pipe diameters of 4 inches to 36 inches.

Water Quality

As water naturally flows over the land in rivers, streams, springs, and lakes, and collects in groundwater basins, both naturally occurring contaminants and those emitted from human activity can end up in water supply systems. Thus, water districts and regulatory agencies regularly test water for contaminant levels and mitigate as needed. Contaminants include microorganisms, inorganics (salts, metals), pesticides and herbicides, organic chemicals, and radioactive particles. The CWA publishes water quality test results in an annual Water Quality Consumer Confidence Report (CCR). As of 2023, the City's water supply has had no contamination violations and levels of contaminants are well below the allowable limits as set by the federal Environmental Protection Agency and the State Water Resources Control Board.[41]

Wastewater Treatment

The City of Coachella Sanitation Division (CSD)treats wastewater at its 4.5 MGD (million gallons per day) wastewater reclamation plant (WRP) located at the east end of Avenue 54. Wastewater is treated to a secondary level and discharged into the adjacent Whitewater River/Coachella Valley Stormwater Channel. During the 2023-2024 Water Year, the CSD WRP treated 3,082 af of wastewater.[42]

The CSD collects and treats water from residential, commercial and industrial areas. The collection system consists of 90 miles of pipeline ranging in diameter of 4 inches to 54 inches, 1,580 manholes and two pump stations. The Project would be able to connect to the existing pipeline on Calhoun Street that extends north of Avenue 50.[43]

41 2023 Water Quality Consumer Confident Report, Coachella Water Authority and Sanitary District, issued July 2024.

42 Indio Subbasin Annual Report for Water Year 2023-2024, Table 5-10 WY 2023-2024 Wastewater Treatment, Reuse, and Disposal in the Indio Subbasin, March 2025.

43 City of Coachella 2015 Sewer System Master Plan, prepared by CDM Smith, June 2015.

Floodplain Management

The Coachella Valley lies within the Whitewater River Watershed, the regional drainage feature that extends from the slopes of Mount San Gorgonio to the Salton Sea. The Whitewater River is the main drainage feature and is fed by mountain streams along its course. In the higher elevation of the Whitewater River, water runs generally year-round, but is ephemeral in the low desert, and has been channelized at the eastern end of the Valley to control stormwater. The CVWD maintains major tributary facilities that guide floodwater into the Coachella Valley Stormwater Channel, but drainage throughout the Coachella Valley generally falls under the supervision of the local cities or the county where it occurs.

Historically the City of Coachella has not constructed extensive infrastructure to control stormwater flows. The 2021 City of Coachella Stormwater Master Plan lays out plans to identify and construct stormwater drainage infrastructure in partnership with the CVWD. Self-contained residential neighborhoods, such as the proposed Project, are required to contain their own drainage basins which manage stormwater flows within their properties, and prevent off-site flooding.

Discussion of Impacts

a) Less Than Significant Impact. The Calhoun Street Housing Development is located in the Whitewater River watershed which drains into the Salton Sea and is part of the larger Colorado River Watershed. Development such as the proposed Project is required to comply with the Clean Water Act, Porter-Cologne Water Quality Control Act, Regional Water Quality Control. Plans, Safe Drinking Water Act, and recycled water regulations. The proposed Project impacts would be significant if the Project were to violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality. In compliance with the National Pollutant Discharge Elimination System (NPDES) regulations to minimize the pollutant load associated with urban and development activities, a Project-Specific Preliminary Water Quality Management Plan (WQMP) dated January 17, 2025 was prepared for the Project by The Altum Group (see the full WQMP in Appenidx E).[44]

Pollutants potentially discharged from the Project site may include bacteria/viruses, heavy metals, nutrients, toxic organic compounds, sediment, trash and debris, oil and grease. Per local requirements, the Project will implement permanent Site Design Best Management Practices (BMPs), Source Control, LID Site Design (Low Impact Development), and Treatment Control BMPs where necessary. On-site retention and filtration facilities such as landscape swales and strips, biofiltration capability, an extended retention basin, a sand filter basin, an infiltratration basin, permeable pavement, and a bioretention basin will be implemented to address the pollutants of concern. The Infiltration Basin system is designed to capture 100% of a 100-year storm event and meets the City's standards.

For construction drainage, the Project would be required to implement a SWPPP to ensure that construction activities do not contaminate surface or ground water quality. The SWPPP would affirm the potential for pollutant discharge, as well as practical monitoring and reporting processes and other strategies to ensure pollutant discharge does not adversely impact water quality.

[44] Project-Specific Preliminary Water Quality Management Plan, Calhoun Street Subdivision, prepared by The Altum Group, January 17, 2025.

Adherence to these water quality requirements ensures that the Project will not violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or ground water quality. Any potential impacts will remain at less than a significant levels.

b) Less Than Significant Impact. In compliance with the 2014 Sustainable Groundwater Management Act and to forecast the water demand on the Indio Subbasin, CWA along with three other local water agencies prepared a water management framework known as the Indio Subbasin Water Management Plan (CVWMP). The most recent 2022 update (Alternative Plan Update) includes forecasted water demand calculations for current and potential future customers within the Indio Subbasin Plan Area, which includes the East Indio Subbasin. The 2022 Alternative Plan Update relies on population growth forecasts supplied by the 2020 SCAG Regional Growth Forecast, SCAG Land Use Inventories, housing and employment analyses. Additionally, the water agencies have prepared a series of Indio Subbasin Annual Reports, the most recent of which explains that the actual total water use for the 2023-2024 Water Year was lower than the forecasted water use described in the 2022 Alternative Plan Update.

To estimate the Project's annual water demand for indoor use, a calculation was made based on an average household size of 4.19 people in the City of Coachella.[45] Using the California State standard for indoor residential water use of 47 gallons per capita daily (gpcd), the Project's 257 housing units would consume approximately 56.71 acre-feet per year (afy).[46]

Total Project outdoor water use for household and common area landscaping, based on CVWD outdoor irrigation factors, would be 23.83 afy.[47] The total daily water demand for all 257 homes and common area landscaping would be 80.54 af/y. Table X-1 below provides details regarding estimated indoor and outdoor water demand upon build out of the Project.

According to the Indio Subbasin Annual Report for Water Year 2023-2024, the total amount of groundwater extractions amounted to 267,495 af. Of this total amount, the urban water use sector accounted for 224,479 af.[48] The urban water use sector includes municipal, residential, commercial, golf courses and other uses. The impacts of increased urban water use on the Indio Subbasin were accounted for in the 2022 Alternative Plan Update. The Project's water demand for both indoor and outdoor uses would account for 0.036% of the urban groundwater extraction from the Indio Subbasin. To comply with the regional Sustainable Groundwater Management Plan, the Project would remain consistent with the City's water resource conservation policies outlined the General Plan and install drought tolerant landscaping and low water-use appliances.[49] Water demand by the Project would be less than significant. Table X-1 summarizes the Project's estimated domestic demand compared to the most recent groundwater extraction data for the Indio Subbasin.

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45 E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024, California Department of Finance, released May 1, 2025.

46 Standards for Indoor Residential Water Use, California Water Code §10609.4(a).

47 Calculations based on Chapter 3.15 Landscape and Irrigation System Design Criteria, CVWD Ordinance Code, updated 2024.

48 Indio Subbasin Annual Report for Water Year 2023-2024, Table 4-1 WY 2023-2024 Groundwater Extractions by Water Use Sector in the Indio Subbasin, March 2025.

49 City of Coachella General Plan Update 2023, Sustainability and Natural Environment Element, Goal 3, Water Resources, April 2015.

Table X-1
Project Water Demand

Land Use: Single-Family Residential	No. of Dwelling Units (DU)	Estimated Occupants per Home	Gallons per Day (gpd) per Occupant[2]	gpd/DU	Project Daily Water Demand (gpd)	Project Annual Water Demand acre-feet/year (af/y)
HH Indoor Water Use	257	4.19[1]	47[2]	197	50,629	56.71 af/y
HH Outdoor Water Use[3]	257			14.52	3,732.48	4.18 af/y
Landscaping (Common Areas acreage)	303,533 sf				17,540.65	19.65 af/y
					TOTAL	**80.54 af/y**
					2023-2024 Indio Subbasin Urban Water Use	**224,479 af**
					Project's Percentage of 2023-2024 Indio Subbasin Water Use	**0.036%**

1. California Department of Finance, Table E-5, City/County Population and Housing Estimates, 1/1/2025.
2. CA Indoor Residential Water Use Standards, 2025-2030.
3. 250 sf per DU, City of Coachella Code of Ordinances §17.14.030.
4. Common open space includes: the park (minus parking lot), retention basins, decorative landscaped areas.
5. Outdoor water demand calculations based on CVWD Evapotranspiration (ETo), Evapotranspiration Adjustment Factor (ETAF), and Conversion Factor (CVWD Landscape Ordinance §3.15, Appendices C and D). Each residence has 250 sf of open space = 64,250 sf. Common open space = 303,533 sf.
6. DU = Dwelling Unit, HH = Household

The Project's wastewater demand was also calculated, based on an assumption that approximately 90% of domestic water use would enter the wastewater treatment system. As described above, the 2023-2024 Annual Report provides wastewater treatment data for water agencies that manage the Indio Subbasin. During 2023-2024, the City of Coachella Wastewater Reclamation Plant (WRP) treated 3,082 af of wastewater. Based on the 2023-2024 data, the Project would comprise 1.65% of the CWA total wastewater treatment. Table X-2 provides a summary of the Project's estimated wastewater demand compared to the most recent treatment data for the CSD WRP.

Table X-2
Project Wastewater Generation

Land Use: Single-Family Residential	No. of Dwelling Units (DU)	Estimated Occupants per Home[1]	Gallons per Day (gpd) per Occupant[1]	gpd/DU	Project Daily Wastewater Flow (gpd)	Project Annual Wastewater acre-feet/year (af/y)
Wastewater Flow	257	4.19	42.3	177.2	45,540	51
					Total 2023-2024 Acre-Feet Treated at CSD WRP	**3,082 af**
					Project's Percentage of 2023-2024 CSD WRP	**1.65%**

1. Between 60% and 90% of potable water may be sent to wastewater treatment. This estimate is based on 90%.

ci-civ) Less Than Significant Impact. The Project site is undeveloped, relatively flat, and contains no rivers or streams. The parcel slopes slightly from north to south as the elevation is -27 feet at the northeast corner and -33 feet at the southeast corner. Construction of the 39.98-acre parcel will entail the removal of mature palms, clearing, grubbing, rough and precise grading, roadway construction, the construction of 257 homes with landscaping for each lot and within common areas, and the addition of a recreational 3.13-acre park on the east side along Calhoun Street.

Proposed Drainage System

A Preliminary Hydrology Report was prepared by The Altum Group (Appendix D) which describes the Project's drainage system as it complies with the design criteria required by the City and the Riverside County Flood Control District.[50] The impermeable surfaces of the Project will increase on-site storm flows. However, the Project will direct storm runoff to flow across the surface via streets toward five different on-site retention basins. The basins will be designed to collectively retain 100% of flows from a 100-year storm event. Flows that exceed this capacity will be directed to exit the Project site and flow north on Calhoun Street to Avenue 48. Then storm water would flow eastward to the MS4 storm drain inlet facility on Van Buren Street where it would flow underground for one mile and empty into the Coachella Valley Storm Channel. On-site retention of 100-year storm flows would contain the increased runoff and prevent the Project from contributing runoff that exceeds the capacity of existing City storm drainage systems.

Compliance with Required Erosion and Pollution Mitigation

The proposed Project will be required to comply with the City's Code of Ordinances, Chapter 13.16, Water Quality Control. Included in the requirements are the approvals of a SWPPP, a project-specific final hydrology study, and a final WQMP prior to the issuance of building permits. In compliance with the National Pollutant Discharge Elimination System (NPDES) the Project will mitigate silt runoff from Project-induced erosion through the implementation of BMPs prescribed in the WQMP (Appendix E). Implementation of required BMPs will also reduce pollutants of concern that may enter nearby receiving waters and help reduce short and long-term water quality impacts caused by the construction and operation of the proposed Project. Approval of the WQMP, SWPPP, and the required BMPs will reduce impacts to surface waters by reducing erosion, siltation, and eliminating pollutants in storm flows. With the implementation of these standard requirements, the impacts to downstream water bodies associated with surface water pollution will be less than significant.

d) No Impact. According to the FEMA National Flood Hazard Layer Viewer, the Project site occurs in a flood zone X, an area of minimal flood hazard and low flood risk. The Whitewater River/Coachella Valley Stormwater Channel flows through the City 1.7 miles northeast/east of the Project site. The Stormwater Channel is the backbone of the Coachella Valley stormwater flood control system and is constructed to control as much as 80,000 cubic feet of water per second, which is greater than a 100-year storm event. Given the Project's distance from the Stormwater Channel and the flood zone X designation, impacts from flood hazards and seiches are not expected to occur. The City of Coachella is also not located near the coast and there will be no impacts from tsunami hazards.

[50] SW Corner – Calhoun Street at 49th Avenue Subdivision, Coachella, CA, Preliminary Hydrology Report, prepared for Pacific Coast Properties, prepared by The Altum Group, January 17, 2025.

e) No Impact. The Project will comply with all applicable water quality standards and will implement a SWPPP and a WQMP approved by the City of Coachella and the Regional Water Quality Control Board for both construction activities and the long-term operation of the site.

The Project will implement the City's drought-tolerant landscaping requirements and adhere to water conservation strategies established in the General Plan. Estimated operational annual water demand will be 0.036% of the total urban use groundwater extraction from the Indio Subbasin, which will be an incremental portion of the local water supply. Also, the water demand by the Project was included in the 2022 Alternative Plan Update forecasted water demand calculations for the years 2020-2045, since the Project is consistent with the land use designation for the site. As documented by the 2023-2024 Annual Water Report for the Indio Subbasin, the actual water demand on the Indio Subbasin between 2020 and 2024 was lower than the forecasted demand by 50,000 af. Water demand for the region has not expanded as quickly as previously forecasted, meaning the Project's water use impacts on the groundwater source will be less significant given the groundwater savings that have occurred over the past five years.

In summary, the Project would not obstruct the implementation of the City's water quality control plan or the region's sustainable groundwater management plan. There would be no impacts.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

2020 Coachella Valley Regional Urban Water Management Plan, June 30, 2021

2023 Water Quality Consumer Confidence Report, Coachella Water Authority and Sanitary District, issued July 2024

City of Coachella 2015 Sewer System Master Plan, prepared by CDM Smith, June 2015.
City of Coachella General Plan Update 2023, Sustainability and Natural Environment Element, Goal 3, Water Resources, April 2015.

SW Corner – Calhoun Street at 49th Avenue Subdivision, Coachella, CA, Preliminary Hydrology Report, prepared for Pacific Coast Properties, prepared by The Altum Group, January 17, 2025.

Indio Subbasin Annual Report for Water Year 2023-2024, Tables 4-1, 5-10 WY 2023-2024, March 2025.

Project-Specific Preliminary Water Quality Management Plan, Calhoun Street Subdivision, prepared by The Altum Group, January 17, 2025.

E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024, California Department of Finance, released May 1, 2024.

Standards for Indoor Residential Water Use, California Water Code §10609.4(a).

Fuel Consumption Rate Factors, Table D-21," Carl Moyer Program Guidelines, Volume I: Program Overview, California Environmental Protection Agency Air Resources Board, June 20, 2017

XI. LAND USE AND PLANNING **Would the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?				✓
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?				✓

Environmental Setting
The City's General Plan 2035 Update governs the development of this Project site. The City established Subareas to guide land uses and zoning as the City continues to grow. The Project is in the West Coachella Neighborhoods Subarea 1; the land use and zoning designations for the subject parcel are both "General Neighborhood," and the surrounded land use and zoning designations are "Suburban Neighborhood."[51]

The City participates in the regional Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP), and the subject parcel is within a fee area and is subject to development impact fees associated with the CVMSHCP.

The planning and construction of the proposed Calhoun Street Housing Development is guided by a Planned Unit Development (PUD) document which establishes specific land uses, intensity of use, and development standards for the Project while remaining consistent with the City's General Plan and Zoning regulations.

a) No Impact. The adjacent residential neighborhoods to the north and south are independently operated communities and will not be divided by the proposed Project. The 38-acre parcel to the east on the other side of Calhoun Street contains one single-family residence. The neighboring 35-acre parcel to the west is in the City of Indio and is currently being developed as a single-family residential use. Development on these parcels will be unaffected by development on the Project site, since each parcel will be, or has been developed as an independent community. The Project will not divide an established community. No impact will occur.

b) No Impact. The General Neighborhood land use and zoning designations for the Project site as established by the City's General Plan 2035 Update permit the development of both single- and multi-family housing units with a density of 7 to 25 dwelling units per acre. The proposed Project is consistent with these stipulations and supports the City's General Plan. The location of the Project site is not in a designated conservation area per the CVMSHCP and will not impact this environmental plan. There are no environmental conflicts with respect to the land use policy or adopted environmental mitigation policy. No Project impacts are expected.

[51] General Land Use Designations, City of Coachella General Plan Update 2035, updated April 2015.

Mitigation Measures: None required.

Monitoring: None required.

Sources:
City of Coachella General Plan Update 2035, updated April 2015

City Land Use Map, City Zoning Map

XII. MINERAL RESOURCES Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				✓
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				✓

Environmental Setting
Mineral resources in City's Planning Area include gravel, clay, oil, gas and geothermal commodities. Subarea 17, known as Eastern Coachella, contains two mineral resource zones designated as MRZ 2a, where mineral resources are significant. Two permitted mining operations occur in these zones.

Discussion of Impacts

a, b) No Impact. According to Figure 4.5-9 of the General Plan Update 2035 Environmental Impact Report, much of the City west of the Whitewater River/Coachella Valley Stormwater Channel is designated as an MRZ 1, an area where there the presence of significant mineral resources is unlikely due to the geologic formation. Since there are no mineral resources of value to the state, region or the local area in the MRZ 1, and the Project is located in this zone, the Project will not result in any loss of availability of valuable mineral resources. There will be no impacts.

Mitigation Measures: None required.

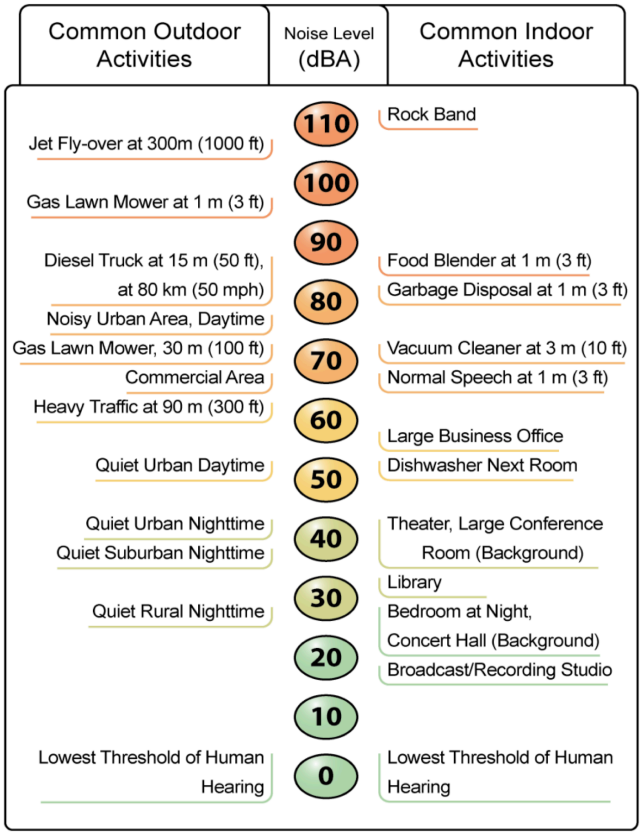
Monitoring: None required.

Sources:
City of Coachella General Plan Update Final EIR, October 2014

XIII. NOISE **Would the project result in:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			✓	
b) Generation of excessive groundborne vibration or groundborne noise levels?			✓	
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				✓

Environmental Setting

Ambient noise are background sounds emitted from a variety of sources and can either be unintrusive sounds from wind, wildlife, and neighborhood activity, or intrusive sounds from construction equipment, traffic, landscaping equipment, mechanical equipment such as HVAC systems, barking dogs, radios and stereo systems, and so forth. Noise levels are expressed as decibels (dB). The A-weighted decibel scale (dBA) filters out very high and very low frequencies such that the scale correlates to the sound a human ear would detect. 25 dBA is a very quiet sound such as a rural nighttime environment, 50 dBA would be the noise level of a refrigerator running, 80 dBA is the noise level of a tractor idling, and 105 dBA would be a louder sound such as a jet flying overhead. Exposure to 70 dBA noise level and higher over certain periods of time can damage a person's hearing.



Source: Standard Environmental Reference, CalTrans, February 2018.

To measure noise for city planning purposes, the Community Noise Equivalent Level (CNEL) scale is applied as it measures the average intensity of a sound over a 24-hour period. CNEL scale measures sound levels by assigning heavier dBA weights, or adding decibel "penalties," to existing sound dBA levels if those sounds occur in either certain sensitive zones or during unpermitted times. Figure XIII-1 provides the City's acceptable CNEL for residential land uses.

Figure XIII-1
General Plan CNEL Levels

LAND USE CATEGORIES		CNEL						
CATEGORIES	USES	55	60	65	70	75	80	
RESIDENTIAL	Single Family, Duplex, Multiple Family							
RESIDENTIAL	Mobile Homes							
COMMERCIAL - Regional, District	Hotel, Motel, Transient Lodging							
COMMERCIAL - Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theater							
COMMERCIAL INDUSTRIAL	Office Building, Research and Development, Professional Offices, City Office Building							
COMMERCIAL - Recreation INSTITUTIONAL - Civic Center	Amphitheater, Concert Hall Auditorium, Meeting Hall							
COMMERCIAL - Recreation	Children's Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club							
COMMERCIAL - General, Special INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities							
INSTITUTIONAL - General	Hospital, Church, Library, School Classroom							
OPEN SPACE	Parks							
OPEN SPACE	Golf Couse, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat							
AGRICULTURE	Agriculture							

INTERPRETATION

ZONE A (GREEN) CLEARLY COMPATIBLE	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal construction, without any special noise insulation requirements.
ZONE B (YELLOW) NORMALLY COMPATIBLE	New construction or development should be undertaken only after an analysis of the noise reduction requirements is made and needed noise insulation features included in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning will normally suffice.
ZONE C (ORANGE) NORMALLY INCOMPATIBLE	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
ZONE D (RED) CLEARLY INCOMPATIBLE	New construction or development should generally not be undertaken.

* Construction of new residential uses will not be allowed within the 65 dBA CNEL contour for airport noise.

Groundborne vibrations can be characterized as rumbling sounds which travel through the ground. Typically groundborne vibrations from human activity such as construction activity, heavy traffic, or jet planes flying overhead are felt indoors and are rarely a problem outdoors. Construction equipment may be categorized as either continuous vibration (excavation and grading equipment), low-rate repeated impact vibration (blasting, drop balls, impact pile drivers), or high-rate repeated impact vibration (jackhammers, hoe rams). The duration and amplitude of groundborne vibration from construction equipment varies. A blast would emit a high amplitude over a short duration, but grading equipment would emit a low amplitude over a longer duration.[52] Groundborne vibration as it relates to disturbance to people is measured in vibration decibels (VdB). Vibration veloctiy level of 65 VdB is considered to be barely perceptible by humans and a lower vibration velocity would be undetectable.

"Sensitive receptors" is a CEQA label granted to land uses where there are people in the community who may be particularly sensitive to noise such as residential areas, schools, libraries, churches, nursing homes, health care facilities. Four sensitive receptors are in proximity to the Project site. Two residential neighborhoods occur on adjacent properties; one single-family neighborhood is immediately south and the other single-family neighborhood is to the west in the City of Indio. Both are separated from the Project site by 6-foot block walls. A third single-family community occurs to the north across Avenue 49, and is also is bounded by a six-foot concrete block wall. Finally, the fourth sensitive receptor is a single residence to the east on the opposite side of Calhoun Street approximately 68 feet from the Project boundary.

The City's Noise Element of the General Plan provides goals and policies for ensuring that noises are maintained at appropriate levels for the various land uses. Within single- and multi-family residential land uses, 55-70 CNEL dBA are compatible exterior noise levels for the land use, but noise levels above 70 CNEL dBA are incompatible noise levels. The City Noise Ordinance provides guidance for controlling incidents of incompatible noise levels. Construction activities are exempted from the Noise Ordinance with the condition that they occur within acceptable hours of the day.[53]

Discussion of Impacts

a, b) Less Than Significant Impact. The addition of 257 new homes will increase ambient noise levels for the surrounding neighborhoods during the construction period and during the on-going operational phase. As described above, two residential communities immediately border the Project site and are separated by a six-foot block wall. The third community is further from the Project site on the north side of Avenue 49, and the single residence on the east side of Calhoun is the furthest from the Project site.

Construction Phase Impacts:
The construction equipment may generate intermittent noise as well as mild groundborne vibration. At a distance of 25 feet, a large bulldozer may produce 87 VdB, and a loaded truck could generate 86 VdB.[54] However, construction equipment moves across a site during grading, and the construction phase is temporary and all impacts related to vibration will stop when construction is complete. Table XIII-1 provides typical Equivalent Energy Levels (L_{eq}) for construction equipment and construction

[52] Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020.

[53] City of Coachella Code of Ordinances, Title 7.04 Noise Control.

[54] "Transit Noise and Vibration Impact," Federal Transit Administration, May 2006.

phases from a 50-foot distance away from the piece of equipment or the loudest piece of equipment during a phase. L_{eq} is understood as the average sound pressure level over a period of time, usually one hour. If the sound level varies, the L_{eq} is a calculation of the average sound level over one hour.

Table XIII-1
Noise Levels from Construction Equipment and Phases

Construction Equipment	Noise Level (dBA, Leq at 50 feet)
Generator	76
Portable air compressor	81
Concrete mixer	85
Backhoe	85
Dozer	87
Dump truck	88
Scraper	88
Jackhammer	88
Paver	89
Rock drilling	98
Construction Phase	**Noise Level (dBA, Leq at 50 feet)**
Foundations	78
Ground clearing	84
Erection	85
Excavation	89
Finishing	89
Rock blasting	115

Source: "Noise from Construction Equipment and Operations, Building Equipment and Home Appliances," US Environmental Protection Agency, December 1971.

A noise level decreases by 6 dBA as the distance from the sound source doubles. If a noise from a generator produces 76 dBA at a distance of 50 feet, then the sound level would decrease to 70 dBA at 100 feet away, and 64 dBA at a distance of 200 feet. During construction, the noise would not emanate from one fixed location, but rather, as the equipment moves, nearby receptors would not be exposed to construction noise from a fixed location during the entire construction period. The homes located to the south of the Project site could experience unmitigated noise levels of 78-89 dBA during construction, as equipment moves across the site. The existing perimeter wall, which is made of solid masonry construction, would reduce the noise levels by at least 6 dBA, which would further attenuate construction noise on adjacent lots. As the construction completes, the noise would no longer occur.

As stated above, construction activities are exempt from the Noise Ordinance with the condition that they occur within acceptable hours of the day.[55] The City's Municipal Code §7.04.070 specifies days and hours when construction activity is permitted. These hours are confined to less sensitive daytime hours, which reduces impacts from noise. Table XIII-2 provides the permitted days and times for construction activities.

[55] City of Coachella Code of Ordinances, Title 7.04 Noise Control.

Table XIII-2
Hours for Construction Activities

Construction Activities	October 1 – April 30	May 1 – September 30
Monday - Friday	6:00am – 5:30pm	5:00am – 7:00pm
Saturday	8:00am – 5:00pm	8:00am – 5:00pm
Sunday	8:00am – 5:00pm	8:00am – 5:00pm
Holidays	8:00am – 5:00pm	8:00am – 5:00pm

The temporary nature of construction, the existence of the perimeter wall for the subdivision to the south, and the City's time restrictions on when construction may occur would confine the increases in ambient noise levels and groundborne vibration from construction activity to less than significant impacts.

Operational Phase Impacts:
Noise produced by residents would be consistent with noise produced from neighboring residential communities and would be subject to the City's Noise Control Ordinance §7.04.

The Project is subject to the City's Municipal Code §7.04.075 which defines permitted times for on-going property maintenance activities, including landscaping, as shown in Table X-III3. Tables XIII- 4 below provides the permitted hours for fixed noise sources which include stationary pieces of equipment such as air conditioners, pumps, fans, and refrigerators.

Table XIII-3
Hours for Property Maintenance Activities

Property Maintenance Activities	October 1 – April 30	May 1 – September 30
Monday - Sunday	9:00am – 5:30pm	8:00am – 5:30pm
Holidays	Not permitted	Not permitted

Table XIII-4
Permitted Sound Levels for Fixed Noise Sources

Zone	Time	Applicable 10-Minute Avg CNEL dBA (Exterior)
All Residential Zones	6:00am – 10:00pm	55
All Residential Zones	10:00pm – 6:00am	45
All Commercial Zones	6:00am – 10:00pm	65
All Commercial Zones	10:00pm – 6:00am	55

The City's General Plan Update EIR reports the CNEL dBA for existing roadway noise. The Project is located at the intersection of Avenue 49 and Calhoun Street. Calhoun Street north of Avenue 48 where it extends between two single-family residential neighborhoods, is rated as a 65 dBA CNEL at a distance of 50 feet from centerline. At the Project build out, a similar condition may be expected for Calhoun Street south of Avenue 49 to Avenue 50. Since the City's standard for residential units is 65 dBA CNEL, the Project's residents will not experience noise levels in excess of the City's standard, and impacts from roadway traffic will be less than significant.

The location of the Project in the West Coachella Neighborhoods Subarea aligns with the City's General Plan and would not introduce noise that is unexpected or inappropriate for the land use. During the operational phase, residential land use would not generate groundborne vibration. The City's Noise Control Ordinance also ensures that all receptors are protected from inappropriate or excessive noise. The operational phase would result in less than significant impacts.

c) No impact. The Jacqueline Cochran Regional Airport is located 3.66 miles southeast of the Project, and the Airport Influence Area boundary is 1.9 miles southeast. Due to this distance, people residing and working in the Project area would not be exposed to excessive noise from the airport. No impact is expected to occur from airport noise.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

City of Coachella Code of Ordinances, Title 7.04 Noise Control

"Noise from Construction Equipment and Operations, Building Equipment and Home Appliances," US Environmental Protection Agency, December 1971.

Standard Environmental Reference, CalTrans, February 2018.

Transportation and Construction Vibration Guidance Manual, California Department of Transportation, April 2020

"Transit Noise and Vibration Impact," Federal Transit Administration, May 2006

XIV. POPULATION AND HOUSING Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			✓	
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				✓

Environmental Setting

The population of the City of Coachella is approximately 44,384,[56] and by the 2045, the population could potentially expand to 129,300.[57] The number of households are also expected to increase from 9,600 households in 2019 to an estimated 35,600 households by 2050. Furthermore, the number of jobs in Coachella is expected to expand from 8,900 in 2019 to 17,200 in 2035 and up to 23,200 by 2050.[58] To accommodate this growth, the City requires an increase in housing opportunities. By 2035, the City plans to provide approximately 45% of its housing with single-family units and 55% with multi-family units.[59]

Discussion of Impacts

a) Less Than Significant Impact. The City uses a system of Subareas to guide growth and development to minimize environmental impacts by concentrating residential growth in areas closer to the downtown area rather than expanding outward into remote Subareas. This strategy increases access to alternative transportation corridors and reduces commute time to City employment areas. The Project would be located in Subarea 1, West Coachella Neighborhoods, an area specifically positioned to accommodate more housing.

According to the 2025 Population and Housing Estimates from the California Department of Finance, the average persons per household in Coachella is 4.19. The Project proposes to build 257 homes, which would result in an additional 1,077 people. If the City's population increases by 129,300 people by 2045 as described above, then the Project would contribute 0.83% of that growth. Also, using the household estimates provided above, the City could see a growth of 36,500 households by 2050, and

[56] Table E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024 with 2020 Census Benchmark, Department of Finance, May 2025.

[57] "Demographics and Growth Forecast Technical Report," 2020-2045 RTPSCS, Southern California Association of Governments.

[58] "Demographics and Growth Forecast Technical Report," 2024-2050 RTPSCS, Southern California Association of Governments.

[59] Final EIR for the City of Coachella General Plan 2035 Update, April 2015.

the Project's 257 units could represent 0.7% of that growth. The City has projected the population to grow and has planned to accommodate this growth by setting aside specific areas where residential growth could reasonably occur. The City's population growth has been accounted for and planned, the Project complies with those plans, and Project impacts to population growth would be less than significant.

The Project proposes to improve Avenue 49 to allow residents to access one of the driveways on the north side. This would reduce potential congestion on Calhoun Street where the second driveway access would be placed. Improving Avenue 49 would also provide additional east-west road access to Jackson Street, which would improve circulation in this section of the City.

The Project's new homes would be located in an area where existing utility infrastructure has already been installed for residential neighborhoods immediately north and south of the Project site. The Project would not necessitate the expansion of new infrastructure. Impacts to City infrastructure would be less than significant.

b) No Impact. The Project site is currently vacant. The proposed homes would not displace existing residents or require the construction of replacement housing in another location. The Project would result in no impacts.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

City of Coachella General Plan Update 2035 Environmental Impact Report, 2014.

Table E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024 with 2020 Census Benchmark, Department of Finance, May 2024

"Demographics and Growth Forecast Technical Report," from 2020-2045 & 2024-2050 RTPSCS, Southern California Association of Governments.

XV. PUBLIC SERVICES **Would the project result in:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?			✓	
b) Police protection?			✓	
c) Schools?			✓	
d) Parks?			✓	
e) Other public facilities?			✓	

Environmental Setting

The 257 new residences proposed by the Project could potentially add 1,077 people to the City, which would pose a minor increase in the demand for public services. The City imposes a development impact fee of $267 per dwelling unit for new residential developments to support the additional costs associated with increased demand for fire, police, street facilities, parks, and library services and general government facilities.[60]

Fire Protection

The City of Coachella contracts with the Riverside County Fire Department (RCFD) to receive fire protection services including fire suppression, fire prevention, and hazardous materials response. The RCFD also provides emergency medical services including paramedic services and urban search and rescue. RCFD Station 79 is currently the only station in the City. Located at 1377 6th Street, the station is 2.53 miles southeast of the Project site. The station is staffed by 18 full-time personnel including six firefighters on duty, ten volunteer firefighters, and 10 explorer cadets. The national standard for fire service is one firefighter staff per 1,000 residents, and the City has 0.4 staff per 1,000 residents according to the 2014 General Plan EIR. Recommendations have been made to add another station and increase the number of personnel.[61]

Police Protection

The Riverside County Sheriff's Department is contracted by the City to provide police services. The police station is located at 86625 Airport Boulevard, in the community of Thermal, 6.6 miles southeast from the Project site. As of the 2014 General Plan EIR, there are 26 sworn positions and five non-sworn support staff serving the City, which at the time, equated to a ratio of 0.64 sworn officers per

60 City of Coachella Code of Ordinances, §4.45.130, updated June 26, 2024.

61 City of Coachella General Plan 2035 Update EIR, June 2014.

1,000 residents. The ratio recommended by the Riverside County Sheriff's Department is 1.3 staff per 1,000 residents.

In addition to patrol and enforcement activities, police protection services provided by contract to the City include: SWAT, Hostage Negotiations Team, Forensic Services Team, Traffic Reconstructions, Canine Units, Hazardous Device Team, Coachella Valley Narcotics Task Force, Coachella Valley Violent Crime Gang Task Force, Central Homicide Unit-East, Aviation Unit, Dive Team, Desert Search and Rescue, Sheriff's Mounted Posse, and Explorer Post #503.

Schools

Coachella Valley Unified School District (CVUSD) serves the City with K-12 educational services. As of 2022, the school district's student capacity was 21,004 students, and the 2022-23 enrollment was 16,497. The school district operates 14 elementary schools, 3 middle schools, four high schools, and one adult school. College of the Desert is the local community college serving all Coachella Valley cities.

Parks

The City of Coachella has a total of nine parks comprising 60.2 acres. The park facilities include community parks with a full range of recreational amenities, mini parks and tot lots. From the Project site, Rancho Las Flores is the nearest public park at 1.22 miles away.

The Proposed Project will have limited impact on Public Services, as discussed below.

Discussion of Impacts

a) Less Than Significant Impact. In cooperation with the RCFD, the City proposes to increase the ratio of firefighters to residents to 2.0 personnel per 1,000 residents and construct more fire stations such that fire protection would be within a 1.5-mile radius and the response times would be no more than five minutes.[62]

The Fire Planning Division with in the RCFD reviews all proposed developments to guarantee compliance with standards, codes and regulations. Response times, fire station locations and equipment availability, and the increase of calls are assessed. In addition, access to, from and throughout the Project development would be reviewed by the fire department.

The City has planned to accommodate the increased need for fire protection services, and the Project would be required to comply with the City and RCFD safety standards and pay the development impact fee to mitigate costs associated with providing fire protection. Due to these requirements and on-going planning for growth, the Project would result in a less than significant impact on the City's fire protection services.

b) Less Than Significant Impact. The Project would potentially increase the number of calls for police service, but the increase would be minor. To maintain adequate protection for a growing population, the City proposes to raise the ratio of police officers per 1,000 people to 1.3.[63] Emergency

[62] Infrastructure and Public Services Element, City of Coachella General Plan 2035 Update, April 2015.

[63] Infrastructure and Public Services Element, City of Coachella General Plan 2035 Update, April 2015.

police access to the Project could be facilitated by Avenue 49 and Calhoun Street locally, both of which connect to larger streets, Jackson Street and Avenue 50.

The Project would comply with all Riverside County Sheriff's Department procedures, regulations and policies. The development impact fee required for each dwelling unit would mitigate the associated costs of providing police protection services. Impacts to police protection services would be less than significant.

b) Less Than Significant Impact. As new dwelling units are built and the population increases, the school district plans future expansion needs by applying a student generation rate calculation to estimate the number of new students added to the district. The Project proposes to construct 257 new single-family homes. Using the CVUSD's most recent student generation rates, the Project could potentially add 143 students to the school district. This would not be a significant impact considering the school district enrollment is lower than its capacity at this time.

To meet the costs of accommodating additional students, the Project would be subject to CVUSD developer fees, which are calculated on a square foot basis. As of January 16, 2023, new residential construction is required to pay $4.79 per square foot. The school developer fee would mitigate any impacts associated with the Project's student generation. The estimated total square feet for the Project's 257 homes would be approximately 460,913 x 4.79 = $2,207,773. With the implementation of the fee, the Project would offset the costs of the additional enrollments and impacts to educational services would be less than significant.

Table XV-1
Project Student Generation

School Level	Student Generation Rate	Students Generated by Project (rate x 257 rounded)
Elementary School (TK-6)	0.2942	76
Middle School (7-8)	0.0849	22
High School (9-12)	0.1742	45
Total		**143**

Source: Coachella Valley Unified School District Fee Justification Study for New Residential and Commercial/Industrial Development, November 2, 2022.

d, e) Less Than Significant Impact. The applicant proposes to construct a 3.13-acre public park as part of the Project. The park would include a walking trail, playground equipment, basketball court, and a small parking lot which will be available to the public. While the public can access the park via the parking lot, pedestrian gates would allow residents to access the park from the Project. More information regarding the City's park facilities is provided in Section XVI Recreational Resources. The Project would not result in substantial adverse physical impacts or create the need for new park facilities.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

City of Coachella Code of Ordinances, §4.45.130, updated June 26, 2024

City of Coachella General Plan 2035 Update EIR, June 2014.

Coachella Valley Unified School District Fee Justification Study for New Residential and Commercial/Industrial Development, November 2, 2022

Infrastructure and Public Services Element, City of Coachella General Plan 2035 Update, April 2015

XVI. RECREATION Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			✓	
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			✓	

Environmental Setting

The City of Coachella maintains nine parks comprising a total of 60.2 acres. The park facilities include a range of amenities from Bagdouma Park, which encompasses 46 acres and provides a full suite of amenities such as a swimming pool, tennis courts, sports fields, and a playground to Dateland Park which provides skateboarding features, and mini parks and tot lots. The newest city park, Rancho Las Flores, is the nearest public park to the Project at 1.22 miles away.

The City is also located within the Desert Recreation District (DRD) boundary, the largest park and recreation district in California. The DRD offers services, programs and classes across 1,800 square miles of the Coachella Valley extending from Cathedral City to the communities of Mecca and Oasis. In the City of Coachella, the DRD operates programs at Bagdouma and Rancho Las Flores parks.

Discussion of Impacts

a, b) Less Than Significant Impact. The Project would not significantly increase the use of existing neighborhood park facilities, nor would it result in the expansion of public recreational facilities. At buildout, the Project would include approximately 257 single family residences, which could potentially house 1,077 people.[64] As described in the Section XV, Public Services, the Project proposes to construct a 3.13-acre public park. Included in the park design is a walking trail, playground equipment, basketball court, ramadas with picnic tables, and a small parking lot which would be available to the public.

All new development is required to pay the City's development impact fee, a percentage of which is dedicated to maintaining the City's public parks. The required development impact fee and the Project's proposed park facility would mitigate potential impacts of additional park goers affecting City recreation facilities and reduce impacts to less than significant levels.

Mitigation Measures: None required.

[64] California Department of Finance, Table E-5, City/County Population and Housing Estimates, 1/1/2024.

Monitoring: None required.

Sources:
City of Coachella Parks and Recreation

Desert Recreation District

California Department of Finance, Table E-5, City/County Population and Housing Estimates, 1/1/2024

XVII. TRANSPORTATION Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with a program, plan, ordinance or policy addressing the Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?		✓		
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?			✓	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				✓
d) Result in inadequate emergency access?				✓

Environmental Setting

The transportation system throughout the City of Coachella is comprised of roadways from two-lane country roads to six-lane major arterials with bicycle facilities. Higher capacity corridors such as Hwy 111, State Highway 86 and Interstate 10 provide regional access to and from the City. Multiple jurisdictions including the federal government, California Department of Transportation, Riverside County Transportation Department, and the City manage different components of the transportation system. The City's Mobility Element of the General Plan Update emphasizes goals of developing more alternative transportation routes to increase accessibility throughout the City including bicycle routes, pedestrian trails and low-speed electric vehicles.

The City applies a Level of Service (LOS) metric when assessing the performance of the transportation network and intersection delays. LOS provides a ranked measurement of roadway operating conditions, that ranges from "A" (free flow, best conditions) to "F" (worst conditions, serious delays, and system failure). The General Plan establishes LOS D as the minimum acceptable level of service for Coachella.

Senate Bill 743 (2013) updates the methodology for analyzing transportation impacts by projects to more accurately measure transportation-related air pollutants and greenhouse gas emissions, and to more effectively reduce emissions via the development of multimodal transportation networks and diversification of land uses. CEQA Guidelines section 15064.3 describes the use of Vehicle Miles Traveled (VMT) as the metric by which to measure project transportation impacts. However, certain projects are exempt from preparing a VMT analysis.

Urban Crossroads prepared a Traffic Analysis for the Project in September 2024 based on a total of 259 dwelling units. A copy of the Traffic Analysis is provided in Appendix F.[65] Since then, the number of dwelling units has been reduced to 257, which means the Traffic Analysis data represents a marginally more conservative analysis of Project conditions. The opening year for the Proposed Project is assumed to be 2026. The Traffic Analysis evaluates potential deficiencies in the City's circulation system that may result from the Project and recommends improvements to the Project and the City's circulation system to achieve the acceptable LOS. A VMT letter was also prepared, and is included in Appendix G.

Discussion of Impacts

a) Less Than Significant Impact with Mitigation Incorporated. If a project conflicts with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities, then its impacts would be significant. The Project's land uses are consistent with the City's General Neighborhood land use and zoning for the parcel. The applicant proposes to build a 257-unit single-family residential neighborhood with a 3.13-acre park. Access to the Project will be facilitated by two driveways allowing vehicle entry and exit from Calhoun Street, a Collector Roadway, and Avenue 49, a Primary Arterial Roadway. Pedestrian access will be provided by new sidewalks and 26-foot landscaped setbacks along the north and east Project boundaries.

Proposed Site-Adjacent Street Improvements

The applicant proposes to construct the following improvements to assure compliance with City standards:

- Avenue 49 Improvements:
  - For 1,300 linear feet between Calhoun Street and the Project's northwesterly site boundary, the Project will provide full-width street improvements as a Primary Arterial roadway including curbs, gutters, six-foot sidewalks and landscaping on both sides. Along the Project frontage, a 26-foot landscaped setback will be provided.
- Calhoun Street Improvements:
  - For 1,300 feet from the Project's northerly site boundary to the southerly site boundary, the Project will widen Calhoun Street at its ultimate westerly half-section width as a Collector Roadway with a landscaped parkway and a bicycle lane, Also, a six-foot sidewalk and a 26-foot landscaped setback will be included.
  - At the Calhoun Street / Avenue 49 (#3) intersection, the Project will install a new traffic signal with potential future reimbursement contingent upon cumulative development activity.
  - On the Project's easterly boundary, public pedestrian access to the 3.13-acre public park from Calhoun Street will be provided. In addition, to a small parking lot will be publicly accessible from the Calhoun Street community entrance. subject to park development access and parking plans (to be determined).

These improvements are consistent with the City's standards, and will assure that adjacent roadways are developed consistent with their General Plan roadway classification.

[65] Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.

The City requires that all intersections achieve at least an LOS D during morning and evening peak hours. The following scenarios were analyzed for the purpose of assessing the impact of the Project on intersection Level of Service (LOS):

- Existing (2024) Conditions
- Existing plus Ambient plus Project (EAP) (2026)
- Existing plus Ambient plus Cumulative (EAPC) (2026)

Table XVII-1 provides a list of intersections that were analyzed in the Traffic Analysis study area.

Table XVII-1
Intersection Analysis Locations

ID	Intersection Location
#1	Calhoun St. / Dr. Carreon Blvd.
#2	Calhoun St. / Avenue 48
#3	Calhoun St. / Avenue 49
#4	Calhoun St. / Avenue 50
#5	Jackson St. /Avenue 49-Odlum Dr.
#6	Calhoun St. / Access 1
#7	Access 2 / Avenue 49

The City's standards provide that a project's traffic impact is significant if the project degrades intersection level of service to an unacceptable level below LOS D, or if a project causes an intersection already at LOS E to degrade to LOS F. At intersections, an increase in delay of 2 seconds or more at existing LOS E intersections, or 1 second or more at LOS F intersections caused by a project would also be considered a significant impact.

Table XVII-2 provides an overview of intersection LOS during existing (2024), EAP (2026), and EAPC (2026) conditions. Below, these sets of conditions are discussed in more detail.

Table XVII-2
Intersection Analysis for Existing (2024), EAP (2026), EAPC (2026) Conditions

Intersection	Existing (2024)		EAP (2026)		EAPC (2026)	
	AM	PM	AM	PM	AM	PM
#1 Calhoun St. / Dr. Carreon Blvd.						
• Without improvements	🔴	🟢	🔴	🟡	🔴	🔴
• With improvements	N/A	N/A	🟢	🟢	🟢	🟢
#2 Calhoun St. / Avenue 48	🟢	🟢	🟢	🟢	🟢	🟢
#3 Calhoun St. / Avenue 49						
• Without improvements	🔴	🟢	🔴	🟡	🔴	🔴
• With improvements	N/A	N/A	🟢	🟢	🟢	🟢
#4 Calhoun St. / Avenue 50	🟢	🟢	🟢	🟢	🟢	🟢
#5 Jackson St. / Avenue 49-Odlum Dr.						
• Without improvements	🔴	🟢	🔴	🟢	🔴	🟡
• With improvements	N/A	N/A	🟢	🟢	🟢	🟢
#6 Calhoun St. / Access 1	N/A	N/A	🟢	🟢	🟢	🟢

Table XVII-2
Intersection Analysis for Existing (2024), EAP (2026), EAPC (2026) Conditions

Intersection	Existing (2024)		EAP (2026)		EAPC (2026)	
	AM	PM	AM	PM	AM	PM
#7 Avenue 49 / Access 2	N/A	N/A	●	●	●	●

Source: Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.
Legend: ● LOS A-D ○ LOS E ● LOS F

Existing (2024) Traffic Conditions

Existing traffic conditions offer a baseline against which the proposed Project's impact may be measured. The Project site is currently vacant and generates no traffic. Adjacent roads include Calhoun Street, a north-south Collector with Bicycle Facility and Avenue 49, an east-west unimproved path. Nearby roads include Jackson Street, a north-south Collector, and Avenues 48 and 50, which are east-west roadways classified as Major Arterial with Bicycle Facility. To measure existing (2024) traffic counts, data was collected in January and July 2024 during two peak hour timeframes: 7:00 and 9:00 AM, and 4:00 and 6:00 pm.

For Existing (2024) traffic conditions, three unsignalized study area intersections operate at unacceptable LOS of E or F: Calhoun St. / Dr. Carreon Blvd. (#1); Calhoun St. / Avenue 49 (#3); and Jackson St. / Avenue 49-Odlum Dr. (#5). All three intersections currently meet the traffic volume warrants for installation of a traffic signal based on existing traffic counts. Table XVII-3 summarizes existing traffic conditions for each study area intersection.

Table XVII-3
Intersection Analysis for Existing (2024) Conditions

Intersection	Traffic Control[1]	Delay[2] (secs)		Level of Service	
		AM	PM	AM	PM
#1 Calhoun St. / Dr. Carreon Blvd.	AWS	>80	28.7	F	D
#2 Calhoun St. / Avenue 48	TS	32.2	28.6	C	C
#3 Calhoun St. / Avenue 49	AWS	51.2	20.3	F	C
#4 Calhoun St. / Avenue 50	TS	33.1	28.5	C	C
#5 Jackson St. / Avenue 49-Odlum Dr.	AWS	51.9	23.0	F	C
#6 Calhoun St. / Access 1	Future Intersection				
#7 Avenue 49 / Access 2	Future Intersection				

Source: Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.
[1] TS = Traffic Signal; AWS = All Way Stop
[2] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal, or all way stop control.

Project Trip Generation

The Traffic Analysis applied two land use codes to calculate the potential number of trips generated by the Project. The first code was derived from the Institute of Transportation Engineers (ITE) Land Use Code for Single Family Detached housing, and the second was supplied by the San Diego Association of Governments (SANDAG) for City Park. At the time that the Traffic Analysis was prepared, the Project included a 1.5-acre park with a dog run, which would have generated more trips

than a park without dog run. SANDAG provided a more appropriate land use code to account for the higher number of park trips. Additionally, as explained above, the number of dwelling units was changed from 259 to 257 after the Traffic Analysis was prepared. Hence, the Traffic Analysis provides a more conservative trip generation calculation. On a daily basis, the residential units and the park are anticipated to generate 2.517 trips. Table XVII-4 shows the total daily trips and the total AM and PM peak hour trips that the Project may generate as estimated by ITE and SANDAG.

Table XVII-4
Project Daily Trip Generation

Land Use	Land Use Code	Quantity	Total Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Single Family Detached	210[1]	259 units[2]	2,442	182	244
Park (with Dog Run)	---	1.5 acres[3]	75	10	6
		Project Total	**2,517**	**192**	**250**

Source: Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024
1. Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).
2. In September 2024, the Traffic Analysis assumed 259 dwelling units. The Project currently includes 257 units.
3. In September 2024, the Traffic Analysis assumed a 1.5-acre park with a dog run, which would've generated more trips than a park without a dog run. SANDAG provided the trip generation estimate for a city park with a higher volume of trips to account for the dog run.

Existing Plus Ambient Plus Project (EAP) (2026) Conditions

EAP (2026) includes Existing (2024) volumes, ambient growth traffic calculated at an increase of 4.04% over two years, and the Project traffic. Per the Traffic Analysis, no additional intersections are expected to operate at unacceptable LOS during peak hours beyond the above-described three intersections which currently operate with deficiencies without the Project. Traffic signal installation at each of the three intersections would sufficiently address the deficiencies, and result in acceptable operations, as shown in Table XVII-2, above.

Intersection #6 Calhoun Street / Access 1 currently operates at an acceptable LOS for EAP conditions, however, it meets the volume warrants for installation of a traffic signal. At this time, the installation of a traffic signal at intersection #6 is not recommended because the intersection is expected to operate at an acceptable LOS for EAP (2026) and EAPC (2026) conditions with cross-street stop control. Also, access to the Project is provided at the Access 2 / Avenue 49 (#7) intersection, which is anticipated to operate at LOS "A" during peak hours for both EAP (2026) and EAPC (2026) conditions. See Table XVII-5 for a summary of the EAP (2026) conditions.

Table XVII-5
Intersection Analysis for EAP (2026) Conditions

Intersection	Traffic Control[1]	Delay[2] (secs) AM	Delay[2] (secs) PM	Level of Service AM	Level of Service PM
#1 Calhoun St. / Dr. Carreon Blvd.					
• With existing All Way Stop	AWS	>80	41.7	F	E
• *With traffic signal improvement*	*TS*	*39.0*	*31.9*	*D*	*C*
#2 Calhoun St. / Avenue 48	TS	33.7	30.3	C	C
#3 Calhoun St. / Avenue 49					
• With existing All Way Stop	AWS	>80	46.2	F	E
• *With traffic signal improvement*	*TS*	*10.4*	*7.9*	*B*	*A*
#4 Calhoun St. / Avenue 50	TS	34.3	29.3	C	C
#5 Jackson St. / Avenue 49-Odlum Dr.					
• With existing All Way Stop	AWS	74.2	35.0	F	D
• *With traffic signal improvement*	*TS*	*12.4*	*9.2*	*B*	*A*
#6 Calhoun St. / Access 1	CSS	27.3	25.1	D	D
#7 Avenue 49 / Access 2	CSS	8.7	8.8	A	A

Source: Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.
[1] TS = Traffic Signal; AWS = All Way Stop; CSS = Cross-Street Stop
[2] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal, or all way stop control. For intersections with cross street stop control, the delay and LOS for the worst individual movement (or movement sharing a single lane) are shown.

Existing Plus Ambient Plus Project Plus Cumulative (EAPC) (2026) Conditions

EAPC (2026) includes existing (2024) volumes, ambient growth traffic calculated at an increase of 4.04% over two years, the Project traffic, and traffic from cumulative development proposed in the area. No additional intersections are expected to operate at unacceptable LOS levels during peak hours for the EAPC 2026 traffic conditions. As described in the previous paragraphs, installation of traffic signals at the currently deficient intersections would address the deficiencies and improve the LOS for the three intersections. The installation of a traffic signal at intersection #6 Calhoun Street / Access 1 is not recommended as the intersection is expected to operate an acceptable LOS with a cross-street stop control under EAPC (2026) conditions.

Table XVII-6 summarizes future EAPC (2026) traffic conditions for each study area intersection.

Table XVII-6
Intersection Analysis for EAPC (2026) Conditions

Intersection	Traffic Control[1]	Delay[2] (secs) AM	Delay[2] (secs) PM	Level of Service AM	Level of Service PM
#1 Calhoun St. / Dr. Carreon Blvd.					
• With existing All Way Stop	AWS	>80	>80	F	F
• *With traffic signal improvement*	*TS*	*43.6*	*32.6*	*D*	*C*
#2 Calhoun St. / Avenue 48	TS	34.7	31.0	C	C

Table XVII-6
Intersection Analysis for EAPC (2026) Conditions

Intersection	Traffic Control[1]	Delay[2] (secs) AM	PM	Level of Service AM	PM
#3 Calhoun St. / Avenue 49					
• With existing All Way Stop	AWS	>80	75.4	F	F
• *With traffic signal improvement*	*TS*	*10.9*	*7.8*	*B*	*A*
#4 Calhoun St. / Avenue 50	TS	37.8	30.5	D	C
#5 Jackson St. / Avenue 49-Odlum Dr.					
• With existing All Way Stop	AWS	>80	47.9	F	E
• *With traffic signal improvement*	*TS*	*15.7*	*11.9*	*B*	*B*
#6 Calhoun St. / Access 1	CSS	32.2	30.6	D	D
#7 Avenue 49 / Access 2	CSS	8.7	8.8	A	A

Source: Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.
[1] TS = Traffic Signal; AWS = All Way Stop; CSS = Cross-Street Stop
[2] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal, or all way stop control. For intersections with cross street stop control, the delay and LOS for the worst individual movement (or movement sharing a single lane) are shown.

Traffic signals are recommended to improve the level of service at study area intersections #1, #3, and #5, where the LOS is currently deficient and will continue to decline after the Project is constructed and with the cumulative development conditions. Although the Project has not contributed to the current unacceptable LOS for these three intersections, it will add to the deficiencies unless the traffic signals are installed. In order to assure that the Project's impact on these intersections is reduced to acceptable levels, Project "fair share" contribution was calculated and is included in Mitigation Measure TRA-1.

Build out of the 257 residential units and the public park will contribute additional traffic to adjacent streets. To reduce the impacts of this traffic increase, the Project will be responsible for installing on-site and site-adjacent improvements. Mitigation Measure TRA-2 provides a list of the necessary on-site and site-adjacent street improvements which will ensure that Project traffic impacts are less than significant.

Public Transit

SunLine Transit Agency provides bus routes throughout the Coachella Valley extending from Desert Hot Springs at the far west end to the North Shore Community near the Salton Sea. Route 8 is operated through the City of Coachella along Dr. Carreon Blvd, Van Buren Street, and passes the Project site along Calhoun Street between Avenue 48 and Avenue 50. The nearest bus stop to the Project is located 2.4 miles southeast at the intersection of Cesar Chavez and 4th Street. SunLine Transit service is periodically updated to keep pace with the growing demand for service throughout the region. The Project will not have direct access to bus service, but will not interfere with SunLine's ability to provide service.

Pedestrian and Bicycle Facilities

Bike lanes are available along Calhoun Street, Avenue 48 and Avenue 50. Sidewalks occur on Avenue 48 and Avenue 50, and portions of sidewalks occur on Calhoun Street, Jackson Street, Dr. Carreon Boulevard, and Odlum Drive and Avenue 49. The Project will build out adjacent street half-widths to General Plan standards, including sidewalks and parkways. The proposed Project will not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. No project related impacts to alternative transportation are anticipated.

Summary

Based on the Traffic Analysis, the project site may generate up to 2,517 daily vehicle trips. To reduce the impacts of additional traffic in the study area, the Project will contribute to traffic signal installation at three intersections and will be responsible for implementing on-site and site-adjacent street improvements. All improvements, detailed in the Mitigation Measures section, will keep the study area intersections operating at acceptable levels of service. With implementation of Mitigation Measures TRA-1 and TRA-2, impacts associated with traffic will be reduced to less than significant levels.

b) Less Than Significant Impact.

Exemptions from VMT Analysis

The City uses the County of Riverside's Transportation Analysis Guidelines to analyze VMT. As provided in the Guidelines, projects meeting certain criteria are exempt from preparing VMT analyses, thus, detailed CEQA assessments are not required for land uses associated with exempt project types.[66] Exempting certain projects avoids unnecessary analyses as these projects are deemed to have less than significant impacts due to project size, proximity to high quality transit, whether local services are provided, and whether affordable housing is provided. To determine if a project is exempt, the County's Guidelines provide a set of Screening Criteria for Development Projects.

As described in the VMT letter prepared by Urban Crossroads in September 2024 (Appendix G), the proposed Project meets two of the County's Screening Criteria:

- Map-Based Low VMT Screening
- Local Essential Service Screening

The map-based screening criteria uses the sub-regional Riverside Transportation Analysis Model (RIVTAM) to gauge the amount of personal motorized trips within particular regions against the average number of personalized trips for the Countywide population. The Project site occurs within RIVTAM Zone "TAZ 4787" where residents make fewer trips and generate VMTs below the County's established significance threshold.

The local essential service screening criteria considers the Project's public park to be a net benefit because it is sited such that Project residents and nearby City residents will not need to travel far to access the park and thus reduce overall VMTs spent on non-discretionary trips to the park.

Given that the Project meets these two Screening Criteria, the Project is consistent with CEQA Guideline section 15064.3 (b) and impacts with regard to VMTs would be less than significant.

[66] Figure 3 "Screening Criteria for Development Projects," Transportation Analysis Guidelines for Level of Service, Vehicle Miles Traveled, County of Riverside, December 2020.

c, d) No Impact. As described above, access to the Proposed Project will be provided through Calhoun Street and Avenue 49. The Project does not propose to alter the City's roadway system or change traffic patterns. Regional access to the site will be provided via I-10 freeway, Major Arterials, Collectors, and a variety of local roads. Prior to construction, both the Fire Department and Police Department will review the site plan to ensure safety measures are addressed, including emergency access and geometric design. Therefore, the Proposed Project will not result in inadequate emergency access or increase hazards due to a geometric design feature.

Mitigation Measures:

TRA-1 Traffic Signal Installation

Traffic signal control will address the operational deficiencies at three intersections that presently experience unacceptable levels of service. Although the Project is not currently contributing to the deficiencies, traffic conditions upon build out will impact these intersections and further degrade the level of service at each intersection. The Project Fair Share Contributions listed in Table XVII-7 show the Project's percentage of the total traffic volume and deficiency. To reduce the Project's expected impacts to less than significant levels, the Project will be responsible for paying its share as shown in the table.

Table XVII-7
Project Fair Share Contributions to Impacted Intersections

Intersection	Existing (2024) Traffic	EAPC (2026) Traffic[1]	Project-Only Traffic	Total New Traffic[2]	Project Fair Share (%)[3]
#1 Calhoun St. / Dr. Carreon Bl.					
• AM Peak Hour	2,002	2,357	58	355	16.3%
• PM Peak Hour	1,585	1,962	75	377	**19.9%**
#3 Calhoun St. / Avenue 49					
• AM Peak Hour	1,159	1,403	96	244	39.3%
• PM Peak Hour	1,050	1,350	125	300	**41.7%**
# 5 Jackson St. / Avenue 49 – Odlum Dr.					
• AM Peak Hour	1,209	1,413	38	204	18.6%
• PM Peak Hour	1,253	1,505	50	252	**19.8%**

1. Existing Plus Ambient Plus Project Plus Cumulative (2026) Conditions
2. Total New Traffic = (EAPC 2026 - Existing Traffic)
3. Project Fair Share % = (Project Only Traffic / Total New Traffic)

TRA-2 On-Site and Site-Adjacent Improvements

The recommendations listed here are the minimum improvements required to accommodate site access and maintain acceptable peak hour operation for the Project. Installation of these improvements will ensure that impacts related to traffic entering and exiting the Project will be reduced to less than significant levels.

#3 – Calhoun Street / Avenue 49

- Provide a separate northbound left turn lane.
- Modify southbound approach striping to provide a separate southbound right turn lane.
- Provide a shared eastbound left/thru/right lane.

#6 – Calhoun Street / Access 1

- Provide a separate northbound left turn lane.
- Provide a shared eastbound left/thru/right turn lane.

#7 – Avenue 49 / Access 2

- Provide a shared northbound left/right turn lane.
- Provide a shared eastbound thru/right turn lane.
- Provide a shared westbound left/thru lane.

Monitoring:

TRA.A The City Engineer shall approve project improvement plans prior to the issuance of grading permits. Project improvements and fair share contributions shall be completed prior to the occupancy of any portion of the Project.

Responsible Parties: Project applicant, project engineer, City Engineer.

Sources:

Calhoun Street Subdivision Traffic Analysis, prepared by Urban Crossroads, September 6, 2024.

Figure 3 “Screening Criteria for Development Projects,” Transportation Analysis Guidelines for Level of Service, Vehicle Miles Traveled, County of Riverside, December 2020.

XVIII. TRIBAL CULTURAL RESOURCES a) Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or			✓	
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.		✓		

Environmental Setting

California state law requires a government-to-government consultation process between project lead agencies and California Native American tribes who have an interest in protecting cultural resources in a project area. The consultation process must begin prior to the release of an environmental impact report, mitigated negative declaration, or negative declaration. Native American tribes participating in the consultation process are those who have requested notice of all proposed projects within the jurisdiction of the lead agency.

Assembly Bill 52

Public Resources Code (PRC) 21074(a) states that if a project has the potential to cause a substantial adverse change or impairment to a tribal cultural resource (TCR), then the project may cause an adverse effect on the environment. The passage of Assembly Bill 52 in 2014 created a new CEQA category of resources called, Tribal Cultural Resources, whereby a formal consultation process was established between lead agencies and impacted California Native American tribes to address concerns regarding a project's potential impacts to tribal cultural resources. Tribal Cultural Resources include California Native American archaeological sites, cultural landscapes and sacred places.[67]

[67] Guidelines for Determining the Significance of and Impact to Cultural Resources: Archaeological, Historic, and Tribal Cultural Resources, Society for California Archaeology, April 2020.

CRM TECH prepared an "Historical/Archaeological Resources Survey Report for Assessor's Parcel Number 612-260-010," (Report) which included a consultation with the Torres Martinez Desert Cahuilla Indian tribe and the Cabazon Band of Mission Indians to obtain their input and recommendations regarding the Project site. Due to previously recorded historical resources in the Coachella area and the history of Cahuilla activity around the lakeshore of Ancient Lake Cahuilla, the Torres Martinez recommend that a tribal archaeological monitor be present during construction related ground disturbance. The details of the Report and consultation are detailed in above in Section V, Cultural Resources. The complete Report is attached as Appendix C. The consultation response letter from the Torres Martinez tribe is provided in Appendix 2 of the Report. A complete description of Tribal lifeways is provided in the Report and summarized in Section V.

In addition, the City conducted Tribal consultation consistent with AB 52. The City's letters to consulting tribes were sent in June of 2025. The Agua Caliente Band of Cahuilla Indians requested consultation, and worked with City staff to develop modifications to the mitigation measures contained in Section V. With inclusion of these mitigation measures, the Tribe concluded consultation.

Discussion of Impacts

a, i) Less Than Significant Impact. The Historical/Archaeological Resources Report for the Project site describes the results of records search at the Eastern Information Center (EIC) at the University of California, Riverside, an historical background research, and a field survey of the subject site. Per the Report, the Project site contains no historical nor archaeological resources that are listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources identified on the Project site, thus there would be no impacts to any such resources.

a, ii) Less Than Significant Impact with Mitigation Incorporated. While the surface of the subject site has been extensively graded and cultivated since the 1930s, the subsurface has not been researched for historical and archaeological cultural resources, hence, the presence of such artifacts under the surface cannot be precluded. During the most recent inundation of Ancient Lake Cahuilla in the 1730s, when the high stand of the shoreline is documented as being 42 feet above sea level, the Project site would have been under water for a time, but eventually would have been exposed and become part of the shoreline as the lake dried. In this region of the Salton Basin, many recorded Native American resources are associated with the receding Ancient Lake Cahuilla shoreline.

Based on the recommendation of the Report, and the City's consultation with…, Mitigation Measure CUL-1 will assure that impacts to Tribal Cultural Resources will be reduced. The implementation of this mitigation measure would ensure that newly identified and potentially significant historical/archaeological artifacts would be protected, and impacts would be reduced to less than significant levels.

Mitigation Measures: See CUL-1, Section V.

Monitoring: See CUL-A, Section V.

Sources:
"Historical/Archaeological Resources Survey Report for Assessor's Parcel No. 612-260-010," prepared by CRM TECH, May 21, 2024.

"Guidelines for Determining the Significance of and Impact to Cultural Resources: Archaeological, Historic, and Tribal Cultural Resources," Society for California Archaeology, April 2020.

"Determining the Significance of Impacts to Archaeological and Historical Resources," California Code of Regulations, Title 14 §15064.5.

"The Cahuilla People," Augustine Band of Cahuilla Indians, 2018, accessed March 28, 2024.

XIX. UTILITIES AND SERVICE SYSTEMS Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?			✓	
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			✓	
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			✓	
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			✓	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?			✓	

Environmental Setting

Domestic Water

As described above in Section X, Hydrology, the primary source of domestic water for the City is the Indio Subbasin, which is one of four subbasins within the Coachella Valley Groundwater Basin. The Coachella Water Authority (CWA) along with the Coachella Valley Water District (CVWD), Desert Water Agency (DWA), and the Indio Water Authority (IWA) manage the Indio Subbasin. CVWD and DWA have supplemented recharge efforts by importing and percolating Colorado River water into the basin. These two agencies also supplement irrigation water with recycled wastewater.

The Coachella Water Authority (CWA) delivers potable, municipal domestic water, collects wastewater, and manages local drainage control. Six wells with a total pumping capacity of 11,400 gpm, or 16.5 MGD are owned and operated by the City. Three storage reservoirs provide a total

storage capacity of 10.5 MG (million gallons). The distribution network includes 120 miles of pipeline with pipe diameters of 4 inches to 36 inches.

Currently, the CWA mainly serves the area west of Grapefruit Boulevard and smaller industrial/commercial corridor north of Avenue 48, while the largely agricultural land to the east is served by the Coachella Canal and privately owned wells.

The 2020 Coachella Valley Regional Urban Water Management Plan forecasted a growth in water demand for the Coachella Valley through the year 2045. However, the Indio Subbasin Annual Report for water year 2023-2024 found that actual water demand within the Indio Subbasin was 50,000 acre-feet less than the forecasted demand.[68] Neither the City's population growth nor the demand for domestic water grew at the rates that had been planned.

Wastewater Treatment

The Coachella Sanitation Division (CSD), also managed by the City, treats wastewater at its 4.5 MGD WRP located at the east end of Avenue 54. Wastewater is treated to a secondary level and discharged into the adjacent Whitewater River/Coachella Valley Stormwater Channel. During the 2023-2024 Water Year, the CSD WRP treated 3,082 af of wastewater.[69]

The CSD collects and treats water from residential, commercial and industrial areas. The collection system consists of 90 miles of pipeline ranging in diameters of 4 inches to 54 inches, 1,580 manholes and two pump stations. The Project would be able to connect to the existing pipeline in Calhoun Street that extends north of Avenue 50.[70]

Floodplain Management

The Coachella Valley lies within the Whitewater River Watershed, the regional drainage feature that extends from the slopes of Mount San Gorgonio to the Salton Sea. The Whitewater River is the main drainage feature and is fed by mountain streams along its course. In the higher elevation of the Whitewater River, water runs generally year-round, but is ephemeral in the low desert, and has been channelized at the eastern end of the Valley to control stormwater. The CVWD maintains major tributary facilities that guide floodwater into the Coachella Valley Stormwater Channel, but drainage throughout the Coachella Valley generally falls under the supervision of the local cities or the county where it occurs.

Historically the City of Coachella has not constructed extensive infrastructure to control stormwater flows. The 2021 City of Coachella Stormwater Master Plan lays out plans to identify and construct stormwater drainage infrastructure in partnership with the CVWD. Self-contained residential neighborhoods, such as the proposed Project, contain their own drainage basins which manage stormwater flows within their properties.

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68 2020 Coachella Valley Regional Urban Water Management Plan, prepared by Water Systems Consulting, Inc., May 25, 2021.

69 Indio Subbasin Annual Report for Water Year 2023-2024, Table 5-10 WY 2023-2024 Wastewater Treatment, Reuse, and Disposal in the Indio Subbasin, March 2025.

70 City of Coachella 2015 Sewer System Master Plan, prepared by CDM Smith, June 2015.

Electricity
As discussed above in Section VI, Energy, Imperial Irrigation District (IID) will provide electricity to the Project site. IID is the sixth largest electric utility in California, as measured by peak load of 1,152 megawatts in 2023 and provides power to over 163,000 customers in Imperial County, and portions of Riverside and San Diego counties.[71] Electricity is purchased from various power generators and distributed along IID's transmission corridors to customers.

Natural Gas
Natural gas is provided to the City by Southern California Gas and is used for home heating, water heating, laundry dryers and gas stoves. More than 90% of the natural gas consumed in California is sourced from Texas and New Mexico, and the SoCalGas transmission network consists of storage facilities and pipelines.

Solid Waste Management
The City contracts with Burrtec Waste and Recycling Services to provide solid waste, recycling, and green waste disposal services. Pursuant to the State's recycling and landfill diversion regulations, Burrtec processes recyclable materials and green waste separately from solid waste. Recyclable materials will be sorted at a Burrtec MRF. Green waste may be composted or applied as alternative daily landfill cover. Solid waste will be taken to the Coachella Valley Transfer Station where it will then be transferred to the Lamb Canyon Landfill in Beaumont. Lamb Canyon Landfill has a remaining capacity of 14,540,000 cubic yards (36.64% of total capacity) with a maximum daily throughput of 5,000 cubic yards.

Communications Systems
Frontier and Spectrum provide phone, internet and cable television connectivity in the City of Coachella and facilities are currently available under Calhoun Street. Existing Spectrum cable facilities are also under Avenue 49. DIRECTV is also available in the City for television service.

Discussion of Impacts

a) Less Than Significant Impact. Surrounding residential land uses on the south and north sides of the Project have facilitated the installation of utility infrastructure throughout the surrounding vicinity.

Water and Sewer Infrastructure
Under Calhoun Street, a 12-inch water line and 8-inch sewer line extend along the entire east side of the Project site. The Project would connect to each line at the east entrance of the development, just south of the retention basin and north of the park. Another 8-inch water line would be installed under Avenue 49 from Jackson Street and enter the Project at the north entrance. The Project would not require the relocation or significant extension of water and sewer facilities.

Project Proposed Drainage System
According to the Preliminary Hydrology Report, (Appendix D) the Project would construct a self-contained drainage system comprised of five retention basins on-site which would retain 100% of flows from a 100-year storm event. Flows that exceed this capacity will be directed to exit the Project site and flow north on Calhoun Street to Avenue 48. Then storm water would flow eastward to the

[71] Imperial Irrigation District, 2024 Integrated Resource Plan, April 2024.

MS4 storm drain inlet facility on Van Buren Street where it would flow underground for one mile and empty into the Coachella Valley Storm Channel. On-site retention of 100-year storm flows would contain the increased runoff and prevent the Project from contributing runoff that exceeds the capacity of existing City storm drainage systems.[72]

Electricity Infrastructure

The Imperial Irrigation District distributes power via overhead and underground transmission lines throughout the City. Along Calhoun Street, IID provides overhead transmission along the entire length of the Project's east boundary. At the intersection of Avenue 49 and Calhoun Street, underground electricity lines also occur and extend west along Avenue 49 to Jackson Street. The Project would connect to existing electricity distribution lines and would not result in the relocation or significant extension of this service.

Telecommunications Service

As with other utility services, cable television lines occur under Calhoun Street along the east side of the Project and under Avenue 49 along the north side of the Project. Frontier facilities are available in the vicinity although the location of the infrastructure is unknown. Given the occurrence of nearby residential neighborhoods, all telecommunications services are likely in close proximity and would not require extensive relocations or extensions of utilities.

In summary, the location of the Project adjacent to existing residential neighborhoods assures that utility services are available to the site without the need to construct significant extensions or relocate infrastructure. The impacts resulting from the Project would not cause significant environmental effects. Impacts would be less than significant.

b) Less Than Significant Impact. In compliance with the 2014 Sustainable Groundwater Management Act and to forecast the water demand on the Indio Subbasin, CWA along with three other local water agencies prepared a water management framework known as the Indio Subbasin Water Management Plan (CVWMP). The most recent 2022 update (Alternative Plan Update) includes forecasted water demand calculations for current and potential future customers within the Indio Subbasin Plan Area, which includes the East Indio Subbasin. The 2022 Alternative Plan Update relies on population growth forecasts supplied by the 2020 SCAG Regional Growth Forecast, SCAG Land Use Inventories, housing and employment analyses. Additionally, the water agencies have prepared a series of Indio Subbasin Annual Reports, the most recent Report explains that the actual total water use for the 2023-2024 Water Year was lower than the forecasted water use described in the 2022 Alternative Plan Update.

To estimate the Project's annual water demand for indoor use, a calculation was made based on an average household size of 4.19 people in the City of Coachella.[73] Using the California State standard for indoor residential water use of 47 gpcd, the Project's 257 dwelling units would consume approximately 56.71 afy for indoor uses.[74]

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72 SW Corner – Calhoun Street at 49th Avenue Subdivision, Coachella, CA, Preliminary Hydrology Report, prepared for Pacific Coast Properties, prepared by The Altum Group, January 17, 2025.

73 E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024, California Department of Finance, released May 1, 2025.

74 Standards for Indoor Residential Water Use, California Water Code §10609.4(a).

Calculations for the outdoor water use are based on outdoor irrigation factors provided by CVWD Landscape Ordinance §3.15.[75] The average yard size for each dwelling unit is estimated to be 250 sf. The common landscaped areas and retention basins would be xeriscaped with drought-tolerant plants while the park would contain grass and native, drought- tolerant trees and bushes. The total estimated outdoor use for the Project is 23.83 afy. Annually, the Project is expected to demand approximately 80.54 af, which would increase the most recently reported Indio Subbasin annual urban use extraction by 0.036%. Table XIX-1 below provides details regarding estimated indoor and outdoor water demand upon buildout of the Project.

Table XIX-1
Project Water Demand

Land Use: Single-Family Residential	No. of Dwelling Units (DU)[6]	Estimated Occupants per Home	Gallons per Day (gpd) per Occupant[2]	gpd/DU	Project Daily Water Demand (gpd)	Project Annual Water Demand acre-feet/year (af/y)
HH Indoor Water Use	257	4.19[1]	47[2]	197	50,629	56.71 af/y
HH Outdoor Water Use[3]	257			14.52	3,732.48	4.18 af/y
Landscaping (Common Areas acreage)	303,533 sf				17,540.65	19.65 af/y
					TOTAL	**80.54 af/y**
					2023-2024 Indio Subbasin Urban Water Use	**224,479 af**
					Project's Percentage of 2023-2024 Indio Subbasin Water Use	**0.036%**

1. California Department of Finance, Table E-5, City/County Population and Housing Estimates, 1/1/2025.
2. CA Indoor Residential Water Use Standards, 2025-2030.
3. 250 sf per DU, City of Coachella Code of Ordinances §17.14.030.
4. Common open space includes: the park (minus parking lot), retention basins, decorative landscaped areas.
5. Outdoor water demand calculations based on CVWD Evapotranspiration (ETo), Evapotranspiration Adjustment Factor (ETAF), and Conversion Factor (CVWD Landscape Ordinance §3.15, Appendices C and D). Each residence has 250 sf of open space = 64,250 sf. Common open space = 303,533 sf.
6. DU = Dwelling Unit, HH = Household

According to the Indio Subbasin Annual Report for the Water Year 2023-2024, the total amount of groundwater extractions amounted to 267,495 af. Of this total amount, the urban water use sector accounted for 224,479 af.[76] The impacts of the region's increased urban water use through the year 2045 on the Indio Subbasin were accounted for in the 2022 Alternative Plan Update. The Project's water demand for both indoor and outdoor uses and would account for 0.036% of the groundwater extraction for urban uses. To comply with the regional Sustainable Groundwater Management Plan, the Project would comply with the City's water resource conservation policies outlined the General Plan and install drought tolerant landscaping and low water-use appliances.[77] Domestic water

75 Chapter 3.15 Landscape and Irrigation System Design Criteria, CVWD Ordinance Code, updated 2024.

76 Indio Subbasin Annual Report for Water Year 2023-2024, Table 4-1 WY 2023-2024 Groundwater Extractions by Water Use Sector in the Indio Subbasin, March 2025.

77 City of Coachella General Plan Update 2023, Sustainability and Natural Environment Element, Goal 3, Water Resources, April 2015.

demand by the Project would cause an incremental increase in local water demand resulting in impacts that would be less than significant, because the Project has been accounted for in water planning, since it is consistent with the General Plan land use assigned to the property.

c) Less Than Significant Impact. The Coachella WRP has a daily capacity of 4.5 million gallons, which equates to 5040.65 afy. During 2023-2024, the CSD WRP treated a total of 3,082 af of wastewater, which was 1,958.65 af under the annual capacity. Based on this recent actual wastewater demand, the Project's anticipated wastewater demand would increase the CSD's current demand by 1.63%. The Project's wastewater demand would account for 1.0% of the CSD's total annual capacity. Table XIX-2 provides a summary of the Project's estimated wastewater demand compared to the most recent treatment data for the CSD WRP. The Calhoun Street Housing Development would provide 257 single-family for the City and contribute an incremental increase to the City's wastewater demand, particularly given that the CSD does not treat wastewater at full capacity. Impacts would be less than significant.

Table XIX-2
Project Wastewater Generation

Land Use: Single-Family Residential	No. of Dwelling Units (DU)	Estimated Occupants per Home[1]	Gallons per Day (gpd) per Occupant[1]	gpd/DU	Project Daily Wastewater Flow (gpd)	Project Annual Wastewater acre-feet/year (af/y)
Wastewater Flow	257	4.19	42.3	177.2	45,540	51
					Total 2023-2024 Acre-Feet Treated at CSD WRP	**3,082 af**
					Project's Percentage of 2023-2024 CSD WRP	**1.65%**

1.Between 60% and 90% of potable water may be sent to wastewater treatment. This estimate is based on 90%.
2.CSD 2023-2024 Water Year wastewater demand = 3082 af.
3.CSD total annual wastewater capacity – 5040.65 af.

d, e) Less than Significant Impact. As described above, Burrtec Waste and Recycling Services provides solid waste, recycling, and green waste disposal services to the City of Coachella. Burrtec processes recyclable materials and green waste separately from solid waste and helps the City achieve the mandatory 50% diversion rate. Recyclable materials would be sorted at a Burrtec MRF. Green waste may be composted or applied as alternative daily landfill cover. The remaining solid waste would be delivered to the Coachella Valley Transfer Station where it will then be transferred to the Lamb Canyon Landfill in Beaumont. Lamb Canyon Landfill has a remaining capacity of 14,540,000 cubic yards (36.64% of total capacity) with a maximum daily throughput of 5,000 cubic yards. See Table XIX-3 for a summary of the Project's impacts on the local landfill.

Table XIX-3
Project Estimated Solid Waste Generation

Land Use	Generation Rate	Proposed Development	Daily Total (lbs)	Annual Total (US tons)
Residential Single Family	11.4 lb/dwelling unit/day[1]	257 DU	2,930	534.73
		With 50% solid waste diversion	**1,465**	**267.4**
		Conversion to cubic yards[2]	**9.77 c.y.**	**3,565.3 c.y.**
		Percent of landfill capacity[3]	**0.2% of daily throughput**	**0.025% of remaining cap.**

1. Estimated Solid Waste Generation Rates for Manufacturing/Warehouse (May 1997), CalRecycle, accessed April 2025, https://www2.calrecycle.ca.gov/wastecharacterization/general/rates.
2. National Recycling Coalition Measurement Standards and Reporting Guidelines, 2006. Estimates that 150 pounds of uncompacted municipal solid waste material is equal to 1 cubic yard of waste.
3. Landfill daily throughput (or intake) is 5,000 cubic yards, and remaining capacity is 14,540,000 cubic yards, CalRecycle SWIS Facility/Site Activity Details, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/2246?siteID=2368, accessed April 2025.

At buildout, the Project's daily solid waste generation will contribute less than 1% of the Lamb Canyon daily capacity of 5,000 cubic yards, and less than 0.1% of the remaining capacity on an annual basis. Commingled recyclable materials (e.g., paper, plastic, glass, cardboard, aluminum) will be transported to Burrtec's material recovery facilities for recycling and reuse.

Burrtec is responsible for maintaining standards that assure that all waste is handled in a manner that meets local, state and federal standards. These requirements will assure that impacts associated with solid waste disposal remain less than significant.

Mitigation Measures: None required.

Monitoring: None required.

Sources:

2020 Coachella Valley Regional Urban Water Management Plan, prepared by Water Systems Consulting, Inc., May 25, 2021.

Chapter 3.15 Landscape and Irrigation System Design Criteria, CVWD Ordinance Code, updated 2024.

City of Coachella General Plan Update 2023, Sustainability and Natural Environment Element, Goal 3, Water Resources, April 2015.

City of Coachella 2015 Sewer System Master Plan, prepared by CDM Smith, June 2015.

Coachella Valley Water District, Landscape Ordinance §1302.5.

E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024, California Department of Finance, released May 1, 2024.

Indio Subbasin Annual Report for Water Year 2023-2024, March 2025.

Imperial Irrigation District, 2024 Integrated Resource Plan, April 2024.

Standards for Indoor Residential Water Use, California Water Code §10609.4(a).

SW Corner – Calhoun Street at 49th Avenue Subdivision, Coachella, CA, Preliminary Hydrology Report, prepared for Pacific Coast Properties, prepared by The Altum Group, January 17, 2025.

XX. WILDFIRE If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?				✓
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?				✓
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?				✓
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?				✓

Environmental Setting

Wildfires are natural events that promote ecosystem regeneration, and ecosystems throughout much of the western United States including California are naturally susceptible to wildfires. In southern California, the winter rains lead to spring germination, then by the fall, the vegetation dries up as the high summer temperatures and lack of rainfall dominate the weather. Wildfire is fed by vegetative fuel load, slope and lack of precipitation. However, wildfires become hazards when they spread into human development areas, or when the built environment encroaches upon wildfire zones. Areas where wilderness and urban land uses meet are referred to as the wildland-urban interface (WUI), and these areas pose an elevated risks of fire hazards to human health and property. In particular, WUI areas near wilderness areas that have not burned for 30+ years are poised for higher risks of burning in the near future due to the buildup of vegetative fuels.

The California Department of Forestry and Fire Protection (Cal Fire) maintains the Fire Hazard Severity Zone Viewer (FHSZ Viewer), a State map of fire hazard zones that are ranked as either moderate, high, or very high. The FHSZ Viewer also shows geographic responsibility areas that are protected with either federal, state or local financial resources.

The City of Coachella lies within the low desert ecosystem of the Colorado Desert section of the Sonoran Desert Bioregion where the fuel load is sparse, and the slope of the terrain is minimal compared to the higher elevations of the surrounding mountain ranges. The sparse desert vegetation and relatively flatter landscape greatly reduce the risk of wildfire in the City. The urban areas of the City have replaced much of the native Colorado Desert vegetation with development and landscaping while agricultural activity is the predominant condition of the southern and eastern regions of the Coachella Planning Area. Due to these conditions, the risk of wildfire in the City is extremely low. The Project site is approximately seven miles northeast from a moderate fire zone area within a state responsibility area (SRA) in the Santa Rosa Mountains.[78]

Discussion of Impacts

a) No Impact. The Primary Evacuation routes for the City of Coachella include Interstate 10, Avenue 48, Avenue 50, Avenue 52, Harrison Street, Highway 111/Grapefruit Boulevard, and State Route 86S.[79] The Project is on the southeast corner of Calhoun Street and Avenue 49, and Calhoun Street connects to both Avenue 48 to the north and Avenue 50 to the south. The Project also proposes to improve Avenue 49, which would grant additional access from the Project site to the primary evacuation routes. The Project does not propose to alter any of the existing evacuation routes and would not substantially impair the City's adopted emergency evacuation and response plans. No impacts would result from the Project.

b, c) No Impact. The Project site and surrounding area are not located within a wildfire hazard severity zone, nor are they located within a WUI. The Project is over seven miles northeast from the nearest wildfire severity zone, which is rated as a moderate severity. The Project, surrounded by urban land uses, would not expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. The Project would not require any installation or maintenance of wildfire emergency infrastructure. There would be no impacts.

d) No Impact. The City of Coachella lies at the far southeastern end of the Coachella Valley, a low desert, low-elevation and relatively flat area within of the Colorado Desert ecoregion. The terrain mildly slopes downward toward the southeast. There is low to no risk of wildfire in the low desert region of the Coachella Valley or the City, and no risk of post-wildfire flooding, landslide, or hillside instability. The Project would not expose residents, workers or structures to such post-fire hazards. No impacts are expected.

Mitigation Measures: None required.

Monitoring: None required.

Sources:
Fire Hazard Severity Zone Viewer, California Department of Forestry and Fire Protection
Technical Background Report to the Safety Element, City of Coachella General Plan 2035 Update

78 Fire Hazard Severity Zone Viewer, California Department of Forestry and Fire Protection, accessed July 2024.

79 Technical Background Report to the Safety Element, City of Coachella General Plan 2035 Update, September 2014.

XXI. MANDATORY FINDINGS OF SIGNIFICANCE

NOTE: If there are significant environmental impacts which cannot be mitigated and no feasible project alternatives are available, then complete the mandatory findings of significance and attach to this initial study as an appendix. This is the first step for starting the environmental impact report (EIR) process. **Does the project:**	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		✓		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			✓	
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?			✓	

a) Less Than Significant Impact with Mitigation Incorporated.

Biological Resources:
The Project site is not located within a CVMSHCP-designated conservation area and does not contain any wildlife corridors or biological linkage areas. However, the vegetative scrub and date palms on the Project site could potentially be used by both resident and migratory nesting birds, many of which are not special status species, but all are protected under the Migratory Bird Treaty Act (MBTA) and

the California Fish and Game Code (FGC). Therefore, a pre-construction survey will be required to avoid impacts to nesting birds covered by the MBTA. Mitigation Measure BIO-1 provides details for conducting the nesting bird survey.

Western burrowing owls are protected under the MBTA, the US Fish and Wildlife Service as a Bird of Conservation Concern (BCC) and receives protection under the California Endangered Species Act (CESA). Neither burrowing owls nor signs of burrowing owls were observed during the site survey, however, because suitable habitat is present on the Project site, burrowing owls could potentially relocate to the Project site prior to the start of construction. Mitigation Measure BIO-2 describes the required pre-construction burrowing owl survey.

Finally, as the City is a signatory to the CVMSHCP, the Project is subject to payment of the Development Mitigation Fee to mitigate potential impacts to covered species under the CVMSHCP.

The Proposed Project will not significantly reduce fish or wildlife habitat or otherwise adversely impact a fish or wildlife species. The construction of the Project has the potential to impact nesting birds, but the mitigation measures included in this document and payment of the CVMSHCP Development Mitigation Fee will reduce those impacts to less than significant levels.

Cultural Resources

The Project site was evaluated by qualified non-Tribal and Tribal archaeologists and was found to have a low potential for resources as no surface deposits were discovered during the field survey. However, the potential for buried resources, including Tribal resources, requires the implementation of mitigation to reduce impacts to less than significant levels. The CUL-1 Mitigation Measure requires the monitoring of earth moving activities, which will reduce these impacts.

b) Less Than Significant Impact. The Project will result in less than significant impacts to the environment, apart from biological and cultural resources, and the transportation network surrounding the Project. The Project is consistent with the City's General Plan Update land use designation assigned to the property, and would therefore not generate any greater impacts than those expected from the build out of the General Plan Update. Cumulative impacts are expected to be less than significant with the implementation of the prescribed mitigation measures.

c) Less Than Significant Impact with Mitigation. The proposed Project will generally not significantly impact people. It will provide additional housing opportunities to existing and future residents, as well as a public park facility for the City. Air quality, GHG, hazardous materials and noise impacts have been determined to be less than significant in the discussions above.

Transportation

At the present time, three intersections within the Traffic Analysis study area operate at unacceptable levels of service (LOS E and F) during peak traffic hours, and the Traffic Analysis finds that traffic signals would adequately address these deficiencies. Although the Project is not contributing to these current deficiencies, traffic conditions upon build out will impact these intersections and further degrade the level of service at each intersection. Therefore, the Project will contribute its fair share towards the installation of traffic signals at these three intersections. Mitigation Measure TRA-1 provides information regarding the Fair Share Contribution.

Along Avenue 49 and Calhoun Street, traffic will be impacted by vehicles entering and exiting the Project's two driveways. To reduce impacts to less than significant levels, several on-site and site adjacent street improvements are recommended in Mitigation Measure TRA-2.

CHAPTER 3: MITIGATION MONITORING & REPORTING PROGRAM
City of Coachella / Calhoun Street Housing Development
Environmental Assessment 25-02 / SCH No.

Resource Topic	Level of Impact After Mitigation	Mitigation Measures	Responsible Party/ Monitoring Party	Implementation Timing
Biological Resources	Less than Significant	**BIO-1** Bird nesting season for resident birds in Southern California occurs between February 1 and August 31. To avoid impacts to nesting birds, all vegetation clearing, ground disturbance, and construction activity should be scheduled between September 1 and January 31 if possible. If construction occurs during the nesting season, a certified avian biologist must conduct a pre-construction nesting bird survey (NBS) immediately prior to scheduled construction activity. If active nests are identified, the biologist will demarcate a no-work buffer zone(s) around the active nest(s) and check the nest site(s) weekly until the young birds fledge and the nest(s) become inactive. The buffer zone size would be based on the nesting species, its sensitivity to disturbance, nesting stage and the expected intensity and duration of disturbance. No ground or vegetation disturbance shall occur within the nest site buffer zone(s) until the qualified biologist determines that the young have successfully fledged, and the nest is inactive. Per CDFW recommendations, a buffer of 500 feet shall be set for listed species and birds of prey, and a buffer of 100 to 300 feet shall be set for unlisted songbirds.	Project applicant, Project biologist, Planning Department, City Engineer	The Project applicant shall complete preconstruction surveys and provide them to the City prior to issuance of any permit allowing ground disturbance on the Project site. Results of the preconstruction surveys are to be kept on file at City Hall.

Resource Topic	Level of Impact After Mitigation	Mitigation Measures	Responsible Party/ Monitoring Party	Implementation Timing
Biological Resources continued	Less than Significant	**BIO-2** To ensure that no burrowing owls have moved to the Project site since the biological site survey was conducted, avoidance surveys of the Project site must be conducted immediately preceding development, in compliance with the CDFW Staff Report for Burrowing Owl (2012) protocols. The first survey should occur 14-30 days prior to initiating ground disturbance activities, and the second survey should take place withing 24 hours of ground disturbance. Should burrowing owls be detected, CDFW shall be contacted as soon as possible to determine the next course of action. CDFW must grant permission to relocate burrowing owls.	Project applicant, Project biologist, Planning Department, City Engineer	The Project applicant shall complete preconstruction surveys and provide them to the City prior to issuance of any permit allowing ground disturbance on the Project site. Results of the preconstruction surveys are to be kept on file at City Hall.
Cultural Resources	Less than Significant	**CUL-1** <u>Tribal Resource Discovery and Documentation</u> A Cultural Resources Monitoring and Discovery Plan (Plan) will be prepared by the Project archaeologist in collaboration with ACBCI and provided to the City and ACBCI prior to the issuance of grading permits for the property. The Plan will require that a qualified archaeological and Tribal monitor from ACBCI be present during all ground-disturbing activities within the Project site. Monitoring requirements and locations should be defined along with resource discovery protocols and guidance for reducing or terminating site monitoring in the	Project Archaeologist, City Planning Department, City Engineer	The Project archaeologist shall provide the City with a copy of the Cultural Resources Monitoring and Discovery Plan prior to the issuance of any ground disturbing permit on the site. The Plan will be prepared in collaboration with ACBCI. Within 30 days following the completion of monitoring activities, the Project archaeologist shall provide the City with a report of monitoring activities.

Resource Topic	Level of Impact After Mitigation	Mitigation Measures	Responsible Party/ Monitoring Party	Implementation Timing
		case that no artifacts are identified, or that documentation finds that ground disturbance will occur in soils with more potential for discovering artifacts. Should an artifact be discovered, all construction activity within 100 feet of the discovery shall stop until the qualified archaeologist can evaluate the significance of the artifact and make a determination whether further study is necessary. Should the artifact be found to be significant under CEQA, an archaeological treatment plan and further data recovery may be required. If the qualified archaeologist and ACBCI monitor determine that on-site reburial is the appropriate measure to be taken for the artifact(s) discovered on the Project site, they will recommend a location to the City and project proponent. That location will be described and recorded as an easement in favor of ACBCI on the property in perpetuity prior to the completion of the first house on the property. This is confidential information, and the exact nature of this area will not be called out on the grading plans.		
Transportation	Less than Significant	**TRA-1** **Traffic Signal Installation** Traffic signal control will address the operational deficiencies at three intersections that presently experience unacceptable levels of service. Although the Project is not currently contributing to the deficiencies, traffic conditions upon build	Project applicant, Project engineer, City Engineer	The City Engineer shall approve project improvement plans prior to the issuance of grading permits. Project improvements and fair share contributions shall be completed prior to the occupancy of any portion of the Project.

<table>
<tr><th>Resource Topic</th><th>Level of Impact After Mitigation</th><th>Mitigation Measures</th><th>Responsible Party/ Monitoring Party</th><th>Implementation Timing</th></tr>
<tr><td></td><td></td><td>out will impact these intersections and further degrade the level of service at each intersection. The Project Fair Share Contributions listed in Table XVII-7 show the Project's percentage of the total traffic volume and deficiency. To reduce the Project's expected impacts to less than significant levels, the Project will be responsible for paying its share as shown in the table.

Table XVII-8
<table>
<tr><th>Intersection</th><th>Project Fair Share (%)</th></tr>
<tr><td>#1 Calhoun St. / Dr. Carreon Bl.</td><td></td></tr>
<tr><td>• AM Peak Hour</td><td>16.3%</td></tr>
<tr><td>• PM Peak Hour</td><td>19.9%</td></tr>
<tr><td>#3 Calhoun St. / Avenue 49</td><td></td></tr>
<tr><td>• AM Peak Hour</td><td>39.3%</td></tr>
<tr><td>• PM Peak Hour</td><td>41.7%</td></tr>
<tr><td># 5 Jackson St. / Avenue 49 – Odlum Dr.</td><td></td></tr>
<tr><td>• AM Peak Hour</td><td>18.6%</td></tr>
<tr><td>• PM Peak Hour</td><td>19.8%</td></tr>
</table></td><td></td><td></td></tr>
<tr><td>Transportation continued</td><td>Less than Significant</td><td>TRA-2
On-Site and Site-Adjacent Improvements
The recommendations listed here are the minimum improvements required to accommodate site access and maintain acceptable peak hour operation for the Project.</td><td>Project applicant,

Project engineer,

City Engineer</td><td>The City Engineer shall approve project improvement plans prior to the issuance of grading permits. Project improvements and fair share contributions shall be completed</td></tr>
</table>

Resource Topic	Level of Impact After Mitigation	Mitigation Measures	Responsible Party/ Monitoring Party	Implementation Timing
		Installation of these improvements will ensure that impacts related to traffic entering and exiting the Project will be reduced to less than significant levels. **#3 – Calhoun Street / Avenue 49** • Provide a separate northbound left turn lane. • Modify southbound approach striping to provide a separate southbound right turn lane. • Provide a shared eastbound left/thru/right lane. **#6 – Calhoun Street / Access 1** • Provide a separate northbound left turn lane. • Provide a shared eastbound left/thru/right turn lane. **#7 – Avenue 49 / Access 2** • Provide a shared northbound left/right turn lane. • Provide a shared eastbound thru/right turn lane. • Provide a shared westbound left/thru lane.		prior to the occupancy of any portion of the Project.
Tribal Cultural Resources	Less than Significant	**See CUL-1** <u>Tribal Resource Discovery and Documentation</u> A Cultural Resources Monitoring and Discovery Plan (Plan) will be prepared by the Project archaeologist in collaboration with ACBCI and provided to the City and ACBCI prior to the issuance of grading permits for the property.	Project Archaeologist, City Planning Department, City Engineer	The Project archaeologist shall provide the City with a copy of the Cultural Resources Monitoring and Discovery Plan prior to the issuance of any ground disturbing permit on the site. The Plan will be prepared in collaboration with ACBCI. Within 30 days following the completion of monitoring activities, the Project

Resource Topic	Level of Impact After Mitigation	Mitigation Measures	Responsible Party/ Monitoring Party	Implementation Timing
		The Plan will require that a qualified archaeological and Tribal monitor from ACBCI be present during all ground-disturbing activities within the Project site. Monitoring requirements and locations should be defined along with resource discovery protocols and guidance for reducing or terminating site monitoring in the case that no artifacts are identified, or that documentation finds that ground disturbance will occur in soils with more potential for discovering artifacts. Should an artifact be discovered, all construction activity within 100 feet of the discovery shall stop until the qualified archaeologist can evaluate the significance of the artifact and make a determination whether further study is necessary. Should the artifact be found to be significant under CEQA, an archaeological treatment plan and further data recovery may be required. If the qualified archaeologist and ACBCI monitor determine that on-site reburial is the appropriate measure to be taken for the artifact(s) discovered on the Project site, they will recommend a location to the City and project proponent. That location will be described and recorded as an easement in favor of ACBCI on the property in perpetuity prior to the completion of the first house on the property. This is confidential information, and the exact nature of this area will not be called out on the grading plans.		archaeologist shall provide the City with a report of monitoring activities.

Appendix A
Calhoun Street Housing Development CalEEMod Report

Calhoun Street Housing Development Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

1.2. Land Use Types

1.3. User-Selected Emission Reduction Measures by Emissions Sector

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

2.2. Construction Emissions by Year, Unmitigated

2.3. Construction Emissions by Year, Mitigated

2.4. Operations Emissions Compared Against Thresholds

2.5. Operations Emissions by Sector, Unmitigated

2.6. Operations Emissions by Sector, Mitigated

3. Construction Emissions Details

3.1. Site Preparation (2026) - Unmitigated

3.2. Site Preparation (2026) - Mitigated

3.3. Grading (2026) - Unmitigated

3.4. Grading (2026) - Mitigated

3.5. Building Construction (2026) - Unmitigated

3.6. Building Construction (2026) - Mitigated

3.7. Building Construction (2027) - Unmitigated

3.8. Building Construction (2027) - Mitigated

3.9. Building Construction (2028) - Unmitigated

3.10. Building Construction (2028) - Mitigated

3.11. Paving (2028) - Unmitigated

3.12. Paving (2028) - Mitigated

3.13. Architectural Coating (2028) - Unmitigated

3.14. Architectural Coating (2028) - Mitigated

3.15. Architectural Coating (2029) - Unmitigated

3.16. Architectural Coating (2029) - Mitigated

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

4.1.2. Mitigated

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

4.2.2. Electricity Emissions By Land Use - Mitigated

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

4.2.4. Natural Gas Emissions By Land Use - Mitigated

4.3. Area Emissions by Source

4.3.1. Unmitigated

4.3.2. Mitigated

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

4.4.2. Mitigated

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

4.5.2. Mitigated

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

4.6.2. Mitigated

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

4.7.2. Mitigated

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

4.8.2. Mitigated

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

4.9.2. Mitigated

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

5. Activity Data

5.1. Construction Schedule

5.2. Off-Road Equipment

5.2.1. Unmitigated

5.2.2. Mitigated

5.3. Construction Vehicles

5.3.1. Unmitigated

5.3.2. Mitigated

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

5.5. Architectural Coatings

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

5.6.2. Construction Earthmoving Control Strategies

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

5.9. Operational Mobile Sources

5.9.1. Unmitigated

5.9.2. Mitigated

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

5.10.3. Landscape Equipment

5.10.4. Landscape Equipment - Mitigated

5.11. Operational Energy Consumption

5.11.1. Unmitigated

5.11.2. Mitigated

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

5.12.2. Mitigated

5.13. Operational Waste Generation

5.13.1. Unmitigated

5.13.2. Mitigated

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

5.14.2. Mitigated

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

5.15.2. Mitigated

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

5.16.2. Process Boilers

5.17. User Defined

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

5.18.1.2. Mitigated

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

5.18.1.2. Mitigated

5.18.2. Sequestration

5.18.2.1. Unmitigated

5.18.2.2. Mitigated

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

6.2. Initial Climate Risk Scores

6.3. Adjusted Climate Risk Scores

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

7.2. Healthy Places Index Scores

7.3. Overall Health & Equity Scores

7.4. Health & Equity Measures

7.5. Evaluation Scorecard

7.6. Health & Equity Custom Measures

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Calhoun Street Housing Development
Construction Start Date	1/6/2026
Operational Year	2029
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.00
Precipitation (days)	7.60
Location	33.691743355835385, -116.21030862160973
County	Riverside-Salton Sea
City	Coachella
Air District	South Coast AQMD
Air Basin	Salton Sea
TAZ	5695
EDFZ	19
Electric Utility	Imperial Irrigation District
Gas Utility	Southern California Gas
App Version	2022.1.1.30

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Single Family Housing	257	Dwelling Unit	22.4	976,050	0.00	0.00	1,058	—

City Park	5.95	Acre	5.95	0.00	5.95	0.00	—	—
User Defined Parking	9.12	User Defined Unit	9.12	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-2*	Limit Heavy-Duty Diesel Vehicle Idling
Construction	C-11	Limit Vehicle Speeds on Unpaved Roads
Energy	E-2	Require Energy Efficient Appliances
Water	W-5	Design Water-Efficient Landscapes

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	71.5	71.4	28.8	29.7	0.07	1.15	4.22	5.37	1.06	1.58	2.64	—	8,233	8,233	0.29	0.27	6.54	8,326
Mit.	71.5	71.4	28.8	29.7	0.07	1.15	4.22	5.37	1.06	1.58	2.64	—	8,233	8,233	0.29	0.27	6.54	8,326
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	71.4	71.4	29.3	29.7	0.07	1.24	7.90	9.15	1.14	4.00	5.14	—	8,191	8,191	0.28	0.27	0.17	8,280
Mit.	71.4	71.4	29.3	29.7	0.07	1.24	7.90	9.15	1.14	4.00	5.14	—	8,191	8,191	0.28	0.27	0.17	8,280

% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	14.1	14.0	14.0	16.4	0.03	0.55	2.33	2.88	0.50	0.92	1.42	—	4,078	4,078	0.13	0.13	1.84	4,122
Mit.	14.1	14.0	14.0	16.4	0.03	0.55	2.33	2.88	0.50	0.92	1.42	—	4,078	4,078	0.13	0.13	1.84	4,122
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.57	2.55	2.55	3.00	0.01	0.10	0.43	0.52	0.09	0.17	0.26	—	675	675	0.02	0.02	0.30	682
Mit.	2.57	2.55	2.55	3.00	0.01	0.10	0.43	0.52	0.09	0.17	0.26	—	675	675	0.02	0.02	0.30	682
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	—	Yes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mit.	—	Yes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.77	3.16	28.8	29.7	0.07	1.15	4.22	5.37	1.06	1.58	2.64	—	8,233	8,233	0.29	0.27	6.54	8,326
2027	1.72	1.46	10.6	20.9	0.03	0.35	1.44	1.79	0.32	0.35	0.67	—	4,550	4,550	0.12	0.17	5.95	4,611
2028	71.5	71.4	10.1	20.4	0.03	0.31	1.44	1.76	0.29	0.35	0.64	—	4,506	4,506	0.12	0.17	5.40	4,566
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.82	3.21	29.3	29.7	0.07	1.24	7.90	9.15	1.14	4.00	5.14	—	8,191	8,191	0.28	0.27	0.17	8,280
2027	1.65	1.39	10.7	17.6	0.03	0.35	1.44	1.79	0.32	0.35	0.67	—	4,355	4,355	0.12	0.17	0.15	4,410
2028	71.4	71.4	10.2	17.3	0.03	0.31	1.44	1.76	0.29	0.35	0.64	—	4,315	4,315	0.12	0.17	0.14	4,370
2029	71.4	71.4	0.87	1.87	< 0.005	0.01	0.24	0.25	0.01	0.06	0.07	—	350	350	0.01	0.01	0.02	353
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.90	1.60	14.0	16.4	0.03	0.55	2.33	2.88	0.50	0.92	1.42	—	4,078	4,078	0.13	0.13	1.30	4,122
2027	1.19	1.01	7.62	13.4	0.02	0.25	1.03	1.28	0.23	0.25	0.48	—	3,166	3,166	0.09	0.12	1.84	3,207
2028	14.1	14.0	4.99	8.87	0.01	0.16	0.61	0.77	0.15	0.15	0.29	—	1,979	1,979	0.06	0.07	0.98	2,003
2029	3.35	3.35	0.04	0.10	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	17.1	17.1	< 0.005	< 0.005	0.01	17.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.35	0.29	2.55	3.00	0.01	0.10	0.43	0.52	0.09	0.17	0.26	—	675	675	0.02	0.02	0.21	682
2027	0.22	0.18	1.39	2.44	< 0.005	0.05	0.19	0.23	0.04	0.05	0.09	—	524	524	0.01	0.02	0.30	531
2028	2.57	2.55	0.91	1.62	< 0.005	0.03	0.11	0.14	0.03	0.03	0.05	—	328	328	0.01	0.01	0.16	332
2029	0.61	0.61	0.01	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.84	2.84	< 0.005	< 0.005	< 0.005	2.86

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.77	3.16	28.8	29.7	0.07	1.15	4.22	5.37	1.06	1.58	2.64	—	8,233	8,233	0.29	0.27	6.54	8,326
2027	1.72	1.46	10.6	20.9	0.03	0.35	1.44	1.79	0.32	0.35	0.67	—	4,550	4,550	0.12	0.17	5.95	4,611
2028	71.5	71.4	10.1	20.4	0.03	0.31	1.44	1.76	0.29	0.35	0.64	—	4,506	4,506	0.12	0.17	5.40	4,566
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.82	3.21	29.3	29.7	0.07	1.24	7.90	9.15	1.14	4.00	5.14	—	8,191	8,191	0.28	0.27	0.17	8,280
2027	1.65	1.39	10.7	17.6	0.03	0.35	1.44	1.79	0.32	0.35	0.67	—	4,355	4,355	0.12	0.17	0.15	4,410
2028	71.4	71.4	10.2	17.3	0.03	0.31	1.44	1.76	0.29	0.35	0.64	—	4,315	4,315	0.12	0.17	0.14	4,370
2029	71.4	71.4	0.87	1.87	< 0.005	0.01	0.24	0.25	0.01	0.06	0.07	—	350	350	0.01	0.01	0.02	353
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.90	1.60	14.0	16.4	0.03	0.55	2.33	2.88	0.50	0.92	1.42	—	4,078	4,078	0.13	0.13	1.30	4,122
2027	1.19	1.01	7.62	13.4	0.02	0.25	1.03	1.28	0.23	0.25	0.48	—	3,166	3,166	0.09	0.12	1.84	3,207
2028	14.1	14.0	4.99	8.87	0.01	0.16	0.61	0.77	0.15	0.15	0.29	—	1,979	1,979	0.06	0.07	0.98	2,003
2029	3.35	3.35	0.04	0.10	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	17.1	17.1	< 0.005	< 0.005	0.01	17.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.35	0.29	2.55	3.00	0.01	0.10	0.43	0.52	0.09	0.17	0.26	—	675	675	0.02	0.02	0.21	682
2027	0.22	0.18	1.39	2.44	< 0.005	0.05	0.19	0.23	0.04	0.05	0.09	—	524	524	0.01	0.02	0.30	531
2028	2.57	2.55	0.91	1.62	< 0.005	0.03	0.11	0.14	0.03	0.03	0.05	—	328	328	0.01	0.01	0.16	332
2029	0.61	0.61	0.01	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.84	2.84	< 0.005	< 0.005	< 0.005	2.86

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	33.0	32.4	4.64	67.0	0.10	0.23	9.85	10.1	0.23	2.48	2.71	632	14,599	15,232	60.4	0.39	25.9	16,882
Mit.	33.0	32.4	4.64	67.0	0.10	0.23	9.85	10.1	0.23	2.48	2.71	632	14,520	15,152	60.4	0.39	25.9	16,802
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	1%	1%	< 0.5%	—	—	< 0.5%
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	30.1	29.5	4.70	40.5	0.09	0.22	9.85	10.1	0.22	2.48	2.70	632	13,251	13,883	60.4	0.40	7.48	15,520
Mit.	30.1	29.5	4.70	40.5	0.09	0.22	9.85	10.1	0.22	2.48	2.70	632	13,172	13,804	60.4	0.40	7.48	15,440
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	1%	1%	< 0.5%	—	—	1%
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	31.1	30.6	4.62	50.5	0.09	0.23	9.80	10.0	0.22	2.47	2.69	632	13,785	14,417	60.4	0.39	15.1	16,057
Mit.	31.1	30.6	4.62	50.5	0.09	0.23	9.80	10.0	0.22	2.47	2.69	632	13,706	14,338	60.4	0.39	15.1	15,978
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	1%	1%	< 0.5%	—	—	< 0.5%
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.68	5.58	0.84	9.21	0.02	0.04	1.79	1.83	0.04	0.45	0.49	105	2,282	2,387	10.00	0.06	2.51	2,658
Mit.	5.68	5.58	0.84	9.21	0.02	0.04	1.79	1.83	0.04	0.45	0.49	105	2,269	2,374	10.00	0.06	2.51	2,645
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	1%	1%	< 0.5%	< 0.5%	—	< 0.5%
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—

Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,000
Unmit.	—	Yes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	No
Mit.	—	Yes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	No

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	8.80	8.38	2.20	51.4	0.08	0.04	9.85	9.89	0.03	2.48	2.52	—	8,494	8,494	0.46	0.27	18.9	8,604
Area	23.9	23.8	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	39.0	39.0	< 0.005	< 0.005	—	39.1
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,931	5,931	0.48	0.03	—	5,953
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	33.0	32.4	4.64	67.0	0.10	0.23	9.85	10.1	0.23	2.48	2.71	632	14,599	15,232	60.4	0.39	25.9	16,882

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	7.25	6.82	2.39	39.5	0.07	0.04	9.85	9.89	0.03	2.48	2.52	—	7,184	7,184	0.50	0.28	0.49	7,281
Area	22.6	22.6	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,931	5,931	0.48	0.03	—	5,953
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	30.1	29.5	4.70	40.5	0.09	0.22	9.85	10.1	0.22	2.48	2.70	632	13,251	13,883	60.4	0.40	7.48	15,520
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	7.63	7.22	2.25	42.3	0.08	0.04	9.80	9.84	0.03	2.47	2.50	—	7,700	7,700	0.47	0.27	8.15	7,800
Area	23.2	23.2	0.07	7.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	19.2	19.2	< 0.005	< 0.005	—	19.3
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,931	5,931	0.48	0.03	—	5,953
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	31.1	30.6	4.62	50.5	0.09	0.23	9.80	10.0	0.22	2.47	2.69	632	13,785	14,417	60.4	0.39	15.1	16,057
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.39	1.32	0.41	7.72	0.01	0.01	1.79	1.80	0.01	0.45	0.46	—	1,275	1,275	0.08	0.04	1.35	1,291
Area	4.24	4.23	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	3.18	3.18	< 0.005	< 0.005	—	3.19
Energy	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	982	982	0.08	0.01	—	986
Water	—	—	—	—	—	—	—	—	—	—	—	6.42	22.4	28.8	0.02	0.01	—	33.6
Waste	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.82	0.00	—	344
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16
Total	5.68	5.58	0.84	9.21	0.02	0.04	1.79	1.83	0.04	0.45	0.49	105	2,282	2,387	10.00	0.06	2.51	2,658

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	8.80	8.38	2.20	51.4	0.08	0.04	9.85	9.89	0.03	2.48	2.52	—	8,494	8,494	0.46	0.27	18.9	8,604
Area	23.9	23.8	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	39.0	39.0	< 0.005	< 0.005	—	39.1
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,852	5,852	0.47	0.03	—	5,873
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	33.0	32.4	4.64	67.0	0.10	0.23	9.85	10.1	0.23	2.48	2.71	632	14,520	15,152	60.4	0.39	25.9	16,802
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	7.25	6.82	2.39	39.5	0.07	0.04	9.85	9.89	0.03	2.48	2.52	—	7,184	7,184	0.50	0.28	0.49	7,281
Area	22.6	22.6	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,852	5,852	0.47	0.03	—	5,873
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	30.1	29.5	4.70	40.5	0.09	0.22	9.85	10.1	0.22	2.48	2.70	632	13,172	13,804	60.4	0.40	7.48	15,440
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	7.63	7.22	2.25	42.3	0.08	0.04	9.80	9.84	0.03	2.47	2.50	—	7,700	7,700	0.47	0.27	8.15	7,800
Area	23.2	23.2	0.07	7.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	19.2	19.2	< 0.005	< 0.005	—	19.3
Energy	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	5,852	5,852	0.47	0.03	—	5,873
Water	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Waste	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99

Total	31.1	30.6	4.62	50.5	0.09	0.23	9.80	10.0	0.22	2.47	2.69	632	13,706	14,338	60.4	0.39	15.1	15,978
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.39	1.32	0.41	7.72	0.01	0.01	1.79	1.80	0.01	0.45	0.46	—	1,275	1,275	0.08	0.04	1.35	1,291
Area	4.24	4.23	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	3.18	3.18	< 0.005	< 0.005	—	3.19
Energy	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	969	969	0.08	0.01	—	972
Water	—	—	—	—	—	—	—	—	—	—	—	6.42	22.4	28.8	0.02	0.01	—	33.6
Waste	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.82	0.00	—	344
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16
Total	5.68	5.58	0.84	9.21	0.02	0.04	1.79	1.83	0.04	0.45	0.49	105	2,269	2,374	10.00	0.06	2.51	2,645

3. Construction Emissions Details

3.1. Site Preparation (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.74	3.14	29.2	28.8	0.05	1.24	—	1.24	1.14	—	1.14	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movement	—	—	—	—	—	—	7.67	7.67	—	3.94	3.94	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.30	2.80	2.76	< 0.005	0.12	—	0.12	0.11	—	0.11	—	508	508	0.02	< 0.005	—	510
Dust From Material Movement	—	—	—	—	—	—	0.74	0.74	—	0.38	0.38	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.51	0.50	< 0.005	0.02	—	0.02	0.02	—	0.02	—	84.1	84.1	< 0.005	< 0.005	—	84.4
Dust From Material Movement	—	—	—	—	—	—	0.13	0.13	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.09	0.88	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	217	217	< 0.005	0.01	0.02	219
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	< 0.005	32.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	22.2	22.2	< 0.005	< 0.005	0.03	22.5

Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.98	2.98	< 0.005	< 0.005	< 0.005	3.11
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.68	3.68	< 0.005	< 0.005	0.01	3.72
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.49	0.49	< 0.005	< 0.005	< 0.005	0.51
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.2. Site Preparation (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.74	3.14	29.2	28.8	0.05	1.24	—	1.24	1.14	—	1.14	—	5,298	5,298	0.21	0.04	—	5,316
Dust From Material Movement	—	—	—	—	—	—	7.67	7.67	—	3.94	3.94	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.30	2.80	2.76	< 0.005	0.12	—	0.12	0.11	—	0.11	—	508	508	0.02	< 0.005	—	510

Dust From Material Movement	—	—	—	—	—	—	0.74	0.74	—	0.38	0.38	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.51	0.50	< 0.005	0.02	—	0.02	0.02	—	0.02	—	84.1	84.1	< 0.005	< 0.005	—	84.4
Dust From Material Movement	—	—	—	—	—	—	0.13	0.13	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.09	0.88	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	217	217	< 0.005	0.01	0.02	219
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	< 0.005	32.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	22.2	22.2	< 0.005	< 0.005	0.03	22.5
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.98	2.98	< 0.005	< 0.005	< 0.005	3.11
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.68	3.68	< 0.005	< 0.005	0.01	3.72

Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.49	0.49	< 0.005	< 0.005	< 0.005	0.51
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Grading (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.62	3.04	27.2	27.6	0.06	1.12	—	1.12	1.03	—	1.03	—	6,599	6,599	0.27	0.05	—	6,621
Dust From Material Movement	—	—	—	—	—	—	3.59	3.59	—	1.43	1.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.62	3.04	27.2	27.6	0.06	1.12	—	1.12	1.03	—	1.03	—	6,599	6,599	0.27	0.05	—	6,621
Dust From Material Movement	—	—	—	—	—	—	3.59	3.59	—	1.43	1.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	0.99	0.83	7.46	7.55	0.02	0.31	—	0.31	0.28	—	0.28	—	1,808	1,808	0.07	0.01	—	1,814
Dust From Material Movement	—	—	—	—	—	—	0.98	0.98	—	0.39	0.39	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.18	0.15	1.36	1.38	< 0.005	0.06	—	0.06	0.05	—	0.05	—	299	299	0.01	< 0.005	—	300
Dust From Material Movement	—	—	—	—	—	—	0.18	0.18	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.10	1.77	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	291	291	0.01	0.01	0.93	295
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	0.08	32.4
Hauling	0.04	0.03	1.46	0.34	0.01	0.03	0.36	0.38	0.03	0.09	0.12	—	1,312	1,312	0.01	0.21	2.73	1,377
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.10	1.00	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	248	248	< 0.005	0.01	0.02	251
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	< 0.005	32.4
Hauling	0.04	0.03	1.56	0.35	0.01	0.03	0.36	0.38	0.03	0.09	0.12	—	1,314	1,314	0.01	0.21	0.07	1,375
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.03	0.34	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	72.5	72.5	< 0.005	< 0.005	0.11	73.4

Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	8.52	8.52	< 0.005	< 0.005	0.01	8.88
Hauling	0.01	0.01	0.42	0.09	< 0.005	0.01	0.10	0.10	0.01	0.02	0.03	—	360	360	< 0.005	0.06	0.32	377
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.0	12.0	< 0.005	< 0.005	0.02	12.2
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.41	1.41	< 0.005	< 0.005	< 0.005	1.47
Hauling	< 0.005	< 0.005	0.08	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	59.6	59.6	< 0.005	0.01	0.05	62.4

3.4. Grading (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.62	3.04	27.2	27.6	0.06	1.12	—	1.12	1.03	—	1.03	—	6,599	6,599	0.27	0.05	—	6,621
Dust From Material Movement	—	—	—	—	—	—	3.59	3.59	—	1.43	1.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.62	3.04	27.2	27.6	0.06	1.12	—	1.12	1.03	—	1.03	—	6,599	6,599	0.27	0.05	—	6,621

Dust From Material Movement	—	—	—	—	—	—	3.59	3.59	—	1.43	1.43	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99	0.83	7.46	7.55	0.02	0.31	—	0.31	0.28	—	0.28	—	1,808	1,808	0.07	0.01	—	1,814
Dust From Material Movement	—	—	—	—	—	—	0.98	0.98	—	0.39	0.39	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.18	0.15	1.36	1.38	< 0.005	0.06	—	0.06	0.05	—	0.05	—	299	299	0.01	< 0.005	—	300
Dust From Material Movement	—	—	—	—	—	—	0.18	0.18	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.10	1.77	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	291	291	0.01	0.01	0.93	295
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	0.08	32.4
Hauling	0.04	0.03	1.46	0.34	0.01	0.03	0.36	0.38	0.03	0.09	0.12	—	1,312	1,312	0.01	0.21	2.73	1,377

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.10	1.00	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	248	248	< 0.005	0.01	0.02	251
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.1	31.1	< 0.005	< 0.005	< 0.005	32.4
Hauling	0.04	0.03	1.56	0.35	0.01	0.03	0.36	0.38	0.03	0.09	0.12	—	1,314	1,314	0.01	0.21	0.07	1,375
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.03	0.34	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	72.5	72.5	< 0.005	< 0.005	0.11	73.4
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	8.52	8.52	< 0.005	< 0.005	0.01	8.88
Hauling	0.01	0.01	0.42	0.09	< 0.005	0.01	0.10	0.10	0.01	0.02	0.03	—	360	360	< 0.005	0.06	0.32	377
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.0	12.0	< 0.005	< 0.005	0.02	12.2
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.41	1.41	< 0.005	< 0.005	< 0.005	1.47
Hauling	< 0.005	< 0.005	0.08	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	59.6	59.6	< 0.005	0.01	0.05	62.4

3.5. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.37	0.31	2.85	3.76	0.01	0.11	—	0.11	0.10	—	0.10	—	694	694	0.03	0.01	—	697
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.52	0.69	< 0.005	0.02	—	0.02	0.02	—	0.02	—	115	115	< 0.005	< 0.005	—	115
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.46	0.42	0.44	8.20	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,345	1,345	0.05	0.05	4.30	1,364
Vendor	0.04	0.03	0.88	0.38	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	854	854	0.01	0.12	2.24	891
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.35	0.48	4.65	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,145	1,145	0.02	0.05	0.11	1,159
Vendor	0.04	0.03	0.95	0.39	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	854	854	0.01	0.12	0.06	890
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.12	0.11	0.13	1.68	0.00	0.00	0.35	0.35	0.00	0.08	0.08	—	354	354	< 0.005	0.01	0.54	359
Vendor	0.01	0.01	0.27	0.11	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	247	247	< 0.005	0.03	0.28	258
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.31	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	58.7	58.7	< 0.005	< 0.005	0.09	59.4
Vendor	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	41.0	41.0	< 0.005	0.01	0.05	42.7
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.6. Building Construction (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	0.37	0.31	2.85	3.76	0.01	0.11	—	0.11	0.10	—	0.10	—	694	694	0.03	0.01	—	697
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.52	0.69	< 0.005	0.02	—	0.02	0.02	—	0.02	—	115	115	< 0.005	< 0.005	—	115
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.46	0.42	0.44	8.20	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,345	1,345	0.05	0.05	4.30	1,364
Vendor	0.04	0.03	0.88	0.38	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	854	854	0.01	0.12	2.24	891
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.35	0.48	4.65	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,145	1,145	0.02	0.05	0.11	1,159
Vendor	0.04	0.03	0.95	0.39	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	854	854	0.01	0.12	0.06	890
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.11	0.13	1.68	0.00	0.00	0.35	0.35	0.00	0.08	0.08	—	354	354	< 0.005	0.01	0.54	359
Vendor	0.01	0.01	0.27	0.11	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	247	247	< 0.005	0.03	0.28	258
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.31	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	58.7	58.7	< 0.005	< 0.005	0.09	59.4
Vendor	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	41.0	41.0	< 0.005	0.01	0.05	42.7

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Building Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.71	9.24	0.02	0.24	—	0.24	0.22	—	0.22	—	1,712	1,712	0.07	0.01	—	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	0.16	0.13	1.22	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	—	283	283	0.01	< 0.005	—	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.44	0.40	0.40	7.63	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,318	1,318	0.01	0.04	3.89	1,336
Vendor	0.04	0.03	0.84	0.37	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	835	835	0.01	0.11	2.07	870
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.38	0.33	0.44	4.33	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,123	1,123	0.02	0.04	0.10	1,136
Vendor	0.04	0.03	0.90	0.37	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	836	836	0.01	0.11	0.05	869
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.28	3.87	0.00	0.00	0.86	0.86	0.00	0.20	0.20	—	857	857	0.01	0.03	1.20	868
Vendor	0.03	0.02	0.63	0.26	< 0.005	0.01	0.17	0.18	0.01	0.05	0.06	—	596	596	0.01	0.08	0.64	621
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.71	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	142	142	< 0.005	0.01	0.20	144
Vendor	0.01	< 0.005	0.11	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	98.7	98.7	< 0.005	0.01	0.11	103
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.23	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	—	2,405
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.88	0.74	6.71	9.24	0.02	0.24	—	0.24	0.22	—	0.22	—	1,712	1,712	0.07	0.01	—	1,718
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	0.13	1.22	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	—	283	283	0.01	< 0.005	—	284
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.44	0.40	0.40	7.63	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,318	1,318	0.01	0.04	3.89	1,336
Vendor	0.04	0.03	0.84	0.37	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	835	835	0.01	0.11	2.07	870
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.38	0.33	0.44	4.33	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,123	1,123	0.02	0.04	0.10	1,136
Vendor	0.04	0.03	0.90	0.37	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	836	836	0.01	0.11	0.05	869
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.28	3.87	0.00	0.00	0.86	0.86	0.00	0.20	0.20	—	857	857	0.01	0.03	1.20	868
Vendor	0.03	0.02	0.63	0.26	< 0.005	0.01	0.17	0.18	0.01	0.05	0.06	—	596	596	0.01	0.08	0.64	621
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.71	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	142	142	< 0.005	0.01	0.20	144
Vendor	0.01	< 0.005	0.11	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	98.7	98.7	< 0.005	0.01	0.11	103
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.43	0.36	3.27	4.73	0.01	0.11	—	0.11	0.10	—	0.10	—	877	877	0.04	0.01	—	880
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.60	0.86	< 0.005	0.02	—	0.02	0.02	—	0.02	—	145	145	0.01	< 0.005	—	146
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.43	0.38	0.36	7.13	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,293	1,293	0.01	0.04	3.50	1,310
Vendor	0.04	0.03	0.80	0.35	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	815	815	0.01	0.11	1.91	850
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.32	0.32	0.40	4.01	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,102	1,102	0.02	0.04	0.09	1,116
Vendor	0.03	0.02	0.87	0.36	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	816	816	0.01	0.11	0.05	849
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.12	0.13	1.84	0.00	0.00	0.44	0.44	0.00	0.10	0.10	—	431	431	0.01	0.02	0.55	436
Vendor	0.01	0.01	0.31	0.13	< 0.005	< 0.005	0.09	0.09	< 0.005	0.02	0.03	—	298	298	< 0.005	0.04	0.30	311
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.34	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	71.3	71.3	< 0.005	< 0.005	0.09	72.2
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	49.4	49.4	< 0.005	0.01	0.05	51.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Building Construction (2028) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	1.18	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	—	2,406
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.43	0.36	3.27	4.73	0.01	0.11	—	0.11	0.10	—	0.10	—	877	877	0.04	0.01	—	880
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.60	0.86	< 0.005	0.02	—	0.02	0.02	—	0.02	—	145	145	0.01	< 0.005	—	146
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.43	0.38	0.36	7.13	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,293	1,293	0.01	0.04	3.50	1,310
Vendor	0.04	0.03	0.80	0.35	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	815	815	0.01	0.11	1.91	850
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.32	0.32	0.40	4.01	0.00	0.00	1.21	1.21	0.00	0.28	0.28	—	1,102	1,102	0.02	0.04	0.09	1,116
Vendor	0.03	0.02	0.87	0.36	0.01	0.01	0.24	0.25	0.01	0.06	0.08	—	816	816	0.01	0.11	0.05	849
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.12	0.12	0.13	1.84	0.00	0.00	0.44	0.44	0.00	0.10	0.10	—	431	431	0.01	0.02	0.55	436
Vendor	0.01	0.01	0.31	0.13	< 0.005	< 0.005	0.09	0.09	< 0.005	0.02	0.03	—	298	298	< 0.005	0.04	0.30	311
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.34	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	71.3	71.3	< 0.005	< 0.005	0.09	72.2
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	49.4	49.4	< 0.005	0.01	0.05	51.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Paving (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.82	0.69	6.63	9.91	0.01	0.26	—	0.26	0.24	—	0.24	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.40	0.40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	1.09	1.63	< 0.005	0.04	—	0.04	0.04	—	0.04	—	248	248	0.01	< 0.005	—	249
Paving	0.07	0.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.20	0.30	< 0.005	0.01	—	0.01	0.01	—	0.01	—	41.1	41.1	< 0.005	< 0.005	—	41.3
Paving	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	1.16	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	210	210	< 0.005	0.01	0.57	212
Vendor	0.01	< 0.005	0.15	0.06	< 0.005	< 0.005	0.04	0.05	< 0.005	0.01	0.01	—	148	148	< 0.005	0.02	0.35	155
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	31.4	31.4	< 0.005	< 0.005	0.04	31.8
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	24.4	24.4	< 0.005	< 0.005	0.02	25.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.20	5.20	< 0.005	< 0.005	0.01	5.26
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.04	4.04	< 0.005	< 0.005	< 0.005	4.21
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Paving (2028) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.82	0.69	6.63	9.91	0.01	0.26	—	0.26	0.24	—	0.24	—	1,511	1,511	0.06	0.01	—	1,516
Paving	0.40	0.40	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	1.09	1.63	< 0.005	0.04	—	0.04	0.04	—	0.04	—	248	248	0.01	< 0.005	—	249
Paving	0.07	0.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.20	0.30	< 0.005	0.01	—	0.01	0.01	—	0.01	—	41.1	41.1	< 0.005	< 0.005	—	41.3
Paving	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	1.16	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	210	210	< 0.005	0.01	0.57	212
Vendor	0.01	< 0.005	0.15	0.06	< 0.005	< 0.005	0.04	0.05	< 0.005	0.01	0.01	—	148	148	< 0.005	0.02	0.35	155
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	31.4	31.4	< 0.005	< 0.005	0.04	31.8
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	24.4	24.4	< 0.005	< 0.005	0.02	25.4
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.20	5.20	< 0.005	< 0.005	0.01	5.26
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.04	4.04	< 0.005	< 0.005	< 0.005	4.21
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Architectural Coating (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134

Architectural Coating	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.15	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	24.8	24.8	< 0.005	< 0.005	—	24.9
Architectural Coatings	13.2	13.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.11	4.11	< 0.005	< 0.005	—	4.12

Architectural Coatings	2.42	2.42	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.07	1.43	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	259	259	< 0.005	0.01	0.70	262
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.08	0.80	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	220	220	< 0.005	0.01	0.02	223
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	43.8	43.8	< 0.005	< 0.005	0.06	44.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.25	7.25	< 0.005	< 0.005	0.01	7.34
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Architectural Coating (2028) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.81	1.12	< 0.005	0.02	—	0.02	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.15	0.21	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	24.8	24.8	< 0.005	< 0.005	—	24.9
Architectural Coatings	13.2	13.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.11	4.11	< 0.005	< 0.005	—	4.12
Architectural Coatings	2.42	2.42	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.07	1.43	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	259	259	< 0.005	0.01	0.70	262
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.08	0.80	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	220	220	< 0.005	0.01	0.02	223
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	43.8	43.8	< 0.005	< 0.005	0.06	44.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.25	7.25	< 0.005	< 0.005	0.01	7.34

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Architectural Coating (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	< 0.005	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.27	6.27	< 0.005	< 0.005	—	6.29
Architectural Coatings	3.35	3.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.04	1.04	< 0.005	< 0.005	—	1.04
Architectural Coatings	0.61	0.61	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.07	0.76	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	217	217	< 0.005	0.01	0.02	219
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.9	10.9	< 0.005	< 0.005	0.01	11.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.80	1.80	< 0.005	< 0.005	< 0.005	1.82
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.16. Architectural Coating (2029) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	71.2	71.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	< 0.005	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.27	6.27	< 0.005	< 0.005	—	6.29
Architectural Coatings	3.35	3.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.04	1.04	< 0.005	< 0.005	—	1.04

Architectural	0.61	0.61	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.07	0.76	0.00	0.00	0.24	0.24	0.00	0.06	0.06	—	217	217	< 0.005	0.01	0.02	219
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.9	10.9	< 0.005	< 0.005	0.01	11.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.80	1.80	< 0.005	< 0.005	< 0.005	1.82
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	8.55	8.14	2.14	50.1	0.08	0.04	9.63	9.67	0.03	2.43	2.46	—	8,303	8,303	0.45	0.26	18.5	8,410
City Park	0.25	0.24	0.06	1.23	< 0.005	< 0.005	0.22	0.22	< 0.005	0.06	0.06	—	191	191	0.01	0.01	0.42	194
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	8.80	8.38	2.20	51.4	0.08	0.04	9.85	9.89	0.03	2.48	2.52	—	8,494	8,494	0.46	0.27	18.9	8,604
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	7.04	6.63	2.33	38.5	0.07	0.04	9.63	9.67	0.03	2.43	2.46	—	7,023	7,023	0.48	0.27	0.48	7,117
City Park	0.21	0.20	0.06	0.98	< 0.005	< 0.005	0.22	0.22	< 0.005	0.06	0.06	—	162	162	0.01	0.01	0.01	164
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	7.25	6.82	2.39	39.5	0.07	0.04	9.85	9.89	0.03	2.48	2.52	—	7,184	7,184	0.50	0.28	0.49	7,281
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.35	1.28	0.40	7.53	0.01	0.01	1.75	1.76	0.01	0.44	0.45	—	1,246	1,246	0.08	0.04	1.32	1,262
City Park	0.04	0.04	0.01	0.19	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	28.7	28.7	< 0.005	< 0.005	0.03	29.1
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.39	1.32	0.41	7.72	0.01	0.01	1.79	1.80	0.01	0.45	0.46	—	1,275	1,275	0.08	0.04	1.35	1,291

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	8.55	8.14	2.14	50.1	0.08	0.04	9.63	9.67	0.03	2.43	2.46	—	8,303	8,303	0.45	0.26	18.5	8,410
City Park	0.25	0.24	0.06	1.23	< 0.005	< 0.005	0.22	0.22	< 0.005	0.06	0.06	—	191	191	0.01	0.01	0.42	194
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	8.80	8.38	2.20	51.4	0.08	0.04	9.85	9.89	0.03	2.48	2.52	—	8,494	8,494	0.46	0.27	18.9	8,604
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	7.04	6.63	2.33	38.5	0.07	0.04	9.63	9.67	0.03	2.43	2.46	—	7,023	7,023	0.48	0.27	0.48	7,117
City Park	0.21	0.20	0.06	0.98	< 0.005	< 0.005	0.22	0.22	< 0.005	0.06	0.06	—	162	162	0.01	0.01	0.01	164
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	7.25	6.82	2.39	39.5	0.07	0.04	9.85	9.89	0.03	2.48	2.52	—	7,184	7,184	0.50	0.28	0.49	7,281
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.35	1.28	0.40	7.53	0.01	0.01	1.75	1.76	0.01	0.44	0.45	—	1,246	1,246	0.08	0.04	1.32	1,262
City Park	0.04	0.04	0.01	0.19	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	28.7	28.7	< 0.005	< 0.005	0.03	29.1

User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.39	1.32	0.41	7.72	0.01	0.01	1.79	1.80	0.01	0.45	0.46	—	1,275	1,275	0.08	0.04	1.35	1,291

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	3,002	3,002	0.22	0.03	—	3,015
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,002	3,002	0.22	0.03	—	3,015
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	3,002	3,002	0.22	0.03	—	3,015
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	3,002	3,002	0.22	0.03	—	3,015

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	497	497	0.04	< 0.005	—	499
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	497	497	0.04	< 0.005	—	499

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	2,923	2,923	0.21	0.03	—	2,936
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	2,923	2,923	0.21	0.03	—	2,936
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	2,923	2,923	0.21	0.03	—	2,936
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	2,923	2,923	0.21	0.03	—	2,936
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	484	484	0.03	< 0.005	—	486
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	484	484	0.03	< 0.005	—	486

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	485	485	0.04	< 0.005	—	486
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	485	485	0.04	< 0.005	—	486

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

Total	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.27	0.14	2.31	0.98	0.01	0.19	—	0.19	0.19	—	0.19	—	2,929	2,929	0.26	0.01	—	2,937
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	485	485	0.04	< 0.005	—	486
City Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.05	0.02	0.42	0.18	< 0.005	0.03	—	0.03	0.03	—	0.03	—	485	485	0.04	< 0.005	—	486

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00

Consumer	20.9	20.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.66	1.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.34	1.26	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	—	39.0	39.0	< 0.005	< 0.005	—	39.1
Total	23.9	23.8	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	39.0	39.0	< 0.005	< 0.005	—	39.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	20.9	20.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.66	1.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	22.6	22.6	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	3.82	3.82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.30	0.30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscape Equipment	0.12	0.11	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.18	3.18	< 0.005	< 0.005	—	3.19
Total	4.24	4.23	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	3.18	3.18	< 0.005	< 0.005	—	3.19

4.3.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	20.9	20.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	1.66	1.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.34	1.26	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	—	39.0	39.0	< 0.005	< 0.005	—	39.1
Total	23.9	23.8	0.14	14.6	< 0.005	0.01	—	0.01	0.01	—	0.01	0.00	39.0	39.0	< 0.005	< 0.005	—	39.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	20.9	20.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Architectural Coating	1.66	1.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	22.6	22.6	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hearths	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00
Consumer Products	3.82	3.82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.30	0.30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.12	0.11	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.18	3.18	< 0.005	< 0.005	—	3.19
Total	4.24	4.23	0.01	1.32	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	0.00	3.18	3.18	< 0.005	< 0.005	—	3.19

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	38.8	113	152	0.14	0.09	—	181
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	22.1	22.1	< 0.005	< 0.005	—	22.2
Total	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	38.8	113	152	0.14	0.09	—	181
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	22.1	22.1	< 0.005	< 0.005	—	22.2
Total	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	6.42	18.7	25.1	0.02	0.01	—	29.9
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	3.66	3.66	< 0.005	< 0.005	—	3.68
Total	—	—	—	—	—	—	—	—	—	—	—	6.42	22.4	28.8	0.02	0.01	—	33.6

4.4.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	38.8	113	152	0.14	0.09	—	181
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	22.1	22.1	< 0.005	< 0.005	—	22.2
Total	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	38.8	113	152	0.14	0.09	—	181
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	22.1	22.1	< 0.005	< 0.005	—	22.2
Total	—	—	—	—	—	—	—	—	—	—	—	38.8	135	174	0.14	0.09	—	203
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	6.42	18.7	25.1	0.02	0.01	—	29.9
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	3.66	3.66	< 0.005	< 0.005	—	3.68
Total	—	—	—	—	—	—	—	—	—	—	—	6.42	22.4	28.8	0.02	0.01	—	33.6

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,075
City Park	—	—	—	—	—	—	—	—	—	—	—	0.28	0.00	0.28	0.03	0.00	—	0.96
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,075
City Park	—	—	—	—	—	—	—	—	—	—	—	0.28	0.00	0.28	0.03	0.00	—	0.96
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.81	0.00	—	343
City Park	—	—	—	—	—	—	—	—	—	—	—	0.05	0.00	0.05	< 0.005	0.00	—	0.16
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.82	0.00	—	344

4.5.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,075
City Park	—	—	—	—	—	—	—	—	—	—	—	0.28	0.00	0.28	0.03	0.00	—	0.96

User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,075
City Park	—	—	—	—	—	—	—	—	—	—	—	0.28	0.00	0.28	0.03	0.00	—	0.96
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	593	0.00	593	59.3	0.00	—	2,076
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.81	0.00	—	343
City Park	—	—	—	—	—	—	—	—	—	—	—	0.05	0.00	0.05	< 0.005	0.00	—	0.16
User Defined Parking	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	98.2	0.00	98.2	9.82	0.00	—	344

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.99	6.99
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.16	1.16

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	1/29/2026	3/18/2026	5.00	35.0	—
Grading	Grading	3/19/2026	8/5/2026	5.00	100	—
Building Construction	Building Construction	8/6/2026	7/5/2028	5.00	500	—
Paving	Paving	7/6/2028	9/27/2028	5.00	60.0	—
Architectural Coating	Architectural Coating	9/28/2028	1/24/2029	5.00	85.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36

Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix

Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	1.00	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	1.00	10.2	HHDT,MHDT
Grading	Hauling	19.7	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	92.5	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	27.5	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	5.00	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	18.5	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix

Site Preparation	—	—	—	—
Site Preparation	Worker	17.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	1.00	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	1.00	10.2	HHDT,MHDT
Grading	Hauling	19.7	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	92.5	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	27.5	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	5.00	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	18.5	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	1,959,188	653,063	0.00	0.00	23,403

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Preparation	0.00	0.00	30.0	0.00	—
Grading	15,749	0.00	300	0.00	—
Paving	0.00	0.00	0.00	0.00	12.0

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Single Family Housing	2.83	0%
City Park	0.00	0%
User Defined Parking	9.12	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	457	0.03	< 0.005
2027	0.00	457	0.03	< 0.005
2028	0.00	457	0.03	< 0.005
2029	0.00	457	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Single Family Housing	2,424	2,424	2,424	884,581	13,899	13,899	13,899	5,073,042
City Park	75.0	75.0	75.0	27,376	315	315	315	115,007
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Single Family Housing	2,424	2,424	2,424	884,581	13,899	13,899	13,899	5,073,042
City Park	75.0	75.0	75.0	27,376	315	315	315	115,007
User Defined Parking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

Hearth Type	Unmitigated (number)
Single Family Housing	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	100

5.10.1.2. Mitigated

Hearth Type	Unmitigated (number)
Single Family Housing	—
Wood Fireplaces	0
Gas Fireplaces	0
Propane Fireplaces	0
Electric Fireplaces	0
No Fireplaces	100

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
1959187.5	653,063	0.00	0.00	0.00

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Single Family Housing	2,400,186	457	0.0330	0.0040	9,140,029
City Park	0.00	457	0.0330	0.0040	0.00
User Defined Parking	0.00	457	0.0330	0.0040	0.00

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Single Family Housing	2,336,876	457	0.0330	0.0040	9,140,029
City Park	0.00	457	0.0330	0.0040	0.00
User Defined Parking	0.00	457	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	18,153,156	1,352,281
City Park	0.00	5,493,847

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Single Family Housing	18,153,156	1,352,281
City Park	0.00	5,493,781

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	1,100	—
City Park	0.51	—
User Defined Parking	0.00	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	1,100	—
City Park	0.51	—
User Defined Parking	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	22.4	annual days of extreme heat
Extreme Precipitation	0.10	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	88.7

AQ-PM	9.65
AQ-DPM	36.6
Drinking Water	50.4
Lead Risk Housing	18.7
Pesticides	0.00
Toxic Releases	3.34
Traffic	10.5
Effect Indicators	—
CleanUp Sites	11.8
Groundwater	0.00
Haz Waste Facilities/Generators	50.1
Impaired Water Bodies	0.00
Solid Waste	0.00
Sensitive Population	—
Asthma	36.0
Cardio-vascular	46.2
Low Birth Weights	57.4
Socioeconomic Factor Indicators	—
Education	80.7
Housing	79.3
Linguistic	98.8
Poverty	55.7
Unemployment	70.0

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—

Above Poverty	50.68651354
Employed	83.80597973
Median HI	47.77364301
Education	—
Bachelor's or higher	5.851405107
High school enrollment	100
Preschool enrollment	3.849608623
Transportation	—
Auto Access	98.98626973
Active commuting	15.30861029
Social	—
2-parent households	61.19594508
Voting	7.891697677
Neighborhood	—
Alcohol availability	97.0101373
Park access	2.194276915
Retail density	10.94572052
Supermarket access	29.03888105
Tree canopy	4.427049917
Housing	—
Homeownership	91.53086103
Housing habitability	90.19633004
Low-inc homeowner severe housing cost burden	20.18478121
Low-inc renter severe housing cost burden	97.81855511
Uncrowded housing	47.26036186
Health Outcomes	—
Insured adults	27.75567817
Arthritis	88.7

Asthma ER Admissions	63.7
High Blood Pressure	71.3
Cancer (excluding skin)	87.6
Asthma	83.3
Coronary Heart Disease	63.8
Chronic Obstructive Pulmonary Disease	81.8
Diagnosed Diabetes	51.3
Life Expectancy at Birth	33.9
Cognitively Disabled	94.6
Physically Disabled	49.3
Heart Attack ER Admissions	72.3
Mental Health Not Good	44.5
Chronic Kidney Disease	45.1
Obesity	19.9
Pedestrian Injuries	67.6
Physical Health Not Good	42.2
Stroke	80.6
Health Risk Behaviors	—
Binge Drinking	4.8
Current Smoker	40.7
No Leisure Time for Physical Activity	31.1
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	10.6
Elderly	98.7
English Speaking	4.3
Foreign-born	75.2

Outdoor Workers	9.7
Climate Change Adaptive Capacity	—
Impervious Surface Cover	65.7
Traffic Density	21.2
Traffic Access	23.0
Other Indices	—
Hardship	70.8
Other Decision Support	—
2016 Voting	17.8

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	31.0
Healthy Places Index Score for Project Location (b)	41.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	- 967,500 - Total single family home lot square footage (22.2107438 acres) - Landscaping for single family units is already included in CaleeMod, so the landscape area is zeroed out to avoid double counting it. - Recreational City Park accounts for the Park, retention basins, and other landscaped common areas in the subdivision (259,169sf, 5.94970156). - User Defined Parking accounts for the subdivision streets (390,047 sf) and parking area for the Park (86,775 for park - 7,200 sf parking lot approx).
Construction: Construction Phases	Grading extended to 100 days. Arch Coating extended to 85 days. No demolition phase.
Construction: Demolition	No demolition phase
Construction: Dust From Material Movement	There will be 15,749 cy of material imported per the grading plan.
Construction: Architectural Coatings	Parking refers to streets within the subdivison. No paint will be applied.
Operations: Vehicle Data	Traffic Scope estimates housing the residential units could generate up 2,404.65 trips per day (LU Code 210). If each unit generate 9.43 trips per day, the total trips = 2423.51. 2423.51 divided by 257 = 9.43 The park could generate up to 75 trips per day. Since the park was included in the acreage all landscaped areas, 75 trips is divided by 5.94970156.
Operations: Fleet Mix	Passenger cars and motorcycles would be the primary vehicles used in the residential and park uses.
Operations: Hearths	No wood stoves No fireplaces
Operations: Architectural Coatings	No coatings or paint applied to parking (streets).
Operations: Refrigerants	Park will not contain refrigeration.
Operations: Water and Waste Water	Water calculations from CVWD worksheet were input here to be consistent with the IS water use analysis.
Operations: Solid Waste	Applied the CalRecycle estimated solid waste generation rate for single family home of 11.4 pounds per unit per day. 4,161.2 pounds of solid waste. Divide in half (50% diversion rate) = 2,080.5. convert to tons.
Construction: Trips and VMT	Paving trips - 397,247 sf of asphalt for streets and parking lot. x .33333 foot depth of asphalt (4 inches) = 132,414.34125 cubic feet. / 27 = 4904.235 cubic yards of asphalt. / 16 (each truck carries 16 cy of asphalt) = 306 trucks. / 60 days in paving phase - 5.1 trips per day
Construction: Paving	no off gassing from landscaped areas

Appendix B
Calhoun Street Housing Development Biological Resources Report

DRAFT BIOLOGICAL RESOURCES ASSESSMENT & COACHELLA VALLEY MULTIPLE SPECIES HABITAT CONSERVATION PLAN CONSISTENCY ANALYSIS REPORT

CALHOUN STREET & AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

Assessor's Parcel Number 612-260-010 (38.80 acres)

Coachella
Riverside County
California

Submitted to:
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19 March 2024

TABLE OF CONTENTS

PAGE

1.0 INTRODUCTION 1
2.0 PROJECT SITE / PROJECT DESCRIPTION 1
3.0 REGULATORY FRAMEWORK 1
3.1 Federal Endangered Species Act 1
3.2 Federal Migratory Bird Treaty Act 2
3.3 Clean Water Act 2
3.3.2 California Environmental Quality Act 4
3.3.3 Section 2081 of the State Fish and Game Code 5
3.3.4 Sections 3503, 3505.5, & 3513 of the State Fish and Game Code 5
3.4 Regional 5
3.4.1 Coachella Valley Multiple Species Habitat Conservation Plan 5
4.0 METHODS 6
4.1 Literature Review 6
4.2 Field Assessment 6
5.0 RESULTS 7
5.1 Coachella Valley Multiple Species Habitat Conservation Plan 7
5.2 Weather Conditions 7
5.3 Topography, Soils and Waters 8
5.4 Vegetation 9
5.5 Wildlife 9
5.6 Special Status Biological Resources 10
6.0 DISCUSSION 24
6.1 Discussion of the Special Status Biological Resources Tables 24
6.1.1 Species Covered Under the CVMSHCP 26
6.1.2 Plant Species Not Covered Under the CVMSHCP 27
6.1.3 Wildlife Species Not Covered Under the CVMSHCP 28
6.1.4 Additional Bird Species Protected by the Migratory Bird Treaty Act 29
6.1.5 Jurisdictional Areas 30
7.0 CONCLUSION 30
8.0 LITERATURE CITED AND REFERENCES 32

LIST OF TABLES

Table 1. Special Status Plants 11
Table 2. Special Status Vegetation Communities 15
Table 3. Special Status Invertebrates 15
Table 4. Special Status Fish 16
Table 5. Special Status Reptiles 16
Table 6. Special Status Birds 17
Table 7. Special Status Mammals 20

LIST OF APPENDICES

Appendix A. Species List: Vascular Plants
Appendix B. Species List: Vertebrate Animals
Appendix C. Figures
Appendix D. Photographic Exhibits

1.0 INTRODUCTION

At the request of Terra Nova Planning & Research, this biological resources assessment report (BRAR) and Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) consistency analysis was prepared by WSP USA Environment & Infrastructure, Inc. (WSP) for the proposed residential development (project) of a 38.80-acre site in Coachella, Riverside County, California (Figure 1). Information contained herein is intended to be used for compliance with the CVMSHCP, the California Environmental Quality Act (CEQA) and other relevant environmental regulations.

2.0 PROJECT SITE / PROJECT DESCRIPTION

The 38.80-acre project site is located at the southwest junction of Calhoun Street and Avenue 49 in Coachella, Riverside County, California. The Assessor's Parcel Number (APN) is APN 612-260-010. The project site is currently zoned as "Vacant Land – Predominate Agriculture Use" by the Riverside County Assessor, County Clerk and Recorders website (Riverside County Information Technology 2024). The project site is located within Section 36, Township 5 South, Range 7 East, United States Geological Survey (USGS) 7.5' Indio, Calif. Quadrangle. Elevations range between approximately -7.6 to -9.1 meters (m) (-25 to -30 feet [ft]) below mean sea level (Figure 2).

The proposed project includes the development of new residential dwellings on the 38.80-acre vacant lot.

3.0 REGULATORY FRAMEWORK

3.1 Federal Endangered Species Act

The United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service are the designated federal agencies accountable for administering the federal Endangered Species Act (FESA). The FESA defines species as "endangered" or "threatened" and provides regulatory protection at the federal level.

- Section 9 of the FESA prohibits the "take" of listed (i.e., endangered or threatened) species. The FESA definition of take is "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct." Recognizing that take cannot always be avoided, Section 10(a) includes provisions for take that is incidental to, but not the purpose of, otherwise lawful activities. Specifically, Section 10(a)(1)(A) permits (authorized take permits) are issued for scientific purposes Section 10(a)(1)(B) permits (incidental take permits) are issued for the incidental take of listed species that does not jeopardize the species.
- Section 7 (a)(2) requires federal agencies to evaluate the proposed project with respect to listed or proposed listed, species and their respective critical habitat (if applicable). Federal

agencies must employ programs for the conservation of listed species and are prohibited from authorizing, funding, or carrying out any action that would jeopardize a listed species or destroy or modify its "critical habitat." As defined by the FESA, "individuals, organizations, states, local governments, and other nonfederal entities are affected by the designation of critical habitat only if their actions occur on federal lands, require a federal permit, license, or other authorization, or involve federal funding.

- Section 10(a) of the FESA authorizes the issuance of incidental take permits and establishes standards for the content of habitat conservation plans (HCP). The CVMSHCP is an HCP, see discussion below.

3.2 Federal Migratory Bird Treaty Act

Treaties signed by the United States, Great Britain, Mexico, Japan and the countries of the former Soviet Union make it unlawful to pursue, capture, kill, and/or possess, or attempt to engage in any such conduct to any migratory bird, nest, egg or parts thereof listed in this document. The Secretary of the Interior can issue permits for incidental take of migratory bird species. The Migratory Bird Treaty Act (MBTA) also allows the Secretary of the Interior to grant permits for specific actions for the incidental take of these protected migratory bird species, but this rarely occurs.

3.3 Clean Water Act

Waters of the United States

On August 29, 2023, the U.S. Environmental Protection Agency and the Department of the Army issued a final rule amending the "Revised Definition of 'Waters of the United States," initially published in the Federal Register on January 18, 2023. This amendment aligns the definition of "waters of the United States" (WOTUS) with the U.S. Supreme Court's decision in the case of Sackett v. Environmental Protection Agency on May 25, 2023. The Supreme Court deemed certain parts of the January 2023 Rule invalid based on its interpretation of the CWA in the Sackett decision. Consequently, the agencies have modified key elements of the regulatory text to comply with the Court's ruling. The conforming rule, titled "Revised Definition of 'Waters of the United States'; Conforming," was published in the Federal Register and became effective on September 8, 2023.

Furthermore, due to ongoing litigation, the January 2023 Rule is currently not in effect in certain states and for certain parties. The agencies are applying the January 2023 Rule, as amended by the conforming rule, in 23 states, the District of Columbia, and the U.S. Territories. In the remaining 27 states and for specific parties, the agencies are interpreting WOTUS in accordance with the pre-2015 regulatory framework and the Supreme Court's decision in Sackett until further notice. To summarize some of the most applicable highlights, the agencies' new rule defines WOTUS as:

Categories of Jurisdictional Waters

1) Waters which are:

(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(ii) The territorial seas; or

(iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters:

(i) Waters identified in paragraph (a)(1) of this section; or

(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds, streams, or wetlands not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section.

Eight exclusions from the definition of WOTUS are codified at paragraph (b), and key terms are defined at paragraph (c). "Adjacent" is defined at (c)(2) as "having a continuous surface connection."

3.3.1 Regional Water Quality Control Board

The Regional Water Quality Control Board (RWQCB) regulates activities pursuant to Section 401(a)(1) of the CWA. Section 401 of the CWA specifies that certification from the State is required for any applicant requesting a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities that may result in any discharge into navigable waters. Through the Porter Cologne Water Quality Control Act, the RWQCB asserts jurisdiction over Waters of the State of California (WSC) which is generally the same as WUS but may also include isolated waterbodies. The Porter Cologne Act defines WSC as “surface water or ground water, including saline waters, within the boundaries of the state.”

3.3.2 California Environmental Quality Act

The basic goal of the CEQA is to maintain a high-quality environment now and in the future and the specific goals are for California's public agencies to:

1) Identify the significant environmental effects of their actions; and, either

2) Avoid those significant environmental effects, where feasible; or

3) Mitigate those significant environmental effects, where feasible.

The CEQA applies to "projects" proposed to be undertaken or requiring approval by State and local government agencies. Projects are activities which have the potential to have a physical impact on the environment and may include the enactment of zoning ordinances, the issuance of conditional use permits and the approval of tentative subdivision maps. Where a project requires approvals from more than one public agency, the CEQA requires one of these public agencies to serve as the "lead agency."

A "lead agency" must complete the environmental review process required by the CEQA. The most basic steps of the environmental review process are:

1) Determine if the activity is a "project" subject to the CEQA;

2) Determine if the "project" is exempt from the CEQA;

3) Perform an Initial Study to identify the environmental impacts of the project and determine whether the identified impacts are "significant". Based on its findings of "significance", the lead agency prepares one of the following environmental review documents:

   a) Negative Declaration if it finds no "significant" impacts;

   b) Mitigated Negative Declaration if it finds "significant" impacts but revises the project to avoid or mitigate those significant impacts;

   c) Environmental Impact Report (EIR) if it finds "significant" impacts.

While there is no ironclad definition of "significance", Article 5 of the CEQA Guidelines provides criteria to lead agencies in determining whether a project may have significant effects.

The purpose of an EIR is to provide State and local agencies and the general public with detailed information on the potentially significant environmental effects which a proposed project is likely to have and to list ways in which the significant environmental effects may be minimized and indicate alternatives to the project.

3.3.3 Section 2081 of the State Fish and Game Code

Under Section 2081 of the California Fish and Game Code (FGC), the California Department of Fish and Wildlife (CDFW) authorizes individuals or public agencies to import, export, take, or possess state endangered, threatened, or candidate species in California through permits or memoranda of understanding. These acts, which are otherwise prohibited, may be authorized through permits or "memoranda of understanding" if (1) the take is incidental to otherwise lawful activities, (2) impacts of the take are minimized and fully mitigated, (3) the permit is consistent with regulations adopted in accordance with any recovery plan for the species in question, and (4) the applicant ensures suitable funding to implement the measures required by the CDFW. The CDFW shall make this determination based on the best scientific information reasonably available and shall include consideration of the species' capability to survive and reproduce.

3.3.4 Sections 3503, 3505.5, & 3513 of the State Fish and Game Code

Section 3503 of the FGC makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3505.5 makes it unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds-of-prey, i.e.: owls, hawks, eagles, etc.) or to take, possess, or destroy the nest or eggs of any bird-of-prey. Section 3513 makes it unlawful to take or possess any migratory nongame bird as designated in the MBTA.

3.4 Regional

3.4.1 Coachella Valley Multiple Species Habitat Conservation Plan

Finalized in October 2008, the CVMSHCP is a comprehensive, regional plan that addresses the conservation needs of 27 species of native flora and fauna and 24 natural vegetation communities occurring throughout the Coachella Valley region of western Riverside County, California. Permits for the CVMSHCP were issued by the CDFW on September 9, 2008 and the United States Fish and Wildlife Service (USFWS) on October 1, 2008 (TE104604-0). The CVMSHCP serves two primary purposes: Balancing environmental protection and economic development objectives in the CVMSHCP area and simplifying compliance with endangered species related laws. The CVMSHCP accomplishes this by conserving unfragmented habitat to permanently protect and secure viable populations of the covered species. The covered species include those plants and animals that are either currently listed as threatened or endangered, are proposed for listing, or are believed by an appointed Scientific Advisory Committee, USFWS and CDFW, to have a high probability of being proposed for listing in the future if not provided protection by the CVMSHCP. The goal of the CVMSHCP is to meet the requirements of the state and federal endangered species acts, while at the same time allowing for the economic growth (land development) within the plan area without significant delay or hidden costs. Under the CVMSHCP, land development/mitigation fees are

collected from all new development projects occurring in the plan area. The purpose of this fee is to support the assembly of a preserve system for the covered species and natural vegetation communities within areas identified as having high conservation value.

4.0 METHODS

4.1 Literature Review

In preparation for the field surveys, a literature search was conducted to identify special status biological resources known from the vicinity of the project site. In the context of this report, and for the purpose of this assessment, vicinity is defined as areas within a 5-mile radius of the project site.

The literature search included a review of the following documents:

- California Natural Diversity Data Base (CNDDB) RareFind 5 (CDFW 2024a)
- Special Animals List (CDFW 2024b)
- California Native Plant Society's (CNPS) Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2024a)
- Information for Planning and Consultation (IPaC) Resources List (USFWS 2024)
- CVMSHCP (Coachella Valley Conservation Commission "CVCC" 2024)
- United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS). 2024. Web Soil Survey
- USGS 7.5' *Indio, La Quinta, Myoma, Valerie* and *West Berdoo Canyon, Calif.* quadrangles (USGS 2015a, USGS 2015b, USGS 2015c, USGS 2015d, USGS 2021)

Scientific nomenclature for this document follows standard reference sources: For plant communities, CVMSHCP (CVCC 2024); for flora, Jepson eFlora (2024) and the USDA NRCS PLANTS Database (2024); for amphibians, reptiles, and mammals, CDFW (2016); and for birds, California Bird Records Committee (2024).

4.2 Field Assessment

The field assessment was conducted between the hours of 1040 and 1240 on 29 February 2024 by WSP senior biologist Michael D. Wilcox. Onsite suitable habitat was assessed based on the presence of constituent habitat elements (e.g., soils, vegetation and topography) characteristic of the potentially occurring special status biological resources determined by the literature review. The entire site and adjacent properties (where accessible) were assessed on foot to record pertinent field data and current site conditions. Where present, adjacent undeveloped areas within an approximate 150-meter (m) (~500-foot [ft]) buffer zone were also assessed visually, from the project site, for burrowing owl (*Athene cunicularia*). All onsite flora and fauna observed or otherwise detected (e.g., vocalizations, presence of scat, tracks, and/or bones) during the

assessment were recorded in field notes and are included in Appendices A and B. General weather and site conditions were also recorded at the beginning and end of the survey. Temperatures and wind speeds were recorded with a handheld Kestrel 3500 anemometer. Percent cloud cover was visually estimated.

5.0 RESULTS

The fenced, 38.8-acre project site currently consists of a combination of an abandoned, remnant date palm farm, intermittent disturbed/ruderal areas and a largely barren area that has been cleared of nearly all vegetation and graded/scraped. With the exception of a few areas, primarily along the western edge of the site, vegetation is relatively sparse. Soils are largely stabilized, compacted and disturbed. Existing site disturbances observed onsite included abandoned, fallow agricultural practices (rows of remnant date palms and associated irrigation and/or farming structures), vegetation clearance, grading/scraping, dumping, offroad vehicular activity (minor), minor dumping and accumulation of roadside trash (minor).

Existing residential (tract home) developments occur to the north and south. The lands to the west are fenced and currently being graded and under construction, likely for future residential development (tract homes), while the lands to the east are largely vacant, undeveloped and disturbed.

5.1 Coachella Valley Multiple Species Habitat Conservation Plan

The project site is located within Coachella, which is a signatory to the CVMSHCP. The site is not within any CVMSHCP-designated conservation areas. The closest is the East Indio Hills Conservation Area which is located approximately 5.5 kilometers (km) (3.4 mi) to the northeast and the Santa Rosa and San Jacinto Mountains Conservation Area, which is located approximately 7.4 km (4.6 mi) to the southwest of the site (Figure 3). The site does not contain CVMSHCP modeled habitats for any covered or special status species. The site is not within a fluvial sand transport area as illustrated on CVMSHCP Figure 4-5: Essential Ecological Processes Conserved Through General Plan Land Use Designations and Flood Control Standards (CVCC 2024). The site is not within any of the Coachella Valley Fringe-toed Lizard Preserves as illustrated on CVMSHCP Figure 6-2 (CVCC 2024). No CVMSHCP-designated wildlife corridors or biological linkages are mapped on the project site.

5.2 Weather Conditions

Weather conditions during the assessment included clear skies with no cloud cover. The temperatures ranged from 72 to 78 degrees Fahrenheit (°F). Winds were calm with speeds ranging 0 to 2 miles per hour (mph).

5.3 Topography, Soils and Waters

Existing topography is largely flat, sloping slightly to the south. Slight relief occurs only in the form of a manufactured linear embankment (edge of dirt perimeter road) along the northern site boundary and around a small, currently dry irrigation pond located in the northwestern corner of the site. Mapped soils (USDA NRCS 2024) include: Coachella fine sand, 0-2% slopes (CpA); Gilman fine sandy loam, 0-2% slopes (GbA) and Indio fine sandy loam (Ip) (Figure 4).

Coachella series soils are well-drained soils that are moderately rapidly permeable and occur in lacustrine basins at elevations from 230 feet below sea level to 800 feet above sea level. Although well drained, perched water tables are common in areas that are irrigated. Sediments originate largely from igneous rocks. Slopes are nearly level to gently sloping. The climate is arid with average annual rainfall ranging from 2 to 4 inches, occurring in light winter rains and/or high intensity summer monsoon thunderstorms (USDA NRCS 2024).

Gilman series soils are very deep, well drained soils with slow runoff and moderate permeability that were formed in stratified stream alluvium. This series generally occur at elevations from 75 to 2,500 feet above sea level. They are known to occur on flood plains and alluvial fans and have slopes of 0 to 3 percent. Gilman series soils generally range from non-saline to strongly saline. Mean annual rainfall is 2 to 10 inches (USDA NRCS 2024).

Indio series soils are very deep, well to moderately well drained soils that were formed in alluvium and are derived from mixed rock sources. Runoff is generally slow and permeability is moderate. This soil series generally occur at elevations from 230 feet below sea level to 1,400 feet above sea level on alluvial fans, lacustrine basins and flood plains. Slopes are usually gentle at 0 to 3 percent with the exception of where they occur on low stream or wash embankments. Mean annual precipitation ranges from 3 to 10 inches (USDA NRCS 2024).

Onsite soils are highly disturbed, a result of past date farming practices and grading in at least one area (the northeastern ¼ of the site). Prior to the planting of the date palms, the entire site was very likely scraped, cleared and graded. A former irrigation pond; evident by manufactured embankments, dried cracked substrates and remnant cement/concrete irrigation structures; is located in the northwest corner of the site. This irrigation pond was completely dry at the time of the assessment and exhibited no evidence of having recently held water or contained moisture (other than the dried, cracked substrate observed in the bottom). Irrigation furrows and underground piping is evident throughout the southern and western 2/3 of the site. No streams, washes, springs, active drifts, sand dunes, rock outcrops, rocky areas, or natural clay lenses were observed.

5.4 Vegetation

According to CVMSHCP Figure 3-1: Natural Communities and Development, onsite vegetation community is mapped as "ruderal" (CVCC 2023). Historic aerial imagery indicates that by 2002, the southern and western ¾ of the site was being used to grow dates. The northeastern ¼ of the site appears to have been cleared of vegetation and has remained vacant, undeveloped and not used to grow dates since 2002 at least. Although Sawyer et. al. (2009) does not provide a description for agricultural and/or disturbed areas, perhaps the best way to describe the current vegetation present onsite would likely be abandoned/fallow agricultural lands with sparse, remnant patches of *Atriplex lentiformis* shrubland alliance (quailbush scrub), ruderal/disturbed and largely barren areas (primarily in the northeastern ¼ of the site) occurring intermittently throughout (Figure 5). The dominant plant species onsite is the formerly cultivated date palm (*Phoenix dactylifera*) that intermittently remain in east/west linear rows throughout the western and southern ¾ of the site. Although relatively sparse and primarily located along the perimeter and in linear rows, in between and beneath the rows of date palms, native perennial plant species observed included quailbush (*Atriplex lentiformis*), arrow-weed (*Pluchea sericea*), common sunflower (*Helianthus annuus*) and blue palo verde (*Parkinsonia florida*). Other plant species observed primarily included a mixture of non-native, invasive and/or ruderal species. These included puncture vine (*Tribulus terrestris*), amaranth (*Amaranthus* sp.), cheeseweed (*Malva parviflora*), Sahara mustard (*Brassica tournefortii*), Mexican palo verde (*Parkinsonia aculeata*), saltcedar (*Tamarisk ramosissima*) and Bermuda grass (*Cynodon dactylon*). A complete list of the plant species observed onsite is included in Appendix A.

No natural wetland, riparian or otherwise special-status vegetation communities were observed on-site. A full list of the plant species observed during the surveys, including common and scientific names, is appended to this report (Appendix A).

5.5 Wildlife

Vertebrate wildlife directly observed and/or detected otherwise (e.g., scat, bones, tracks, feathers, burrows, etc.) during the surveys was not diverse or abundant, limited to 17 species common to the region. This included one reptile, 14 birds and two mammals (Appendix B).

The one reptile species observed onsite include the side-blotched lizard (*Uta stansburiana*). Representative bird species observed onsite included but were not limited to: Eurasian collared dove (*Streptopelia decaocto*), mourning dove (*Zenaida macroura*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), common raven (*Corvus corax*), verdin (*Auriparus flaviceps*), northern mockingbird (*Mimus polyglottos*), house finch (*Haemorhous mexicanus*) and white-crowned sparrow (*Zonotrichia leucophrys*). The two mammals observed and/or detected onsite included Botta's pocket gopher (*Thomomys bottae*) and

California ground squirrel (*Otospermophilus beecheyi*). A complete list of the vertebrate species observed or detected onsite is included as Appendix B.

It should be noted that relatively short-term biological studies of this nature are often limited by the seasonality of annual plants, the migratory habits of many birds, the fossorial and nocturnal habits of many mammals and reptiles, as well as the timing of field visit. A complete inventory of the wildlife on the site would require extensive year-round surveys for birds, amphibians, and reptiles, and additional surveys, such as placement of scent stations or tracking stations, for the detection of nocturnal mammals. Knowledge of habitat associations, natural history, seasonality, and distribution is essential in the assessment of the potential for occurrence of the various special status plants and animals known to occur throughout the Coachella Valley. For these reasons, other common and special status species that were not observed onsite may also have the potential to occur based on their geographic distribution, habitat preferences and the regional location of the site. The following section summarizes information on special status biological resources known to occur in the vicinity of the project site.

5.6 Special Status Biological Resources

Plant or animal taxa may be considered "sensitive" or as having “special status” due to declining populations, vulnerability to habitat change, or because they have restricted ranges. Some are listed as threatened or endangered by the USFWS or by the CDFW and are protected by the federal and state Endangered Species acts. Others have been identified as sensitive or as special-status species by the USFWS, the CDFW, or by private conservation organizations, including the CNPS. Unlisted sensitive species do not have formal state or federal status but may nevertheless be considered significant under the CEQA. The CVMSHCP provides conservation for twenty-seven (27) imperiled plant and animal species (5 plants, 2 insects, 1 amphibian, 3 reptiles, 11 birds, and 5 mammals). These include federal and state-listed species, federal and California Species of Concern, and species on the CNPS sensitive species lists. CVMSHCP covered species are designated on the tables below. The site is not within designated critical habitat for any special status plants or wildlife.

The review of the CNDDB, CNPS Online Inventory of Rare Plants and IPaC Resources List resulted in the identification of 68 special status biological resources known to occur in the vicinity (within an approximate 5-mile radius) of the project site. The 68 special status biological resources known from the vicinity included 33 plants, one vegetation communities, five invertebrates, one fish, four reptiles, 14 birds and 10 mammals. Tables 1 through 7 provide a complete list of the special status biological resources, their associated legal status, and their respective onsite occurrence potentials.

Tables 1 through 7 summarize information on all special status species that have been reported within the vicinity (5-mile radius) or that occur or are considered to have some potential to occur onsite based on geographic distribution, elevational parameters and/or presence of potentially suitable habitat. Occurrence probability is based on the best available information and the collective expertise of WSP biologists. These tables provide the names, legal or conservation status, general habitat associations, and the probability of occurrence for each of these species.

Table 1. Special Status Plants

Species	Status	Habitat	Probability
Abronia villosa var. *aurita* **chaparral sand-verbena**	F: None C: None CNPS: List 1B.1 State Rank: S2 CVMSHCP: No	Sandy areas in chaparral, coastal sage scrub & desert dune habitats. 80-1,600 m. (262-5,249 ft.); B: (Jan) Mar-Sept.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Astragalus lentiginosus var. borreganus **Borrego milk-vetch**	F: None C: None CNPS List: 4.3 State Rank: S4 CVMSHCP: No	Mojavean desert scrub, Sonoran Desert scrub; sandy. 30-895 m. (100-2,935 ft.); B: Feb-May.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Astragalus lentiginosus var. *coachellae* **Coachella Valley milk-vetch**	F: **END** C: None CNPS: 1B.2 State Rank: S1 CVMSHCP: **Yes**	Sonoran desert scrub; sandy flats, washes, outwash fans, sometimes on dunes. 40-665 m. (131-2,182 ft.); B: Jan–Sept.	**Absent** Suitable habitat lacking. Site below known elevational range of species. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.
Astragalus preussii var. *laxiflorus* **Lancaster milk-vetch**	F: None C: None CNPS: 1B.1 State Rank: S1 CVMSHCP: No	Chenopod scrub. 700 m. (2,295 ft.); B: Mar–May.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Astragalus subulonum **gravel milk-vetch**	F: None C: None CNPS: 2B.2 State Rank: S2 CVMSHCP: No	Mojavean desert scrub, Sonoran desert scrub; dunes; -60-930 m. (195-3,050 ft.); B: Feb–Jun.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Astragalus tricarinatus **triple-ribbed milk-vetch**	F: **END** C: None CNPS: 1B.2 State Rank: S2 CVMSHCP: **Yes**	Joshua tree woodland & Sonoran desert scrub on hot, rocky slopes in canyons & along edge of boulder-strewn desert washes with *Larrea* and *Encelia*. 455-1,525 m. (1,492-5,000 ft.); B: Feb–May.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Bursera microphylla **little-leaf elephant tree**	F: None C: None CNPS: 2B.3 State Rank: S3	Sonoran desert scrub, hillsides, canyon sides and washes; rocky. 195-700 m. (640-2,297 ft.); B: Jun-Jul.	**Absent** Suitable habitat lacking. Site below known elevational range of species.

Table 1. Special Status Plants

Species	Status	Habitat	Probability
	CVMSHCP: No		
Chorizanthe leptotheca **Peninsular spineflower**	F: None C: None CNPS: 4.2 State Rank: S3 CVMSHCP: No	Chaparral, coastal scrub, lower montane coniferous forest. 300-1,900 m. (985-6,230 ft.); B: May-Aug.	**Absent** Suitable habitat lacking. Site below known elevation range of species.
Ditaxis claryana **glandular ditaxis**	F: None C: None CNPS: 2B.2 State Rank: S2 CVMSHCP: No	Mojavean & Sonoran desert scrub. 0-465 m. (0-1,526 ft.); B: Oct–Mar.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Ditaxis serrata var. *californica* **California ditaxis**	F: None C: None CNPS: 3.2 State Rank: S2? CVMSHCP: No	Sonoran desert scrub. 30 to 1,000 m. (98-3,281 ft.); B: Mar-Dec.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Eremothera boothii var. *boothii* **Booth's evening primrose**	F: None C: None CNPS: 2B.3 State Rank: S3 CVMSHCP: No	Joshua tree woodland, pinyon & juniper woodland. 815-2,400 m. (2,674-7,874 ft.); B: Apr-Sep.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Eschscholtzia androuxii **Joshua Tree poppy**	F: None C: None CNPS: 4.3 State Rank: S3 CVMSHCP: No	Mojavean desert scrub, Joshua tree woodland. 585-1,685 m. (1,920-5,530 ft.); B: Feb-May (Jun).	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Euphorbia abramsiana **Abrams' spurge**	F: None C: None CNPS: 2B.2 State Rank: S2 CVMSHCP: No	Sandy sites in Mojave and Sonoran desert scrub. -5–1,450 m. (-16-4,757 ft.). B: (Aug) Sept- Nov.	**Very Low** Remnant marginally suitable habitat very limited, disturbed and largely stabilized. Only small, insignificant pockets of sandy soils present. Site just below/at edge of elevational range of species.
Euphorbia arizonica **Arizona spurge**	F: None C: None CNPS: 2B.3 State Rank: S3 CVMSHCP: No	Sandy soils in Sonoran desert scrub; 50-300 m. (200-1,000 ft); B: Mar-Apr.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Euphorbia platysperma **flat-seeded spurge**	F: None C: None CNPS: 1B.2 State Rank: S1 CVMSHCP: No	Sandy Sonoran desert scrub, shifting dunes. In CA, potentially a waif; more common in AZ and MX. 65-100 m. (215-330 ft.); B: Feb-Sep.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Horsfordia alata **pink velvet-mallow**	F: None C: None CNPS: 4.3 State Rank: S4	Sonoran desert scrub (rocky). 100-500 m. (330-1,640 ft); B: Feb-Dec.	**Absent**

Table 1. Special Status Plants

Species	Status	Habitat	Probability
	CVMSHCP: No		Suitable habitat lacking. Site below known elevational range of species.
Horsfordia newberryi **Newberry's velvet-mallow**	F: None C: None CNPS: 4.3 State Rank: S4 CVMSHCP: No	Sonoran desert scrub (rocky). 8-300 m. (26-984 ft); B: Feb-Dec.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Johnstonella costata **ribbed cryptantha**	F: None C: None CNPS: 4.3 State Rank: S4 CVMSHCP: No	Desert dunes, Mojavean desert scrub, Sonoran desert scrub; -60-500 m (-195-1,640 ft); B: Feb-May.	**Very Low** Remnant marginally suitable habitat very limited, disturbed and largely stabilized. Only small, insignificant pockets of sandy soils present.
Johnstonella holoptera **winged cryptantha**	F: None C: None CNPS: 4.3 State Rank: S4 CVMSHCP: No	Sonoran desert scrub, Mojavean desert scrub; sandy or rocky canyons. 100-1,690 m. (328-5,545 ft); B: Mar-Apr.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Juncus acutus ssp. leopoldii **southwestern spiny rush**	F: None C: None CNPS: 4.2 State Rank: S4 CVMSHCP: No	Coastal dunes (mesic), coastal scrub, meadows & seeps (alkaline), marshes & swamps (coastal salt) Mojavean desert scrub, Sonoran desert scrub; -3-900 m (-10-2,955 ft). B: Mar-Jun.	**Absent** Suitable habitat lacking. Former irrigation pond located in NW corner of site and irrigation rows for date palms currently dry. Site just below/at edge of elevational range of species.
Juncus cooperi **Cooper's rush**	F: None C: None CNPS: 4.3 State Rank: S3 CVMSHCP: No	Meadows & seeps (mesic, alkaline or saline). -260-1,700 m (-855-5,805 ft); B: Apr-Aug.	**Absent** Suitable habitat lacking. Former irrigation pond located in NW corner of site and irrigation rows for date palms currently dry.
Leptosiphon floribundus **Santa Rosa Mountains leptosiphon**	F: None C: None CNPS: 1B.3 State Rank: S1S2 CVMSHCP: No	Sonoran desert scrub, pinyon juniper woodland; 1,000-2,000 m (3,280–6,560 ft); B: May-Jul (Nov).	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Lycium torreyi **Torrey's box-thorn**	F: None C: None CNPS: 4.2 State Rank: S3 CVMSHCP: No	Mojavean desert scrub, Sonoran desert scrub; -50 - 1220 m (-165–4,005 ft); B: (Jan-Feb) Mar-Jun (Sep-Nov).	**Absent** Remnant marginally suitable habitat very limited and disturbed. Conspicuous perennial species would likely have been detected if present.
Marina orcuttii var. *orcuttii* **California marina**	F: None C: None CNPS: 1B.3	Chaparral, pinyon and juniper woodland, Sonoran desert scrub, rocky. 1,050-1,160 m (3,445–3,806 ft); B: May-Oct.	**Absent**

Table 1. Special Status Plants

Species	Status	Habitat	Probability
	State Rank: S2? CVMSHCP: No		Suitable habitat lacking. Site below known elevational range of species.
Matelea parvifolia **spear-leaf matelea**	F: None C: None CNPS: 2B.3 State Rank: S3 CVMSHCP: No	Mojavean desert scrub, Sonoran desert scrub, rocky. 440-1,095 m. (1,445–3,595 ft.); B: Mar-May (Jul).	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Nemacaulis denudata var. *gracilis* **slender cottonheads**	F: None C: None CNPS: 2B.2 State Rank: S2 CVMSHCP: No	Sandy places in coastal dunes, desert dunes & Sonoran desert scrub. 50-400 m. (164-1,315 ft.); B: Mar–May.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Petalonyx linearis **narrow-leaf sandpaper-plant**	F: None C: None CNPS: 2B.3 State Rank: S3? CVMSHCP: No	Sandy or rocky canyons in Mojavean desert scrub and Sonoran desert scrub; -25-1115 m. (-80-3,660 ft.); B: Mar-May (sometimes Jan-Dec).	**Absent** Suitable habitat lacking. Perennial sandpaper-plant (*Petalonyx* spp.) not observed.
Phaseolis filiformis **slender-stem bean**	F: None C: None CNPS: 2B.1 State Rank: S1 CVMSHCP: No	Sonoran desert scrub. 125 m (410 ft.); B: Apr.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Pseudorontium cyanthiferum **Deep Canyon snapdragon**	F: None C: None CNPS: 2B.3 State Rank: S1 CVMSHCP: No	Sonoran desert scrub in rocky washes and on rocky slopes in the immediate vicinity of Deep Canyon. 0-800 m. (0-2,625 ft.); B: Feb-Apr.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Selaginella eremophila **desert spike-moss**	F: None C: None CNPS: 2B.2 State Rank: S2S3 CVMSHCP: No	Chaparral, Sonoran Desert scrub; shaded sites, gravelly soils, crevices or among rocks. 200-900 m. (656-2,953 ft.); B: May–Jul.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Senna covesii **Cove's cassia**	F: None C: None CNPS: 2B.2 State Rank: S3 CVMSHCP: No	Sonoran Desert scrub, dry, sandy desert washes & slopes. 225-1,295 m. (740-4,250 ft.); B: Mar–Jun (Aug).	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Stemodia durantifolia **purple stemodia**	F: None C: None CNPS: List 2B.1 State Rank: S2.1? CVMSHCP: No	Mesic sites on sandy soils in Sonoran desert scrub. 180-300 m. (590–980 ft.); B: (Jan) Apr-Dec.	**Absent** Suitable habitat lacking. Site below known elevational range of species.
Xylorhiza cognata **Mecca-aster**	F: None C: None CNPS: List 1B.2 State Rank: S2 CVMSHCP: **Yes**	Grows on steep canyon slopes on sandstone and clay substrates, 20-305 m (65–1,000 ft); B: Jan-Jun.	**Absent** Suitable habitat lacking. Site below known elevational range of species.

Table 2. Special Status Vegetation Communities

Community	Status	Habitat	Probability
desert fan palm oasis woodland	F: None C: S3.2 State Rank: S3.2 CVMSHCP: **Yes**	Natural California fan palm (*Washingtonia filifera*) stands	**Absent** Only small, sapling fan palms and cultivated date palms (*Phoenix dactilifera*) observed onsite.

Table 3. Special Status Invertebrates

Community	Status	Habitat	Probability
Dinacoma caseyi **Casey's June beetle**	F: END C: None State Rank: S1 CVMSHCP: No	Appears to be entirely restricted to the mouth and alluvial floodplain of Palm Canyon Wash and Tahquitz Creek in Palm Springs, in association with deposits of fine silts, sands and gravels	**Absent** Suitable habitat lacking. Site outside of known range of species. Site is not within designated critical habitat or USFWS recommended survey area for this species.
Danaus plexippus **monarch butterfly**	F: FC C: None State Rank: S2S3 CVMSHCP: No	Western winter roost sites primarily occur along the coast from northern Mendocino to Baja California, Mexico, located in wind-protected tree groves (*Eucalyptus* species, Monterey pine (*Pinus radiata*), cypress), with nectar and water sources nearby. During breeding season, adults widespread but scarce in the desert. Larvae require milkweed	**Absent** Suitable habitat lacking. Larval host plants (milkweeds) not observed. Winter roost sites not present. Adults may, however, occasionally fly through site.
Macrobaenetes valgum **Coachella giant sand treader cricket**	F: None C: None State Rank: S1S2 CVMSHCP: **Yes**	Active sand dune hummocks and ridges, sites favorable to permanent habitation include spring-moistened sand.	**Absent** Suitable habitat lacking. Sand dunes and hummocks not present. Site is not within CVMSHCP modeled habitat for this species.
Oliarces clara **cheeseweed owlfly**	F: None C: None State Rank: S2 CVMSHCP: No	Known from lower Colorado River drainage, associated with creosote bush (*Larrea tridentata*) in desert scrub; creosote is suspected larval host. Found under rocks or in flight over streams.	**Absent** Suitable habitat lacking. No drainages or washes on the site.

Table 3. Special Status Invertebrates

Euparagia unidentate **Algodones Dunes Euparagia**	F: None C: None State Rank: S1S2 CVMSHCP: No	Desert dunes.	**Absent** Suitable habitat lacking. Dune habitats not present.

Table 4. Special Status Fish

Community	Status	Habitat	Probability
Cyprinodon macularius **desert pupfish**	F: **END** C: **END** State Rank: S1 CVMSHCP: **Yes**	Desert ponds, springs, marshes and streams.	**Absent** Suitable aquatic habitat lacking. Former irrigation pond in NW corner of site currently dry. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.

Table 5. Special Status Reptiles

Species	Status	Habitat	Probability
Crotalus ruber ruber **northern red diamond rattlesnake**	F: ND C: SSC State Rank: S2? CVMSHCP: No	Favors rocky areas and dense vegetation, shelters in rodent burrows, rock cracks, or surface cover. Known from the eastern slopes of the Peninsular Ranges, desert floor up to 5,000 feet	**Absent** Suitable habitat lacking.
Gopherus agassizi **desert tortoise**	F: **THR** C: **THR** State Rank: S2 CVMSHCP: **Yes**	Creosote bush scrub, Joshua tree woodland, saltbush scrub); washes, arroyos, bajadas, rocky hillsides, open flat desert.	**Absent** Suitable habitat lacking. Site formerly agricultural (date palm farm). Sign (burrows, scat, remains, etc.) not observed. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.
Phrynosoma mcallii **flat-tailed horned lizard**	F: None C: SSC State Rank: S2 CVMSHCP: **Yes**	Sandy and gravelly areas in desert washes, edges of dunes and desert flats; requires vegetative cover, ants & fine sand.	**Absent** Suitable habitat lacking. Site disturbed with only small, remnant patches of sandy soils and native plant species. Site not within CVMSHCP modeled habitat for this species.

Table 4. Special Status Fish

Community	Status	Habitat	Probability
Cyprinodon macularius **desert pupfish**	F: **END** C: **END** State Rank: S1 CVMSHCP: **Yes**	Desert ponds, springs, marshes and streams.	**Absent** Suitable aquatic habitat lacking. Former irrigation pond in NW corner of site currently dry. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.

Table 5. Special Status Reptiles

Species	Status	Habitat	Probability
Uma inornata **Coachella Valley fringe-toed lizard**	F: **THR** C: **END** State Rank: S1 CVMSHCP: **Yes**	Requires fine, loose, windblown sand (dunes) interspersed with hardpan & widely spaced desert shrubs. Known only from the Coachella Valley.	**Absent** Suitable habitat lacking. Site disturbed, primarily stabilized with only small, remnant patches of sandy soils and native plant species. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.

Table 6. Special Status Birds

Species	Status	Habitat	Probability
Accipiter cooperii **Cooper's hawk**	F: MBTA C: Watch List State Rank: S4 CVMSHCP: No	Woodland, chiefly of open, interrupted or marginal type, including residential areas. Nests in trees.	**Nesting: Absent** Suitable nesting habitat lacking. **Foraging: Occurs** Observed.
Aquila chrysaetos **golden eagle**	F: BGEPA, MBTA, BCC C: FP, WL State Rank: S3 CVMSHCP: No	Forages over rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons used for nesting, sometimes large trees in open areas.	**Nesting: Absent** Suitable habitat lacking. **Foraging: Low** Marginally suitable habitat present.

Table 6. Special Status Birds

Species	Status	Habitat	Probability
Athene cunicularia **burrowing owl**	F: MBTA, BCC C: SSC (burrows), FGC State Rank: S2 CVMSHCP: **Yes***	Open, dry annual or perennial grassland, deserts & scrublands characterized by low-growing vegetation. Burrow sites essential.	**Nesting: Low** Marginally suitable habitat intermittently present. Suitable California ground squirrel burrows detected. **Foraging: Low** If present onsite or on other suitable lands to the east of the site.
Buteo regalis **ferruginous hawk**	F: MBTA, BCC C: WL State Rank: S3S4 CVMSHCP: No	Great Basin grassland, Great Basin scrub, pinon & juniper woodland, valley & foothill grassland.	**Nesting**: **Absent** Suitable habitat lacking. **Foraging**: **Low** During winter and migration only.
Calypte costae **Costa's hummingbird**	F: MBTA, BCC C: None State Rank: S4 CVMSHCP: No	Desert and semi-desert, arid brushy foothills and chaparral, in migration and winter also in adjacent mountains and in open meadows and gardens	**Nesting**: **Moderate** Suitable nesting habitat (sparse palo verde) present. **Foraging**: **Occurs** Observed.
Empidonax traillii extimus **southwestern willow flycatcher**	F: **END**, MBTA C: **END** State Rank: S1 CVMSHCP: **Yes***	Breeds in dense riparian areas.	**Nesting: Absent** Suitable habitat lacking. **Foraging: Very Low** Occurs in many habitats during migration. Site is not within designated critical habitat for this species.
Falco mexicanus **prairie falcon**	F: MBTA, BCC C: SSC (nesting), FGC State Rank: S3 CVMSHCP: No	Inhabits dry, open terrain, either level or hilly. Breeding sites located on cliffs, but forages far afield.	**Nesting**: **Absent** Suitable habitat lacking. **Foraging: Moderate** May nest or winter nearby & forage over site.
Haliaeetus leucocephalus **bald eagle**	F: BGEPA, MBTA, BCC C: END, FP State: S3 CVMSHCP: No	Margins of lakes, rivers, and other bodies of water. In Southern California, nests at Big Bear Lake and Lake Silverwood in the San Bernardino Mountains and Lake Hemet in the San Jacinto Mountains.	**Nesting: Absent** Suitable habitat lacking. **Foraging: Absent** Suitable habitat lacking.

Table 6. Special Status Birds

Species	Status	Habitat	Probability
Lanius ludovicianus **loggerhead shrike**	F: MBTA, BCC C: SSC (nesting), FGC State Rank: S4 CVMSHCP: No	Open fields with scattered trees or shrubs, open country with short vegetation, pastures, old orchards, cemeteries, golf courses, riparian areas & open woodlands.	**Nesting: Very Low** Suitable nesting habitat very limited. **Foraging: Moderate** May nest or winter nearby & forage onsite.
Polioptila melanura **black-tailed gnatcatcher**	F: ND C: ND State rank: S3S4 CVMSHCP: No	Nests in wooded desert wash habitat containing mesquite, palo verde, ironwood, and acacia. May also occur in areas with salt cedar, especially when adjacent to native wooded desert wash habitat. Also occurs in desert scrub habitat in winter.	**Nesting: Very Low** Suitable nesting habitat (palo verde) limited. **Foraging: Low** May forage or move through site from nearby areas.
Pyrocephalus rubinus **vermilion flycatcher**	F: MBTA C: SSC (nesting) State Rank: S2S3 CVMSHCP: No	During nesting, inhabits desert riparian adjacent to irrigated fields, irrigation ditches, pastures, & other open, mesic areas with nests in cottonwood, willow, mesquite, or other large desert riparian trees. Also known to nest in landscaped areas such as commercial and residential developments, golf courses and parks.	**Nesting: Absent** Suitable nesting habitat lacking. **Foraging: Low** If nesting nearby.
Toxostoma crissale **crissal thrasher**	F: None C: SSC State Rank: S3 CVMSHCP: **Yes***	Resident of SE deserts in desert riparian and wash habitats, nests in dense mesquite, ironwood, catclaw, arrowweed.	**Nesting**: **Absent** Suitable nesting habitat lacking. **Foraging**: **Very low** If nesting nearby. Site is not within CVMSHCP modeled habitat for this species.

Table 6. Special Status Birds

Species	Status	Habitat	Probability
Toxostoma lecontei **Le Conte's thrasher**	F: **MBTA**, BCC C: SSC (nesting), FGC State Rank: S3 CVMSHCP: **Yes***	Desert resident; primarily of open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats. Nest in dense, spiny shrub or densely branched cactus in desert wash habitat, usually 2-8 feet above ground.	**Nesting**: **Absent** Suitable nesting habitat lacking. **Foraging**: **Very Low** If nesting nearby. Suitable habitat not observed on adjacent lands, however. Site is not within CVMSHCP modeled habitat for this species.
Vireo bellii pusillus **least Bell's vireo**	F: END C: END State rank: S2 CVMSHCP: **Yes**	Riparian woodland habitats along the riverine systems of Southern California, primarily in San Diego, Santa Barbara, and Riverside Counties. Needs dense shrub cover within 1 to 2 meters (3 to 6 feet) off the ground for nesting, and stratified canopy for foraging	**Nesting: Absent** Suitable habitat lacking. **Foraging: Low** Migration only Site is not within designated critical habitat for this species.

* Species conserved under the CVMSHCP, but is still protected by the MBTA and FGC

Table 7. Special Status Mammals

Species	Status	Habitat	Probability
Chaetodipus fallax pallidus **pallid San Diego pocket mouse**	F: None C: SSC State Rank: S3S4 CVMSHCP: No	Desert border areas in desert wash, desert scrub, desert succulent scrub, pinon-juniper, etc. Sandy herbaceous areas usually in association with rocks or coarse gravel.	**Absent** Suitable habitat lacking. Site largely disturbed former date palm farm.
Dipodomys merriami collinus **Earthquake Merriam's (Aguanga) kangaroo rat**	F: None C: SSC State Rank: S1S2 CVMSHCP: No	Known only from San Diego & Riverside Counties. Associated with Riversidean sage scrub, chaparral, & non-native grassland. Needs sandy loam substrates for digging of burrows.	**Absent** The CNDDB records near site out of range and habitat for this subspecies. Presumably these records are in error and refer to a different subspecies.

Table 7. Special Status Mammals

Species	Status	Habitat	Probability
Eumops perotis californicus **western mastiff bat**	F: ND C: CSC State Rank: S3S4 CVMSHCP: No WBWG: M (Region 8)	Many open, semi-arid to arid areas including conifer and deciduous forests, grasslands, chaparral, and coastal scrubs. Roosts in crevices in cliff faces, buildings, trees, and tunnels.	**Roosting: Absent** Roosting habitat lacking. **Foraging: Low** May forage over site if roosting nearby.
Lasiurus xanthinus **western yellow bat**	F: None C: SSC State Rank: S3 WBWG: H CVMSHCP: **Yes**	Found in a variety of habitats: Valley foothill riparian, desert riparian, desert wash, and palm oasis habitats	**Roosting: Absent** Roosting habitat lacking. **Foraging: Low** May forage over site if roosting nearby.
Neotoma lepida intermedia **San Diego desert woodrat**	F: None C: SSC State Rank: S3S4 CVMSHCP: No	Coastal scrub of southern California. Moderate to dense canopies preferred. Particularly abundant in rock outcrops & rocky cliffs & slopes.	**Absent** Habitat lacking. Middens not detected. Site heavily disturbed.
Nyctinomops femorosaccus **pocketed free-tailed bat**	F: None C: SSC State Rank: S2S3 WBWG: M CVMSHCP: No	Rocky areas with high cliffs in a variety of arid areas in southern California.	**Roosting: Absent** Suitable habitat lacking **Foraging: Low** May roost in vicinity and forage over site.
Peninsular bighorn sheep DPS *Ovis canadensis nelsoni* (Pop. 2)	F: END C: THR State Rank: S1 MSHCP: **Yes**	Eastern slopes of the Peninsular Ranges below 4,600 feet. Optimal habitat includes steep-walled canyons/ridges bisected by rocky or sandy washes w/ available water	**Absent** Suitable habitat lacking. Site is not within designated critical habitat or CVMSHCP modeled habitat for this species.
Perognathus longimembris bangsi **Palm Springs pocket mouse**	F: None C: SSC State Rank: S2 CVMSHCP: **Yes**	Inhabits flat or gently sloping areas with sparse vegetative cover and packed or sandy soils.	**Very Low** Only small, remnant patches of marginal potentially suitable habitat present. Site disturbance and past agricultural practices further reduce the likelihood of occurrence. Site not within CVMSHCP modeled habitat for this species.
Taxidea taxus **American badger**	F: ND C: CSC State Rank: S3 CVMSHCP: No	Widespread, occurring in a wide variety of usually open habitats.	**Very Low** Although disturbed, site potentially suitable. No burrows or sign observed.

Table 7. Special Status Mammals

Species	Status	Habitat	Probability
Xerospermophilus tereticaudus chlorus **Coachella Valley (Palm Springs) round-tailed ground squirrel**	F: None C: SSC State Rank: S1S2 CVMSHCP: **Yes**	Prefers open, flat, grassy areas in fine-textured, sandy soil in desert succulent scrub, desert wash, desert scrub, alkali scrub, & levees.	**Very Low** Preferred habitat lacking. Species has been known to occur in disturbed and converted habitats. Site not within CVMSHCP modeled habitat for this species.

Definitions of status designations and occurrence probabilities for Tables 1-7

Definitions for Species

Italics – Scientific name (*i.e., Genus species subspecies*)
Bold – Standard common name
[*Genus*] – Previous genus, relatively recent taxonomic revision
var. – variety (plants only)
DPS – Distinct Population Segment

Definitions of occurrence probability:

Occurs*:* Observed or detected onsite by WSP or recently reported by another reliable source.
High*:* Observed in similar habitat in region by qualified biologists, or habitat onsite is a type often utilized by the species and the site is within the known range of the species.
Moderate*:* Reported sightings in surrounding region, or site is within the known range of the species and habitat onsite is a type occasionally used by the species.
Low*:* Site is within the known range of the species but habitat onsite is rarely used by the species
Very Low: Habitat is of marginal suitability and/or site is at the edge of species known range or distribution.
Absent*:*A focused study failed to detect the species, suitable habitat not present, or site is outside the geographic distribution of the species.
Unknown*:* No focused surveys have been performed in the region, & the species' distribution & habitat are poorly known.

CVMSHCP designations

Yes: Conserved by the CVMSHCP
No: Not Specifically Conserved by the CVMSHCP

Federal designations: (F = federal Endangered Species Act or USFWS designations)
END: Federally listed, Endangered
THR: Federally listed, Threatened
CAN: Candidate for Federal listing
MBTA: Migratory Bird Treat
BEPA: Bald Eagle Protection Act (also protects Golden Eagles)
BCC: Birds of Conservation Concern
None: No designation

State designations: (C = California Endangered Species Act or CDFG designations)
END: State listed, Endangered
THR: State listed, Threatened
CAN: Candidate for State listing
RARE: State listed, Rare
FP: Fully Protected Species
SSC: Species of Special Concern
FGC: Fish and Game Code

WL: Watch List Species

CDFW state rankings are a reflection of the overall condition of an element throughout its California range. The number after the decimal point represents a threat designation attached to the rank:

S1 = Critically Imperiled. Less than (<) 6 Element Occurrences (EOs) OR < 1,000 individuals OR < 2,000 acres
- **S1.1** = very threatened
- **S1.2** = threatened
- **S1.3** = no current threats known

S2 = Imperiled. 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres
- **S2.1** = very threatened
- **S2.2** = threatened
- **S2.3** = no current threats known

S3 = Vulnerable. 21-80 EOs OR 3,000-10,000 individuals OR 10,000-50,000 acres
- **S3.1** = very threatened
- **S3.2** = threatened
- **S3.3** = no current threats known

S4 =

S5 = Secure. Common, widespread, and abundant in the state.

SH = All known California sites are historical, not extant

? = Qualifier: Inexact or Uncertain - A question mark represents a rank qualifier, denoting an inexact or uncertain numeric rank.

California Native Plant Society (CNPS) designations:

Primary Categories
LIST 1A: Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
LIST 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere
LIST 2A: Plants Presumed Extirpated in California, But Common Elsewhere
LIST 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
LIST 3: Plants About Which More Information is Needed - A Review List
LIST 4: Plants of Limited Distribution - A Watch List
Subdivisions within Categories
0.1: Seriously threatened in California
0.2: Moderately threatened in California
0.3: Not very threatened in California

Western Bat Working Group (WBWG) designations:

The Western Bat Working Group is comprised of agencies, organizations and individuals interested in bat research, management and conservation from the 13 western states and provinces. Its goals are (1) to facilitate communication among interested parties and reduce risks of species decline or extinction; (2) to provide a mechanism by which current information on bat ecology, distribution and research techniques can be readily accessed; and (3) to develop a forum to discuss conservation strategies, provide technical assistance and encourage education programs.

- **H**: High: Species which are imperiled or are at high risk of imperilment based on available information on distribution, status, ecology and known threats.
- **M**: Medium: Species which warrant a medium level of concern and need closer evaluation, more research, and conservation actions of both the species and possible threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status and should be considered a threat.
- **L**: Low: Species for which most of the existing data support stable populations, and for which the potential for major changes in status in the near future is considered unlikely. There may be localized concerns, but the overall status of the species is believed to be secure. Conservation actions would still apply for these bats, but limited resources are best used on High and Medium status species.
- **P**: Periphery: This designation indicates a species on the edge of its range, for which no other designation has been determined.

6.0 DISCUSSION

The proposed development of the project site would result in the loss/conversion of 38.8 acres of fallow, vacant, abandoned agricultural lands (date palm farm) and the biological resources, sensitive and otherwise, that occur, or potentially occur, onsite. The likelihood of occurrence for the special status species reported from the vicinity has either been eliminated or significantly reduced by the former conversion of the site to agricultural uses and past farming practices, which included removal of nearly all native vegetation, grading and may have also included use of herbicides and/or pesticides. Small, unmapped, remnant or successional patches of what is best described as quailbush scrub are, however, present intermittently throughout portions of the site, primarily along the western and southern-most areas. Other existing site disturbance (i.e., compaction of soils, offroad vehicular activity, dumping and accumulation of roadside trash) also reduces the likelihood of occurrence of many special status species. Furthermore, the presence of existing adjacent residential development to the north and south of the site and the vegetation removal, active grading of the lands to the west have largely isolated the site from other undeveloped open space. The only undeveloped, vacant open space occurs to the east. The adjacent vacant lands appear to the east appear to have also been rough graded and cleared of most native vegetation in the past. As a result, connectivity of the site to other undeveloped open space has been eliminated, or at least significantly diminished, for many terrestrial species.

The CVMSHCP was designed to streamline the permitting process and to mitigate potential impacts resulting from covered projects and the lawful activities of permittees through payment of the requisite development fee and participation in plan's requirements. A few species, which are not covered by the CVMSHCP and/or are not yet adequately conserved by the CVMSHCP (e.g., burrowing owl, nesting birds) require additional consideration and/or actions, which are detailed below.

6.1 Discussion of the Special Status Biological Resources Tables

A review of the CNDDB, CNPS and IPaC Resources List resulted in a total of 68 special status biological resources that have been reported from the vicinity (Tables 1-7). These include: 33 plants, one vegetation communities, five invertebrates, one fish, four reptiles, 14 birds and 10 mammals. Of these, 59 are considered to be absent from the site due to a combination of factors including a lack of suitable habitat, the elevation of the site outside of elevational parameters and/or in the case of flying animals (birds and bats), they may only occur onsite to forage and will therefore not be directly impacted. The special status biological resources that are considered to be absent from the site include: chaparral sand-verbena (*Abronia villosa* var. *aurita*), Borrego milk-vetch (*Astragalus lentiginosus var. borreganus*), Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*), Lancaster milk-vetch (*Astragalus preussii* var. *laxiflorus*), gravel milk-vetch (*Astragalus subulonum*), triple-ribbed milk-vetch (*Astragalus tricarinatus*), little-leaf elephant

tree (*Bursera microphylla*), Peninsular spineflower (*Chorizanthe leptotheca*), glandular ditaxis (*Ditaxis claryana*), California ditaxis (*Ditaxis serrata* var. *californica*), Booth's evening primrose (*Eremothera boothii* var. *boothii*), Joshua Tree poppy (*Eschscholtzia androuxii*), Arizona spurge (*Euphorbia arizonica*), flat-seeded spurge (*Euphorbia platysperma*), pink velvet-mallow (*Horsfordia alata*), Newberry's velvet-mallow (*Horsfordia newberryi*), winged cryptantha (*Johnstonella holoptera*), southwestern spiny rush (*Juncus acutus ssp. leopoldii*), Cooper's rush (*Juncus cooperi*), Santa Rosa Mountains leptosiphon (*Leptosiphon floribundus*), Torrey's box-thorn (*Lycium torreyi*), California marina (*Marina orcuttii* var. *orcuttii*), spear-leaf matelea (*Matelea parvifolia*), slender cottonheads (*Nemacaulis denudate* var. *gracilis*), narrow-leaf sandpaper-plant (*Petalonyx linearis*), slender-stem bean (*Phaseolis filiformis*), Deep Canyon snapdragon (*Pseudorontium cyanthiferum*), desert spike-moss (*Selaginella eremophila*), Cove's cassia (*Senna covesii*), purple stemodia (*Stemodia durantifolia*), Mecca-aster (*Xylorhiza cognata*), desert fan palm oasis woodland, Casey's June beetle (*Dinacoma caseyi*), monarch butterfly (*Danaus plexippus*), Coachella giant sand treader cricket (*Macrobaenetes valgum*), cheeseweed owlfly (*Oliarces clara*), Algodunes Dunes Euparagia (*Euparagia unidentate*), desert pupfish (*Cyprinodon macularius*), northern red diamond rattlesnake (*Crotalus ruber ruber*), desert tortoise (*Gopherus agassizi*), flat-tailed horned lizard (*Phrynosoma mcallii*), Coachella Valley fringe-toed lizard (*Uma inornata*), nesting Cooper's hawk (*Accipiter cooperii*), nesting golden eagle (*Aquila chrysaetos*), nesting ferruginous hawk (*Buteo regalis*), nesting southwestern willow flycatcher (*Empidonax traillii extimus*), nesting prairie falcon (*Falco mexicanus*), nesting bald eagle (*Haliaeetus leucocephalus*), nesting vermilion flycatcher (*Pyrocephalus rubinus*), nesting crissal thrasher (*Toxostoma crissale*), nesting Le Conte's thrasher (*Toxostoma lecontei*), nesting least Bell's vireo (*Vireo bellii pusillus*), pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*), Earthquake Merriam's (Aguanga) kangaroo rat (*Dipodomys merriami collinus*), roosting western mastiff bat (*Eumops perotis californicus*), roosting western yellow bat (*Lasiurus xanthinus*), San Diego desert woodrat (*Neotoma lepida intermedia*), roosting pocketed free-tailed bat (*Nyctinomops femorosaccus*) and Peninsular bighorn sheep DPS (*Ovis canadensis nelsoni* [Pop. 2]). These special status biological resources will not be discussed further.

Three of the remaining nine species are fully (or partially) covered, conserved (or partially conserved) under the CVMSHCP. Participation in the CVMSHPS and payment of the requisite CVMSHCP development fee and participation in the plan is expected to fully mitigate project related impacts (if any) to these species. These include burrowing owl (*Athene cunicularia*), Palm Springs pocket mouse (*Perognathus longimembris bangsi*) and Coachella Valley (Palm Springs) round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*). The site is not within CVMSHCP modeled habitat for Coachella Valley milk-vetch, Coachella giant sand-treader cricket, flat-tailed horned lizard, Coachella Valley fringe-toed lizard, Palm Springs pocket mouse and Coachella Valley (Palm Springs) round-tailed ground squirrel. It should be noted that due to the current, highly disturbed condition and/or past agricultural conversion of the site, the likelihood for the occurrence for these species is considered to be very low to low. Regardless of whether

these species occur on the project site or not, participation in the CVMSHCP and payment of the development fee is designed and intended to provide full coverage of potential project-related impacts. One of these species, burrowing owl, however, requires additional considerations and/or actions for full CVMSHCP compliance, which is discussed below. Although desert tortoise is considered to be absent from the site, due to an overall lack of suitable habitat, it will also be discussed below for further clarification.

6.1.1 Species Covered Under the CVMSHCP

The desert tortoise is federally and state listed as threatened by the CDFW and USFWS. Although desert tortoise is covered under the CVMSHCP, further actions are required (where suitable habitat is present) to ensure that take is entirely avoided and/or minimized to the greatest extent possible. No live desert tortoises or sign thereof (i.e., burrows, scat, tracks, carcass remains, courtship rings, drinking depressions) were observed onsite during the assessment. Furthermore, the site is the location of a former date palm farm/plantation and contains very little remnant and sparse native vegetation (i.e., quailbush scrub). The site is not located within designated critical habitat or CVMSHCP modeled habitat for desert tortoise. For these reasons, habitat suitable for desert tortoise is not present onsite. Additionally, surrounding lands (with the exception of lands to the east) have been developed or are currently in the process of being developed. The land to the east is vacant, undeveloped and disturbed but also does not appear to support habitat suitable for desert tortoise. For these reasons, although a very limited amount of remnant vegetation community (i.e., quailbush scrub) that might otherwise technically be suitable for the desert tortoise, existing site conditions (i.e., nearly 100% conversion to former agricultural practices, existing and past site disturbance, existing adjacent development, etc.) have resulted in an area that is currently unsuitable for this conspicuous and wide-ranging species. For these reasons, it is the opinion of WSP that desert tortoise is absent from the project site and that focused surveys are not warranted or recommended. Project implementation is anticipated to have no impact on the desert tortoise.

The burrowing owl is not listed as threatened or endangered by the USFWS or CDFW. It is, however, managed as a BCC by the USFWS and designated as a SSC by the CDFW. It is also protected from take by the MBTA and FGC. The burrowing owl is a covered species under the CVMSHCP, however the federal permit for the CVMSHCP does not allow take of this species under the MBTA. Any impacts to burrowing owl would be considered significant under the CEQA. Although no burrowing owls, or sign thereof, were observed or detected onsite during the assessment, potentially suitable habitat (i.e., sparsely vegetated vacant lands; disturbed, remnant and sparse saltbush scrub) is, however, present on the site (Appendix D). California ground squirrel burrows of sufficient size to be suitable for burrowing owl were also observed onsite (Appendix D). The CNDDB reported burrowing owl occurring in the vicinity of the site, including a 2004 record

from 0.5 mile north of the site (CDFW 2024a). For these reasons, WSP considers there to be at least a low potential for the occurrence of burrowing owl onsite. Because the site is not located within or adjacent to a CVMSHCP conservation area, it is the opinion of WSP that at a minimum, a preconstruction (take avoidance) survey for burrowing owl is warranted and is therefore recommended to be conducted immediately prior to initial site clearance to ensure that burrowing owl does not occur on the site and that no direct take of burrowing owl result from project implementation. If burrowing owl is found to be present onsite, scheduled project activities would need to be temporarily halted or delayed and the CVCC and other resource agencies contact for further guidance.

Although there is a very low potential for Palm Springs pocket mouse and/or Coachella Valley (Palm Springs) round-tailed ground squirrel to occur onsite, both are fully covered species under the CVMSHCP, therefore payment of the development fee and participation in the plan is expected to fully mitigate any potential impacts to these species. Neither of these species are listed by USFWS or CDFW but are designated as SSCs by the CDFW. The site is not within CVMSHCP modeled habitat for either of these species.

The remaining six species, which are not covered, or not fully covered, under the CVMSHCP are discussed separately below.

6.1.2 Plant Species Not Covered Under the CVMSHCP

Abram's spurge is considered to have a very low potential of occurrence as it is associated with sandy soils in Mojavean and Sonoran desert scrub within the elevational parameters of the site and is known from the vicinity. It should be noted that due to the sparse and disturbed nature of the remnant native vegetation remaining and soils onsite, the potential occurrence of this species is considered highly unlikely, however, not impossible. This species was not detected during the field assessment as the assessment was conducted outside of this species blooming period (September-November). Abram's spurge is not listed as threatened or endangered but is designated as S2 by the CDFW and List 2B.2 by the CNPS meaning that it is considered to be "imperiled" by the CDFW and "rare, threated or endangered in California but more common elsewhere" and "moderately threatened in California". Abram's spurge is not covered under the CVMSHCP; thus, development fees and participation offer no mitigation for impacts (if any). Impacts (if any) to Abrams spurge potentially resulting from the implementation of the proposed project would not likely be considered significant, as there is almost no potential for the occurrence of a significant population of this species onsite. If present, this species would very likely only be in the form of a very limited number of individual plants. The site offers little to no conservation value for this, or any other special status species. For these reasons, unmitigated impacts to Abram's spurge (if any) would not likely be considered significant under the CEQA. For

these reasons, a focused survey for Abram's spurge is not considered to be warranted and thus is not recommended for this site.

Ribbed cryptantha is considered to have a very low potential of occurrence onsite as it is associated with sandy soils in Sonoran desert scrub, has been reported from the Cathedral City quadrangle. This species was not detected during the field assessment as the assessment was conducted outside of this species blooming period (February-May), however the sparse, remnant and disturbed quailbush scrub and somewhat sandy soils that are intermittently remnant onsite may nevertheless provide potentially suitable (albeit low quality) habitat for the occurrence of this species. Ribbed cryptantha is not listed as threatened or endangered but is designated as S4 by the CDFW and List 4.3 by the CNPS meaning that it is considered to be "Apparently Secure; but some cause for long-term concern" by the CDFW and "Plant of limited distribution, a Watch List species" and "not very threatened in California". Ribbed cryptantha is not covered under the CVMSHCP, thus development fees and participation offer no mitigation for impacts to this species. Impacts (if any) to ribbed cryptantha potentially resulting from the implementation of the proposed project would not likely be considered significant, as there is almost no potential for the occurrence of a significant population onsite. If present, this species would very likely only be in the form of a very limited number of individual plants. The site offers little to no conservation value for this, or any other special status species. Potential impacts to a few individuals (again, in the unlikely event that this species was present) would not be expected to cause the population to drop to a less than self-sustaining level. For these reasons, unmitigated impacts to ribbed cryptantha (if any) would not likely be considered significant under the CEQA. For these reasons, a focused survey for ribbed cryptantha on this site is not considered to be warranted and thus is not recommended.

6.1.3 Wildlife Species Not Covered Under the CVMSHCP

A single Cooper's hawk was observed onsite during the assessment. This species is not federally or state listed by the USFWS or CDFW. It is, however, managed as a Bird of Conservation Concern (BCC) and protected by Fish and Game Code (FGC) and the MBTA while nesting. Although observed occurring onsite, nesting habitat (i.e., riparian and/or deciduous communities, live oaks, etc.) is not present onsite. For these reasons, despite the detection of Cooper's hawk onsite, impacts to nesting Cooper's hawk are not anticipated to occur as a result of project implementation. As a result, surveys for nesting Coopers hawk are not considered to be warranted and are therefore not recommended for this site.

Costa's hummingbird was observed onsite during the assessment. This species is not federally or state listed by the USFWS or CDFW, however is managed as a BCC and protected by FGC and the MBTA while nesting. Limited nesting habitat for Costa's hummingbird is present onsite in the blue palo verde trees, Mexican palo verde trees and saltcedar trees intermittently present throughout

the site. In order to avoid potentially impacting nesting Costa's hummingbird, avoidance of any project-related disturbance (i.e., grading, vegetation removal, landscaping, operation of heavy equipment, construction, etc.) during the nesting season (1 February through 31 August) is recommended. If initial project disturbance cannot be scheduled to occur outside of the nesting season, a clearance survey for nesting Costa's hummingbird conducted by a qualified ornithologist or biologist immediately prior to onsite disturbance is recommended. If nesting Costa's hummingbirds are found, 100% avoidance of impacts is required and no work buffer zones would need to be established and observed where no work would be permitted until young have fledged. While there is no established protocol for nest avoidance, when consulted the CDFW generally recommends avoidance buffers of about 100–300 feet for unlisted songbirds.

American badger was not observed or detected on-site during the assessment. This species is not listed as threatened or endangered by either the USFWS or CDFW, however, it is designated as a SSC by the CDFW. American badger is a wide-ranging species and occurs in many habitats from below sea level to alpine habitats in the western and midwestern US, southcentral Canada and much of Mexico. No potential badger burrows were observed on-site, however lands on and adjacent to (to the east of) the site are otherwise potentially suitable. The American badger is known from the vicinity (CDFW 2024a). For these reasons, WSP considers there to be at least a low potential for American badger to occur on-site. Project-related impacts (if any) to American badger would not likely be considered significant under the CEQA as implementation of the proposed project is not anticipated to result in: 1) a substantial reduction of habitat for these this species, 2) a drop in self-sustaining population levels, 3) an elimination of these this species population levels, or 4) substantially reduce these this species numbers or reduce their its geographic range. For these reasons, despite considered to have a low potential of occurrence, presence/absence survey(s) for American badger are not recommended for this site.

6.1.4 Additional Bird Species Protected by the Migratory Bird Treaty Act

Excluded from coverage under the CVMSHCP are a variety of common bird species that are protected by the MBTA and FGC. This includes virtually all native migratory and resident bird species, including birds observed onsite and/or known to occur in the vicinity. Avoidance of impacts to these nesting migratory and resident birds is a requirement of the federal permit issued for the CVMSHCP. In order to avoid potentially impacting nesting birds, avoidance of any project-related disturbance (i.e., grading, vegetation removal, landscaping, operation of heavy equipment, construction, etc.) during the nesting season (1 February through 31 August) is recommended. If initial project disturbance cannot be scheduled to occur outside of the nesting season, a nesting bird clearance survey conducted by a qualified ornithologist or biologist immediately prior to onsite disturbance is recommended. If nesting birds are found, no work buffer zones would need to be established and observed where no work would be permitted until young have fledged.

While there is no established protocol for nest avoidance, when consulted the CDFW generally recommends avoidance buffers of about 100–300 feet for unlisted songbirds and 500 feet for listed songbirds and raptors.

6.1.5 Jurisdictional Areas

No natural streams, creeks, rivers, lakes, ponds or pools are located on the project site. A man-made, abandoned and dry irrigation pond and old irrigation structures (i.e., presumed derelict pumps, machinery, cement or concrete pipes and linear earthen furrows) are present in the approximate western and southern 2/3 of the site. These irrigation features, including the dry irrigation pond, are not anticipated to fall under the jurisdiction of either the USACE or CDFW.

7.0 CONCLUSION

The City of Coachella is a signatory to the CVMSHCP (CVCC 2024). Therefore, payment of the required development fees for approved projects are anticipated to mitigate the impacts and/or potential impacts (if any) to covered species potentially resulting from the development of the site, whether those covered species occur there or not. Covered species that are considered to have at least some (very low to low) potential of onsite occurrence include: burrowing owl, Palm Springs pocket mouse and Coachella Valley (Palm Springs) round-tailed ground squirrel. Impacts to these species (if any) and their respective habitat, would be fully covered and mitigated under the CVMSHCP with the payment of the requisite development fee and participation in the requirements of the plan.

Because the site contains suitable habitat and burrows suitable for burrowing owl were observed onsite, WSP recommends a preconstruction (take avoidance) survey for burrowing owl to ensure that burrowing owls do not occur onsite immediately prior to initial site clearance and or construction activities. Conducting a preconstruction (take avoidance) survey immediately prior to the commencement of proposed construction would ensure that impacts to burrowing owl do not result from project implementation. If burrowing owls are detected onsite, the CDFW would need to be contacted for guidance. If burrowing owls are detected onsite, relocation may be required, in coordination with the CVCC and CDFW.

Impacts to other bird species protected by the MBTA and FGC, including but not limited to Costa's hummingbird, mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferus*) and lesser nighthawk (*Chordeiles acutipennis*), require avoidance. If project activities (i.e., site grading, vegetation removal/trimming, earthwork in undisturbed areas, etc.) are conducted during the nesting season (i.e., generally between 1 February and 31 August), a nesting bird clearance survey is recommended to ensure impacts to nesting birds are avoided. If project activities are conducted outside of the nesting season, a nesting bird clearance survey could likely be avoided. If active

bird nests are found, at any time, proposed project activities would need to be halted and postponed until young have fledged the nest and impacts to nesting birds are entirely avoided.

With participation in and compliance with the requirements of the CVMSHC and implementation of the recommendations above, impacts to special status biological resources are anticipated to be mitigated to a less than significant level.

8.0 LITERATURE CITED AND REFERENCES

Association of Environmental Professionals. 2022. 2022 CEQA California Environmental Quality Act Statute and Guidelines. Accessed online at: https://www.califaep.org/docs/2022_CEQA_Statue_and_Guidelines.pdf

California Bird Records Committee. 2024. Official California Checklist. Accessed online at: http://californiabirds.org/ca_list.asp.

California Department of Fish and Wildlife (CDFW). 2024a. California Natural Diversity Data Base, Rarefind 5. Report for the *Indio, La Quinta, Myoma, Valerie* and *West Berdoo Canyon, Calif*. quadrangles. Accessed at: dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp

CDFW. 2024b. Special Animals List. January. Periodic publication. Sacramento, CA. Accessed online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline=1

CDFW. 2016. Complete List of Amphibian, Reptile, Bird and Mammal Species in California. Accessed online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=87155&inline

California Native Plant Society (CNPS). 2024a. CNPS Rare Plant Inventory. Report for the *Indio, La Quinta, Myoma, Valerie and West Berdoo Canyon Calif*. quadrangles. Accessed online at: http://www.rareplants.cnps.org

CNPS. 2024b. California Rare Plant Ranks. Accessed online at: https://www.cnps.org/rare-plants/california-rare-plant-ranks

Coachella Valley Conservation Commission (CVCC). 2024. Coachella Valley Multiple Species Habitat Conservation Plan. Accessed plan documents online at: cvmshcp.org

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Prepared for the California Department of Fish and Game.

Jepson Flora Project (2nd ed.). 2024. Jepson eFlora**.** Accessed online at: [13 Mar 2024]

Riverside County Information Technology. 2024. Map My County. Accessed online at: http://mmc.rivcoit.org/MMC_Public/Custom/disclaimer/Default.htm

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A manual of California vegetation (2nd ed.). California Native Plant Society, Sacramento, CA.

USDA, NRCS. 2024. Web Soil Survey. Accessed online at: http://websoilsurvey.nrcs.usda.gov/app/

USDA, NRCS. 2024. The PLANTS Database. National Plant Data Team. Accessed online at: plants.usda.gov

USFWS. 2024. Migratory Bird Treaty Act of 1918. Accessed online at: https://www.fws.gov/law/migratory-bird-treaty-act-1918

USGS. 2021. *West Berdoo Canyon, Calif.* 7.5-Minute Topographic Quadrangle.

USGS. 2015a. *Indio, Calif.* 7.5-Minute Topographic Quadrangle.

USGS. 2015b. *La Quinta, Calif.* 7.5-Minute Topographic Quadrangle.

USGS. 2015c. *Myoma, Calif.* 7.5-Minute Topographic Quadrangle.

USGS. 2015d. *Valerie, Calif.* 7.5-Minute Topographic Quadrangle.

APPENDIX A

SPECIES LIST: VASCULAR PLANTS

APPENDIX A
Species List: Vascular Plants

This list reports only plants observed by WSP on the site during the field assessment. Other species may have been overlooked or undetectable due to their growing season. [† = *special status species,* * = non-native species, sp. = identified only to genus, *cf*= compares favorably with]

Amaranthaceae	**Amaranth family**
Amaranthis cf. *albus**	tumbleweed*
Asteraceae	**Sunflower family**
Dicoria canescens	desert dicoria
Helianthus annuus	common sunflower
*Lactuca serriola**	prickly lettuce*
cf. *Lepidospartum squamatum*	scalebroom
Palafoxia arida	Spanish needles
Pluchea sericea	arrow-weed
Brassicaceae	**Mustard family**
*Brassica tournefortii**	Saraha mustard*
*Sisymbrium irio**	London rocket*
Chenopodaceae	**Goosefoot family**
Atriplex canescens	four-wing saltbush
Atriplex lentiformis	quailbush
*Salsola tragus**	Russian thistle*
Fabaceae	**Pea family**
cf. Acacia sp.*	Unidentified non-native acacia*
*Parkinsonia aculeata**	Mexican palo verde*
Parkinsonia florida	Mexican palo verde*
Malvaceae	**Saltcedar family**
*Malva parviflora**	cheeseweed*
Solanaceae	**Nightshade family**
Datura wrightii	jimsonweed
Solanum cf. *xanti*	purple nightshade
Tamaricaceae	**Saltcedar family**
Tamarix cf. *ramosissima*	*cf.* saltcedar
Zygophyllaceace	**Caltrop family**
*Tribulus terrestris**	Puncture vine*
Arecaceae	**Palm family**
*Phoenix dactylifera** (remnant agriculture)	date palm (remnant agriculture)
Washingtonia sp. (sapling)	fan palm (sapling)
Poaceae	**Grass family**
*Cynodon dactylon**	Bermuda grass*
*Schismus cf. barbatus**	Mediterranean grass*

APPENDIX B

SPECIES LIST: VERTEBRATE ANIMALS

APPENDIX B

Species List: Vertebrate Animals

This list reports only the vertebrate animals observed or detected by WSP during the field assessment. Other species may have been overlooked or undetectable due to their activity patterns or weather conditions. [† = *special status species,* * = non-native species, sp. = identified only to genus, *cf* = compares favorably with]

VERTEBRATES	
REPTILIA	**REPTILES**
Phrynosomatidae	**Spiny Lizards & Allies**
Uta stansburiana	side-blotched lizard
AVES	**BIRDS**
Columbidae	**Pigeons & Doves**
*Columba livia**	rock pigeon*
*Streptopelia decaocto**	Eurasian collared dove*
Zenaida macroura	mourning dove
Trochilidae	**Hummingbirds**
Calypte costae†	Costa's hummingbird†
Accipitridae	**Hawks, Kites, Eagles & Allies**
Accipiter cooperii†	Cooper's hawk†
Buteo lineatus	red-shouldered hawk
Buteo jamaicensis	red-tailed hawk
Falconidae	**Caracaras & Falcons**
Falco sparverius	American kestrel
Remizidae	**Penduline Tits & Verdins**
Auriparus flaviceps	verdin
Mimidae	**Mockingbirds & Thrashers**
Mimus polyglottos	northern mockingbird
Corvidae	**Crows & Ravens**
Corvus corax	common raven
Fringillidae	**Fringilline & Cardueline Finches**
Haemorhous mexicanus	house finch
Passerellidae	**New World Sparrows**
Zonotrichia leucophrys	white-crowned sparrow
MAMMALIA	**MAMMALS**
Geomyidae	**Pocket Gophers**
Thomomys bottae (burrows & tailings)	Botta's pocket gopher
Scuiridae	**Squirrels**
Otospermophilus beecheyi	California ground squirrel

APPENDIX C

FIGURES

Service Layer Credits: Esri, CGIAR, USGS, Airbus, USGS, NGA, NASA, CGIAR, NCEAS, NLS, OS, NMA, Geodatastyrelsen, GSA, GSI and the GIS User Community. Sources: Esri, USGS, NOAA, County of Riverside, California State Parks, Esri, TomTom,

FIGURE 1

Regional Map
Biological Resources Assessment & CVMSHCP Consistency Analysis Report
Calhoun Street & Avenue 49 Residential Development Project
Coachella, CA

Service Layer Credits: Copyright: © 2011 National Geographic Society, i-cubed, Esri, CDIAR, USGS, Sources: Esri, USGS, NOAA, Navan County of Riverside, California State Parks, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS

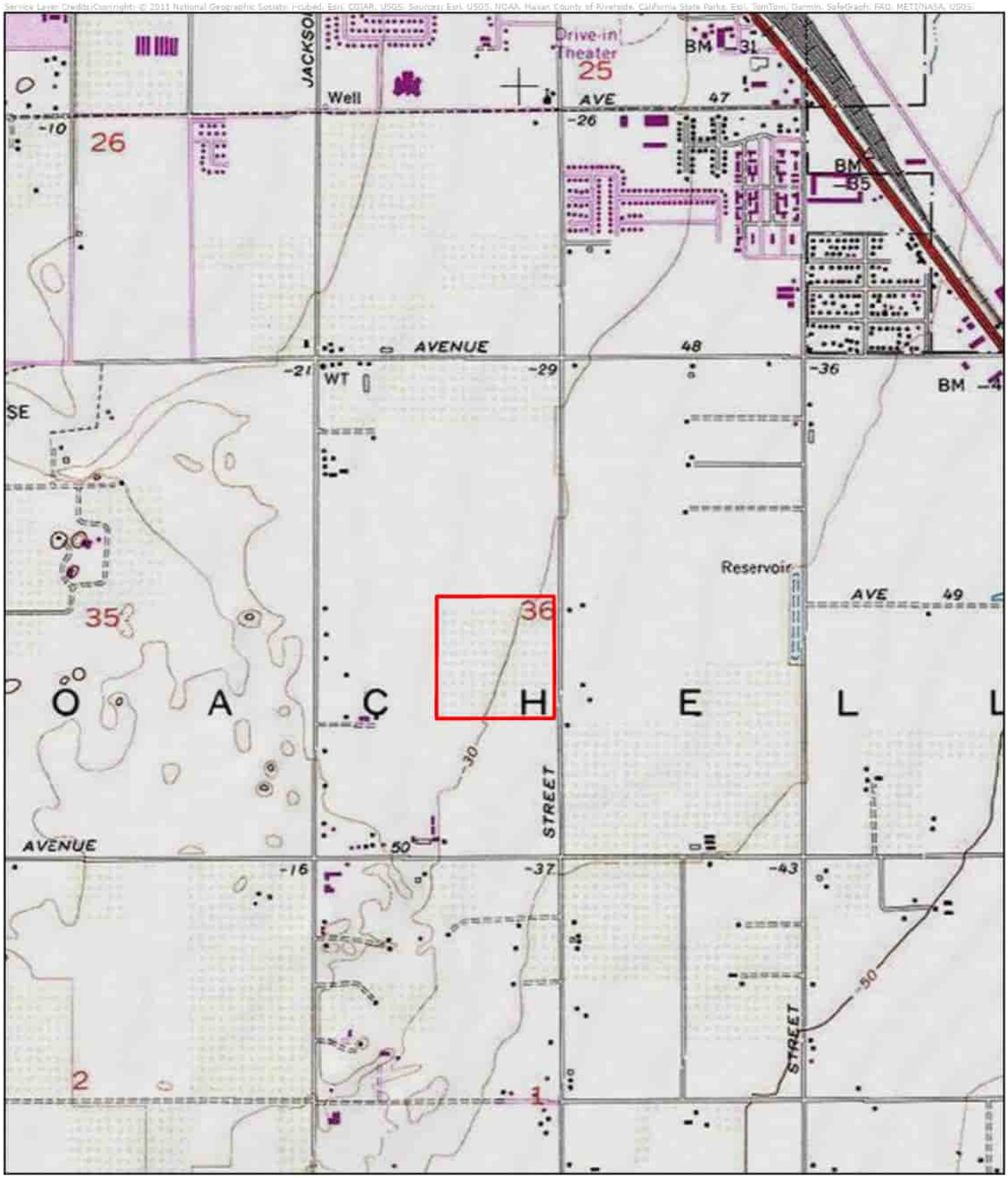

FIGURE 2

Location/Vicinity (USGS Topo)
Biological Resources Assessment & CVMSHCP Consistency Analysis Report
Calhoun Street & Avenue 49 Residential Development Project
Coachella, CA

Service Layer Credits:Earthstar Geographics, Esri, CGIAR, USGS, Sources: Esri, USGS, NOAA, County of Riverside, California State Parks, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS

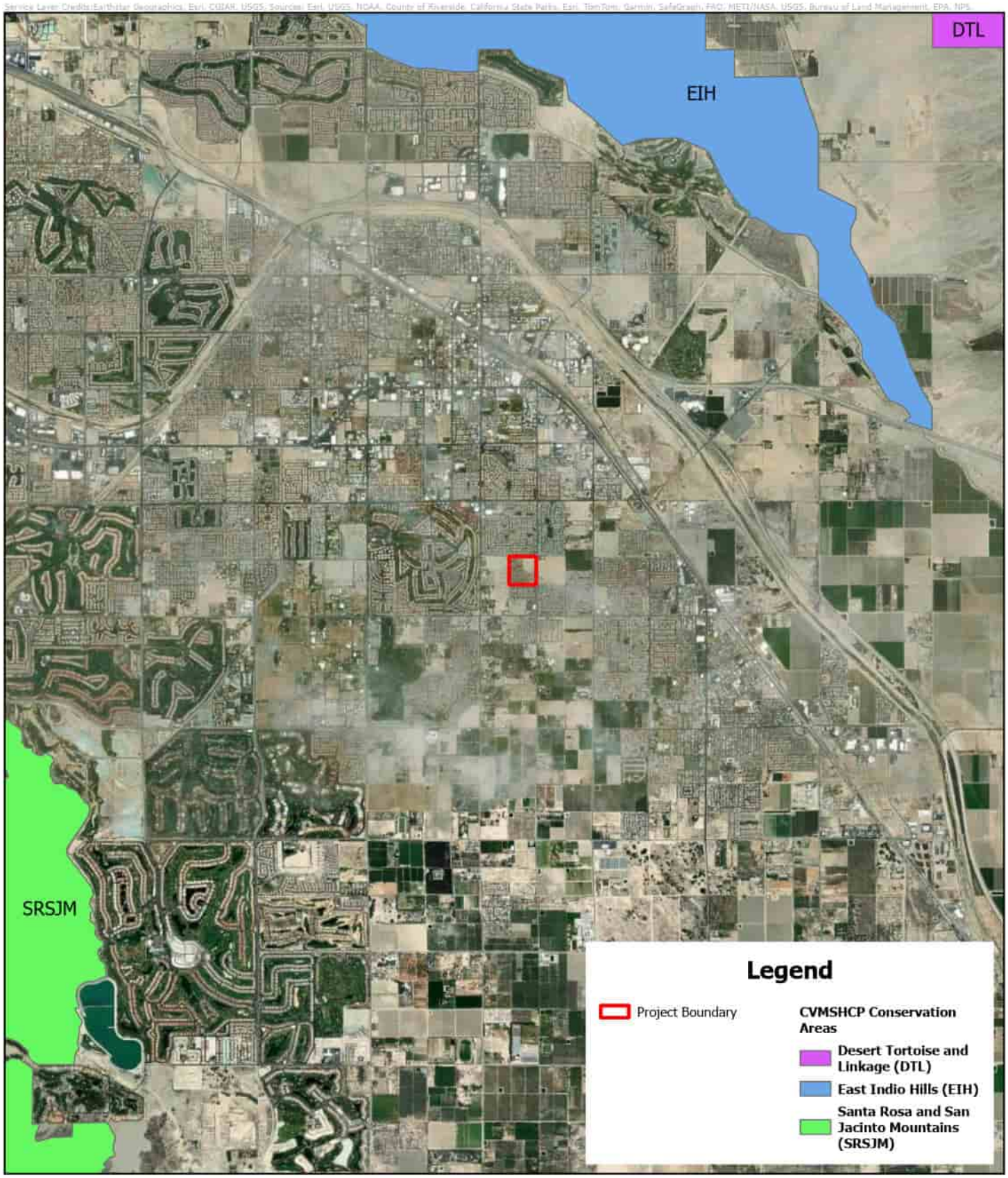

FIGURE 3
CVMSHCP Plan Area
Biological Resources Assessment & CVMSHCP Consistency Analysis Report
Calhoun Street & Avenue 49 Residential Development Project
Coachella, CA

Service Layer Credits: Esri, CGIAR, USGS, Sources: Esri, USGS, NOAA, Maxar, County of Riverside, California State Parks, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS

wsp

FIGURE 4
USDA Soils
Biological Resources Assessment & CVMSHCP Consistency Analysis Report
Calhoun Street & Avenue 49 Residential Development Project
Coachella, CA

Service Layer Credits: Esri, CONAP, USGS, Sources: Esri, USGS, NOAA, Maxar, County of Riverside, California State Parks, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS

FIGURE 5
Vegetation
Biological Resources Assessment & CVMSHCP Consistency Analysis Report
Calhoun Street & Avenue 49 Residential Development Project
Coachella, CA

APPENDIX D

PHOTOGRAPHIC EXHIBITS

CALHOUN STREET AND AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

PHOTOGRAPHIC LOG

Photo 1: Representative condition of the largely barren, highly disturbed area of the site. Boundary of existing residential development visible to right (perimeter wall). View facing west-southwest from the northeastern corner of the site.

Photo 2: Representative condition of some of the remnant quailbush scrub onsite. Dry, abandoned irrigation pond visible to left. View facing south-southeast from northwestern corner of site.

CALHOUN STREET AND AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

PHOTOGRAPHIC LOG

Photo 3: Representative condition of a remnant quailbush scrub portion of the site. Dry, abandoned irrigation pond visible in center. View facing east-southeast from northeast corner of site.

Photo 4: Representative condition of the remnant, fallow date palm farm portion of the site. View facing north from vicinity of the southwestern corner of site.

CALHOUN STREET AND AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

PHOTOGRAPHIC LOG

Photo 5: Representative condition of the remnant, fallow date palm farm portion of the site. Existing adjacent residential development visible to right. View facing east from a south-central portion of site.

Photo 6: View of highly disturbed portion of site. Off-road vehicular activity and dumping evident. Calhoun Street and adjacent undeveloped open space visible to right. View facing north from southeastern corner of site.

CALHOUN STREET AND AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

PHOTOGRAPHIC LOG

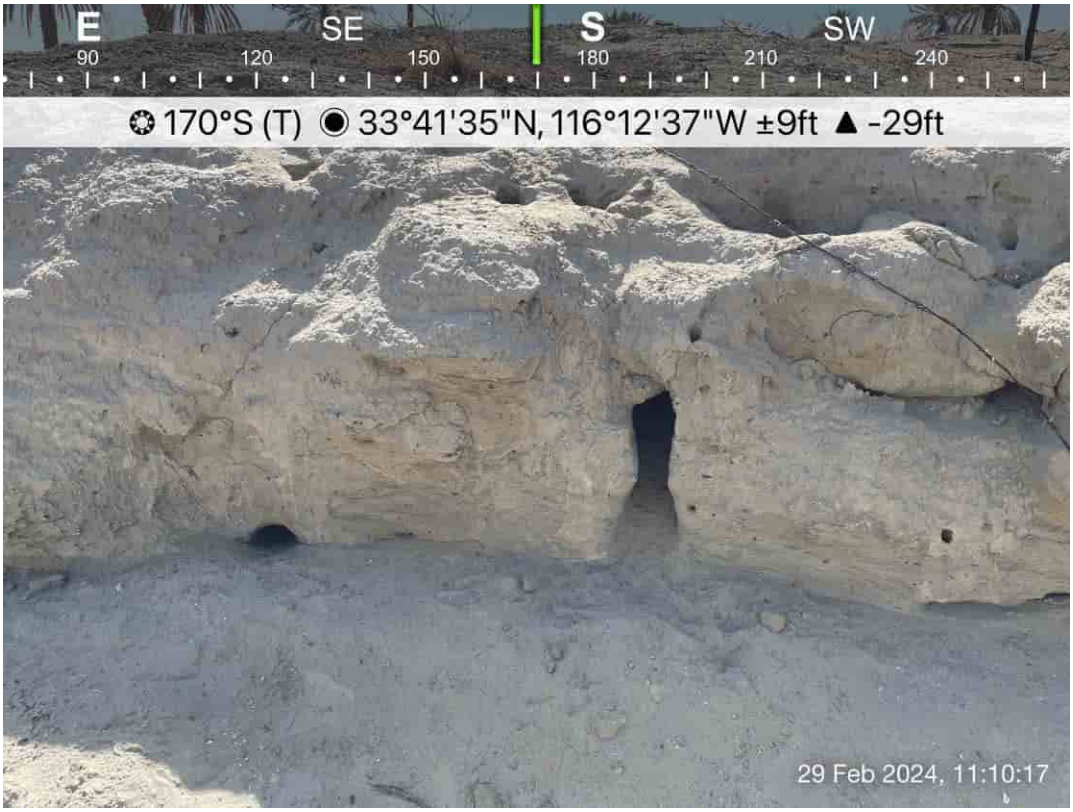

Photo 7: Representative example of burrows suitable for burrowing owl present onsite. View facing south from north-central portion of site.

Photo 8: Another representative example of an onsite burrow suitable for burrowing owl. View facing south from north-central potion of site.

CALHOUN STREET AND AVENUE 49 RESIDENTIAL DEVELOPMENT PROJECT

PHOTOGRAPHIC LOG

Photo 9: Another representative example of burrow suitable for burrowing owl present onsite. View facing south from south-central portion of site.

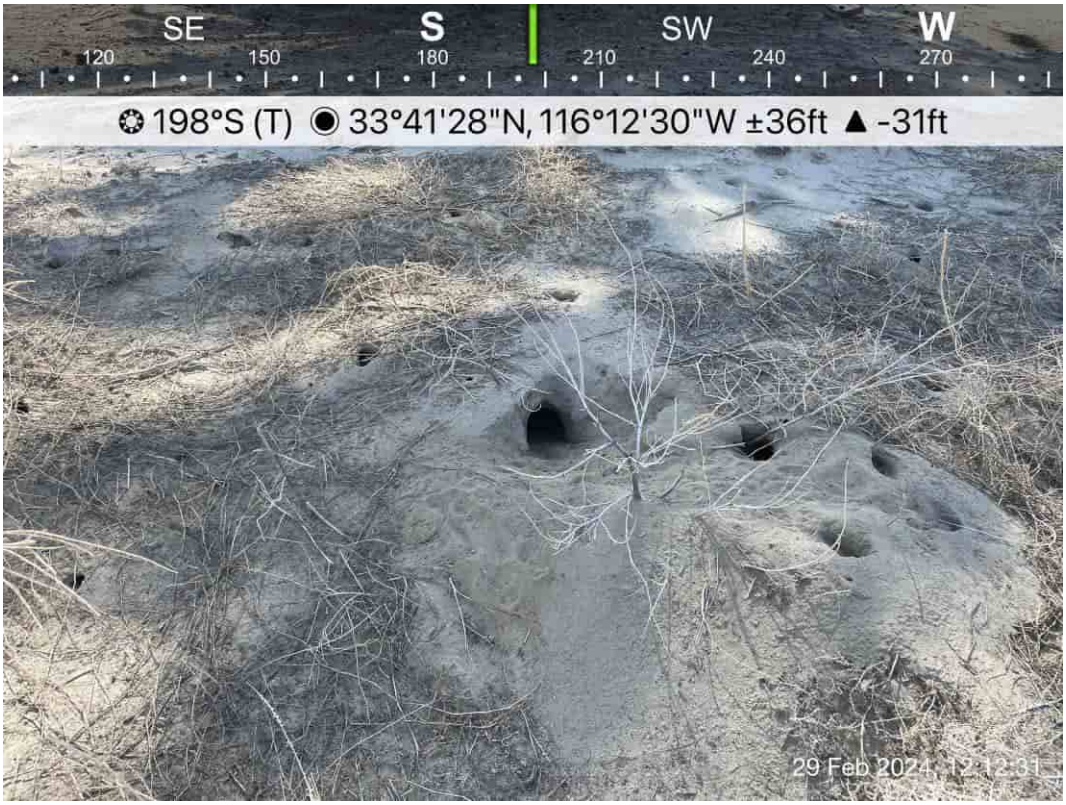

Photo 10: Another representative example of an onsite burrow suitable for burrowing owl. View facing south-southwest from a central location of site.

Appendix C
Calhoun Street Housing Development
Historical/Archaeological Resources Survey Report

CONFIDENTIAL
Available upon request to qualified professionals

Appendix D
Calhoun Street Housing Development Preliminary Hydrology Report

SW CORNER – CALHOUN ATREET AT 49TH AVENUE SUBDIVISION

COACHELLA, CA

PRELIMINARY HYDROLOGY REPORT

PREPARED FOR:
PACIFIC COAST PROPERTIES
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January 17, 2025

Prepared Under the Supervision of:

James Bazua, PE
R.C.E. 58394
Expiration Date: December 31, 2026

SW CORNER – CALHOUN ATREET AT 49TH AVENUE SUBDIVISION

PRELIMINARY HYDROLOGY REPORT

TABLE OF CONTENTS:

I PURPOSE AND SCOPE

II DESIGN METHODOLOGY

III RCFCD SYNTHETIC UNIT HYDROGRAPH CALCULATIONS

IV STREET FLOWRATE CAPACITY

V APPENDIX – REFERENCE MATERIAL

I. PURPOSE AND SCOPE

This report was prepared in support of the Calhoun Street at 49th Avenue Subdivision entitlement package submittal. The purpose of this preliminary report is to analyze the existing and proposed drainage patterns, discuss the on-site drainage design and size the proposed on-site drainage facilities to meet the City of Coachella drainage ordinance requirements.

The existing project site is an undeveloped lot at the southwesterly corner of the intersection of Calhoun Street and 49th Avenue in Coachella, CA. The proposed project improvements include the addition of residential lots with an interior access drive serving the lots on a 38.76 acre parcel. The site is bound to the north and east with fully improved public streets, to the east by a residential subdivision under development and to the south by an existing residential subdivision. The project proposes to obtain access to the site from Calhoun Street to the east, and from 49th Avenue to the north. The site will be drain via street surface flow to a series of on-site retention basins designed to capture and and store the storm run off generated during the 100 year design storm event. In general, the existing site is not subject to offsite storm flows.

II. DESIGN METHODOLOGY AND CALCULATIONS

The Calhoun Street project will provide five (5) on-site storm drain infiltration retention basin systems designed to capture and store the runoff generated from the "worst case" 100 year design storm based on City of Coachella requirements. The five retention basins have a combined volume capacity designed to store the runoff generated on-site during the 100 year design storm as well as runoff from the Calhoun Street half street project frontage and the 49 Avenue full width street frontage within the public right of way. The low point on the existing project site occurs on the project's easterly frontage. Runoff that exceeds the capacity of the on-site retention basin storage systems in an emergency overflow condition is designed to overflow onto interior surface streets and exit via surface flow onto Calhoun Street following the historical drainage pattern toward the south.

Riverside County Flood Control District Synthetic Unit Hydrograph methods are used to quantify the runoff volume generated and stored on-site during the 100 year "worst case" design storm return period. The program data and results prepared for this project are included in the Appendix of this report. The program model typically accounts for the volume of runoff lost due to infiltration in the basins and the allowable design retention basin infiltration rate of 10 gal./s.f./day (0.67 in/hr) established by City of Coachella will be applied over the surface area of the basin bottoms. The combined capacity of all five on-site basins will be compared to the total design runoff volume calculated for the Calhoun Street project to show that runoff generated during the 100 year design storm can be stored within the basins at a depth not to exceed 3ft and the runoff generated during the 10 year storm event can be stored within the on-site basins at a depth not to exceed 1.5 feet in accordance with City of Coachella retention basin criteria.

City of Coachella requires that runoff water stored on-site must be evacuated completely via infiltration within a period of 72 hours in order to comply with vector control concerns. In order to help facilitate this requirement, City of Coachella has limited the maximum depth of

stored runoff within any basin to 1.5' during the 10 year storm event and the maximum depth of any on-site retention basin must not exceed 3.5 feet.

On-site street curb and gutter systems will be designed to convey runoff to the on-site retention basin systems via surface flow. The project site will be designed to ensure that surface runoff generated during the 10 year storm is contained below the top of the proposed street curbs and runoff generated during the 100 year storm event is contained within street right of way. Street flowrates (Q) will be calculated by applying the Rational Method using CivilD software.

DESIGN CRITERIA

The following Riverside County Flood Control District (RCFCD) parameters were used in the preparation of the analyses:

- 2 year – 1 hour Precipitation 0.35" (NOAA)
- 10 year – 1 hour Precipitation 0.70" (NOAA)
- 10 year – 3 hour Precipitation 1.04" (NOAA)
- 10 year – 6 hour Precipitation 1.36" (NOAA)
- 10 year – 24 hour Precipitation 1.04" (NOAA)
- 100 year – 1 hour Precipitation 1.37" (NOAA)
- 100 year – 3 hour Precipitation 2.12" (NOAA)
- 100 year – 6 hour Precipitation 2.78" (NOAA)
- 100 year – 24 hour Precipitation 4.47" (NOAA)
- Hydrologic Soil Type "B" US Dept. of Agriculture, SCS
- Runoff Index Number 56 (RCFC&WCD Plate E-6.1)
- Assumed Design Percolation Rate 0.67 in/hr
- Slope Intensity Duration Curve 0.59 (RCFC&WCD Plate D-4.6)

III RCFCD SYNTHETIC UNIT HYDROGRAPH CALCULATED RETENTION VOLUMES

SUBAREA	100 YR. VOLUME REQUIRED (CU.FT.)	BASIN VOLUME PROVIDED (CU.FT.)	100 YR. BASIN STORAGE DEPTH	10 YR. BASIN STORAGE DEPTH
1	9,580	12,250	2.45	0.72
2	57,661	64,193	3.19’	0.99’
3	53,709	62,528	3.07’	0.94’
4	51,654	57,236	3.20	0.99
5	41,999	72,828	2.14’	0.54

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 1		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.18		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	1000		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	15		
30				
31	ELEVATION OF HEADWATER	471.5		
32	ELEVATION OF CONCENTRATION POINT	468.8		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	3025	
45		466	3700	
46		467	4430	
47		468	5215	
48		468.5	5630	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 1
[3] AREA - ACRES	2.010
[4] L-FEET	1000
[5] L-MILES	0.189
[6] La-FEET	15.00
[7] La-MILES	0.003
[8] ELEVATION OF HEADWATER	471.5
[9] ELEVATION OF CONCENTRATION POINT	468.8
[10] H-FEET	2.7
[11] S-FEET/MILE	14.3
[12] S^0.5	3.78
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.0
[17] 100% OF LAG-MINUTES	1.0
[18] 200% OF LAG-MINUTES	2.0
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.05

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	2.010	1.00	1.04	1.36	2.010	1.00	1.36	2.23	2.010	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	2.01	SUM [7]	1.04	SUM [9]	2.01	SUM [11]	1.36	SUM [13]	2.01	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.40	0.39	0.26
FLOOD VOLUME	(cu-ft)	2,906	2,880	1,903
	(acre-ft)	0.07	0.07	0.04
REQUIRED STORAGE	(cu-ft)	2,439	2,140	370
	(acre-ft)	0.06	0.05	0.01
PEAK FLOW	(cfs)	1.56	1.34	0.19
MAXIMUM WSEL	(ft)	465.72	465.64	465.10

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.18	0.587	0.0305
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	0.00	0.000	0.0000
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.83	0.413	0.2147
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	2.01	SUM	0.2453

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.122626866

C= 0.00227

Ft=C(24-(T/60))^1.55 = 0.00227 (24-(T/60))^1.55 + 0.12 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.25
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.25	0.15	0.02	0.03	0.00
2	10	0.17	1.3	0.162	0.25	0.15	0.02	0.03	0.00
3	15	0.25	1.1	0.137	0.25	0.12	0.01	0.03	0.00
4	20	0.33	1.5	0.187	0.25	0.17	0.02	0.04	0.00
5	25	0.42	1.5	0.187	0.25	0.17	0.02	0.04	0.00
6	30	0.50	1.8	0.225	0.25	0.20	0.02	0.05	0.00
7	35	0.58	1.5	0.187	0.25	0.17	0.02	0.04	0.00
8	40	0.67	1.8	0.225	0.25	0.20	0.02	0.05	0.00
9	45	0.75	1.8	0.225	0.25	0.20	0.02	0.05	0.00
10	50	0.83	1.5	0.187	0.25	0.17	0.02	0.04	0.00
11	55	0.92	1.6	0.200	0.25	0.18	0.02	0.04	0.00
12	60	1.00	1.8	0.225	0.25	0.20	0.02	0.05	0.00
13	65	1.08	2.2	0.275	0.25	0.25	0.03	0.06	3.60
14	70	1.17	2.2	0.275	0.25	0.25	0.03	0.06	3.60
15	75	1.25	2.2	0.275	0.25	0.25	0.03	0.06	3.60
16	80	1.33	2.0	0.250	0.25	0.22	0.00	0.01	0.00
17	85	1.42	2.6	0.324	0.25	0.29	0.08	0.16	33.70
18	90	1.50	2.7	0.337	0.25	0.30	0.09	0.18	41.22
19	95	1.58	2.4	0.300	0.25	0.27	0.05	0.11	18.65
20	100	1.67	2.7	0.337	0.25	0.30	0.09	0.18	41.22
21	105	1.75	3.3	0.412	0.25	0.37	0.17	0.33	86.38
22	110	1.83	3.1	0.387	0.25	0.35	0.14	0.28	71.33
23	115	1.92	2.9	0.362	0.25	0.33	0.12	0.23	56.28
24	120	2.00	3.0	0.374	0.25	0.34	0.13	0.26	63.80
25	125	2.08	3.1	0.387	0.25	0.35	0.14	0.28	71.33
26	130	2.17	4.2	0.524	0.25	0.47	0.28	0.56	154.11
27	135	2.25	5.0	0.624	0.25	0.56	0.38	0.76	214.31
28	140	2.33	3.5	0.437	0.25	0.39	0.19	0.39	101.43
29	145	2.42	6.8	0.849	0.25	0.76	0.60	1.21	349.77
30	150	2.50	7.3	0.911	0.25	0.82	0.67	1.34	387.39
31	155	2.58	8.2	1.023	0.25	0.92	0.78	1.56	455.12
32	160	2.67	5.9	0.736	0.25	0.66	0.49	0.99	282.04
33	165	2.75	2.0	0.250	0.25	0.22	0.00	0.01	0.00
34	170	2.83	1.8	0.225	0.25	0.20	0.02	0.05	0.00
35	175	2.92	1.8	0.225	0.25	0.20	0.02	0.05	0.00
36	180	3.00	0.6	0.075	0.25	0.07	0.01	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.40
FLOOD VOLUME (acft)	0.07
FLOOD VOLUME (cuft)	2906.38
REQUIRED STORAGE (acft)	0.06
REQUIRED STORAGE (cuft)	2438.86
PEAK FLOW RATE (cfs)	1.56

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.00		
UNIT TIME-PERCENT OF LAG	502.5		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.245		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.05 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.082	0.25	0.07	0.01	0.02	0.00
2	10	0.17	0.6	0.098	0.25	0.09	0.01	0.02	0.00
3	15	0.25	0.6	0.098	0.25	0.09	0.01	0.02	0.00
4	20	0.33	0.6	0.098	0.25	0.09	0.01	0.02	0.00
5	25	0.42	0.6	0.098	0.25	0.09	0.01	0.02	0.00
6	30	0.50	0.7	0.114	0.25	0.10	0.01	0.02	0.00
7	35	0.58	0.7	0.114	0.25	0.10	0.01	0.02	0.00
8	40	0.67	0.7	0.114	0.25	0.10	0.01	0.02	0.00
9	45	0.75	0.7	0.114	0.25	0.10	0.01	0.02	0.00
10	50	0.83	0.7	0.114	0.25	0.10	0.01	0.02	0.00
11	55	0.92	0.7	0.114	0.25	0.10	0.01	0.02	0.00
12	60	1.00	0.8	0.131	0.25	0.12	0.01	0.03	0.00
13	65	1.08	0.8	0.131	0.25	0.12	0.01	0.03	0.00
14	70	1.17	0.8	0.131	0.25	0.12	0.01	0.03	0.00
15	75	1.25	0.8	0.131	0.25	0.12	0.01	0.03	0.00
16	80	1.33	0.8	0.131	0.25	0.12	0.01	0.03	0.00
17	85	1.42	0.8	0.131	0.25	0.12	0.01	0.03	0.00
18	90	1.50	0.8	0.131	0.25	0.12	0.01	0.03	0.00
19	95	1.58	0.8	0.131	0.25	0.12	0.01	0.03	0.00
20	100	1.67	0.8	0.131	0.25	0.12	0.01	0.03	0.00
21	105	1.75	0.8	0.131	0.25	0.12	0.01	0.03	0.00
22	110	1.83	0.8	0.131	0.25	0.12	0.01	0.03	0.00
23	115	1.92	0.8	0.131	0.25	0.12	0.01	0.03	0.00
24	120	2.00	0.9	0.147	0.25	0.13	0.01	0.03	0.00
25	125	2.08	0.8	0.131	0.25	0.12	0.01	0.03	0.00
26	130	2.17	0.9	0.147	0.25	0.13	0.01	0.03	0.00
27	135	2.25	0.9	0.147	0.25	0.13	0.01	0.03	0.00
28	140	2.33	0.9	0.147	0.25	0.13	0.01	0.03	0.00
29	145	2.42	0.9	0.147	0.25	0.13	0.01	0.03	0.00
30	150	2.50	0.9	0.147	0.25	0.13	0.01	0.03	0.00
31	155	2.58	0.9	0.147	0.25	0.13	0.01	0.03	0.00
32	160	2.67	0.9	0.147	0.25	0.13	0.01	0.03	0.00
33	165	2.75	1.0	0.163	0.25	0.15	0.02	0.03	0.00
34	170	2.83	1.0	0.163	0.25	0.15	0.02	0.03	0.00
35	175	2.92	1.0	0.163	0.25	0.15	0.02	0.03	0.00
36	180	3.00	1.0	0.163	0.25	0.15	0.02	0.03	0.00
37	185	3.08	1.0	0.163	0.25	0.15	0.02	0.03	0.00
38	190	3.17	1.1	0.180	0.25	0.16	0.02	0.04	0.00
39	195	3.25	1.1	0.180	0.25	0.16	0.02	0.04	0.00
40	200	3.33	1.1	0.180	0.25	0.16	0.02	0.04	0.00
41	205	3.42	1.2	0.196	0.25	0.18	0.02	0.04	0.00
42	210	3.50	1.3	0.212	0.25	0.19	0.02	0.04	0.00
43	215	3.58	1.4	0.228	0.25	0.21	0.02	0.05	0.00
44	220	3.67	1.4	0.228	0.25	0.21	0.02	0.05	0.00
45	225	3.75	1.5	0.245	0.25	0.22	0.02	0.05	0.69
46	230	3.83	1.5	0.245	0.25	0.22	0.02	0.05	0.69
47	235	3.92	1.6	0.261	0.25	0.24	0.02	0.03	0.00
48	240	4.00	1.6	0.261	0.25	0.24	0.02	0.03	0.00
49	245	4.08	1.7	0.277	0.25	0.25	0.03	0.06	5.33
50	250	4.17	1.8	0.294	0.25	0.26	0.05	0.10	15.17
51	255	4.25	1.9	0.310	0.25	0.28	0.06	0.13	25.02
52	260	4.33	2.0	0.326	0.25	0.29	0.08	0.16	34.86
53	265	4.42	2.1	0.343	0.25	0.31	0.10	0.20	44.70
54	270	4.50	2.1	0.343	0.25	0.31	0.10	0.20	44.70
55	275	4.58	2.2	0.359	0.25	0.32	0.11	0.23	54.54
56	280	4.67	2.3	0.375	0.25	0.34	0.13	0.26	64.38

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.00		
UNIT TIME-PERCENT OF LAG	502.5		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.245		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.05 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.392	0.25	0.35	0.15	0.29	74.22
58	290	4.83	2.4	0.392	0.25	0.35	0.15	0.29	74.22
59	295	4.92	2.5	0.408	0.25	0.37	0.16	0.33	84.06
60	300	5.00	2.6	0.424	0.25	0.38	0.18	0.36	93.90
61	305	5.08	3.1	0.506	0.25	0.46	0.26	0.52	143.11
62	310	5.17	3.6	0.588	0.25	0.53	0.34	0.69	192.31
63	315	5.25	3.9	0.636	0.25	0.57	0.39	0.79	221.83
64	320	5.33	4.2	0.685	0.25	0.62	0.44	0.88	251.36
65	325	5.42	4.7	0.767	0.25	0.69	0.52	1.05	300.56
66	330	5.50	5.6	0.914	0.25	0.82	0.67	1.34	389.13
67	335	5.58	1.9	0.310	0.25	0.28	0.06	0.13	25.02
68	340	5.67	0.9	0.147	0.25	0.13	0.01	0.03	0.00
69	345	5.75	0.6	0.098	0.25	0.09	0.01	0.02	0.00
70	350	5.83	0.5	0.082	0.25	0.07	0.01	0.02	0.00
71	355	5.92	0.3	0.049	0.25	0.04	0.00	0.01	0.00
72	360	6.00	0.2	0.033	0.25	0.03	0.00	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.39
FLOOD VOLUME (acft)	0.07
FLOOD VOLUME (cuft)	2879.82
REQUIRED STORAGE (acft)	0.05
REQUIRED STORAGE (cuft)	2139.79
PEAK FLOW RATE (cfs)	1.34

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.433	0.016	0.002	0.00	0.00
2	30	0.50	0.3	0.027	0.428	0.024	0.003	0.01	0.00
3	45	0.75	0.3	0.027	0.423	0.024	0.003	0.01	0.00
4	60	1.00	0.4	0.036	0.418	0.032	0.004	0.01	0.00
5	75	1.25	0.3	0.027	0.413	0.024	0.003	0.01	0.00
6	90	1.50	0.3	0.027	0.408	0.024	0.003	0.01	0.00
7	105	1.75	0.3	0.027	0.403	0.024	0.003	0.01	0.00
8	120	2.00	0.4	0.036	0.399	0.032	0.004	0.01	0.00
9	135	2.25	0.4	0.036	0.394	0.032	0.004	0.01	0.00
10	150	2.50	0.4	0.036	0.389	0.032	0.004	0.01	0.00
11	165	2.75	0.5	0.045	0.384	0.040	0.004	0.01	0.00
12	180	3.00	0.5	0.045	0.379	0.040	0.004	0.01	0.00
13	195	3.25	0.5	0.045	0.375	0.040	0.004	0.01	0.00
14	210	3.50	0.5	0.045	0.370	0.040	0.004	0.01	0.00
15	225	3.75	0.5	0.045	0.365	0.040	0.004	0.01	0.00
16	240	4.00	0.6	0.054	0.361	0.048	0.005	0.01	0.00
17	255	4.25	0.6	0.054	0.356	0.048	0.005	0.01	0.00
18	270	4.50	0.7	0.062	0.352	0.056	0.006	0.01	0.00
19	285	4.75	0.7	0.062	0.347	0.056	0.006	0.01	0.00
20	300	5.00	0.8	0.071	0.343	0.064	0.007	0.01	0.00
21	315	5.25	0.6	0.054	0.338	0.048	0.005	0.01	0.00
22	330	5.50	0.7	0.062	0.334	0.056	0.006	0.01	0.00
23	345	5.75	0.8	0.071	0.330	0.064	0.007	0.01	0.00
24	360	6.00	0.8	0.071	0.325	0.064	0.007	0.01	0.00
25	375	6.25	0.9	0.080	0.321	0.072	0.008	0.02	0.00
26	390	6.50	0.9	0.080	0.317	0.072	0.008	0.02	0.00
27	405	6.75	1.0	0.089	0.312	0.080	0.009	0.02	0.00
28	420	7.00	1.0	0.089	0.308	0.080	0.009	0.02	0.00
29	435	7.25	1.0	0.089	0.304	0.080	0.009	0.02	0.00
30	450	7.50	1.1	0.098	0.300	0.088	0.010	0.02	0.00
31	465	7.75	1.2	0.107	0.296	0.096	0.011	0.02	0.00
32	480	8.00	1.3	0.116	0.292	0.104	0.012	0.02	0.00
33	495	8.25	1.5	0.134	0.288	0.120	0.013	0.03	0.00
34	510	8.50	1.5	0.134	0.284	0.120	0.013	0.03	0.00
35	525	8.75	1.6	0.143	0.280	0.128	0.014	0.03	0.00
36	540	9.00	1.7	0.152	0.276	0.136	0.015	0.03	0.00
37	555	9.25	1.9	0.169	0.272	0.153	0.017	0.03	0.00
38	570	9.50	2.0	0.178	0.268	0.161	0.018	0.04	0.00
39	585	9.75	2.1	0.187	0.264	0.169	0.019	0.04	0.00
40	600	10.00	2.2	0.196	0.260	0.177	0.020	0.04	0.00
41	615	10.25	1.5	0.134	0.256	0.120	0.013	0.03	0.00
42	630	10.50	1.5	0.134	0.253	0.120	0.013	0.03	0.00
43	645	10.75	2.0	0.178	0.249	0.161	0.018	0.04	0.00
44	660	11.00	2.0	0.178	0.245	0.161	0.018	0.04	0.00
45	675	11.25	1.9	0.169	0.242	0.153	0.017	0.03	0.00
46	690	11.50	1.9	0.169	0.238	0.153	0.017	0.03	0.00
47	705	11.75	1.7	0.152	0.235	0.136	0.015	0.03	0.00
48	720	12.00	1.8	0.161	0.231	0.145	0.016	0.03	0.00
49	735	12.25	2.5	0.223	0.228	0.201	0.022	0.04	0.00
50	750	12.50	2.6	0.232	0.224	0.209	0.008	0.02	0.00
51	765	12.75	2.8	0.250	0.221	0.225	0.029	0.06	9.79
52	780	13.00	2.9	0.259	0.218	0.233	0.041	0.08	31.95
53	795	13.25	3.4	0.303	0.214	0.273	0.089	0.18	118.58
54	810	13.50	3.4	0.303	0.211	0.273	0.092	0.19	124.46
55	825	13.75	2.3	0.205	0.208	0.185	0.021	0.04	0.00
56	840	14.00	2.3	0.205	0.205	0.185	0.000	0.00	0.00
57	855	14.25	2.7	0.241	0.202	0.217	0.039	0.08	28.68
58	870	14.50	2.6	0.232	0.199	0.209	0.033	0.07	18.11
59	885	14.75	2.6	0.232	0.196	0.209	0.036	0.07	23.61
60	900	15.00	2.5	0.223	0.193	0.201	0.030	0.06	12.88
61	915	15.25	2.4	0.214	0.190	0.193	0.024	0.05	2.07

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate		Effective Rain	Flood Hydrograph	Required Storage
	Minutes	Hours	Percent	in/hr	in/hr			Flow	
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.187	0.185	0.018	0.04	0.00
63	945	15.75	1.9	0.169	0.184	0.153	0.017	0.03	0.00
64	960	16.00	1.9	0.169	0.181	0.153	0.017	0.03	0.00
65	975	16.25	0.4	0.036	0.178	0.032	0.004	0.01	0.00
66	990	16.50	0.4	0.036	0.176	0.032	0.004	0.01	0.00
67	1005	16.75	0.3	0.027	0.173	0.024	0.003	0.01	0.00
68	1020	17.00	0.3	0.027	0.170	0.024	0.003	0.01	0.00
69	1035	17.25	0.5	0.045	0.168	0.040	0.004	0.01	0.00
70	1050	17.50	0.5	0.045	0.165	0.040	0.004	0.01	0.00
71	1065	17.75	0.5	0.045	0.163	0.040	0.004	0.01	0.00
72	1080	18.00	0.4	0.036	0.160	0.032	0.004	0.01	0.00
73	1095	18.25	0.4	0.036	0.158	0.032	0.004	0.01	0.00
74	1110	18.50	0.4	0.036	0.156	0.032	0.004	0.01	0.00
75	1125	18.75	0.3	0.027	0.153	0.024	0.003	0.01	0.00
76	1140	19.00	0.2	0.018	0.151	0.016	0.002	0.00	0.00
77	1155	19.25	0.3	0.027	0.149	0.024	0.003	0.01	0.00
78	1170	19.50	0.4	0.036	0.147	0.032	0.004	0.01	0.00
79	1185	19.75	0.3	0.027	0.145	0.024	0.003	0.01	0.00
80	1200	20.00	0.2	0.018	0.143	0.016	0.002	0.00	0.00
81	1215	20.25	0.3	0.027	0.141	0.024	0.003	0.01	0.00
82	1230	20.50	0.3	0.027	0.139	0.024	0.003	0.01	0.00
83	1245	20.75	0.3	0.027	0.138	0.024	0.003	0.01	0.00
84	1260	21.00	0.2	0.018	0.136	0.016	0.002	0.00	0.00
85	1275	21.25	0.3	0.027	0.134	0.024	0.003	0.01	0.00
86	1290	21.50	0.2	0.018	0.133	0.016	0.002	0.00	0.00
87	1305	21.75	0.3	0.027	0.131	0.024	0.003	0.01	0.00
88	1320	22.00	0.2	0.018	0.130	0.016	0.002	0.00	0.00
89	1335	22.25	0.3	0.027	0.129	0.024	0.003	0.01	0.00
90	1350	22.50	0.2	0.018	0.127	0.016	0.002	0.00	0.00
91	1365	22.75	0.2	0.018	0.126	0.016	0.002	0.00	0.00
92	1380	23.00	0.2	0.018	0.125	0.016	0.002	0.00	0.00
93	1395	23.25	0.2	0.018	0.124	0.016	0.002	0.00	0.00
94	1410	23.50	0.2	0.018	0.124	0.016	0.002	0.00	0.00
95	1425	23.75	0.2	0.018	0.123	0.016	0.002	0.00	0.00
96	1440	24.00	0.2	0.018	0.123	0.016	0.002	0.00	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.26
FLOOD VOLUME (acft)	0.04
FLOOD VOLUME (cuft)	1902.84
REQUIRED STORAGE (acft)	0.01
REQUIRED STORAGE (cuft)	370.13
PEAK FLOW (cfs)	0.19

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		3025	0	0	0.00
466	1	1	675	3700	3363	3363	0.08
467	1	2	730	4430	4065	7428	0.17
468	1	3	785	5215	4823	12250	0.28
468.5	0.5	3.5	415	5630	2711	14961	0.34

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.05 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.05 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.03	10	10	14	-	465.00	-	0.00
2	10	0.03	10	10	14	-	465.00	-	0.00
3	15	0.03	8	8	14	-	465.00	-	0.00
4	20	0.04	11	11	14	-	465.00	-	0.00
5	25	0.04	11	11	14	-	465.00	-	0.00
6	30	0.05	14	14	14	-	465.00	-	0.00
7	35	0.04	11	11	14	-	465.00	-	0.00
8	40	0.05	14	14	14	-	465.00	-	0.00
9	45	0.05	14	14	14	-	465.00	-	0.00
10	50	0.04	11	11	14	-	465.00	-	0.00
11	55	0.04	12	12	14	-	465.00	-	0.00
12	60	0.05	14	14	14	-	465.00	-	0.00
13	65	0.06	18	18	14	4	465.00	4	0.00
14	70	0.06	18	21	14	7	465.00	7	0.00
15	75	0.06	18	25	14	11	465.00	11	0.00
16	80	0.01	3	13	14	-	465.00	-	0.00
17	85	0.16	48	48	14	34	465.01	34	0.00
18	90	0.18	55	89	14	75	465.02	75	0.00
19	95	0.11	33	108	14	94	465.03	94	0.00
20	100	0.18	55	149	14	135	465.04	135	0.00
21	105	0.33	100	235	14	221	465.07	221	0.01
22	110	0.28	85	307	14	292	465.09	292	0.01
23	115	0.23	70	363	14	349	465.10	349	0.01
24	120	0.26	78	427	14	413	465.12	413	0.01
25	125	0.28	85	498	14	484	465.14	484	0.01
26	130	0.56	168	652	14	638	465.19	638	0.01
27	135	0.76	228	866	14	852	465.25	852	0.02
28	140	0.39	116	968	14	954	465.28	954	0.02
29	145	1.21	364	1,318	14	1,304	465.39	1,304	0.03
30	150	1.34	401	1,705	14	1,691	465.50	1,691	0.04
31	155	1.56	469	2,160	14	2,146	465.64	2,146	0.05
32	160	0.99	296	2,442	14	2,428	465.72	2,428	0.06
33	165	0.01	3	2,431	14	2,417	465.72	2,417	0.06
34	170	0.05	14	2,430	14	2,416	465.72	2,416	0.06
35	175	0.05	14	2,430	14	2,416	465.72	2,416	0.06
36	180	0.02	5	2,420	14	2,406	465.72	2,406	0.06

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.02	5	5	14	-	465.00	-	0.00
2	10	0.02	6	6	14	-	465.00	-	0.00
3	15	0.02	6	6	14	-	465.00	-	0.00
4	20	0.02	6	6	14	-	465.00	-	0.00
5	25	0.02	6	6	14	-	465.00	-	0.00
6	30	0.02	7	7	14	-	465.00	-	0.00
7	35	0.02	7	7	14	-	465.00	-	0.00
8	40	0.02	7	7	14	-	465.00	-	0.00
9	45	0.02	7	7	14	-	465.00	-	0.00
10	50	0.02	7	7	14	-	465.00	-	0.00
11	55	0.02	7	7	14	-	465.00	-	0.00
12	60	0.03	8	8	14	-	465.00	-	0.00
13	65	0.03	8	8	14	-	465.00	-	0.00
14	70	0.03	8	8	14	-	465.00	-	0.00
15	75	0.03	8	8	14	-	465.00	-	0.00
16	80	0.03	8	8	14	-	465.00	-	0.00
17	85	0.03	8	8	14	-	465.00	-	0.00
18	90	0.03	8	8	14	-	465.00	-	0.00
19	95	0.03	8	8	14	-	465.00	-	0.00
20	100	0.03	8	8	14	-	465.00	-	0.00
21	105	0.03	8	8	14	-	465.00	-	0.00
22	110	0.03	8	8	14	-	465.00	-	0.00
23	115	0.03	8	8	14	-	465.00	-	0.00
24	120	0.03	9	9	14	-	465.00	-	0.00
25	125	0.03	8	8	14	-	465.00	-	0.00
26	130	0.03	9	9	14	-	465.00	-	0.00
27	135	0.03	9	9	14	-	465.00	-	0.00
28	140	0.03	9	9	14	-	465.00	-	0.00
29	145	0.03	9	9	14	-	465.00	-	0.00
30	150	0.03	9	9	14	-	465.00	-	0.00
31	155	0.03	9	9	14	-	465.00	-	0.00
32	160	0.03	9	9	14	-	465.00	-	0.00
33	165	0.03	10	10	14	-	465.00	-	0.00
34	170	0.03	10	10	14	-	465.00	-	0.00
35	175	0.03	10	10	14	-	465.00	-	0.00
36	180	0.03	10	10	14	-	465.00	-	0.00
37	185	0.03	10	10	14	-	465.00	-	0.00
38	190	0.04	11	11	14	-	465.00	-	0.00
39	195	0.04	11	11	14	-	465.00	-	0.00
40	200	0.04	11	11	14	-	465.00	-	0.00
41	205	0.04	12	12	14	-	465.00	-	0.00
42	210	0.04	13	13	14	-	465.00	-	0.00
43	215	0.05	14	14	14	-	465.00	-	0.00
44	220	0.05	14	14	14	-	465.00	-	0.00
45	225	0.05	15	15	14	1	465.00	1	0.00
46	230	0.05	15	15	14	1	465.00	1	0.00
47	235	0.03	10	11	14	-	465.00	-	0.00
48	240	0.03	10	10	14	-	465.00	-	0.00
49	245	0.06	19	19	14	5	465.00	5	0.00
50	250	0.10	29	35	14	21	465.01	21	0.00
51	255	0.13	39	60	14	46	465.01	46	0.00
52	260	0.16	49	94	14	80	465.02	80	0.00
53	265	0.20	59	139	14	125	465.04	125	0.00
54	270	0.20	59	184	14	170	465.05	170	0.00
55	275	0.23	69	238	14	224	465.07	224	0.01

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.26	78	303	14	289	465.09	289	0.01
57	285	0.29	88	377	14	363	465.11	363	0.01
58	290	0.29	88	451	14	437	465.13	437	0.01
59	295	0.33	98	535	14	521	465.16	521	0.01
60	300	0.36	108	629	14	615	465.18	615	0.01
61	305	0.52	157	772	14	758	465.23	758	0.02
62	310	0.69	206	965	14	951	465.28	951	0.02
63	315	0.79	236	1,186	14	1,172	465.35	1,172	0.03
64	320	0.88	265	1,438	14	1,424	465.42	1,424	0.03
65	325	1.05	315	1,738	14	1,724	465.51	1,724	0.04
66	330	1.34	403	2,127	14	2,113	465.63	2,113	0.05
67	335	0.13	39	2,152	14	2,138	465.64	2,138	0.05
68	340	0.03	9	2,147	14	2,133	465.63	2,133	0.05
69	345	0.02	6	2,139	14	2,125	465.63	2,125	0.05
70	350	0.02	5	2,130	14	2,116	465.63	2,116	0.05
71	355	0.01	3	2,119	14	2,105	465.63	2,105	0.05
72	360	0.01	2	2,107	14	2,093	465.62	2,093	0.05

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.00	3	3	42	-	465.00	-	0.00
2	30	0.01	5	5	42	-	465.00	-	0.00
3	45	0.01	5	5	42	-	465.00	-	0.00
4	60	0.01	6	6	42	-	465.00	-	0.00
5	75	0.01	5	5	42	-	465.00	-	0.00
6	90	0.01	5	5	42	-	465.00	-	0.00
7	105	0.01	5	5	42	-	465.00	-	0.00
8	120	0.01	6	6	42	-	465.00	-	0.00
9	135	0.01	6	6	42	-	465.00	-	0.00
10	150	0.01	6	6	42	-	465.00	-	0.00
11	165	0.01	8	8	42	-	465.00	-	0.00
12	180	0.01	8	8	42	-	465.00	-	0.00
13	195	0.01	8	8	42	-	465.00	-	0.00
14	210	0.01	8	8	42	-	465.00	-	0.00
15	225	0.01	8	8	42	-	465.00	-	0.00
16	240	0.01	10	10	42	-	465.00	-	0.00
17	255	0.01	10	10	42	-	465.00	-	0.00
18	270	0.01	11	11	42	-	465.00	-	0.00
19	285	0.01	11	11	42	-	465.00	-	0.00
20	300	0.01	13	13	42	-	465.00	-	0.00
21	315	0.01	10	10	42	-	465.00	-	0.00
22	330	0.01	11	11	42	-	465.00	-	0.00
23	345	0.01	13	13	42	-	465.00	-	0.00
24	360	0.01	13	13	42	-	465.00	-	0.00
25	375	0.02	15	15	42	-	465.00	-	0.00
26	390	0.02	15	15	42	-	465.00	-	0.00
27	405	0.02	16	16	42	-	465.00	-	0.00
28	420	0.02	16	16	42	-	465.00	-	0.00
29	435	0.02	16	16	42	-	465.00	-	0.00
30	450	0.02	18	18	42	-	465.00	-	0.00
31	465	0.02	19	19	42	-	465.00	-	0.00
32	480	0.02	21	21	42	-	465.00	-	0.00
33	495	0.03	24	24	42	-	465.00	-	0.00
34	510	0.03	24	24	42	-	465.00	-	0.00
35	525	0.03	26	26	42	-	465.00	-	0.00
36	540	0.03	27	27	42	-	465.00	-	0.00
37	555	0.03	31	31	42	-	465.00	-	0.00
38	570	0.04	32	32	42	-	465.00	-	0.00
39	585	0.04	34	34	42	-	465.00	-	0.00
40	600	0.04	35	35	42	-	465.00	-	0.00
41	615	0.03	24	24	42	-	465.00	-	0.00
42	630	0.03	24	24	42	-	465.00	-	0.00
43	645	0.04	32	32	42	-	465.00	-	0.00
44	660	0.04	32	32	42	-	465.00	-	0.00
45	675	0.03	31	31	42	-	465.00	-	0.00
46	690	0.03	31	31	42	-	465.00	-	0.00
47	705	0.03	27	27	42	-	465.00	-	0.00
48	720	0.03	29	29	42	-	465.00	-	0.00
49	735	0.04	40	40	42	-	465.00	-	0.00
50	750	0.02	14	14	42	-	465.00	-	0.00
51	765	0.06	52	52	42	10	465.00	10	0.00
52	780	0.08	74	84	42	42	465.01	42	0.00
53	795	0.18	161	203	42	160	465.05	160	0.00
54	810	0.19	167	327	42	285	465.08	285	0.01
55	825	0.04	37	322	42	280	465.08	280	0.01
56	840	0.00	1	280	42	238	465.07	238	0.01
57	855	0.08	71	309	42	267	465.08	267	0.01
58	870	0.07	60	327	42	285	465.08	285	0.01

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.07	66	351	42	309	465.09	309	0.01
60	900	0.06	55	364	42	321	465.10	321	0.01
61	915	0.05	44	366	42	324	465.10	324	0.01
62	930	0.04	33	357	42	315	465.09	315	0.01
63	945	0.03	31	345	42	303	465.09	303	0.01
64	960	0.03	31	334	42	292	465.09	292	0.01
65	975	0.01	6	298	42	256	465.08	256	0.01
66	990	0.01	6	262	42	220	465.07	220	0.01
67	1005	0.01	5	225	42	183	465.05	183	0.00
68	1020	0.01	5	187	42	145	465.04	145	0.00
69	1035	0.01	8	153	42	111	465.03	111	0.00
70	1050	0.01	8	119	42	77	465.02	77	0.00
71	1065	0.01	8	85	42	43	465.01	43	0.00
72	1080	0.01	6	49	42	7	465.00	7	0.00
73	1095	0.01	6	13	42	-	465.00	-	0.00
74	1110	0.01	6	6	42	-	465.00	-	0.00
75	1125	0.01	5	5	42	-	465.00	-	0.00
76	1140	0.00	3	3	42	-	465.00	-	0.00
77	1155	0.01	5	5	42	-	465.00	-	0.00
78	1170	0.01	6	6	42	-	465.00	-	0.00
79	1185	0.01	5	5	42	-	465.00	-	0.00
80	1200	0.00	3	3	42	-	465.00	-	0.00
81	1215	0.01	5	5	42	-	465.00	-	0.00
82	1230	0.01	5	5	42	-	465.00	-	0.00
83	1245	0.01	5	5	42	-	465.00	-	0.00
84	1260	0.00	3	3	42	-	465.00	-	0.00
85	1275	0.01	5	5	42	-	465.00	-	0.00
86	1290	0.00	3	3	42	-	465.00	-	0.00
87	1305	0.01	5	5	42	-	465.00	-	0.00
88	1320	0.00	3	3	42	-	465.00	-	0.00
89	1335	0.01	5	5	42	-	465.00	-	0.00
90	1350	0.00	3	3	42	-	465.00	-	0.00
91	1365	0.00	3	3	42	-	465.00	-	0.00
92	1380	0.00	3	3	42	-	465.00	-	0.00
93	1395	0.00	3	3	42	-	465.00	-	0.00
94	1410	0.00	3	3	42	-	465.00	-	0.00
95	1425	0.00	3	3	42	-	465.00	-	0.00
96	1440	0.00	3	3	42	-	465.00	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 2		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.51		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	7.46		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.6		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	724		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	100		
30				
31	ELEVATION OF HEADWATER	472		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15600	
45		466	17120	
46		467	18710	
47		468	20350	
48		468.5	21200	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 2
[3] AREA - ACRES	10.570
[4] L-FEET	724
[5] L-MILES	0.137
[6] La-FEET	100.00
[7] La-MILES	0.019
[8] ELEVATION OF HEADWATER	472
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.5
[11] S-FEET/MILE	25.5
[12] S^0.5	5.05
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	1.6
[17] 100% OF LAG-MINUTES	1.6
[18] 200% OF LAG-MINUTES	3.2
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.24

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	10.570	1.00	1.04	1.36	10.570	1.00	1.36	2.23	10.570	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.57	SUM [7]	1.04	SUM [9]	10.57	SUM [11]	1.36	SUM [13]	10.57	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.49	0.49	0.40
FLOOD VOLUME	(cu-ft)	18,821	18,747	15,460
	(acre-ft)	0.43	0.43	0.35
REQUIRED STORAGE	(cu-ft)	16,281	14,878	6,850
	(acre-ft)	0.37	0.34	0.16
PEAK FLOW	(cfs)	8.76	7.61	1.44
MAXIMUM WSEL	(ft)	465.99	465.91	465.42

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.51	0.237	0.0123
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	7.46	0.706	0.1523
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.60	0.057	0.0295
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.57	SUM	0.1942

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.097085525

C= 0.00180

Ft=C(24-(T/60))^1.55 = 0.00180 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.19
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.19	0.15	0.02	0.17	0.00
2	10	0.17	1.3	0.162	0.19	0.15	0.02	0.17	0.00
3	15	0.25	1.1	0.137	0.19	0.12	0.01	0.15	0.00
4	20	0.33	1.5	0.187	0.19	0.17	0.02	0.20	0.00
5	25	0.42	1.5	0.187	0.19	0.17	0.02	0.20	0.00
6	30	0.50	1.8	0.225	0.19	0.20	0.03	0.32	24.03
7	35	0.58	1.5	0.187	0.19	0.17	0.02	0.20	0.00
8	40	0.67	1.8	0.225	0.19	0.20	0.03	0.32	24.03
9	45	0.75	1.8	0.225	0.19	0.20	0.03	0.32	24.03
10	50	0.83	1.5	0.187	0.19	0.17	0.02	0.20	0.00
11	55	0.92	1.6	0.200	0.19	0.18	0.01	0.06	0.00
12	60	1.00	1.8	0.225	0.19	0.20	0.03	0.32	24.03
13	65	1.08	2.2	0.275	0.19	0.25	0.08	0.85	182.33
14	70	1.17	2.2	0.275	0.19	0.25	0.08	0.85	182.33
15	75	1.25	2.2	0.275	0.19	0.25	0.08	0.85	182.33
16	80	1.33	2.0	0.250	0.19	0.22	0.06	0.59	103.18
17	85	1.42	2.6	0.324	0.19	0.29	0.13	1.38	340.63
18	90	1.50	2.7	0.337	0.19	0.30	0.14	1.51	380.20
19	95	1.58	2.4	0.300	0.19	0.27	0.11	1.11	261.48
20	100	1.67	2.7	0.337	0.19	0.30	0.14	1.51	380.20
21	105	1.75	3.3	0.412	0.19	0.37	0.22	2.30	617.64
22	110	1.83	3.1	0.387	0.19	0.35	0.19	2.04	538.50
23	115	1.92	2.9	0.362	0.19	0.33	0.17	1.77	459.35
24	120	2.00	3.0	0.374	0.19	0.34	0.18	1.91	498.92
25	125	2.08	3.1	0.387	0.19	0.35	0.19	2.04	538.50
26	130	2.17	4.2	0.524	0.19	0.47	0.33	3.49	973.81
27	135	2.25	5.0	0.624	0.19	0.56	0.43	4.54	1290.40
28	140	2.33	3.5	0.437	0.19	0.39	0.24	2.56	696.79
29	145	2.42	6.8	0.849	0.19	0.76	0.65	6.92	2002.74
30	150	2.50	7.3	0.911	0.19	0.82	0.72	7.58	2200.61
31	155	2.58	8.2	1.023	0.19	0.92	0.83	8.76	2556.77
32	160	2.67	5.9	0.736	0.19	0.66	0.54	5.73	1646.57
33	165	2.75	2.0	0.250	0.19	0.22	0.06	0.59	103.18
34	170	2.83	1.8	0.225	0.19	0.20	0.03	0.32	24.03
35	175	2.92	1.8	0.225	0.19	0.20	0.03	0.32	24.03
36	180	3.00	0.6	0.075	0.19	0.07	0.01	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.49
FLOOD VOLUME (acft)	0.43
FLOOD VOLUME (cuft)	18821.12
REQUIRED STORAGE (acft)	0.37
REQUIRED STORAGE (cuft)	16280.67
PEAK FLOW RATE (cfs)	8.76

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.62		
UNIT TIME-PERCENT OF LAG	308.6		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.194		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.24 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.082	0.19	0.07	0.01	0.09	0.00
2	10	0.17	0.6	0.098	0.19	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.19	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.19	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.19	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.19	0.10	0.01	0.12	0.00
7	35	0.58	0.7	0.114	0.19	0.10	0.01	0.12	0.00
8	40	0.67	0.7	0.114	0.19	0.10	0.01	0.12	0.00
9	45	0.75	0.7	0.114	0.19	0.10	0.01	0.12	0.00
10	50	0.83	0.7	0.114	0.19	0.10	0.01	0.12	0.00
11	55	0.92	0.7	0.114	0.19	0.10	0.01	0.12	0.00
12	60	1.00	0.8	0.131	0.19	0.12	0.01	0.14	0.00
13	65	1.08	0.8	0.131	0.19	0.12	0.01	0.14	0.00
14	70	1.17	0.8	0.131	0.19	0.12	0.01	0.14	0.00
15	75	1.25	0.8	0.131	0.19	0.12	0.01	0.14	0.00
16	80	1.33	0.8	0.131	0.19	0.12	0.01	0.14	0.00
17	85	1.42	0.8	0.131	0.19	0.12	0.01	0.14	0.00
18	90	1.50	0.8	0.131	0.19	0.12	0.01	0.14	0.00
19	95	1.58	0.8	0.131	0.19	0.12	0.01	0.14	0.00
20	100	1.67	0.8	0.131	0.19	0.12	0.01	0.14	0.00
21	105	1.75	0.8	0.131	0.19	0.12	0.01	0.14	0.00
22	110	1.83	0.8	0.131	0.19	0.12	0.01	0.14	0.00
23	115	1.92	0.8	0.131	0.19	0.12	0.01	0.14	0.00
24	120	2.00	0.9	0.147	0.19	0.13	0.01	0.16	0.00
25	125	2.08	0.8	0.131	0.19	0.12	0.01	0.14	0.00
26	130	2.17	0.9	0.147	0.19	0.13	0.01	0.16	0.00
27	135	2.25	0.9	0.147	0.19	0.13	0.01	0.16	0.00
28	140	2.33	0.9	0.147	0.19	0.13	0.01	0.16	0.00
29	145	2.42	0.9	0.147	0.19	0.13	0.01	0.16	0.00
30	150	2.50	0.9	0.147	0.19	0.13	0.01	0.16	0.00
31	155	2.58	0.9	0.147	0.19	0.13	0.01	0.16	0.00
32	160	2.67	0.9	0.147	0.19	0.13	0.01	0.16	0.00
33	165	2.75	1.0	0.163	0.19	0.15	0.02	0.17	0.00
34	170	2.83	1.0	0.163	0.19	0.15	0.02	0.17	0.00
35	175	2.92	1.0	0.163	0.19	0.15	0.02	0.17	0.00
36	180	3.00	1.0	0.163	0.19	0.15	0.02	0.17	0.00
37	185	3.08	1.0	0.163	0.19	0.15	0.02	0.17	0.00
38	190	3.17	1.1	0.180	0.19	0.16	0.02	0.19	0.00
39	195	3.25	1.1	0.180	0.19	0.16	0.02	0.19	0.00
40	200	3.33	1.1	0.180	0.19	0.16	0.02	0.19	0.00
41	205	3.42	1.2	0.196	0.19	0.18	0.00	0.02	0.00
42	210	3.50	1.3	0.212	0.19	0.19	0.02	0.19	0.00
43	215	3.58	1.4	0.228	0.19	0.21	0.03	0.36	36.21
44	220	3.67	1.4	0.228	0.19	0.21	0.03	0.36	36.21
45	225	3.75	1.5	0.245	0.19	0.22	0.05	0.54	87.96
46	230	3.83	1.5	0.245	0.19	0.22	0.05	0.54	87.96
47	235	3.92	1.6	0.261	0.19	0.24	0.07	0.71	139.71
48	240	4.00	1.6	0.261	0.19	0.24	0.07	0.71	139.71
49	245	4.08	1.7	0.277	0.19	0.25	0.08	0.88	191.46
50	250	4.17	1.8	0.294	0.19	0.26	0.10	1.05	243.21
51	255	4.25	1.9	0.310	0.19	0.28	0.12	1.23	294.96
52	260	4.33	2.0	0.326	0.19	0.29	0.13	1.40	346.71
53	265	4.42	2.1	0.343	0.19	0.31	0.15	1.57	398.47
54	270	4.50	2.1	0.343	0.19	0.31	0.15	1.57	398.47
55	275	4.58	2.2	0.359	0.19	0.32	0.16	1.74	450.22
56	280	4.67	2.3	0.375	0.19	0.34	0.18	1.92	501.97

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.62		
UNIT TIME-PERCENT OF LAG	308.6		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.194		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.24 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.392	0.19	0.35	0.20	2.09	553.72
58	290	4.83	2.4	0.392	0.19	0.35	0.20	2.09	553.72
59	295	4.92	2.5	0.408	0.19	0.37	0.21	2.26	605.47
60	300	5.00	2.6	0.424	0.19	0.38	0.23	2.43	657.22
61	305	5.08	3.1	0.506	0.19	0.46	0.31	3.30	915.97
62	310	5.17	3.6	0.588	0.19	0.53	0.39	4.16	1174.73
63	315	5.25	3.9	0.636	0.19	0.57	0.44	4.68	1329.98
64	320	5.33	4.2	0.685	0.19	0.62	0.49	5.19	1485.23
65	325	5.42	4.7	0.767	0.19	0.69	0.57	6.06	1743.98
66	330	5.50	5.6	0.914	0.19	0.82	0.72	7.61	2209.74
67	335	5.58	1.9	0.310	0.19	0.28	0.12	1.23	294.96
68	340	5.67	0.9	0.147	0.19	0.13	0.01	0.16	0.00
69	345	5.75	0.6	0.098	0.19	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.19	0.07	0.01	0.09	0.00
71	355	5.92	0.3	0.049	0.19	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.19	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.49
FLOOD VOLUME (acft)	0.43
FLOOD VOLUME (cuft)	18747.03
REQUIRED STORAGE (acft)	0.34
REQUIRED STORAGE (cuft)	14877.95
PEAK FLOW RATE (cfs)	7.61

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.343	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.339	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.335	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.331	0.032	0.004	0.04	0.00
5	75	1.25	0.3	0.027	0.327	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.323	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.319	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.316	0.032	0.004	0.04	0.00
9	135	2.25	0.4	0.036	0.312	0.032	0.004	0.04	0.00
10	150	2.50	0.4	0.036	0.308	0.032	0.004	0.04	0.00
11	165	2.75	0.5	0.045	0.304	0.040	0.004	0.05	0.00
12	180	3.00	0.5	0.045	0.300	0.040	0.004	0.05	0.00
13	195	3.25	0.5	0.045	0.297	0.040	0.004	0.05	0.00
14	210	3.50	0.5	0.045	0.293	0.040	0.004	0.05	0.00
15	225	3.75	0.5	0.045	0.289	0.040	0.004	0.05	0.00
16	240	4.00	0.6	0.054	0.286	0.048	0.005	0.06	0.00
17	255	4.25	0.6	0.054	0.282	0.048	0.005	0.06	0.00
18	270	4.50	0.7	0.062	0.278	0.056	0.006	0.07	0.00
19	285	4.75	0.7	0.062	0.275	0.056	0.006	0.07	0.00
20	300	5.00	0.8	0.071	0.271	0.064	0.007	0.08	0.00
21	315	5.25	0.6	0.054	0.268	0.048	0.005	0.06	0.00
22	330	5.50	0.7	0.062	0.264	0.056	0.006	0.07	0.00
23	345	5.75	0.8	0.071	0.261	0.064	0.007	0.08	0.00
24	360	6.00	0.8	0.071	0.257	0.064	0.007	0.08	0.00
25	375	6.25	0.9	0.080	0.254	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.251	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.247	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.244	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.241	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.237	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.234	0.096	0.011	0.11	0.00
32	480	8.00	1.3	0.116	0.231	0.104	0.012	0.12	0.00
33	495	8.25	1.5	0.134	0.228	0.120	0.013	0.14	0.00
34	510	8.50	1.5	0.134	0.224	0.120	0.013	0.14	0.00
35	525	8.75	1.6	0.143	0.221	0.128	0.014	0.15	0.00
36	540	9.00	1.7	0.152	0.218	0.136	0.015	0.16	0.00
37	555	9.25	1.9	0.169	0.215	0.153	0.017	0.18	0.00
38	570	9.50	2.0	0.178	0.212	0.161	0.018	0.19	0.00
39	585	9.75	2.1	0.187	0.209	0.169	0.019	0.20	0.00
40	600	10.00	2.2	0.196	0.206	0.177	0.020	0.21	0.00
41	615	10.25	1.5	0.134	0.203	0.120	0.013	0.14	0.00
42	630	10.50	1.5	0.134	0.200	0.120	0.013	0.14	0.00
43	645	10.75	2.0	0.178	0.197	0.161	0.018	0.19	0.00
44	660	11.00	2.0	0.178	0.194	0.161	0.018	0.19	0.00
45	675	11.25	1.9	0.169	0.191	0.153	0.017	0.18	0.00
46	690	11.50	1.9	0.169	0.189	0.153	0.017	0.18	0.00
47	705	11.75	1.7	0.152	0.186	0.136	0.015	0.16	0.00
48	720	12.00	1.8	0.161	0.183	0.145	0.016	0.17	0.00
49	735	12.25	2.5	0.223	0.180	0.201	0.043	0.45	188.01
50	750	12.50	2.6	0.232	0.178	0.209	0.054	0.57	298.56
51	765	12.75	2.8	0.250	0.175	0.225	0.075	0.79	493.67
52	780	13.00	2.9	0.259	0.172	0.233	0.086	0.91	603.61
53	795	13.25	3.4	0.303	0.170	0.273	0.134	1.41	1052.67
54	810	13.50	3.4	0.303	0.167	0.273	0.136	1.44	1077.14
55	825	13.75	2.3	0.205	0.165	0.185	0.041	0.43	167.88
56	840	14.00	2.3	0.205	0.162	0.185	0.043	0.45	191.72
57	855	14.25	2.7	0.241	0.160	0.217	0.081	0.86	554.66
58	870	14.50	2.6	0.232	0.157	0.209	0.075	0.79	492.99
59	885	14.75	2.6	0.232	0.155	0.209	0.077	0.82	515.85
60	900	15.00	2.5	0.223	0.152	0.201	0.071	0.75	453.52
61	915	15.25	2.4	0.214	0.150	0.193	0.064	0.68	390.86

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.148	0.185	0.057	0.61	327.85
63	945	15.75	1.9	0.169	0.146	0.153	0.024	0.25	9.93
64	960	16.00	1.9	0.169	0.143	0.153	0.026	0.28	31.09
65	975	16.25	0.4	0.036	0.141	0.032	0.004	0.04	0.00
66	990	16.50	0.4	0.036	0.139	0.032	0.004	0.04	0.00
67	1005	16.75	0.3	0.027	0.137	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.135	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.133	0.040	0.004	0.05	0.00
70	1050	17.50	0.5	0.045	0.131	0.040	0.004	0.05	0.00
71	1065	17.75	0.5	0.045	0.129	0.040	0.004	0.05	0.00
72	1080	18.00	0.4	0.036	0.127	0.032	0.004	0.04	0.00
73	1095	18.25	0.4	0.036	0.125	0.032	0.004	0.04	0.00
74	1110	18.50	0.4	0.036	0.123	0.032	0.004	0.04	0.00
75	1125	18.75	0.3	0.027	0.121	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.120	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.116	0.032	0.004	0.04	0.00
79	1185	19.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.113	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.112	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.110	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.109	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.108	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.106	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.105	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.104	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.103	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.102	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.101	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.100	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.099	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.099	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.098	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.097	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.097	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.40
FLOOD VOLUME (acft)	0.35
FLOOD VOLUME (cuft)	15459.88
REQUIRED STORAGE (acft)	0.16
REQUIRED STORAGE (cuft)	6850.04
PEAK FLOW (cfs)	1.44

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15600	0	0	0.00
466	1	1	1520	17120	16360	16360	0.38
467	1	2	1590	18710	17915	34275	0.79
468	1	3	1640	20350	19530	53805	1.24
468.5	0.5	3.5	850	21200	10388	64193	1.47

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.24 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.24 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	73	-	465.00	-	0.00
2	10	0.17	51	51	73	-	465.00	-	0.00
3	15	0.15	44	44	73	-	465.00	-	0.00
4	20	0.20	59	59	73	-	465.00	-	0.00
5	25	0.20	59	59	73	-	465.00	-	0.00
6	30	0.32	97	97	73	24	465.00	24	0.00
7	35	0.20	59	83	73	11	465.00	11	0.00
8	40	0.32	97	107	73	35	465.00	35	0.00
9	45	0.32	97	131	73	59	465.00	59	0.00
10	50	0.20	59	118	73	46	465.00	46	0.00
11	55	0.06	17	63	73	-	465.00	-	0.00
12	60	0.32	97	97	73	24	465.00	24	0.00
13	65	0.85	255	279	73	206	465.01	206	0.00
14	70	0.85	255	461	73	389	465.02	389	0.01
15	75	0.85	255	644	73	571	465.03	571	0.01
16	80	0.59	176	747	73	674	465.04	674	0.02
17	85	1.38	413	1,087	73	1,015	465.06	1,015	0.02
18	90	1.51	453	1,468	73	1,395	465.09	1,395	0.03
19	95	1.11	334	1,729	73	1,657	465.10	1,657	0.04
20	100	1.51	453	2,109	73	2,037	465.12	2,037	0.05
21	105	2.30	690	2,727	73	2,654	465.16	2,654	0.06
22	110	2.04	611	3,265	73	3,193	465.20	3,193	0.07
23	115	1.77	532	3,725	73	3,652	465.22	3,652	0.08
24	120	1.91	572	4,224	73	4,151	465.25	4,151	0.10
25	125	2.04	611	4,762	73	4,690	465.29	4,690	0.11
26	130	3.49	1,046	5,736	73	5,663	465.35	5,663	0.13
27	135	4.54	1,363	7,026	73	6,954	465.43	6,954	0.16
28	140	2.56	769	7,723	73	7,651	465.47	7,651	0.18
29	145	6.92	2,075	9,726	73	9,653	465.59	9,653	0.22
30	150	7.58	2,273	11,927	73	11,854	465.72	11,854	0.27
31	155	8.76	2,629	14,483	73	14,411	465.88	14,411	0.33
32	160	5.73	1,719	16,130	73	16,057	465.98	16,057	0.37
33	165	0.59	176	16,233	73	16,161	465.99	16,161	0.37
34	170	0.32	97	16,257	73	16,185	465.99	16,185	0.37
35	175	0.32	97	16,281	73	16,209	465.99	16,209	0.37
36	180	0.08	24	16,232	73	16,160	465.99	16,160	0.37

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.09	26	26	73	-	465.00	-	0.00
2	10	0.10	31	31	73	-	465.00	-	0.00
3	15	0.10	31	31	73	-	465.00	-	0.00
4	20	0.10	31	31	73	-	465.00	-	0.00
5	25	0.10	31	31	73	-	465.00	-	0.00
6	30	0.12	36	36	73	-	465.00	-	0.00
7	35	0.12	36	36	73	-	465.00	-	0.00
8	40	0.12	36	36	73	-	465.00	-	0.00
9	45	0.12	36	36	73	-	465.00	-	0.00
10	50	0.12	36	36	73	-	465.00	-	0.00
11	55	0.12	36	36	73	-	465.00	-	0.00
12	60	0.14	41	41	73	-	465.00	-	0.00
13	65	0.14	41	41	73	-	465.00	-	0.00
14	70	0.14	41	41	73	-	465.00	-	0.00
15	75	0.14	41	41	73	-	465.00	-	0.00
16	80	0.14	41	41	73	-	465.00	-	0.00
17	85	0.14	41	41	73	-	465.00	-	0.00
18	90	0.14	41	41	73	-	465.00	-	0.00
19	95	0.14	41	41	73	-	465.00	-	0.00
20	100	0.14	41	41	73	-	465.00	-	0.00
21	105	0.14	41	41	73	-	465.00	-	0.00
22	110	0.14	41	41	73	-	465.00	-	0.00
23	115	0.14	41	41	73	-	465.00	-	0.00
24	120	0.16	47	47	73	-	465.00	-	0.00
25	125	0.14	41	41	73	-	465.00	-	0.00
26	130	0.16	47	47	73	-	465.00	-	0.00
27	135	0.16	47	47	73	-	465.00	-	0.00
28	140	0.16	47	47	73	-	465.00	-	0.00
29	145	0.16	47	47	73	-	465.00	-	0.00
30	150	0.16	47	47	73	-	465.00	-	0.00
31	155	0.16	47	47	73	-	465.00	-	0.00
32	160	0.16	47	47	73	-	465.00	-	0.00
33	165	0.17	52	52	73	-	465.00	-	0.00
34	170	0.17	52	52	73	-	465.00	-	0.00
35	175	0.17	52	52	73	-	465.00	-	0.00
36	180	0.17	52	52	73	-	465.00	-	0.00
37	185	0.17	52	52	73	-	465.00	-	0.00
38	190	0.19	57	57	73	-	465.00	-	0.00
39	195	0.19	57	57	73	-	465.00	-	0.00
40	200	0.19	57	57	73	-	465.00	-	0.00
41	205	0.02	5	5	73	-	465.00	-	0.00
42	210	0.19	57	57	73	-	465.00	-	0.00
43	215	0.36	109	109	73	36	465.00	36	0.00
44	220	0.36	109	145	73	72	465.00	72	0.00
45	225	0.54	161	233	73	160	465.01	160	0.00
46	230	0.54	161	321	73	248	465.02	248	0.01
47	235	0.71	212	461	73	388	465.02	388	0.01
48	240	0.71	212	600	73	528	465.03	528	0.01
49	245	0.88	264	792	73	719	465.04	719	0.02
50	250	1.05	316	1,035	73	962	465.06	962	0.02
51	255	1.23	368	1,330	73	1,257	465.08	1,257	0.03
52	260	1.40	419	1,677	73	1,604	465.10	1,604	0.04
53	265	1.57	471	2,075	73	2,003	465.12	2,003	0.05
54	270	1.57	471	2,474	73	2,401	465.15	2,401	0.06
55	275	1.74	523	2,924	73	2,851	465.17	2,851	0.07

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.92	575	3,426	73	3,353	465.20	3,353	0.08
57	285	2.09	626	3,980	73	3,907	465.24	3,907	0.09
58	290	2.09	626	4,533	73	4,461	465.27	4,461	0.10
59	295	2.26	678	5,139	73	5,066	465.31	5,066	0.12
60	300	2.43	730	5,796	73	5,723	465.35	5,723	0.13
61	305	3.30	989	6,712	73	6,639	465.41	6,639	0.15
62	310	4.16	1,247	7,887	73	7,814	465.48	7,814	0.18
63	315	4.68	1,403	9,217	73	9,144	465.56	9,144	0.21
64	320	5.19	1,558	10,702	73	10,629	465.65	10,629	0.24
65	325	6.06	1,817	12,446	73	12,373	465.76	12,373	0.28
66	330	7.61	2,282	14,656	73	14,583	465.89	14,583	0.33
67	335	1.23	368	14,951	73	14,878	465.91	14,878	0.34
68	340	0.16	47	14,925	73	14,852	465.91	14,852	0.34
69	345	0.10	31	14,883	73	14,810	465.91	14,810	0.34
70	350	0.09	26	14,836	73	14,764	465.90	14,764	0.34
71	355	0.05	16	14,779	73	14,707	465.90	14,707	0.34
72	360	0.03	10	14,717	73	14,644	465.90	14,644	0.34

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	17	17	218	-	465.00	-	0.00
2	30	0.03	25	25	218	-	465.00	-	0.00
3	45	0.03	25	25	218	-	465.00	-	0.00
4	60	0.04	34	34	218	-	465.00	-	0.00
5	75	0.03	25	25	218	-	465.00	-	0.00
6	90	0.03	25	25	218	-	465.00	-	0.00
7	105	0.03	25	25	218	-	465.00	-	0.00
8	120	0.04	34	34	218	-	465.00	-	0.00
9	135	0.04	34	34	218	-	465.00	-	0.00
10	150	0.04	34	34	218	-	465.00	-	0.00
11	165	0.05	42	42	218	-	465.00	-	0.00
12	180	0.05	42	42	218	-	465.00	-	0.00
13	195	0.05	42	42	218	-	465.00	-	0.00
14	210	0.05	42	42	218	-	465.00	-	0.00
15	225	0.05	42	42	218	-	465.00	-	0.00
16	240	0.06	51	51	218	-	465.00	-	0.00
17	255	0.06	51	51	218	-	465.00	-	0.00
18	270	0.07	59	59	218	-	465.00	-	0.00
19	285	0.07	59	59	218	-	465.00	-	0.00
20	300	0.08	68	68	218	-	465.00	-	0.00
21	315	0.06	51	51	218	-	465.00	-	0.00
22	330	0.07	59	59	218	-	465.00	-	0.00
23	345	0.08	68	68	218	-	465.00	-	0.00
24	360	0.08	68	68	218	-	465.00	-	0.00
25	375	0.08	76	76	218	-	465.00	-	0.00
26	390	0.08	76	76	218	-	465.00	-	0.00
27	405	0.09	85	85	218	-	465.00	-	0.00
28	420	0.09	85	85	218	-	465.00	-	0.00
29	435	0.09	85	85	218	-	465.00	-	0.00
30	450	0.10	93	93	218	-	465.00	-	0.00
31	465	0.11	102	102	218	-	465.00	-	0.00
32	480	0.12	110	110	218	-	465.00	-	0.00
33	495	0.14	127	127	218	-	465.00	-	0.00
34	510	0.14	127	127	218	-	465.00	-	0.00
35	525	0.15	136	136	218	-	465.00	-	0.00
36	540	0.16	144	144	218	-	465.00	-	0.00
37	555	0.18	161	161	218	-	465.00	-	0.00
38	570	0.19	170	170	218	-	465.00	-	0.00
39	585	0.20	178	178	218	-	465.00	-	0.00
40	600	0.21	187	187	218	-	465.00	-	0.00
41	615	0.14	127	127	218	-	465.00	-	0.00
42	630	0.14	127	127	218	-	465.00	-	0.00
43	645	0.19	170	170	218	-	465.00	-	0.00
44	660	0.19	170	170	218	-	465.00	-	0.00
45	675	0.18	161	161	218	-	465.00	-	0.00
46	690	0.18	161	161	218	-	465.00	-	0.00
47	705	0.16	144	144	218	-	465.00	-	0.00
48	720	0.17	153	153	218	-	465.00	-	0.00
49	735	0.45	406	406	218	188	465.01	188	0.00
50	750	0.57	516	704	218	487	465.03	487	0.01
51	765	0.79	711	1,198	218	980	465.06	980	0.02
52	780	0.91	821	1,802	218	1,584	465.10	1,584	0.04
53	795	1.41	1,270	2,854	218	2,637	465.16	2,637	0.06
54	810	1.44	1,295	3,931	218	3,714	465.23	3,714	0.09
55	825	0.43	386	4,099	218	3,882	465.24	3,882	0.09
56	840	0.45	409	4,291	218	4,073	465.25	4,073	0.09
57	855	0.86	772	4,846	218	4,628	465.28	4,628	0.11
58	870	0.79	711	5,339	218	5,121	465.31	5,121	0.12

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.82	734	5,855	218	5,637	465.34	5,637	0.13
60	900	0.75	671	6,308	218	6,090	465.37	6,090	0.14
61	915	0.68	609	6,699	218	6,481	465.40	6,481	0.15
62	930	0.61	546	7,027	218	6,809	465.42	6,809	0.16
63	945	0.25	228	7,037	218	6,819	465.42	6,819	0.16
64	960	0.28	249	7,068	218	6,850	465.42	6,850	0.16
65	975	0.04	34	6,884	218	6,666	465.41	6,666	0.15
66	990	0.04	34	6,700	218	6,482	465.40	6,482	0.15
67	1005	0.03	25	6,508	218	6,290	465.38	6,290	0.14
68	1020	0.03	25	6,316	218	6,098	465.37	6,098	0.14
69	1035	0.05	42	6,140	218	5,923	465.36	5,923	0.14
70	1050	0.05	42	5,965	218	5,747	465.35	5,747	0.13
71	1065	0.05	42	5,790	218	5,572	465.34	5,572	0.13
72	1080	0.04	34	5,606	218	5,388	465.33	5,388	0.12
73	1095	0.04	34	5,422	218	5,204	465.32	5,204	0.12
74	1110	0.04	34	5,238	218	5,020	465.31	5,020	0.12
75	1125	0.03	25	5,046	218	4,828	465.30	4,828	0.11
76	1140	0.02	17	4,845	218	4,627	465.28	4,627	0.11
77	1155	0.03	25	4,653	218	4,435	465.27	4,435	0.10
78	1170	0.04	34	4,469	218	4,251	465.26	4,251	0.10
79	1185	0.03	25	4,277	218	4,059	465.25	4,059	0.09
80	1200	0.02	17	4,076	218	3,858	465.24	3,858	0.09
81	1215	0.03	25	3,884	218	3,666	465.22	3,666	0.08
82	1230	0.03	25	3,691	218	3,474	465.21	3,474	0.08
83	1245	0.03	25	3,499	218	3,281	465.20	3,281	0.08
84	1260	0.02	17	3,298	218	3,081	465.19	3,081	0.07
85	1275	0.03	25	3,106	218	2,888	465.18	2,888	0.07
86	1290	0.02	17	2,905	218	2,687	465.16	2,687	0.06
87	1305	0.03	25	2,713	218	2,495	465.15	2,495	0.06
88	1320	0.02	17	2,512	218	2,294	465.14	2,294	0.05
89	1335	0.03	25	2,320	218	2,102	465.13	2,102	0.05
90	1350	0.02	17	2,119	218	1,901	465.12	1,901	0.04
91	1365	0.02	17	1,918	218	1,701	465.10	1,701	0.04
92	1380	0.02	17	1,718	218	1,500	465.09	1,500	0.03
93	1395	0.02	17	1,517	218	1,299	465.08	1,299	0.03
94	1410	0.02	17	1,316	218	1,098	465.07	1,098	0.03
95	1425	0.02	17	1,115	218	897	465.05	897	0.02
96	1440	0.02	17	914	218	697	465.04	697	0.02

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 3		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.56		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.65		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	1.04		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	750		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	170		
30				
31	ELEVATION OF HEADWATER	471.8		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15000	
45		466	16600	
46		467	18250	
47		468	19960	
48		468.5	20831	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 3
[3] AREA - ACRES	10.250
[4] L-FEET	750
[5] L-MILES	0.142
[6] La-FEET	170.00
[7] La-MILES	0.032
[8] ELEVATION OF HEADWATER	471.8
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.3
[11] S-FEET/MILE	23.2
[12] S^0.5	4.82
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	2.0
[17] 100% OF LAG-MINUTES	2.0
[18] 200% OF LAG-MINUTES	4.1
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.23

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	10.250	1.00	1.04	1.36	10.250	1.00	1.36	2.23	10.250	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.25	SUM [7]	1.04	SUM [9]	10.25	SUM [11]	1.36	SUM [13]	10.25	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.47	0.46	0.36
FLOOD VOLUME	(cu-ft)	17,326	17,301	13,560
	(acre-ft)	0.40	0.40	0.31
REQUIRED STORAGE	(cu-ft)	14,912	13,552	5,367
	(acre-ft)	0.34	0.31	0.12
PEAK FLOW	(cfs)	8.38	7.26	1.29
MAXIMUM WSEL	(ft)	465.94	465.86	465.34

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.56	0.250	0.0130
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.65	0.649	0.1400
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	1.04	0.101	0.0528
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.25	SUM	0.2058

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102877561

C= 0.00191

Ft=C(24-(T/60))^1.55 = 0.00191 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.21
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.21	0.15	0.02	0.17	0.00
2	10	0.17	1.3	0.162	0.21	0.15	0.02	0.17	0.00
3	15	0.25	1.1	0.137	0.21	0.12	0.01	0.14	0.00
4	20	0.33	1.5	0.187	0.21	0.17	0.02	0.19	0.00
5	25	0.42	1.5	0.187	0.21	0.17	0.02	0.19	0.00
6	30	0.50	1.8	0.225	0.21	0.20	0.02	0.19	0.00
7	35	0.58	1.5	0.187	0.21	0.17	0.02	0.19	0.00
8	40	0.67	1.8	0.225	0.21	0.20	0.02	0.19	0.00
9	45	0.75	1.8	0.225	0.21	0.20	0.02	0.19	0.00
10	50	0.83	1.5	0.187	0.21	0.17	0.02	0.19	0.00
11	55	0.92	1.6	0.200	0.21	0.18	0.02	0.20	0.00
12	60	1.00	1.8	0.225	0.21	0.20	0.02	0.19	0.00
13	65	1.08	2.2	0.275	0.21	0.25	0.07	0.71	141.78
14	70	1.17	2.2	0.275	0.21	0.25	0.07	0.71	141.78
15	75	1.25	2.2	0.275	0.21	0.25	0.07	0.71	141.78
16	80	1.33	2.0	0.250	0.21	0.22	0.04	0.45	65.03
17	85	1.42	2.6	0.324	0.21	0.29	0.12	1.22	295.29
18	90	1.50	2.7	0.337	0.21	0.30	0.13	1.34	333.66
19	95	1.58	2.4	0.300	0.21	0.27	0.09	0.96	218.54
20	100	1.67	2.7	0.337	0.21	0.30	0.13	1.34	333.66
21	105	1.75	3.3	0.412	0.21	0.37	0.21	2.11	563.92
22	110	1.83	3.1	0.387	0.21	0.35	0.18	1.86	487.17
23	115	1.92	2.9	0.362	0.21	0.33	0.16	1.60	410.42
24	120	2.00	3.0	0.374	0.21	0.34	0.17	1.73	448.79
25	125	2.08	3.1	0.387	0.21	0.35	0.18	1.86	487.17
26	130	2.17	4.2	0.524	0.21	0.47	0.32	3.26	909.30
27	135	2.25	5.0	0.624	0.21	0.56	0.42	4.29	1216.31
28	140	2.33	3.5	0.437	0.21	0.39	0.23	2.37	640.67
29	145	2.42	6.8	0.849	0.21	0.76	0.64	6.59	1907.08
30	150	2.50	7.3	0.911	0.21	0.82	0.71	7.23	2098.96
31	155	2.58	8.2	1.023	0.21	0.92	0.82	8.38	2444.34
32	160	2.67	5.9	0.736	0.21	0.66	0.53	5.44	1561.70
33	165	2.75	2.0	0.250	0.21	0.22	0.04	0.45	65.03
34	170	2.83	1.8	0.225	0.21	0.20	0.02	0.19	0.00
35	175	2.92	1.8	0.225	0.21	0.20	0.02	0.19	0.00
36	180	3.00	0.6	0.075	0.21	0.07	0.01	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.40
FLOOD VOLUME (cuft)	17326.37
REQUIRED STORAGE (acft)	0.34
REQUIRED STORAGE (cuft)	14912.39
PEAK FLOW RATE (cfs)	8.38

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.082	0.21	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.21	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.21	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.21	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.21	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.21	0.10	0.01	0.12	0.00
7	35	0.58	0.7	0.114	0.21	0.10	0.01	0.12	0.00
8	40	0.67	0.7	0.114	0.21	0.10	0.01	0.12	0.00
9	45	0.75	0.7	0.114	0.21	0.10	0.01	0.12	0.00
10	50	0.83	0.7	0.114	0.21	0.10	0.01	0.12	0.00
11	55	0.92	0.7	0.114	0.21	0.10	0.01	0.12	0.00
12	60	1.00	0.8	0.131	0.21	0.12	0.01	0.13	0.00
13	65	1.08	0.8	0.131	0.21	0.12	0.01	0.13	0.00
14	70	1.17	0.8	0.131	0.21	0.12	0.01	0.13	0.00
15	75	1.25	0.8	0.131	0.21	0.12	0.01	0.13	0.00
16	80	1.33	0.8	0.131	0.21	0.12	0.01	0.13	0.00
17	85	1.42	0.8	0.131	0.21	0.12	0.01	0.13	0.00
18	90	1.50	0.8	0.131	0.21	0.12	0.01	0.13	0.00
19	95	1.58	0.8	0.131	0.21	0.12	0.01	0.13	0.00
20	100	1.67	0.8	0.131	0.21	0.12	0.01	0.13	0.00
21	105	1.75	0.8	0.131	0.21	0.12	0.01	0.13	0.00
22	110	1.83	0.8	0.131	0.21	0.12	0.01	0.13	0.00
23	115	1.92	0.8	0.131	0.21	0.12	0.01	0.13	0.00
24	120	2.00	0.9	0.147	0.21	0.13	0.01	0.15	0.00
25	125	2.08	0.8	0.131	0.21	0.12	0.01	0.13	0.00
26	130	2.17	0.9	0.147	0.21	0.13	0.01	0.15	0.00
27	135	2.25	0.9	0.147	0.21	0.13	0.01	0.15	0.00
28	140	2.33	0.9	0.147	0.21	0.13	0.01	0.15	0.00
29	145	2.42	0.9	0.147	0.21	0.13	0.01	0.15	0.00
30	150	2.50	0.9	0.147	0.21	0.13	0.01	0.15	0.00
31	155	2.58	0.9	0.147	0.21	0.13	0.01	0.15	0.00
32	160	2.67	0.9	0.147	0.21	0.13	0.01	0.15	0.00
33	165	2.75	1.0	0.163	0.21	0.15	0.02	0.17	0.00
34	170	2.83	1.0	0.163	0.21	0.15	0.02	0.17	0.00
35	175	2.92	1.0	0.163	0.21	0.15	0.02	0.17	0.00
36	180	3.00	1.0	0.163	0.21	0.15	0.02	0.17	0.00
37	185	3.08	1.0	0.163	0.21	0.15	0.02	0.17	0.00
38	190	3.17	1.1	0.180	0.21	0.16	0.02	0.18	0.00
39	195	3.25	1.1	0.180	0.21	0.16	0.02	0.18	0.00
40	200	3.33	1.1	0.180	0.21	0.16	0.02	0.18	0.00
41	205	3.42	1.2	0.196	0.21	0.18	0.02	0.20	0.00
42	210	3.50	1.3	0.212	0.21	0.19	0.01	0.07	0.00
43	215	3.58	1.4	0.228	0.21	0.21	0.02	0.23	0.09
44	220	3.67	1.4	0.228	0.21	0.21	0.02	0.23	0.09
45	225	3.75	1.5	0.245	0.21	0.22	0.04	0.40	50.27
46	230	3.83	1.5	0.245	0.21	0.22	0.04	0.40	50.27
47	235	3.92	1.6	0.261	0.21	0.24	0.06	0.57	100.46
48	240	4.00	1.6	0.261	0.21	0.24	0.06	0.57	100.46
49	245	4.08	1.7	0.277	0.21	0.25	0.07	0.73	150.64
50	250	4.17	1.8	0.294	0.21	0.26	0.09	0.90	200.82
51	255	4.25	1.9	0.310	0.21	0.28	0.10	1.07	251.01
52	260	4.33	2.0	0.326	0.21	0.29	0.12	1.24	301.19
53	265	4.42	2.1	0.343	0.21	0.31	0.14	1.40	351.38
54	270	4.50	2.1	0.343	0.21	0.31	0.14	1.40	351.38
55	275	4.58	2.2	0.359	0.21	0.32	0.15	1.57	401.56
56	280	4.67	2.3	0.375	0.21	0.34	0.17	1.74	451.74

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.05		
UNIT TIME-PERCENT OF LAG	244.5		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.206		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.23 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.392	0.21	0.35	0.19	1.91	501.93
58	290	4.83	2.4	0.392	0.21	0.35	0.19	1.91	501.93
59	295	4.92	2.5	0.408	0.21	0.37	0.20	2.07	552.11
60	300	5.00	2.6	0.424	0.21	0.38	0.22	2.24	602.30
61	305	5.08	3.1	0.506	0.21	0.46	0.30	3.08	853.22
62	310	5.17	3.6	0.588	0.21	0.53	0.38	3.91	1104.14
63	315	5.25	3.9	0.636	0.21	0.57	0.43	4.41	1254.69
64	320	5.33	4.2	0.685	0.21	0.62	0.48	4.92	1405.24
65	325	5.42	4.7	0.767	0.21	0.69	0.56	5.75	1656.16
66	330	5.50	5.6	0.914	0.21	0.82	0.71	7.26	2107.82
67	335	5.58	1.9	0.310	0.21	0.28	0.10	1.07	251.01
68	340	5.67	0.9	0.147	0.21	0.13	0.01	0.15	0.00
69	345	5.75	0.6	0.098	0.21	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.21	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.21	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.21	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.46
FLOOD VOLUME (acft)	0.40
FLOOD VOLUME (cuft)	17301.15
REQUIRED STORAGE (acft)	0.31
REQUIRED STORAGE (cuft)	13551.86
PEAK FLOW RATE (cfs)	7.26

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.363	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.359	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.355	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.351	0.032	0.004	0.04	0.00
5	75	1.25	0.3	0.027	0.347	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.343	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.338	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.334	0.032	0.004	0.04	0.00
9	135	2.25	0.4	0.036	0.330	0.032	0.004	0.04	0.00
10	150	2.50	0.4	0.036	0.326	0.032	0.004	0.04	0.00
11	165	2.75	0.5	0.045	0.322	0.040	0.004	0.05	0.00
12	180	3.00	0.5	0.045	0.318	0.040	0.004	0.05	0.00
13	195	3.25	0.5	0.045	0.314	0.040	0.004	0.05	0.00
14	210	3.50	0.5	0.045	0.310	0.040	0.004	0.05	0.00
15	225	3.75	0.5	0.045	0.307	0.040	0.004	0.05	0.00
16	240	4.00	0.6	0.054	0.303	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.299	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.295	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.291	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.288	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.284	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.280	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.276	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.273	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.269	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.266	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.262	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.258	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.255	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.252	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.248	0.096	0.011	0.11	0.00
32	480	8.00	1.3	0.116	0.245	0.104	0.012	0.12	0.00
33	495	8.25	1.5	0.134	0.241	0.120	0.013	0.14	0.00
34	510	8.50	1.5	0.134	0.238	0.120	0.013	0.14	0.00
35	525	8.75	1.6	0.143	0.235	0.128	0.014	0.15	0.00
36	540	9.00	1.7	0.152	0.231	0.136	0.015	0.16	0.00
37	555	9.25	1.9	0.169	0.228	0.153	0.017	0.17	0.00
38	570	9.50	2.0	0.178	0.225	0.161	0.018	0.18	0.00
39	585	9.75	2.1	0.187	0.222	0.169	0.019	0.19	0.00
40	600	10.00	2.2	0.196	0.218	0.177	0.020	0.20	0.00
41	615	10.25	1.5	0.134	0.215	0.120	0.013	0.14	0.00
42	630	10.50	1.5	0.134	0.212	0.120	0.013	0.14	0.00
43	645	10.75	2.0	0.178	0.209	0.161	0.018	0.18	0.00
44	660	11.00	2.0	0.178	0.206	0.161	0.018	0.18	0.00
45	675	11.25	1.9	0.169	0.203	0.153	0.017	0.17	0.00
46	690	11.50	1.9	0.169	0.200	0.153	0.017	0.17	0.00
47	705	11.75	1.7	0.152	0.197	0.136	0.015	0.16	0.00
48	720	12.00	1.8	0.161	0.194	0.145	0.016	0.16	0.00
49	735	12.25	2.5	0.223	0.191	0.201	0.032	0.33	84.85
50	750	12.50	2.6	0.232	0.188	0.209	0.044	0.45	193.54
51	765	12.75	2.8	0.250	0.185	0.225	0.064	0.66	384.21
52	780	13.00	2.9	0.259	0.183	0.233	0.076	0.78	492.27
53	795	13.25	3.4	0.303	0.180	0.273	0.123	1.27	929.17
54	810	13.50	3.4	0.303	0.177	0.273	0.126	1.29	954.32
55	825	13.75	2.3	0.205	0.174	0.185	0.031	0.31	73.98
56	840	14.00	2.3	0.205	0.172	0.185	0.033	0.34	98.48
57	855	14.25	2.7	0.241	0.169	0.217	0.072	0.73	451.79
58	870	14.50	2.6	0.232	0.167	0.209	0.065	0.67	393.33
59	885	14.75	2.6	0.232	0.164	0.209	0.068	0.70	416.82
60	900	15.00	2.5	0.223	0.162	0.201	0.061	0.63	357.68
61	915	15.25	2.4	0.214	0.159	0.193	0.055	0.56	298.20

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.157	0.185	0.049	0.50	238.37
63	945	15.75	1.9	0.169	0.154	0.153	0.015	0.16	0.00
64	960	16.00	1.9	0.169	0.152	0.153	0.018	0.18	0.00
65	975	16.25	0.4	0.036	0.150	0.032	0.004	0.04	0.00
66	990	16.50	0.4	0.036	0.147	0.032	0.004	0.04	0.00
67	1005	16.75	0.3	0.027	0.145	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.143	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.141	0.040	0.004	0.05	0.00
70	1050	17.50	0.5	0.045	0.139	0.040	0.004	0.05	0.00
71	1065	17.75	0.5	0.045	0.137	0.040	0.004	0.05	0.00
72	1080	18.00	0.4	0.036	0.134	0.032	0.004	0.04	0.00
73	1095	18.25	0.4	0.036	0.133	0.032	0.004	0.04	0.00
74	1110	18.50	0.4	0.036	0.131	0.032	0.004	0.04	0.00
75	1125	18.75	0.3	0.027	0.129	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.127	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.125	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.123	0.032	0.004	0.04	0.00
79	1185	19.75	0.3	0.027	0.122	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.120	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.117	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.114	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.113	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.111	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.110	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.109	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.108	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.107	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.106	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.105	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.104	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.104	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.103	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.103	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.36
FLOOD VOLUME (acft)	0.31
FLOOD VOLUME (cuft)	13560.19
REQUIRED STORAGE (acft)	0.12
REQUIRED STORAGE (cuft)	5367.00
PEAK FLOW (cfs)	1.29

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15000	0	0	0.00
466	1	1	1600	16600	15800	15800	0.36
467	1	2	1650	18250	17425	33225	0.76
468	1	3	1710	19960	19105	52330	1.20
468.5	0.5	3.5	871	20831	10198	62528	1.44

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.23 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.23 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	50	50	70	-	465.00	-	0.00
2	10	0.17	50	50	70	-	465.00	-	0.00
3	15	0.14	42	42	70	-	465.00	-	0.00
4	20	0.19	58	58	70	-	465.00	-	0.00
5	25	0.19	58	58	70	-	465.00	-	0.00
6	30	0.19	58	58	70	-	465.00	-	0.00
7	35	0.19	58	58	70	-	465.00	-	0.00
8	40	0.19	58	58	70	-	465.00	-	0.00
9	45	0.19	58	58	70	-	465.00	-	0.00
10	50	0.19	58	58	70	-	465.00	-	0.00
11	55	0.20	61	61	70	-	465.00	-	0.00
12	60	0.19	58	58	70	-	465.00	-	0.00
13	65	0.71	212	212	70	142	465.01	142	0.00
14	70	0.71	212	353	70	284	465.02	284	0.01
15	75	0.71	212	495	70	425	465.03	425	0.01
16	80	0.45	135	560	70	490	465.03	490	0.01
17	85	1.22	365	855	70	786	465.05	786	0.02
18	90	1.34	403	1,189	70	1,119	465.07	1,119	0.03
19	95	0.96	288	1,408	70	1,338	465.08	1,338	0.03
20	100	1.34	403	1,741	70	1,672	465.11	1,672	0.04
21	105	2.11	634	2,305	70	2,235	465.14	2,235	0.05
22	110	1.86	557	2,792	70	2,723	465.17	2,723	0.06
23	115	1.60	480	3,203	70	3,133	465.20	3,133	0.07
24	120	1.73	519	3,652	70	3,582	465.23	3,582	0.08
25	125	1.86	557	4,139	70	4,069	465.26	4,069	0.09
26	130	3.26	979	5,048	70	4,978	465.32	4,978	0.11
27	135	4.29	1,286	6,264	70	6,195	465.39	6,195	0.14
28	140	2.37	710	6,905	70	6,835	465.43	6,835	0.16
29	145	6.59	1,977	8,812	70	8,742	465.55	8,742	0.20
30	150	7.23	2,169	10,911	70	10,841	465.69	10,841	0.25
31	155	8.38	2,514	13,355	70	13,286	465.84	13,286	0.30
32	160	5.44	1,631	14,917	70	14,847	465.94	14,847	0.34
33	165	0.45	135	14,982	70	14,912	465.94	14,912	0.34
34	170	0.19	58	14,970	70	14,901	465.94	14,901	0.34
35	175	0.19	58	14,959	70	14,889	465.94	14,889	0.34
36	180	0.08	23	14,912	70	14,842	465.94	14,842	0.34

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	25	25	70	-	465.00	-	0.00
2	10	0.10	30	30	70	-	465.00	-	0.00
3	15	0.10	30	30	70	-	465.00	-	0.00
4	20	0.10	30	30	70	-	465.00	-	0.00
5	25	0.10	30	30	70	-	465.00	-	0.00
6	30	0.12	35	35	70	-	465.00	-	0.00
7	35	0.12	35	35	70	-	465.00	-	0.00
8	40	0.12	35	35	70	-	465.00	-	0.00
9	45	0.12	35	35	70	-	465.00	-	0.00
10	50	0.12	35	35	70	-	465.00	-	0.00
11	55	0.12	35	35	70	-	465.00	-	0.00
12	60	0.13	40	40	70	-	465.00	-	0.00
13	65	0.13	40	40	70	-	465.00	-	0.00
14	70	0.13	40	40	70	-	465.00	-	0.00
15	75	0.13	40	40	70	-	465.00	-	0.00
16	80	0.13	40	40	70	-	465.00	-	0.00
17	85	0.13	40	40	70	-	465.00	-	0.00
18	90	0.13	40	40	70	-	465.00	-	0.00
19	95	0.13	40	40	70	-	465.00	-	0.00
20	100	0.13	40	40	70	-	465.00	-	0.00
21	105	0.13	40	40	70	-	465.00	-	0.00
22	110	0.13	40	40	70	-	465.00	-	0.00
23	115	0.13	40	40	70	-	465.00	-	0.00
24	120	0.15	45	45	70	-	465.00	-	0.00
25	125	0.13	40	40	70	-	465.00	-	0.00
26	130	0.15	45	45	70	-	465.00	-	0.00
27	135	0.15	45	45	70	-	465.00	-	0.00
28	140	0.15	45	45	70	-	465.00	-	0.00
29	145	0.15	45	45	70	-	465.00	-	0.00
30	150	0.15	45	45	70	-	465.00	-	0.00
31	155	0.15	45	45	70	-	465.00	-	0.00
32	160	0.15	45	45	70	-	465.00	-	0.00
33	165	0.17	50	50	70	-	465.00	-	0.00
34	170	0.17	50	50	70	-	465.00	-	0.00
35	175	0.17	50	50	70	-	465.00	-	0.00
36	180	0.17	50	50	70	-	465.00	-	0.00
37	185	0.17	50	50	70	-	465.00	-	0.00
38	190	0.18	55	55	70	-	465.00	-	0.00
39	195	0.18	55	55	70	-	465.00	-	0.00
40	200	0.18	55	55	70	-	465.00	-	0.00
41	205	0.20	60	60	70	-	465.00	-	0.00
42	210	0.07	20	20	70	-	465.00	-	0.00
43	215	0.23	70	70	70	0	465.00	0	0.00
44	220	0.23	70	70	70	0	465.00	0	0.00
45	225	0.40	120	120	70	50	465.00	50	0.00
46	230	0.40	120	171	70	101	465.01	101	0.00
47	235	0.57	170	271	70	201	465.01	201	0.00
48	240	0.57	170	371	70	302	465.02	302	0.01
49	245	0.73	220	522	70	452	465.03	452	0.01
50	250	0.90	271	723	70	653	465.04	653	0.01
51	255	1.07	321	974	70	904	465.06	904	0.02
52	260	1.24	371	1,275	70	1,205	465.08	1,205	0.03
53	265	1.40	421	1,626	70	1,557	465.10	1,557	0.04
54	270	1.40	421	1,978	70	1,908	465.12	1,908	0.04
55	275	1.57	471	2,379	70	2,310	465.15	2,310	0.05

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.74	522	2,831	70	2,761	465.17	2,761	0.06
57	285	1.91	572	3,333	70	3,263	465.21	3,263	0.07
58	290	1.91	572	3,835	70	3,765	465.24	3,765	0.09
59	295	2.07	622	4,387	70	4,317	465.27	4,317	0.10
60	300	2.24	672	4,989	70	4,920	465.31	4,920	0.11
61	305	3.08	923	5,843	70	5,773	465.37	5,773	0.13
62	310	3.91	1,174	6,947	70	6,877	465.44	6,877	0.16
63	315	4.41	1,324	8,201	70	8,132	465.51	8,132	0.19
64	320	4.92	1,475	9,607	70	9,537	465.60	9,537	0.22
65	325	5.75	1,726	11,263	70	11,193	465.71	11,193	0.26
66	330	7.26	2,178	13,371	70	13,301	465.84	13,301	0.31
67	335	1.07	321	13,622	70	13,552	465.86	13,552	0.31
68	340	0.15	45	13,597	70	13,527	465.86	13,527	0.31
69	345	0.10	30	13,557	70	13,488	465.85	13,488	0.31
70	350	0.08	25	13,513	70	13,443	465.85	13,443	0.31
71	355	0.05	15	13,458	70	13,388	465.85	13,388	0.31
72	360	0.03	10	13,398	70	13,328	465.84	13,328	0.31

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	16	16	209	-	465.00	-	0.00
2	30	0.03	25	25	209	-	465.00	-	0.00
3	45	0.03	25	25	209	-	465.00	-	0.00
4	60	0.04	33	33	209	-	465.00	-	0.00
5	75	0.03	25	25	209	-	465.00	-	0.00
6	90	0.03	25	25	209	-	465.00	-	0.00
7	105	0.03	25	25	209	-	465.00	-	0.00
8	120	0.04	33	33	209	-	465.00	-	0.00
9	135	0.04	33	33	209	-	465.00	-	0.00
10	150	0.04	33	33	209	-	465.00	-	0.00
11	165	0.05	41	41	209	-	465.00	-	0.00
12	180	0.05	41	41	209	-	465.00	-	0.00
13	195	0.05	41	41	209	-	465.00	-	0.00
14	210	0.05	41	41	209	-	465.00	-	0.00
15	225	0.05	41	41	209	-	465.00	-	0.00
16	240	0.05	49	49	209	-	465.00	-	0.00
17	255	0.05	49	49	209	-	465.00	-	0.00
18	270	0.06	58	58	209	-	465.00	-	0.00
19	285	0.06	58	58	209	-	465.00	-	0.00
20	300	0.07	66	66	209	-	465.00	-	0.00
21	315	0.05	49	49	209	-	465.00	-	0.00
22	330	0.06	58	58	209	-	465.00	-	0.00
23	345	0.07	66	66	209	-	465.00	-	0.00
24	360	0.07	66	66	209	-	465.00	-	0.00
25	375	0.08	74	74	209	-	465.00	-	0.00
26	390	0.08	74	74	209	-	465.00	-	0.00
27	405	0.09	82	82	209	-	465.00	-	0.00
28	420	0.09	82	82	209	-	465.00	-	0.00
29	435	0.09	82	82	209	-	465.00	-	0.00
30	450	0.10	91	91	209	-	465.00	-	0.00
31	465	0.11	99	99	209	-	465.00	-	0.00
32	480	0.12	107	107	209	-	465.00	-	0.00
33	495	0.14	123	123	209	-	465.00	-	0.00
34	510	0.14	123	123	209	-	465.00	-	0.00
35	525	0.15	132	132	209	-	465.00	-	0.00
36	540	0.16	140	140	209	-	465.00	-	0.00
37	555	0.17	156	156	209	-	465.00	-	0.00
38	570	0.18	165	165	209	-	465.00	-	0.00
39	585	0.19	173	173	209	-	465.00	-	0.00
40	600	0.20	181	181	209	-	465.00	-	0.00
41	615	0.14	123	123	209	-	465.00	-	0.00
42	630	0.14	123	123	209	-	465.00	-	0.00
43	645	0.18	165	165	209	-	465.00	-	0.00
44	660	0.18	165	165	209	-	465.00	-	0.00
45	675	0.17	156	156	209	-	465.00	-	0.00
46	690	0.17	156	156	209	-	465.00	-	0.00
47	705	0.16	140	140	209	-	465.00	-	0.00
48	720	0.16	148	148	209	-	465.00	-	0.00
49	735	0.33	294	294	209	85	465.01	85	0.00
50	750	0.45	403	488	209	278	465.02	278	0.01
51	765	0.66	594	872	209	663	465.04	663	0.02
52	780	0.78	702	1,364	209	1,155	465.07	1,155	0.03
53	795	1.27	1,139	2,293	209	2,084	465.13	2,084	0.05
54	810	1.29	1,164	3,248	209	3,038	465.19	3,038	0.07
55	825	0.31	283	3,322	209	3,112	465.20	3,112	0.07
56	840	0.34	308	3,420	209	3,211	465.20	3,211	0.07
57	855	0.73	661	3,872	209	3,663	465.23	3,663	0.08
58	870	0.67	603	4,265	209	4,056	465.26	4,056	0.09

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.70	626	4,682	209	4,473	465.28	4,473	0.10
60	900	0.63	567	5,040	209	4,830	465.31	4,830	0.11
61	915	0.56	508	5,338	209	5,129	465.32	5,129	0.12
62	930	0.50	448	5,576	209	5,367	465.34	5,367	0.12
63	945	0.16	141	5,508	209	5,298	465.34	5,298	0.12
64	960	0.18	162	5,461	209	5,251	465.33	5,251	0.12
65	975	0.04	33	5,284	209	5,075	465.32	5,075	0.12
66	990	0.04	33	5,108	209	4,898	465.31	4,898	0.11
67	1005	0.03	25	4,923	209	4,714	465.30	4,714	0.11
68	1020	0.03	25	4,738	209	4,529	465.29	4,529	0.10
69	1035	0.05	41	4,570	209	4,361	465.28	4,361	0.10
70	1050	0.05	41	4,402	209	4,193	465.27	4,193	0.10
71	1065	0.05	41	4,234	209	4,024	465.25	4,024	0.09
72	1080	0.04	33	4,057	209	3,848	465.24	3,848	0.09
73	1095	0.04	33	3,881	209	3,671	465.23	3,671	0.08
74	1110	0.04	33	3,704	209	3,495	465.22	3,495	0.08
75	1125	0.03	25	3,520	209	3,310	465.21	3,310	0.08
76	1140	0.02	16	3,327	209	3,117	465.20	3,117	0.07
77	1155	0.03	25	3,142	209	2,933	465.19	2,933	0.07
78	1170	0.04	33	2,966	209	2,756	465.17	2,756	0.06
79	1185	0.03	25	2,781	209	2,572	465.16	2,572	0.06
80	1200	0.02	16	2,588	209	2,379	465.15	2,379	0.05
81	1215	0.03	25	2,403	209	2,194	465.14	2,194	0.05
82	1230	0.03	25	2,219	209	2,009	465.13	2,009	0.05
83	1245	0.03	25	2,034	209	1,825	465.12	1,825	0.04
84	1260	0.02	16	1,841	209	1,632	465.10	1,632	0.04
85	1275	0.03	25	1,656	209	1,447	465.09	1,447	0.03
86	1290	0.02	16	1,463	209	1,254	465.08	1,254	0.03
87	1305	0.03	25	1,279	209	1,069	465.07	1,069	0.02
88	1320	0.02	16	1,086	209	876	465.06	876	0.02
89	1335	0.03	25	901	209	692	465.04	692	0.02
90	1350	0.02	16	708	209	499	465.03	499	0.01
91	1365	0.02	16	515	209	306	465.02	306	0.01
92	1380	0.02	16	322	209	113	465.01	113	0.00
93	1395	0.02	16	129	209	-	465.00	-	0.00
94	1410	0.02	16	16	209	-	465.00	-	0.00
95	1425	0.02	16	16	209	-	465.00	-	0.00
96	1440	0.02	16	16	209	-	465.00	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 4		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.33		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.56		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.9		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	620		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	70		
30				
31	ELEVATION OF HEADWATER	470.5		
32	ELEVATION OF CONCENTRATION POINT	468		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		464.5	13730	
45		465.5	15200	
46		466.5	16700	
47		467.5	18270	
48		468	19075	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 4
[3] AREA - ACRES	9.790
[4] L-FEET	620
[5] L-MILES	0.117
[6] La-FEET	70.00
[7] La-MILES	0.013
[8] ELEVATION OF HEADWATER	470.5
[9] ELEVATION OF CONCENTRATION POINT	468
[10] H-FEET	2.5
[11] S-FEET/MILE	21.3
[12] S^0.5	4.61
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.4
[17] 100% OF LAG-MINUTES	1.4
[18] 200% OF LAG-MINUTES	2.8
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.21

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	9.790	1.00	1.04	1.36	9.790	1.00	1.36	2.23	9.790	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.79	SUM [7]	1.04	SUM [9]	9.79	SUM [11]	1.36	SUM [13]	9.79	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.47	0.47	0.37
FLOOD VOLUME	(cu-ft)	16,627	16,600	13,067
	(acre-ft)	0.38	0.38	0.30
REQUIRED STORAGE	(cu-ft)	14,362	13,085	5,344
	(acre-ft)	0.33	0.30	0.12
PEAK FLOW	(cfs)	8.01	6.94	1.24
MAXIMUM WSEL	(ft)	465.49	465.40	464.87

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.33	0.238	0.0124
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.56	0.670	0.1446
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.90	0.092	0.0478
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.79	SUM	0.2048

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102390603

C= 0.00190

Ft=C(24-(T/60))^1.55 = 0.00190 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.20
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.20	0.15	0.02	0.16	0.00
2	10	0.17	1.3	0.162	0.20	0.15	0.02	0.16	0.00
3	15	0.25	1.1	0.137	0.20	0.12	0.01	0.13	0.00
4	20	0.33	1.5	0.187	0.20	0.17	0.02	0.18	0.00
5	25	0.42	1.5	0.187	0.20	0.17	0.02	0.18	0.00
6	30	0.50	1.8	0.225	0.20	0.20	0.02	0.19	0.00
7	35	0.58	1.5	0.187	0.20	0.17	0.02	0.18	0.00
8	40	0.67	1.8	0.225	0.20	0.20	0.02	0.19	0.00
9	45	0.75	1.8	0.225	0.20	0.20	0.02	0.19	0.00
10	50	0.83	1.5	0.187	0.20	0.17	0.02	0.18	0.00
11	55	0.92	1.6	0.200	0.20	0.18	0.02	0.20	0.00
12	60	1.00	1.8	0.225	0.20	0.20	0.02	0.19	0.00
13	65	1.08	2.2	0.275	0.20	0.25	0.07	0.68	141.06
14	70	1.17	2.2	0.275	0.20	0.25	0.07	0.68	141.06
15	75	1.25	2.2	0.275	0.20	0.25	0.07	0.68	141.06
16	80	1.33	2.0	0.250	0.20	0.22	0.04	0.44	67.75
17	85	1.42	2.6	0.324	0.20	0.29	0.12	1.17	287.67
18	90	1.50	2.7	0.337	0.20	0.30	0.13	1.29	324.33
19	95	1.58	2.4	0.300	0.20	0.27	0.09	0.93	214.37
20	100	1.67	2.7	0.337	0.20	0.30	0.13	1.29	324.33
21	105	1.75	3.3	0.412	0.20	0.37	0.21	2.03	544.25
22	110	1.83	3.1	0.387	0.20	0.35	0.18	1.78	470.94
23	115	1.92	2.9	0.362	0.20	0.33	0.16	1.54	397.63
24	120	2.00	3.0	0.374	0.20	0.34	0.17	1.66	434.29
25	125	2.08	3.1	0.387	0.20	0.35	0.18	1.78	470.94
26	130	2.17	4.2	0.524	0.20	0.47	0.32	3.13	874.13
27	135	2.25	5.0	0.624	0.20	0.56	0.42	4.10	1167.36
28	140	2.33	3.5	0.437	0.20	0.39	0.23	2.27	617.56
29	145	2.42	6.8	0.849	0.20	0.76	0.64	6.30	1827.13
30	150	2.50	7.3	0.911	0.20	0.82	0.71	6.91	2010.40
31	155	2.58	8.2	1.023	0.20	0.92	0.82	8.01	2340.28
32	160	2.67	5.9	0.736	0.20	0.66	0.53	5.20	1497.25
33	165	2.75	2.0	0.250	0.20	0.22	0.04	0.44	67.75
34	170	2.83	1.8	0.225	0.20	0.20	0.02	0.19	0.00
35	175	2.92	1.8	0.225	0.20	0.20	0.02	0.19	0.00
36	180	3.00	0.6	0.075	0.20	0.07	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.38
FLOOD VOLUME (cuft)	16626.67
REQUIRED STORAGE (acft)	0.33
REQUIRED STORAGE (cuft)	14361.53
PEAK FLOW RATE (cfs)	8.01

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.38		
UNIT TIME-PERCENT OF LAG	362.1		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.205		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.21 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.082	0.20	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.20	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.20	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.20	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.20	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.20	0.10	0.01	0.11	0.00
7	35	0.58	0.7	0.114	0.20	0.10	0.01	0.11	0.00
8	40	0.67	0.7	0.114	0.20	0.10	0.01	0.11	0.00
9	45	0.75	0.7	0.114	0.20	0.10	0.01	0.11	0.00
10	50	0.83	0.7	0.114	0.20	0.10	0.01	0.11	0.00
11	55	0.92	0.7	0.114	0.20	0.10	0.01	0.11	0.00
12	60	1.00	0.8	0.131	0.20	0.12	0.01	0.13	0.00
13	65	1.08	0.8	0.131	0.20	0.12	0.01	0.13	0.00
14	70	1.17	0.8	0.131	0.20	0.12	0.01	0.13	0.00
15	75	1.25	0.8	0.131	0.20	0.12	0.01	0.13	0.00
16	80	1.33	0.8	0.131	0.20	0.12	0.01	0.13	0.00
17	85	1.42	0.8	0.131	0.20	0.12	0.01	0.13	0.00
18	90	1.50	0.8	0.131	0.20	0.12	0.01	0.13	0.00
19	95	1.58	0.8	0.131	0.20	0.12	0.01	0.13	0.00
20	100	1.67	0.8	0.131	0.20	0.12	0.01	0.13	0.00
21	105	1.75	0.8	0.131	0.20	0.12	0.01	0.13	0.00
22	110	1.83	0.8	0.131	0.20	0.12	0.01	0.13	0.00
23	115	1.92	0.8	0.131	0.20	0.12	0.01	0.13	0.00
24	120	2.00	0.9	0.147	0.20	0.13	0.01	0.14	0.00
25	125	2.08	0.8	0.131	0.20	0.12	0.01	0.13	0.00
26	130	2.17	0.9	0.147	0.20	0.13	0.01	0.14	0.00
27	135	2.25	0.9	0.147	0.20	0.13	0.01	0.14	0.00
28	140	2.33	0.9	0.147	0.20	0.13	0.01	0.14	0.00
29	145	2.42	0.9	0.147	0.20	0.13	0.01	0.14	0.00
30	150	2.50	0.9	0.147	0.20	0.13	0.01	0.14	0.00
31	155	2.58	0.9	0.147	0.20	0.13	0.01	0.14	0.00
32	160	2.67	0.9	0.147	0.20	0.13	0.01	0.14	0.00
33	165	2.75	1.0	0.163	0.20	0.15	0.02	0.16	0.00
34	170	2.83	1.0	0.163	0.20	0.15	0.02	0.16	0.00
35	175	2.92	1.0	0.163	0.20	0.15	0.02	0.16	0.00
36	180	3.00	1.0	0.163	0.20	0.15	0.02	0.16	0.00
37	185	3.08	1.0	0.163	0.20	0.15	0.02	0.16	0.00
38	190	3.17	1.1	0.180	0.20	0.16	0.02	0.18	0.00
39	195	3.25	1.1	0.180	0.20	0.16	0.02	0.18	0.00
40	200	3.33	1.1	0.180	0.20	0.16	0.02	0.18	0.00
41	205	3.42	1.2	0.196	0.20	0.18	0.02	0.19	0.00
42	210	3.50	1.3	0.212	0.20	0.19	0.01	0.07	0.00
43	215	3.58	1.4	0.228	0.20	0.21	0.02	0.23	5.72
44	220	3.67	1.4	0.228	0.20	0.21	0.02	0.23	5.72
45	225	3.75	1.5	0.245	0.20	0.22	0.04	0.39	53.65
46	230	3.83	1.5	0.245	0.20	0.22	0.04	0.39	53.65
47	235	3.92	1.6	0.261	0.20	0.24	0.06	0.55	101.58
48	240	4.00	1.6	0.261	0.20	0.24	0.06	0.55	101.58
49	245	4.08	1.7	0.277	0.20	0.25	0.07	0.71	149.52
50	250	4.17	1.8	0.294	0.20	0.26	0.09	0.87	197.45
51	255	4.25	1.9	0.310	0.20	0.28	0.11	1.03	245.38
52	260	4.33	2.0	0.326	0.20	0.29	0.12	1.19	293.31
53	265	4.42	2.1	0.343	0.20	0.31	0.14	1.35	341.24
54	270	4.50	2.1	0.343	0.20	0.31	0.14	1.35	341.24
55	275	4.58	2.2	0.359	0.20	0.32	0.15	1.51	389.18
56	280	4.67	2.3	0.375	0.20	0.34	0.17	1.67	437.11

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.38		
UNIT TIME-PERCENT OF LAG	362.1		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.205		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.21 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.392	0.20	0.35	0.19	1.83	485.04
58	290	4.83	2.4	0.392	0.20	0.35	0.19	1.83	485.04
59	295	4.92	2.5	0.408	0.20	0.37	0.20	1.99	532.97
60	300	5.00	2.6	0.424	0.20	0.38	0.22	2.15	580.90
61	305	5.08	3.1	0.506	0.20	0.46	0.30	2.95	820.56
62	310	5.17	3.6	0.588	0.20	0.53	0.38	3.75	1060.22
63	315	5.25	3.9	0.636	0.20	0.57	0.43	4.23	1204.02
64	320	5.33	4.2	0.685	0.20	0.62	0.48	4.71	1347.81
65	325	5.42	4.7	0.767	0.20	0.69	0.56	5.50	1587.47
66	330	5.50	5.6	0.914	0.20	0.82	0.71	6.94	2018.86
67	335	5.58	1.9	0.310	0.20	0.28	0.11	1.03	245.38
68	340	5.67	0.9	0.147	0.20	0.13	0.01	0.14	0.00
69	345	5.75	0.6	0.098	0.20	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.20	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.20	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.20	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.38
FLOOD VOLUME (cuft)	16599.70
REQUIRED STORAGE (acft)	0.30
REQUIRED STORAGE (cuft)	13084.61
PEAK FLOW RATE (cfs)	6.94

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate		Effective Rain	Flood Hydrograph	Required Storage
	Minutes	Hours	Percent	in/hr	in/hr			Flow	
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.362	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.357	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.353	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.349	0.032	0.004	0.03	0.00
5	75	1.25	0.3	0.027	0.345	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.341	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.337	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.333	0.032	0.004	0.03	0.00
9	135	2.25	0.4	0.036	0.329	0.032	0.004	0.03	0.00
10	150	2.50	0.4	0.036	0.325	0.032	0.004	0.03	0.00
11	165	2.75	0.5	0.045	0.321	0.040	0.004	0.04	0.00
12	180	3.00	0.5	0.045	0.317	0.040	0.004	0.04	0.00
13	195	3.25	0.5	0.045	0.313	0.040	0.004	0.04	0.00
14	210	3.50	0.5	0.045	0.309	0.040	0.004	0.04	0.00
15	225	3.75	0.5	0.045	0.305	0.040	0.004	0.04	0.00
16	240	4.00	0.6	0.054	0.301	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.297	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.294	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.290	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.286	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.282	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.279	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.275	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.272	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.268	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.264	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.261	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.257	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.254	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.250	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.247	0.096	0.011	0.10	0.00
32	480	8.00	1.3	0.116	0.243	0.104	0.012	0.11	0.00
33	495	8.25	1.5	0.134	0.240	0.120	0.013	0.13	0.00
34	510	8.50	1.5	0.134	0.237	0.120	0.013	0.13	0.00
35	525	8.75	1.6	0.143	0.233	0.128	0.014	0.14	0.00
36	540	9.00	1.7	0.152	0.230	0.136	0.015	0.15	0.00
37	555	9.25	1.9	0.169	0.227	0.153	0.017	0.17	0.00
38	570	9.50	2.0	0.178	0.224	0.161	0.018	0.17	0.00
39	585	9.75	2.1	0.187	0.220	0.169	0.019	0.18	0.00
40	600	10.00	2.2	0.196	0.217	0.177	0.020	0.19	0.00
41	615	10.25	1.5	0.134	0.214	0.120	0.013	0.13	0.00
42	630	10.50	1.5	0.134	0.211	0.120	0.013	0.13	0.00
43	645	10.75	2.0	0.178	0.208	0.161	0.018	0.17	0.00
44	660	11.00	2.0	0.178	0.205	0.161	0.018	0.17	0.00
45	675	11.25	1.9	0.169	0.202	0.153	0.017	0.17	0.00
46	690	11.50	1.9	0.169	0.199	0.153	0.017	0.17	0.00
47	705	11.75	1.7	0.152	0.196	0.136	0.015	0.15	0.00
48	720	12.00	1.8	0.161	0.193	0.145	0.016	0.16	0.00
49	735	12.25	2.5	0.223	0.190	0.201	0.033	0.32	97.34
50	750	12.50	2.6	0.232	0.187	0.209	0.045	0.44	201.03
51	765	12.75	2.8	0.250	0.185	0.225	0.065	0.64	383.03
52	780	13.00	2.9	0.259	0.182	0.233	0.077	0.75	486.13
53	795	13.25	3.4	0.303	0.179	0.273	0.124	1.22	903.31
54	810	13.50	3.4	0.303	0.176	0.273	0.127	1.24	927.21
55	825	13.75	2.3	0.205	0.174	0.185	0.032	0.31	86.27
56	840	14.00	2.3	0.205	0.171	0.185	0.034	0.33	109.55
57	855	14.25	2.7	0.241	0.168	0.217	0.072	0.71	446.90
58	870	14.50	2.6	0.232	0.166	0.209	0.066	0.65	390.96
59	885	14.75	2.6	0.232	0.163	0.209	0.069	0.67	413.29
60	900	15.00	2.5	0.223	0.161	0.201	0.062	0.61	356.70
61	915	15.25	2.4	0.214	0.158	0.193	0.056	0.55	299.78

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.156	0.185	0.049	0.48	242.53
63	945	15.75	1.9	0.169	0.153	0.153	0.016	0.16	0.00
64	960	16.00	1.9	0.169	0.151	0.153	0.018	0.18	0.00
65	975	16.25	0.4	0.036	0.149	0.032	0.004	0.03	0.00
66	990	16.50	0.4	0.036	0.147	0.032	0.004	0.03	0.00
67	1005	16.75	0.3	0.027	0.144	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.142	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.140	0.040	0.004	0.04	0.00
70	1050	17.50	0.5	0.045	0.138	0.040	0.004	0.04	0.00
71	1065	17.75	0.5	0.045	0.136	0.040	0.004	0.04	0.00
72	1080	18.00	0.4	0.036	0.134	0.032	0.004	0.03	0.00
73	1095	18.25	0.4	0.036	0.132	0.032	0.004	0.03	0.00
74	1110	18.50	0.4	0.036	0.130	0.032	0.004	0.03	0.00
75	1125	18.75	0.3	0.027	0.128	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.126	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.124	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.123	0.032	0.004	0.03	0.00
79	1185	19.75	0.3	0.027	0.121	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.119	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.116	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.113	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.112	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.111	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.110	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.108	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.107	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.106	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.105	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.105	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.104	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.103	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.103	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.102	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.37
FLOOD VOLUME (acft)	0.30
FLOOD VOLUME (cuft)	13066.60
REQUIRED STORAGE (acft)	0.12
REQUIRED STORAGE (cuft)	5344.02
PEAK FLOW (cfs)	1.24

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
464.5	0	0		13730	0	0	0.00
465.5	1	1	1470	15200	14465	14465	0.33
466.5	1	2	1500	16700	15950	30415	0.70
467.5	1	3	1570	18270	17485	47900	1.10
468	0.5	3.5	805	19075	9336	57236	1.31

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.21 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.21 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	48	48	64	-	464.50	-	0.00
2	10	0.16	48	48	64	-	464.50	-	0.00
3	15	0.13	40	40	64	-	464.50	-	0.00
4	20	0.18	55	55	64	-	464.50	-	0.00
5	25	0.18	55	55	64	-	464.50	-	0.00
6	30	0.19	58	58	64	-	464.50	-	0.00
7	35	0.18	55	55	64	-	464.50	-	0.00
8	40	0.19	58	58	64	-	464.50	-	0.00
9	45	0.19	58	58	64	-	464.50	-	0.00
10	50	0.18	55	55	64	-	464.50	-	0.00
11	55	0.20	59	59	64	-	464.50	-	0.00
12	60	0.19	58	58	64	-	464.50	-	0.00
13	65	0.68	205	205	64	141	464.51	141	0.00
14	70	0.68	205	346	64	282	464.52	282	0.01
15	75	0.68	205	487	64	423	464.53	423	0.01
16	80	0.44	132	555	64	491	464.53	491	0.01
17	85	1.17	352	842	64	779	464.55	779	0.02
18	90	1.29	388	1,167	64	1,103	464.58	1,103	0.03
19	95	0.93	278	1,381	64	1,317	464.59	1,317	0.03
20	100	1.29	388	1,705	64	1,642	464.61	1,642	0.04
21	105	2.03	608	2,250	64	2,186	464.65	2,186	0.05
22	110	1.78	535	2,721	64	2,657	464.68	2,657	0.06
23	115	1.54	462	3,118	64	3,054	464.71	3,054	0.07
24	120	1.66	498	3,553	64	3,489	464.74	3,489	0.08
25	125	1.78	535	4,024	64	3,960	464.77	3,960	0.09
26	130	3.13	938	4,898	64	4,834	464.83	4,834	0.11
27	135	4.10	1,231	6,065	64	6,001	464.91	6,001	0.14
28	140	2.27	681	6,683	64	6,619	464.96	6,619	0.15
29	145	6.30	1,891	8,510	64	8,446	465.08	8,446	0.19
30	150	6.91	2,074	10,520	64	10,456	465.22	10,456	0.24
31	155	8.01	2,404	12,860	64	12,797	465.38	12,797	0.29
32	160	5.20	1,561	14,358	64	14,294	465.49	14,294	0.33
33	165	0.44	132	14,425	64	14,362	465.49	14,362	0.33
34	170	0.19	58	14,420	64	14,356	465.49	14,356	0.33
35	175	0.19	58	14,414	64	14,350	465.49	14,350	0.33
36	180	0.07	22	14,372	64	14,309	465.49	14,309	0.33

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	24	24	64	-	464.50	-	0.00
2	10	0.10	29	29	64	-	464.50	-	0.00
3	15	0.10	29	29	64	-	464.50	-	0.00
4	20	0.10	29	29	64	-	464.50	-	0.00
5	25	0.10	29	29	64	-	464.50	-	0.00
6	30	0.11	34	34	64	-	464.50	-	0.00
7	35	0.11	34	34	64	-	464.50	-	0.00
8	40	0.11	34	34	64	-	464.50	-	0.00
9	45	0.11	34	34	64	-	464.50	-	0.00
10	50	0.11	34	34	64	-	464.50	-	0.00
11	55	0.11	34	34	64	-	464.50	-	0.00
12	60	0.13	38	38	64	-	464.50	-	0.00
13	65	0.13	38	38	64	-	464.50	-	0.00
14	70	0.13	38	38	64	-	464.50	-	0.00
15	75	0.13	38	38	64	-	464.50	-	0.00
16	80	0.13	38	38	64	-	464.50	-	0.00
17	85	0.13	38	38	64	-	464.50	-	0.00
18	90	0.13	38	38	64	-	464.50	-	0.00
19	95	0.13	38	38	64	-	464.50	-	0.00
20	100	0.13	38	38	64	-	464.50	-	0.00
21	105	0.13	38	38	64	-	464.50	-	0.00
22	110	0.13	38	38	64	-	464.50	-	0.00
23	115	0.13	38	38	64	-	464.50	-	0.00
24	120	0.14	43	43	64	-	464.50	-	0.00
25	125	0.13	38	38	64	-	464.50	-	0.00
26	130	0.14	43	43	64	-	464.50	-	0.00
27	135	0.14	43	43	64	-	464.50	-	0.00
28	140	0.14	43	43	64	-	464.50	-	0.00
29	145	0.14	43	43	64	-	464.50	-	0.00
30	150	0.14	43	43	64	-	464.50	-	0.00
31	155	0.14	43	43	64	-	464.50	-	0.00
32	160	0.14	43	43	64	-	464.50	-	0.00
33	165	0.16	48	48	64	-	464.50	-	0.00
34	170	0.16	48	48	64	-	464.50	-	0.00
35	175	0.16	48	48	64	-	464.50	-	0.00
36	180	0.16	48	48	64	-	464.50	-	0.00
37	185	0.16	48	48	64	-	464.50	-	0.00
38	190	0.18	53	53	64	-	464.50	-	0.00
39	195	0.18	53	53	64	-	464.50	-	0.00
40	200	0.18	53	53	64	-	464.50	-	0.00
41	205	0.19	58	58	64	-	464.50	-	0.00
42	210	0.07	22	22	64	-	464.50	-	0.00
43	215	0.23	70	70	64	6	464.50	6	0.00
44	220	0.23	70	75	64	11	464.50	11	0.00
45	225	0.39	118	129	64	65	464.50	65	0.00
46	230	0.39	118	183	64	119	464.51	119	0.00
47	235	0.55	165	284	64	220	464.52	220	0.01
48	240	0.55	165	386	64	322	464.52	322	0.01
49	245	0.71	213	535	64	471	464.53	471	0.01
50	250	0.87	261	733	64	669	464.55	669	0.02
51	255	1.03	309	978	64	914	464.56	914	0.02
52	260	1.19	357	1,271	64	1,208	464.58	1,208	0.03
53	265	1.35	405	1,613	64	1,549	464.61	1,549	0.04
54	270	1.35	405	1,954	64	1,890	464.63	1,890	0.04
55	275	1.51	453	2,343	64	2,279	464.66	2,279	0.05

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.67	501	2,780	64	2,716	464.69	2,716	0.06
57	285	1.83	549	3,265	64	3,201	464.72	3,201	0.07
58	290	1.83	549	3,750	64	3,686	464.75	3,686	0.08
59	295	1.99	597	4,283	64	4,219	464.79	4,219	0.10
60	300	2.15	645	4,864	64	4,800	464.83	4,800	0.11
61	305	2.95	884	5,685	64	5,621	464.89	5,621	0.13
62	310	3.75	1,124	6,745	64	6,681	464.96	6,681	0.15
63	315	4.23	1,268	7,949	64	7,885	465.05	7,885	0.18
64	320	4.71	1,412	9,297	64	9,233	465.14	9,233	0.21
65	325	5.50	1,651	10,884	64	10,820	465.25	10,820	0.25
66	330	6.94	2,083	12,903	64	12,839	465.39	12,839	0.29
67	335	1.03	309	13,148	64	13,085	465.40	13,085	0.30
68	340	0.14	43	13,128	64	13,064	465.40	13,064	0.30
69	345	0.10	29	13,093	64	13,029	465.40	13,029	0.30
70	350	0.08	24	13,053	64	12,989	465.40	12,989	0.30
71	355	0.05	14	13,003	64	12,939	465.39	12,939	0.30
72	360	0.03	10	12,949	64	12,885	465.39	12,885	0.30

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	16	16	192	-	464.50	-	0.00
2	30	0.03	24	24	192	-	464.50	-	0.00
3	45	0.03	24	24	192	-	464.50	-	0.00
4	60	0.03	31	31	192	-	464.50	-	0.00
5	75	0.03	24	24	192	-	464.50	-	0.00
6	90	0.03	24	24	192	-	464.50	-	0.00
7	105	0.03	24	24	192	-	464.50	-	0.00
8	120	0.03	31	31	192	-	464.50	-	0.00
9	135	0.03	31	31	192	-	464.50	-	0.00
10	150	0.03	31	31	192	-	464.50	-	0.00
11	165	0.04	39	39	192	-	464.50	-	0.00
12	180	0.04	39	39	192	-	464.50	-	0.00
13	195	0.04	39	39	192	-	464.50	-	0.00
14	210	0.04	39	39	192	-	464.50	-	0.00
15	225	0.04	39	39	192	-	464.50	-	0.00
16	240	0.05	47	47	192	-	464.50	-	0.00
17	255	0.05	47	47	192	-	464.50	-	0.00
18	270	0.06	55	55	192	-	464.50	-	0.00
19	285	0.06	55	55	192	-	464.50	-	0.00
20	300	0.07	63	63	192	-	464.50	-	0.00
21	315	0.05	47	47	192	-	464.50	-	0.00
22	330	0.06	55	55	192	-	464.50	-	0.00
23	345	0.07	63	63	192	-	464.50	-	0.00
24	360	0.07	63	63	192	-	464.50	-	0.00
25	375	0.08	71	71	192	-	464.50	-	0.00
26	390	0.08	71	71	192	-	464.50	-	0.00
27	405	0.09	79	79	192	-	464.50	-	0.00
28	420	0.09	79	79	192	-	464.50	-	0.00
29	435	0.09	79	79	192	-	464.50	-	0.00
30	450	0.10	86	86	192	-	464.50	-	0.00
31	465	0.10	94	94	192	-	464.50	-	0.00
32	480	0.11	102	102	192	-	464.50	-	0.00
33	495	0.13	118	118	192	-	464.50	-	0.00
34	510	0.13	118	118	192	-	464.50	-	0.00
35	525	0.14	126	126	192	-	464.50	-	0.00
36	540	0.15	134	134	192	-	464.50	-	0.00
37	555	0.17	149	149	192	-	464.50	-	0.00
38	570	0.17	157	157	192	-	464.50	-	0.00
39	585	0.18	165	165	192	-	464.50	-	0.00
40	600	0.19	173	173	192	-	464.50	-	0.00
41	615	0.13	118	118	192	-	464.50	-	0.00
42	630	0.13	118	118	192	-	464.50	-	0.00
43	645	0.17	157	157	192	-	464.50	-	0.00
44	660	0.17	157	157	192	-	464.50	-	0.00
45	675	0.17	149	149	192	-	464.50	-	0.00
46	690	0.17	149	149	192	-	464.50	-	0.00
47	705	0.15	134	134	192	-	464.50	-	0.00
48	720	0.16	141	141	192	-	464.50	-	0.00
49	735	0.32	289	289	192	97	464.51	97	0.00
50	750	0.44	393	490	192	298	464.52	298	0.01
51	765	0.64	575	873	192	681	464.55	681	0.02
52	780	0.75	678	1,359	192	1,168	464.58	1,168	0.03
53	795	1.22	1,095	2,262	192	2,071	464.64	2,071	0.05
54	810	1.24	1,119	3,190	192	2,998	464.71	2,998	0.07
55	825	0.31	278	3,276	192	3,084	464.71	3,084	0.07
56	840	0.33	301	3,386	192	3,194	464.72	3,194	0.07
57	855	0.71	639	3,832	192	3,641	464.75	3,641	0.08
58	870	0.65	583	4,223	192	4,032	464.78	4,032	0.09

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.67	605	4,637	192	4,445	464.81	4,445	0.10
60	900	0.61	548	4,993	192	4,802	464.83	4,802	0.11
61	915	0.55	491	5,293	192	5,101	464.85	5,101	0.12
62	930	0.48	434	5,536	192	5,344	464.87	5,344	0.12
63	945	0.16	141	5,485	192	5,293	464.87	5,293	0.12
64	960	0.18	161	5,455	192	5,263	464.86	5,263	0.12
65	975	0.03	31	5,294	192	5,103	464.85	5,103	0.12
66	990	0.03	31	5,134	192	4,943	464.84	4,943	0.11
67	1005	0.03	24	4,966	192	4,775	464.83	4,775	0.11
68	1020	0.03	24	4,798	192	4,606	464.82	4,606	0.11
69	1035	0.04	39	4,646	192	4,454	464.81	4,454	0.10
70	1050	0.04	39	4,493	192	4,302	464.80	4,302	0.10
71	1065	0.04	39	4,341	192	4,149	464.79	4,149	0.10
72	1080	0.03	31	4,181	192	3,989	464.78	3,989	0.09
73	1095	0.03	31	4,021	192	3,829	464.76	3,829	0.09
74	1110	0.03	31	3,860	192	3,669	464.75	3,669	0.08
75	1125	0.03	24	3,692	192	3,501	464.74	3,501	0.08
76	1140	0.02	16	3,516	192	3,325	464.73	3,325	0.08
77	1155	0.03	24	3,348	192	3,157	464.72	3,157	0.07
78	1170	0.03	31	3,188	192	2,996	464.71	2,996	0.07
79	1185	0.03	24	3,020	192	2,828	464.70	2,828	0.06
80	1200	0.02	16	2,844	192	2,652	464.68	2,652	0.06
81	1215	0.03	24	2,676	192	2,484	464.67	2,484	0.06
82	1230	0.03	24	2,508	192	2,316	464.66	2,316	0.05
83	1245	0.03	24	2,340	192	2,148	464.65	2,148	0.05
84	1260	0.02	16	2,164	192	1,972	464.64	1,972	0.05
85	1275	0.03	24	1,996	192	1,804	464.62	1,804	0.04
86	1290	0.02	16	1,820	192	1,628	464.61	1,628	0.04
87	1305	0.03	24	1,652	192	1,460	464.60	1,460	0.03
88	1320	0.02	16	1,476	192	1,284	464.59	1,284	0.03
89	1335	0.03	24	1,308	192	1,116	464.58	1,116	0.03
90	1350	0.02	16	1,132	192	940	464.57	940	0.02
91	1365	0.02	16	956	192	764	464.55	764	0.02
92	1380	0.02	16	780	192	588	464.54	588	0.01
93	1395	0.02	16	604	192	413	464.53	413	0.01
94	1410	0.02	16	428	192	237	464.52	237	0.01
95	1425	0.02	16	252	192	61	464.50	61	0.00
96	1440	0.02	16	76	192	-	464.50	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 5		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.95		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	4.71		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	2.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	950		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	310		
30				
31	ELEVATION OF HEADWATER	471		
32	ELEVATION OF CONCENTRATION POINT	467		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		463.5	17610	
45		464.5	19400	
46		465.5	21240	
47		466.5	23140	
48		467	24110	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 5
[3] AREA - ACRES	9.490
[4] L-FEET	950
[5] L-MILES	0.180
[6] La-FEET	310.00
[7] La-MILES	0.059
[8] ELEVATION OF HEADWATER	471
[9] ELEVATION OF CONCENTRATION POINT	467
[10] H-FEET	4
[11] S-FEET/MILE	22.2
[12] S^0.5	4.72
[13] L*LCA/S^0.5	0.002
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.05
[16] LAG TIME-MINUTES	2.8
[17] 100% OF LAG-MINUTES	2.8
[18] 200% OF LAG-MINUTES	5.7
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.27

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	9.490	1.00	1.04	1.36	9.490	1.00	1.36	2.23	9.490	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.49	SUM [7]	1.04	SUM [9]	9.49	SUM [11]	1.36	SUM [13]	9.49	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.36	0.35	0.22
FLOOD VOLUME	(cu-ft)	12,335	12,150	7,524
	(acre-ft)	0.28	0.28	0.17
REQUIRED STORAGE	(cu-ft)	9,965	8,400	646
	(acre-ft)	0.23	0.19	0.01
PEAK FLOW	(cfs)	7.12	6.08	0.65
MAXIMUM WSEL	(ft)	464.04	463.95	463.53

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.95	0.205	0.0107
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	4.71	0.496	0.1071
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	2.83	0.298	0.1551
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.49	SUM	0.2729

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.136428767

C= 0.00253

Ft=C(24-(T/60))^1.55 = 0.00253 (24-(T/60))^1.55 + 0.14 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.27
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.27	0.15	0.02	0.15	0.00
2	10	0.17	1.3	0.162	0.27	0.15	0.02	0.15	0.00
3	15	0.25	1.1	0.137	0.27	0.12	0.01	0.13	0.00
4	20	0.33	1.5	0.187	0.27	0.17	0.02	0.18	0.00
5	25	0.42	1.5	0.187	0.27	0.17	0.02	0.18	0.00
6	30	0.50	1.8	0.225	0.27	0.20	0.02	0.21	0.00
7	35	0.58	1.5	0.187	0.27	0.17	0.02	0.18	0.00
8	40	0.67	1.8	0.225	0.27	0.20	0.02	0.21	0.00
9	45	0.75	1.8	0.225	0.27	0.20	0.02	0.21	0.00
10	50	0.83	1.5	0.187	0.27	0.17	0.02	0.18	0.00
11	55	0.92	1.6	0.200	0.27	0.18	0.02	0.19	0.00
12	60	1.00	1.8	0.225	0.27	0.20	0.02	0.21	0.00
13	65	1.08	2.2	0.275	0.27	0.25	0.00	0.02	0.00
14	70	1.17	2.2	0.275	0.27	0.25	0.00	0.02	0.00
15	75	1.25	2.2	0.275	0.27	0.25	0.00	0.02	0.00
16	80	1.33	2.0	0.250	0.27	0.22	0.02	0.24	0.00
17	85	1.42	2.6	0.324	0.27	0.29	0.05	0.49	65.03
18	90	1.50	2.7	0.337	0.27	0.30	0.06	0.61	100.56
19	95	1.58	2.4	0.300	0.27	0.27	0.03	0.25	0.00
20	100	1.67	2.7	0.337	0.27	0.30	0.06	0.61	100.56
21	105	1.75	3.3	0.412	0.27	0.37	0.14	1.32	313.75
22	110	1.83	3.1	0.387	0.27	0.35	0.11	1.08	242.69
23	115	1.92	2.9	0.362	0.27	0.33	0.09	0.85	171.63
24	120	2.00	3.0	0.374	0.27	0.34	0.10	0.96	207.16
25	125	2.08	3.1	0.387	0.27	0.35	0.11	1.08	242.69
26	130	2.17	4.2	0.524	0.27	0.47	0.25	2.38	633.52
27	135	2.25	5.0	0.624	0.27	0.56	0.35	3.33	917.77
28	140	2.33	3.5	0.437	0.27	0.39	0.16	1.56	384.81
29	145	2.42	6.8	0.849	0.27	0.76	0.58	5.46	1557.32
30	150	2.50	7.3	0.911	0.27	0.82	0.64	6.06	1734.97
31	155	2.58	8.2	1.023	0.27	0.92	0.75	7.12	2054.75
32	160	2.67	5.9	0.736	0.27	0.66	0.46	4.40	1237.54
33	165	2.75	2.0	0.250	0.27	0.22	0.02	0.24	0.00
34	170	2.83	1.8	0.225	0.27	0.20	0.02	0.21	0.00
35	175	2.92	1.8	0.225	0.27	0.20	0.02	0.21	0.00
36	180	3.00	0.6	0.075	0.27	0.07	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.36
FLOOD VOLUME (acft)	0.28
FLOOD VOLUME (cuft)	12334.87
REQUIRED STORAGE (acft)	0.23
REQUIRED STORAGE (cuft)	9964.74
PEAK FLOW RATE (cfs)	7.12

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.273
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.082	0.27	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.27	0.09	0.01	0.09	0.00
3	15	0.25	0.6	0.098	0.27	0.09	0.01	0.09	0.00
4	20	0.33	0.6	0.098	0.27	0.09	0.01	0.09	0.00
5	25	0.42	0.6	0.098	0.27	0.09	0.01	0.09	0.00
6	30	0.50	0.7	0.114	0.27	0.10	0.01	0.11	0.00
7	35	0.58	0.7	0.114	0.27	0.10	0.01	0.11	0.00
8	40	0.67	0.7	0.114	0.27	0.10	0.01	0.11	0.00
9	45	0.75	0.7	0.114	0.27	0.10	0.01	0.11	0.00
10	50	0.83	0.7	0.114	0.27	0.10	0.01	0.11	0.00
11	55	0.92	0.7	0.114	0.27	0.10	0.01	0.11	0.00
12	60	1.00	0.8	0.131	0.27	0.12	0.01	0.12	0.00
13	65	1.08	0.8	0.131	0.27	0.12	0.01	0.12	0.00
14	70	1.17	0.8	0.131	0.27	0.12	0.01	0.12	0.00
15	75	1.25	0.8	0.131	0.27	0.12	0.01	0.12	0.00
16	80	1.33	0.8	0.131	0.27	0.12	0.01	0.12	0.00
17	85	1.42	0.8	0.131	0.27	0.12	0.01	0.12	0.00
18	90	1.50	0.8	0.131	0.27	0.12	0.01	0.12	0.00
19	95	1.58	0.8	0.131	0.27	0.12	0.01	0.12	0.00
20	100	1.67	0.8	0.131	0.27	0.12	0.01	0.12	0.00
21	105	1.75	0.8	0.131	0.27	0.12	0.01	0.12	0.00
22	110	1.83	0.8	0.131	0.27	0.12	0.01	0.12	0.00
23	115	1.92	0.8	0.131	0.27	0.12	0.01	0.12	0.00
24	120	2.00	0.9	0.147	0.27	0.13	0.01	0.14	0.00
25	125	2.08	0.8	0.131	0.27	0.12	0.01	0.12	0.00
26	130	2.17	0.9	0.147	0.27	0.13	0.01	0.14	0.00
27	135	2.25	0.9	0.147	0.27	0.13	0.01	0.14	0.00
28	140	2.33	0.9	0.147	0.27	0.13	0.01	0.14	0.00
29	145	2.42	0.9	0.147	0.27	0.13	0.01	0.14	0.00
30	150	2.50	0.9	0.147	0.27	0.13	0.01	0.14	0.00
31	155	2.58	0.9	0.147	0.27	0.13	0.01	0.14	0.00
32	160	2.67	0.9	0.147	0.27	0.13	0.01	0.14	0.00
33	165	2.75	1.0	0.163	0.27	0.15	0.02	0.15	0.00
34	170	2.83	1.0	0.163	0.27	0.15	0.02	0.15	0.00
35	175	2.92	1.0	0.163	0.27	0.15	0.02	0.15	0.00
36	180	3.00	1.0	0.163	0.27	0.15	0.02	0.15	0.00
37	185	3.08	1.0	0.163	0.27	0.15	0.02	0.15	0.00
38	190	3.17	1.1	0.180	0.27	0.16	0.02	0.17	0.00
39	195	3.25	1.1	0.180	0.27	0.16	0.02	0.17	0.00
40	200	3.33	1.1	0.180	0.27	0.16	0.02	0.17	0.00
41	205	3.42	1.2	0.196	0.27	0.18	0.02	0.19	0.00
42	210	3.50	1.3	0.212	0.27	0.19	0.02	0.20	0.00
43	215	3.58	1.4	0.228	0.27	0.21	0.02	0.22	0.00
44	220	3.67	1.4	0.228	0.27	0.21	0.02	0.22	0.00
45	225	3.75	1.5	0.245	0.27	0.22	0.02	0.23	0.00
46	230	3.83	1.5	0.245	0.27	0.22	0.02	0.23	0.00
47	235	3.92	1.6	0.261	0.27	0.24	0.03	0.25	0.00
48	240	4.00	1.6	0.261	0.27	0.24	0.03	0.25	0.00
49	245	4.08	1.7	0.277	0.27	0.25	0.00	0.04	0.00
50	250	4.17	1.8	0.294	0.27	0.26	0.02	0.20	0.00
51	255	4.25	1.9	0.310	0.27	0.28	0.04	0.35	24.04
52	260	4.33	2.0	0.326	0.27	0.29	0.05	0.51	70.50
53	265	4.42	2.1	0.343	0.27	0.31	0.07	0.66	116.96
54	270	4.50	2.1	0.343	0.27	0.31	0.07	0.66	116.96
55	275	4.58	2.2	0.359	0.27	0.32	0.09	0.82	163.43
56	280	4.67	2.3	0.375	0.27	0.34	0.10	0.97	209.89

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.83		
UNIT TIME-PERCENT OF LAG	176.4		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.273		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.27 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.392	0.27	0.35	0.12	1.13	256.35
58	290	4.83	2.4	0.392	0.27	0.35	0.12	1.13	256.35
59	295	4.92	2.5	0.408	0.27	0.37	0.14	1.28	302.82
60	300	5.00	2.6	0.424	0.27	0.38	0.15	1.44	349.28
61	305	5.08	3.1	0.506	0.27	0.46	0.23	2.21	581.59
62	310	5.17	3.6	0.588	0.27	0.53	0.31	2.99	813.91
63	315	5.25	3.9	0.636	0.27	0.57	0.36	3.45	953.30
64	320	5.33	4.2	0.685	0.27	0.62	0.41	3.92	1092.69
65	325	5.42	4.7	0.767	0.27	0.69	0.49	4.69	1325.00
66	330	5.50	5.6	0.914	0.27	0.82	0.64	6.08	1743.17
67	335	5.58	1.9	0.310	0.27	0.28	0.04	0.35	24.04
68	340	5.67	0.9	0.147	0.27	0.13	0.01	0.14	0.00
69	345	5.75	0.6	0.098	0.27	0.09	0.01	0.09	0.00
70	350	5.83	0.5	0.082	0.27	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.27	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.27	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.35
FLOOD VOLUME (acft)	0.28
FLOOD VOLUME (cuft)	12149.95
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8400.27
PEAK FLOW RATE (cfs)	6.08

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.482	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.476	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.471	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.465	0.032	0.004	0.03	0.00
5	75	1.25	0.3	0.027	0.460	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.454	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.449	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.443	0.032	0.004	0.03	0.00
9	135	2.25	0.4	0.036	0.438	0.032	0.004	0.03	0.00
10	150	2.50	0.4	0.036	0.433	0.032	0.004	0.03	0.00
11	165	2.75	0.5	0.045	0.427	0.040	0.004	0.04	0.00
12	180	3.00	0.5	0.045	0.422	0.040	0.004	0.04	0.00
13	195	3.25	0.5	0.045	0.417	0.040	0.004	0.04	0.00
14	210	3.50	0.5	0.045	0.412	0.040	0.004	0.04	0.00
15	225	3.75	0.5	0.045	0.407	0.040	0.004	0.04	0.00
16	240	4.00	0.6	0.054	0.401	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.396	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.391	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.386	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.381	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.376	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.371	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.367	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.362	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.357	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.352	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.347	0.080	0.009	0.08	0.00
28	420	7.00	1.0	0.089	0.343	0.080	0.009	0.08	0.00
29	435	7.25	1.0	0.089	0.338	0.080	0.009	0.08	0.00
30	450	7.50	1.1	0.098	0.334	0.088	0.010	0.09	0.00
31	465	7.75	1.2	0.107	0.329	0.096	0.011	0.10	0.00
32	480	8.00	1.3	0.116	0.324	0.104	0.012	0.11	0.00
33	495	8.25	1.5	0.134	0.320	0.120	0.013	0.13	0.00
34	510	8.50	1.5	0.134	0.315	0.120	0.013	0.13	0.00
35	525	8.75	1.6	0.143	0.311	0.128	0.014	0.14	0.00
36	540	9.00	1.7	0.152	0.307	0.136	0.015	0.14	0.00
37	555	9.25	1.9	0.169	0.302	0.153	0.017	0.16	0.00
38	570	9.50	2.0	0.178	0.298	0.161	0.018	0.17	0.00
39	585	9.75	2.1	0.187	0.294	0.169	0.019	0.18	0.00
40	600	10.00	2.2	0.196	0.290	0.177	0.020	0.19	0.00
41	615	10.25	1.5	0.134	0.285	0.120	0.013	0.13	0.00
42	630	10.50	1.5	0.134	0.281	0.120	0.013	0.13	0.00
43	645	10.75	2.0	0.178	0.277	0.161	0.018	0.17	0.00
44	660	11.00	2.0	0.178	0.273	0.161	0.018	0.17	0.00
45	675	11.25	1.9	0.169	0.269	0.153	0.017	0.16	0.00
46	690	11.50	1.9	0.169	0.265	0.153	0.017	0.16	0.00
47	705	11.75	1.7	0.152	0.261	0.136	0.015	0.14	0.00
48	720	12.00	1.8	0.161	0.257	0.145	0.016	0.15	0.00
49	735	12.25	2.5	0.223	0.253	0.201	0.022	0.21	0.00
50	750	12.50	2.6	0.232	0.250	0.209	0.023	0.22	0.00
51	765	12.75	2.8	0.250	0.246	0.225	0.004	0.04	0.00
52	780	13.00	2.9	0.259	0.242	0.233	0.017	0.16	0.00
53	795	13.25	3.4	0.303	0.239	0.273	0.065	0.61	307.33
54	810	13.50	3.4	0.303	0.235	0.273	0.068	0.65	338.20
55	825	13.75	2.3	0.205	0.231	0.185	0.021	0.19	0.00
56	840	14.00	2.3	0.205	0.228	0.185	0.021	0.19	0.00
57	855	14.25	2.7	0.241	0.224	0.217	0.016	0.16	0.00
58	870	14.50	2.6	0.232	0.221	0.209	0.011	0.10	0.00
59	885	14.75	2.6	0.232	0.218	0.209	0.014	0.14	0.00
60	900	15.00	2.5	0.223	0.214	0.201	0.009	0.08	0.00
61	915	15.25	2.4	0.214	0.211	0.193	0.003	0.03	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent	in/hr	in/hr				
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.208	0.185	0.021	0.19	0.00
63	945	15.75	1.9	0.169	0.205	0.153	0.017	0.16	0.00
64	960	16.00	1.9	0.169	0.201	0.153	0.017	0.16	0.00
65	975	16.25	0.4	0.036	0.198	0.032	0.004	0.03	0.00
66	990	16.50	0.4	0.036	0.195	0.032	0.004	0.03	0.00
67	1005	16.75	0.3	0.027	0.192	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.189	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.187	0.040	0.004	0.04	0.00
70	1050	17.50	0.5	0.045	0.184	0.040	0.004	0.04	0.00
71	1065	17.75	0.5	0.045	0.181	0.040	0.004	0.04	0.00
72	1080	18.00	0.4	0.036	0.178	0.032	0.004	0.03	0.00
73	1095	18.25	0.4	0.036	0.176	0.032	0.004	0.03	0.00
74	1110	18.50	0.4	0.036	0.173	0.032	0.004	0.03	0.00
75	1125	18.75	0.3	0.027	0.171	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.168	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.166	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.164	0.032	0.004	0.03	0.00
79	1185	19.75	0.3	0.027	0.161	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.159	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.157	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.155	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.153	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.151	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.149	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.148	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.146	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.145	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.143	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.142	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.141	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.139	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.138	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.138	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.137	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.137	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.22
FLOOD VOLUME (acft)	0.17
FLOOD VOLUME (cuft)	7524.21
REQUIRED STORAGE (acft)	0.01
REQUIRED STORAGE (cuft)	645.53
PEAK FLOW (cfs)	0.65

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
463.5	0	0		17610	0	0	0.00
464.5	1	1	1790	19400	18505	18505	0.42
465.5	1	2	1840	21240	20320	38825	0.89
466.5	1	3	1900	23140	22190	61015	1.40
467	0.5	3.5	970	24110	11813	72828	1.67

PERCOLATION CALCULATIONS

PERCOLATION RATE	0.67 in/hr	0.27 cfs

MAXWELL IV DRYWELLS

NUMBER USED	0	
RATE/DRYWELL	0 cfs	
TOTAL DISSIPATED		0 cfs

TOTAL PERCOLATION RATE 0.27 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.15	46	46	82	-	463.50	-	0.00
2	10	0.15	46	46	82	-	463.50	-	0.00
3	15	0.13	39	39	82	-	463.50	-	0.00
4	20	0.18	53	53	82	-	463.50	-	0.00
5	25	0.18	53	53	82	-	463.50	-	0.00
6	30	0.21	64	64	82	-	463.50	-	0.00
7	35	0.18	53	53	82	-	463.50	-	0.00
8	40	0.21	64	64	82	-	463.50	-	0.00
9	45	0.21	64	64	82	-	463.50	-	0.00
10	50	0.18	53	53	82	-	463.50	-	0.00
11	55	0.19	57	57	82	-	463.50	-	0.00
12	60	0.21	64	64	82	-	463.50	-	0.00
13	65	0.02	5	5	82	-	463.50	-	0.00
14	70	0.02	5	5	82	-	463.50	-	0.00
15	75	0.02	5	5	82	-	463.50	-	0.00
16	80	0.24	71	71	82	-	463.50	-	0.00
17	85	0.49	147	147	82	65	463.50	65	0.00
18	90	0.61	182	248	82	166	463.51	166	0.00
19	95	0.25	76	242	82	160	463.51	160	0.00
20	100	0.61	182	342	82	260	463.51	260	0.01
21	105	1.32	396	656	82	574	463.53	574	0.01
22	110	1.08	325	899	82	817	463.54	817	0.02
23	115	0.85	254	1,070	82	988	463.55	988	0.02
24	120	0.96	289	1,277	82	1,195	463.56	1,195	0.03
25	125	1.08	325	1,520	82	1,438	463.58	1,438	0.03
26	130	2.38	715	2,153	82	2,072	463.61	2,072	0.05
27	135	3.33	1,000	3,071	82	2,989	463.66	2,989	0.07
28	140	1.56	467	3,456	82	3,374	463.68	3,374	0.08
29	145	5.46	1,639	5,013	82	4,931	463.77	4,931	0.11
30	150	6.06	1,817	6,748	82	6,666	463.86	6,666	0.15
31	155	7.12	2,137	8,803	82	8,721	463.97	8,721	0.20
32	160	4.40	1,319	10,041	82	9,959	464.04	9,959	0.23
33	165	0.24	71	10,030	82	9,948	464.04	9,948	0.23
34	170	0.21	64	10,012	82	9,930	464.04	9,930	0.23
35	175	0.21	64	9,994	82	9,912	464.04	9,912	0.23
36	180	0.07	21	9,933	82	9,851	464.03	9,851	0.23

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	23	23	82	-	463.50	-	0.00
2	10	0.09	28	28	82	-	463.50	-	0.00
3	15	0.09	28	28	82	-	463.50	-	0.00
4	20	0.09	28	28	82	-	463.50	-	0.00
5	25	0.09	28	28	82	-	463.50	-	0.00
6	30	0.11	33	33	82	-	463.50	-	0.00
7	35	0.11	33	33	82	-	463.50	-	0.00
8	40	0.11	33	33	82	-	463.50	-	0.00
9	45	0.11	33	33	82	-	463.50	-	0.00
10	50	0.11	33	33	82	-	463.50	-	0.00
11	55	0.11	33	33	82	-	463.50	-	0.00
12	60	0.12	37	37	82	-	463.50	-	0.00
13	65	0.12	37	37	82	-	463.50	-	0.00
14	70	0.12	37	37	82	-	463.50	-	0.00
15	75	0.12	37	37	82	-	463.50	-	0.00
16	80	0.12	37	37	82	-	463.50	-	0.00
17	85	0.12	37	37	82	-	463.50	-	0.00
18	90	0.12	37	37	82	-	463.50	-	0.00
19	95	0.12	37	37	82	-	463.50	-	0.00
20	100	0.12	37	37	82	-	463.50	-	0.00
21	105	0.12	37	37	82	-	463.50	-	0.00
22	110	0.12	37	37	82	-	463.50	-	0.00
23	115	0.12	37	37	82	-	463.50	-	0.00
24	120	0.14	42	42	82	-	463.50	-	0.00
25	125	0.12	37	37	82	-	463.50	-	0.00
26	130	0.14	42	42	82	-	463.50	-	0.00
27	135	0.14	42	42	82	-	463.50	-	0.00
28	140	0.14	42	42	82	-	463.50	-	0.00
29	145	0.14	42	42	82	-	463.50	-	0.00
30	150	0.14	42	42	82	-	463.50	-	0.00
31	155	0.14	42	42	82	-	463.50	-	0.00
32	160	0.14	42	42	82	-	463.50	-	0.00
33	165	0.15	46	46	82	-	463.50	-	0.00
34	170	0.15	46	46	82	-	463.50	-	0.00
35	175	0.15	46	46	82	-	463.50	-	0.00
36	180	0.15	46	46	82	-	463.50	-	0.00
37	185	0.15	46	46	82	-	463.50	-	0.00
38	190	0.17	51	51	82	-	463.50	-	0.00
39	195	0.17	51	51	82	-	463.50	-	0.00
40	200	0.17	51	51	82	-	463.50	-	0.00
41	205	0.19	56	56	82	-	463.50	-	0.00
42	210	0.20	60	60	82	-	463.50	-	0.00
43	215	0.22	65	65	82	-	463.50	-	0.00
44	220	0.22	65	65	82	-	463.50	-	0.00
45	225	0.23	70	70	82	-	463.50	-	0.00
46	230	0.23	70	70	82	-	463.50	-	0.00
47	235	0.25	74	74	82	-	463.50	-	0.00
48	240	0.25	74	74	82	-	463.50	-	0.00
49	245	0.04	13	13	82	-	463.50	-	0.00
50	250	0.20	60	60	82	-	463.50	-	0.00
51	255	0.35	106	106	82	24	463.50	24	0.00
52	260	0.51	152	176	82	95	463.51	95	0.00
53	265	0.66	199	293	82	211	463.51	211	0.00
54	270	0.66	199	410	82	328	463.52	328	0.01
55	275	0.82	245	574	82	492	463.53	492	0.01

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.97	292	784	82	702	463.54	702	0.02
57	285	1.13	338	1,040	82	958	463.55	958	0.02
58	290	1.13	338	1,296	82	1,214	463.57	1,214	0.03
59	295	1.28	385	1,599	82	1,517	463.58	1,517	0.03
60	300	1.44	431	1,949	82	1,867	463.60	1,867	0.04
61	305	2.21	664	2,530	82	2,448	463.63	2,448	0.06
62	310	2.99	896	3,344	82	3,262	463.68	3,262	0.07
63	315	3.45	1,035	4,297	82	4,215	463.73	4,215	0.10
64	320	3.92	1,175	5,390	82	5,308	463.79	5,308	0.12
65	325	4.69	1,407	6,715	82	6,633	463.86	6,633	0.15
66	330	6.08	1,825	8,458	82	8,376	463.95	8,376	0.19
67	335	0.35	106	8,482	82	8,400	463.95	8,400	0.19
68	340	0.14	42	8,442	82	8,360	463.95	8,360	0.19
69	345	0.09	28	8,388	82	8,306	463.95	8,306	0.19
70	350	0.08	23	8,329	82	8,247	463.95	8,247	0.19
71	355	0.05	14	8,261	82	8,179	463.94	8,179	0.19
72	360	0.03	9	8,189	82	8,107	463.94	8,107	0.19

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	15	15	246	-	463.50	-	0.00
2	30	0.03	23	23	246	-	463.50	-	0.00
3	45	0.03	23	23	246	-	463.50	-	0.00
4	60	0.03	30	30	246	-	463.50	-	0.00
5	75	0.03	23	23	246	-	463.50	-	0.00
6	90	0.03	23	23	246	-	463.50	-	0.00
7	105	0.03	23	23	246	-	463.50	-	0.00
8	120	0.03	30	30	246	-	463.50	-	0.00
9	135	0.03	30	30	246	-	463.50	-	0.00
10	150	0.03	30	30	246	-	463.50	-	0.00
11	165	0.04	38	38	246	-	463.50	-	0.00
12	180	0.04	38	38	246	-	463.50	-	0.00
13	195	0.04	38	38	246	-	463.50	-	0.00
14	210	0.04	38	38	246	-	463.50	-	0.00
15	225	0.04	38	38	246	-	463.50	-	0.00
16	240	0.05	46	46	246	-	463.50	-	0.00
17	255	0.05	46	46	246	-	463.50	-	0.00
18	270	0.06	53	53	246	-	463.50	-	0.00
19	285	0.06	53	53	246	-	463.50	-	0.00
20	300	0.07	61	61	246	-	463.50	-	0.00
21	315	0.05	46	46	246	-	463.50	-	0.00
22	330	0.06	53	53	246	-	463.50	-	0.00
23	345	0.07	61	61	246	-	463.50	-	0.00
24	360	0.07	61	61	246	-	463.50	-	0.00
25	375	0.08	69	69	246	-	463.50	-	0.00
26	390	0.08	69	69	246	-	463.50	-	0.00
27	405	0.08	76	76	246	-	463.50	-	0.00
28	420	0.08	76	76	246	-	463.50	-	0.00
29	435	0.08	76	76	246	-	463.50	-	0.00
30	450	0.09	84	84	246	-	463.50	-	0.00
31	465	0.10	91	91	246	-	463.50	-	0.00
32	480	0.11	99	99	246	-	463.50	-	0.00
33	495	0.13	114	114	246	-	463.50	-	0.00
34	510	0.13	114	114	246	-	463.50	-	0.00
35	525	0.14	122	122	246	-	463.50	-	0.00
36	540	0.14	130	130	246	-	463.50	-	0.00
37	555	0.16	145	145	246	-	463.50	-	0.00
38	570	0.17	152	152	246	-	463.50	-	0.00
39	585	0.18	160	160	246	-	463.50	-	0.00
40	600	0.19	168	168	246	-	463.50	-	0.00
41	615	0.13	114	114	246	-	463.50	-	0.00
42	630	0.13	114	114	246	-	463.50	-	0.00
43	645	0.17	152	152	246	-	463.50	-	0.00
44	660	0.17	152	152	246	-	463.50	-	0.00
45	675	0.16	145	145	246	-	463.50	-	0.00
46	690	0.16	145	145	246	-	463.50	-	0.00
47	705	0.14	130	130	246	-	463.50	-	0.00
48	720	0.15	137	137	246	-	463.50	-	0.00
49	735	0.21	190	190	246	-	463.50	-	0.00
50	750	0.22	198	198	246	-	463.50	-	0.00
51	765	0.04	33	33	246	-	463.50	-	0.00
52	780	0.16	141	141	246	-	463.50	-	0.00
53	795	0.61	553	553	246	307	463.52	307	0.01
54	810	0.65	584	891	246	646	463.53	646	0.01
55	825	0.19	175	821	246	575	463.53	575	0.01
56	840	0.19	175	750	246	504	463.53	504	0.01
57	855	0.16	141	645	246	399	463.52	399	0.01
58	870	0.10	94	493	246	248	463.51	248	0.01

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.14	123	371	246	125	463.51	125	0.00
60	900	0.08	75	200	246	-	463.50	-	0.00
61	915	0.03	27	27	246	-	463.50	-	0.00
62	930	0.19	175	175	246	-	463.50	-	0.00
63	945	0.16	145	145	246	-	463.50	-	0.00
64	960	0.16	145	145	246	-	463.50	-	0.00
65	975	0.03	30	30	246	-	463.50	-	0.00
66	990	0.03	30	30	246	-	463.50	-	0.00
67	1005	0.03	23	23	246	-	463.50	-	0.00
68	1020	0.03	23	23	246	-	463.50	-	0.00
69	1035	0.04	38	38	246	-	463.50	-	0.00
70	1050	0.04	38	38	246	-	463.50	-	0.00
71	1065	0.04	38	38	246	-	463.50	-	0.00
72	1080	0.03	30	30	246	-	463.50	-	0.00
73	1095	0.03	30	30	246	-	463.50	-	0.00
74	1110	0.03	30	30	246	-	463.50	-	0.00
75	1125	0.03	23	23	246	-	463.50	-	0.00
76	1140	0.02	15	15	246	-	463.50	-	0.00
77	1155	0.03	23	23	246	-	463.50	-	0.00
78	1170	0.03	30	30	246	-	463.50	-	0.00
79	1185	0.03	23	23	246	-	463.50	-	0.00
80	1200	0.02	15	15	246	-	463.50	-	0.00
81	1215	0.03	23	23	246	-	463.50	-	0.00
82	1230	0.03	23	23	246	-	463.50	-	0.00
83	1245	0.03	23	23	246	-	463.50	-	0.00
84	1260	0.02	15	15	246	-	463.50	-	0.00
85	1275	0.03	23	23	246	-	463.50	-	0.00
86	1290	0.02	15	15	246	-	463.50	-	0.00
87	1305	0.03	23	23	246	-	463.50	-	0.00
88	1320	0.02	15	15	246	-	463.50	-	0.00
89	1335	0.03	23	23	246	-	463.50	-	0.00
90	1350	0.02	15	15	246	-	463.50	-	0.00
91	1365	0.02	15	15	246	-	463.50	-	0.00
92	1380	0.02	15	15	246	-	463.50	-	0.00
93	1395	0.02	15	15	246	-	463.50	-	0.00
94	1410	0.02	15	15	246	-	463.50	-	0.00
95	1425	0.02	15	15	246	-	463.50	-	0.00
96	1440	0.02	15	15	246	-	463.50	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 1		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.18		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	1000		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	15		
30				
31	ELEVATION OF HEADWATER	471.5		
32	ELEVATION OF CONCENTRATION POINT	468.8		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	3025	
45		466	3700	
46		467	4430	
47		468	5215	
48		468.5	5630	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 1
[3] AREA - ACRES	2.010
[4] L-FEET	1000
[5] L-MILES	0.189
[6] La-FEET	15.00
[7] La-MILES	0.003
[8] ELEVATION OF HEADWATER	471.5
[9] ELEVATION OF CONCENTRATION POINT	468.8
[10] H-FEET	2.7
[11] S-FEET/MILE	14.3
[12] S^0.5	3.78
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.0
[17] 100% OF LAG-MINUTES	1.0
[18] 200% OF LAG-MINUTES	2.0
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.05

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	2.010	1.00	2.12	2.78	2.010	1.00	2.78	4.47	2.010	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	2.01	SUM [7]	2.12	SUM [9]	2.01	SUM [11]	2.78	SUM [13]	2.01	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.39	1.40	1.43
FLOOD VOLUME	(cu-ft)	10,165	10,196	10,445
	(acre-ft)	0.23	0.23	0.24
REQUIRED STORAGE	(cu-ft)	9,580	9,148	8,100
	(acre-ft)	0.22	0.21	0.19
PEAK FLOW	(cfs)	3.70	3.26	0.80
MAXIMUM WSEL	(ft)	467.45	467.36	467.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.18	0.587	0.0305
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	0.00	0.000	0.0000
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.83	0.413	0.2147
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		2.01	SUM	0.2453

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.122626866

C= 0.00227

Ft=C(24-(T/60))^1.55 = 0.00227 (24-(T/60))^1.55 + 0.12 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.25
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.25	0.30	0.09	0.17	37.46
2	10	0.17	1.3	0.331	0.25	0.30	0.09	0.17	37.46
3	15	0.25	1.1	0.280	0.25	0.25	0.03	0.07	6.78
4	20	0.33	1.5	0.382	0.25	0.34	0.14	0.27	68.14
5	25	0.42	1.5	0.382	0.25	0.34	0.14	0.27	68.14
6	30	0.50	1.8	0.458	0.25	0.41	0.21	0.43	114.16
7	35	0.58	1.5	0.382	0.25	0.34	0.14	0.27	68.14
8	40	0.67	1.8	0.458	0.25	0.41	0.21	0.43	114.16
9	45	0.75	1.8	0.458	0.25	0.41	0.21	0.43	114.16
10	50	0.83	1.5	0.382	0.25	0.34	0.14	0.27	68.14
11	55	0.92	1.6	0.407	0.25	0.37	0.16	0.33	83.48
12	60	1.00	1.8	0.458	0.25	0.41	0.21	0.43	114.16
13	65	1.08	2.2	0.560	0.25	0.50	0.31	0.63	175.52
14	70	1.17	2.2	0.560	0.25	0.50	0.31	0.63	175.52
15	75	1.25	2.2	0.560	0.25	0.50	0.31	0.63	175.52
16	80	1.33	2.0	0.509	0.25	0.46	0.26	0.53	144.84
17	85	1.42	2.6	0.661	0.25	0.60	0.42	0.84	236.89
18	90	1.50	2.7	0.687	0.25	0.62	0.44	0.89	252.23
19	95	1.58	2.4	0.611	0.25	0.55	0.37	0.73	206.21
20	100	1.67	2.7	0.687	0.25	0.62	0.44	0.89	252.23
21	105	1.75	3.3	0.840	0.25	0.76	0.59	1.19	344.27
22	110	1.83	3.1	0.789	0.25	0.71	0.54	1.09	313.59
23	115	1.92	2.9	0.738	0.25	0.66	0.49	0.99	282.91
24	120	2.00	3.0	0.763	0.25	0.69	0.52	1.04	298.25
25	125	2.08	3.1	0.789	0.25	0.71	0.54	1.09	313.59
26	130	2.17	4.2	1.068	0.25	0.96	0.82	1.65	482.33
27	135	2.25	5.0	1.272	0.25	1.14	1.03	2.06	605.05
28	140	2.33	3.5	0.890	0.25	0.80	0.65	1.30	374.95
29	145	2.42	6.8	1.730	0.25	1.56	1.48	2.98	881.18
30	150	2.50	7.3	1.857	0.25	1.67	1.61	3.24	957.88
31	155	2.58	8.2	2.086	0.25	1.88	1.84	3.70	1095.94
32	160	2.67	5.9	1.501	0.25	1.35	1.26	2.52	743.12
33	165	2.75	2.0	0.509	0.25	0.46	0.26	0.53	144.84
34	170	2.83	1.8	0.458	0.25	0.41	0.21	0.43	114.16
35	175	2.92	1.8	0.458	0.25	0.41	0.21	0.43	114.16
36	180	3.00	0.6	0.153	0.25	0.14	0.02	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.39
FLOOD VOLUME (acft)	0.23
FLOOD VOLUME (cuft)	10165.45
REQUIRED STORAGE (acft)	0.22
REQUIRED STORAGE (cuft)	9579.59
PEAK FLOW RATE (cfs)	3.70

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.245
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.167	0.25	0.15	0.02	0.03	0.00
2	10	0.17	0.6	0.200	0.25	0.18	0.02	0.04	0.00
3	15	0.25	0.6	0.200	0.25	0.18	0.02	0.04	0.00
4	20	0.33	0.6	0.200	0.25	0.18	0.02	0.04	0.00
5	25	0.42	0.6	0.200	0.25	0.18	0.02	0.04	0.00
6	30	0.50	0.7	0.234	0.25	0.21	0.02	0.05	0.01
7	35	0.58	0.7	0.234	0.25	0.21	0.02	0.05	0.01
8	40	0.67	0.7	0.234	0.25	0.21	0.02	0.05	0.01
9	45	0.75	0.7	0.234	0.25	0.21	0.02	0.05	0.01
10	50	0.83	0.7	0.234	0.25	0.21	0.02	0.05	0.01
11	55	0.92	0.7	0.234	0.25	0.21	0.02	0.05	0.01
12	60	1.00	0.8	0.267	0.25	0.24	0.02	0.04	0.00
13	65	1.08	0.8	0.267	0.25	0.24	0.02	0.04	0.00
14	70	1.17	0.8	0.267	0.25	0.24	0.02	0.04	0.00
15	75	1.25	0.8	0.267	0.25	0.24	0.02	0.04	0.00
16	80	1.33	0.8	0.267	0.25	0.24	0.02	0.04	0.00
17	85	1.42	0.8	0.267	0.25	0.24	0.02	0.04	0.00
18	90	1.50	0.8	0.267	0.25	0.24	0.02	0.04	0.00
19	95	1.58	0.8	0.267	0.25	0.24	0.02	0.04	0.00
20	100	1.67	0.8	0.267	0.25	0.24	0.02	0.04	0.00
21	105	1.75	0.8	0.267	0.25	0.24	0.02	0.04	0.00
22	110	1.83	0.8	0.267	0.25	0.24	0.02	0.04	0.00
23	115	1.92	0.8	0.267	0.25	0.24	0.02	0.04	0.00
24	120	2.00	0.9	0.300	0.25	0.27	0.05	0.11	19.08
25	125	2.08	0.8	0.267	0.25	0.24	0.02	0.04	0.00
26	130	2.17	0.9	0.300	0.25	0.27	0.05	0.11	19.08
27	135	2.25	0.9	0.300	0.25	0.27	0.05	0.11	19.08
28	140	2.33	0.9	0.300	0.25	0.27	0.05	0.11	19.08
29	145	2.42	0.9	0.300	0.25	0.27	0.05	0.11	19.08
30	150	2.50	0.9	0.300	0.25	0.27	0.05	0.11	19.08
31	155	2.58	0.9	0.300	0.25	0.27	0.05	0.11	19.08
32	160	2.67	0.9	0.300	0.25	0.27	0.05	0.11	19.08
33	165	2.75	1.0	0.334	0.25	0.30	0.09	0.18	39.20
34	170	2.83	1.0	0.334	0.25	0.30	0.09	0.18	39.20
35	175	2.92	1.0	0.334	0.25	0.30	0.09	0.18	39.20
36	180	3.00	1.0	0.334	0.25	0.30	0.09	0.18	39.20
37	185	3.08	1.0	0.334	0.25	0.30	0.09	0.18	39.20
38	190	3.17	1.1	0.367	0.25	0.33	0.12	0.24	59.31
39	195	3.25	1.1	0.367	0.25	0.33	0.12	0.24	59.31
40	200	3.33	1.1	0.367	0.25	0.33	0.12	0.24	59.31
41	205	3.42	1.2	0.400	0.25	0.36	0.16	0.31	79.43
42	210	3.50	1.3	0.434	0.25	0.39	0.19	0.38	99.55
43	215	3.58	1.4	0.467	0.25	0.42	0.22	0.45	119.66
44	220	3.67	1.4	0.467	0.25	0.42	0.22	0.45	119.66
45	225	3.75	1.5	0.500	0.25	0.45	0.26	0.51	139.78
46	230	3.83	1.5	0.500	0.25	0.45	0.26	0.51	139.78
47	235	3.92	1.6	0.534	0.25	0.48	0.29	0.58	159.89
48	240	4.00	1.6	0.534	0.25	0.48	0.29	0.58	159.89
49	245	4.08	1.7	0.567	0.25	0.51	0.32	0.65	180.01
50	250	4.17	1.8	0.600	0.25	0.54	0.36	0.71	200.13
51	255	4.25	1.9	0.634	0.25	0.57	0.39	0.78	220.24
52	260	4.33	2.0	0.667	0.25	0.60	0.42	0.85	240.36
53	265	4.42	2.1	0.701	0.25	0.63	0.46	0.92	260.48
54	270	4.50	2.1	0.701	0.25	0.63	0.46	0.92	260.48
55	275	4.58	2.2	0.734	0.25	0.66	0.49	0.98	280.59
56	280	4.67	2.3	0.767	0.25	0.69	0.52	1.05	300.71

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.00		
UNIT TIME-PERCENT OF LAG	502.5		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.245		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.05 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.801	0.25	0.72	0.56	1.12	320.82
58	290	4.83	2.4	0.801	0.25	0.72	0.56	1.12	320.82
59	295	4.92	2.5	0.834	0.25	0.75	0.59	1.18	340.94
60	300	5.00	2.6	0.867	0.25	0.78	0.62	1.25	361.06
61	305	5.08	3.1	1.034	0.25	0.93	0.79	1.59	461.64
62	310	5.17	3.6	1.201	0.25	1.08	0.96	1.92	562.22
63	315	5.25	3.9	1.301	0.25	1.17	1.06	2.12	622.56
64	320	5.33	4.2	1.401	0.25	1.26	1.16	2.32	682.91
65	325	5.42	4.7	1.568	0.25	1.41	1.32	2.66	783.49
66	330	5.50	5.6	1.868	0.25	1.68	1.62	3.26	964.54
67	335	5.58	1.9	0.634	0.25	0.57	0.39	0.78	220.24
68	340	5.67	0.9	0.300	0.25	0.27	0.05	0.11	19.08
69	345	5.75	0.6	0.200	0.25	0.18	0.02	0.04	0.00
70	350	5.83	0.5	0.167	0.25	0.15	0.02	0.03	0.00
71	355	5.92	0.3	0.100	0.25	0.09	0.01	0.02	0.00
72	360	6.00	0.2	0.067	0.25	0.06	0.01	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.40
FLOOD VOLUME (acft)	0.23
FLOOD VOLUME (cuft)	10195.68
REQUIRED STORAGE (acft)	0.21
REQUIRED STORAGE (cuft)	9147.59
PEAK FLOW RATE (cfs)	3.26

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.433	0.032	0.004	0.01	0.00
2	30	0.50	0.3	0.054	0.428	0.048	0.005	0.01	0.00
3	45	0.75	0.3	0.054	0.423	0.048	0.005	0.01	0.00
4	60	1.00	0.4	0.072	0.418	0.064	0.007	0.01	0.00
5	75	1.25	0.3	0.054	0.413	0.048	0.005	0.01	0.00
6	90	1.50	0.3	0.054	0.408	0.048	0.005	0.01	0.00
7	105	1.75	0.3	0.054	0.403	0.048	0.005	0.01	0.00
8	120	2.00	0.4	0.072	0.399	0.064	0.007	0.01	0.00
9	135	2.25	0.4	0.072	0.394	0.064	0.007	0.01	0.00
10	150	2.50	0.4	0.072	0.389	0.064	0.007	0.01	0.00
11	165	2.75	0.5	0.089	0.384	0.080	0.009	0.02	0.00
12	180	3.00	0.5	0.089	0.379	0.080	0.009	0.02	0.00
13	195	3.25	0.5	0.089	0.375	0.080	0.009	0.02	0.00
14	210	3.50	0.5	0.089	0.370	0.080	0.009	0.02	0.00
15	225	3.75	0.5	0.089	0.365	0.080	0.009	0.02	0.00
16	240	4.00	0.6	0.107	0.361	0.097	0.011	0.02	0.00
17	255	4.25	0.6	0.107	0.356	0.097	0.011	0.02	0.00
18	270	4.50	0.7	0.125	0.352	0.113	0.013	0.03	0.00
19	285	4.75	0.7	0.125	0.347	0.113	0.013	0.03	0.00
20	300	5.00	0.8	0.143	0.343	0.129	0.014	0.03	0.00
21	315	5.25	0.6	0.107	0.338	0.097	0.011	0.02	0.00
22	330	5.50	0.7	0.125	0.334	0.113	0.013	0.03	0.00
23	345	5.75	0.8	0.143	0.330	0.129	0.014	0.03	0.00
24	360	6.00	0.8	0.143	0.325	0.129	0.014	0.03	0.00
25	375	6.25	0.9	0.161	0.321	0.145	0.016	0.03	0.00
26	390	6.50	0.9	0.161	0.317	0.145	0.016	0.03	0.00
27	405	6.75	1.0	0.179	0.312	0.161	0.018	0.04	0.00
28	420	7.00	1.0	0.179	0.308	0.161	0.018	0.04	0.00
29	435	7.25	1.0	0.179	0.304	0.161	0.018	0.04	0.00
30	450	7.50	1.1	0.197	0.300	0.177	0.020	0.04	0.00
31	465	7.75	1.2	0.215	0.296	0.193	0.021	0.04	0.00
32	480	8.00	1.3	0.232	0.292	0.209	0.023	0.05	0.00
33	495	8.25	1.5	0.268	0.288	0.241	0.027	0.05	6.29
34	510	8.50	1.5	0.268	0.284	0.241	0.027	0.05	6.29
35	525	8.75	1.6	0.286	0.280	0.257	0.007	0.01	0.00
36	540	9.00	1.7	0.304	0.276	0.274	0.028	0.06	9.01
37	555	9.25	1.9	0.340	0.272	0.306	0.068	0.14	80.76
38	570	9.50	2.0	0.358	0.268	0.322	0.090	0.18	120.10
39	585	9.75	2.1	0.375	0.264	0.338	0.111	0.22	159.37
40	600	10.00	2.2	0.393	0.260	0.354	0.133	0.27	198.58
41	615	10.25	1.5	0.268	0.256	0.241	0.012	0.02	0.00
42	630	10.50	1.5	0.268	0.253	0.241	0.015	0.03	0.00
43	645	10.75	2.0	0.358	0.249	0.322	0.109	0.22	154.08
44	660	11.00	2.0	0.358	0.245	0.322	0.112	0.23	160.67
45	675	11.25	1.9	0.340	0.242	0.306	0.098	0.20	134.85
46	690	11.50	1.9	0.340	0.238	0.306	0.101	0.20	141.31
47	705	11.75	1.7	0.304	0.235	0.274	0.069	0.14	83.00
48	720	12.00	1.8	0.322	0.231	0.290	0.091	0.18	121.66
49	735	12.25	2.5	0.447	0.228	0.402	0.219	0.44	354.32
50	750	12.50	2.6	0.465	0.224	0.418	0.240	0.48	392.84
51	765	12.75	2.8	0.501	0.221	0.451	0.280	0.56	463.63
52	780	13.00	2.9	0.519	0.218	0.467	0.301	0.60	502.00
53	795	13.25	3.4	0.608	0.214	0.547	0.394	0.79	669.68
54	810	13.50	3.4	0.608	0.211	0.547	0.397	0.80	675.55
55	825	13.75	2.3	0.411	0.208	0.370	0.203	0.41	325.56
56	840	14.00	2.3	0.411	0.205	0.370	0.206	0.42	331.29
57	855	14.25	2.7	0.483	0.202	0.434	0.281	0.57	466.31
58	870	14.50	2.6	0.465	0.199	0.418	0.266	0.54	439.54
59	885	14.75	2.6	0.465	0.196	0.418	0.269	0.54	445.03
60	900	15.00	2.5	0.447	0.193	0.402	0.254	0.51	418.10
61	915	15.25	2.4	0.429	0.190	0.386	0.240	0.48	391.08
62	930	15.50	2.3	0.411	0.187	0.370	0.225	0.45	363.98
63	945	15.75	1.9	0.340	0.184	0.306	0.156	0.31	239.77
64	960	16.00	1.9	0.340	0.181	0.306	0.159	0.32	244.85
65	975	16.25	0.4	0.072	0.178	0.064	0.007	0.01	0.00
66	990	16.50	0.4	0.072	0.176	0.064	0.007	0.01	0.00
67	1005	16.75	0.3	0.054	0.173	0.048	0.005	0.01	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
	Minutes	Hours	(Plate E-5.9)		Max	Low			
68	1020	17.00	0.3	0.054	0.170	0.048	0.005	0.01	0.00
69	1035	17.25	0.5	0.089	0.168	0.080	0.009	0.02	0.00
70	1050	17.50	0.5	0.089	0.165	0.080	0.009	0.02	0.00
71	1065	17.75	0.5	0.089	0.163	0.080	0.009	0.02	0.00
72	1080	18.00	0.4	0.072	0.160	0.064	0.007	0.01	0.00
73	1095	18.25	0.4	0.072	0.158	0.064	0.007	0.01	0.00
74	1110	18.50	0.4	0.072	0.156	0.064	0.007	0.01	0.00
75	1125	18.75	0.3	0.054	0.153	0.048	0.005	0.01	0.00
76	1140	19.00	0.2	0.036	0.151	0.032	0.004	0.01	0.00
77	1155	19.25	0.3	0.054	0.149	0.048	0.005	0.01	0.00
78	1170	19.50	0.4	0.072	0.147	0.064	0.007	0.01	0.00
79	1185	19.75	0.3	0.054	0.145	0.048	0.005	0.01	0.00
80	1200	20.00	0.2	0.036	0.143	0.032	0.004	0.01	0.00
81	1215	20.25	0.3	0.054	0.141	0.048	0.005	0.01	0.00
82	1230	20.50	0.3	0.054	0.139	0.048	0.005	0.01	0.00
83	1245	20.75	0.3	0.054	0.138	0.048	0.005	0.01	0.00
84	1260	21.00	0.2	0.036	0.136	0.032	0.004	0.01	0.00
85	1275	21.25	0.3	0.054	0.134	0.048	0.005	0.01	0.00
86	1290	21.50	0.2	0.036	0.133	0.032	0.004	0.01	0.00
87	1305	21.75	0.3	0.054	0.131	0.048	0.005	0.01	0.00
88	1320	22.00	0.2	0.036	0.130	0.032	0.004	0.01	0.00
89	1335	22.25	0.3	0.054	0.129	0.048	0.005	0.01	0.00
90	1350	22.50	0.2	0.036	0.127	0.032	0.004	0.01	0.00
91	1365	22.75	0.2	0.036	0.126	0.032	0.004	0.01	0.00
92	1380	23.00	0.2	0.036	0.125	0.032	0.004	0.01	0.00
93	1395	23.25	0.2	0.036	0.124	0.032	0.004	0.01	0.00
94	1410	23.50	0.2	0.036	0.124	0.032	0.004	0.01	0.00
95	1425	23.75	0.2	0.036	0.123	0.032	0.004	0.01	0.00
96	1440	24.00	0.2	0.036	0.123	0.032	0.004	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	1.43
FLOOD VOLUME (acft)	0.24
FLOOD VOLUME (cuft)	10444.84
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8099.53
PEAK FLOW (cfs)	0.80

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		3025	0	0	0.00
466	1	1	675	3700	3363	3363	0.08
467	1	2	730	4430	4065	7428	0.17
468	1	3	785	5215	4823	12250	0.28
468.5	0.5	3.5	415	5630	2711	14961	0.34

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.05 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.05 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	52	52	14	37	465.01	37	0.00
2	10	0.17	52	89	14	75	465.02	75	0.00
3	15	0.07	21	96	14	82	465.02	82	0.00
4	20	0.27	82	164	14	150	465.04	150	0.00
5	25	0.27	82	232	14	218	465.06	218	0.01
6	30	0.43	128	346	14	332	465.10	332	0.01
7	35	0.27	82	414	14	400	465.12	400	0.01
8	40	0.43	128	529	14	514	465.15	514	0.01
9	45	0.43	128	643	14	629	465.19	629	0.01
10	50	0.27	82	711	14	697	465.21	697	0.02
11	55	0.33	98	794	14	780	465.23	780	0.02
12	60	0.43	128	908	14	894	465.27	894	0.02
13	65	0.63	190	1,084	14	1,070	465.32	1,070	0.02
14	70	0.63	190	1,260	14	1,245	465.37	1,245	0.03
15	75	0.63	190	1,435	14	1,421	465.42	1,421	0.03
16	80	0.53	159	1,580	14	1,566	465.47	1,566	0.04
17	85	0.84	251	1,817	14	1,803	465.54	1,803	0.04
18	90	0.89	266	2,069	14	2,055	465.61	2,055	0.05
19	95	0.73	220	2,275	14	2,261	465.67	2,261	0.05
20	100	0.89	266	2,527	14	2,513	465.75	2,513	0.06
21	105	1.19	358	2,872	14	2,858	465.85	2,858	0.07
22	110	1.09	328	3,185	14	3,171	465.94	3,171	0.07
23	115	0.99	297	3,468	14	3,454	466.02	3,454	0.08
24	120	1.04	312	3,766	14	3,752	466.10	3,752	0.09
25	125	1.09	328	4,080	14	4,066	466.17	4,066	0.09
26	130	1.65	496	4,562	14	4,548	466.29	4,548	0.10
27	135	2.06	619	5,167	14	5,153	466.44	5,153	0.12
28	140	1.30	389	5,542	14	5,528	466.53	5,528	0.13
29	145	2.98	895	6,424	14	6,409	466.75	6,409	0.15
30	150	3.24	972	7,381	14	7,367	466.99	7,367	0.17
31	155	3.70	1,110	8,477	14	8,463	467.21	8,463	0.19
32	160	2.52	757	9,220	14	9,206	467.37	9,206	0.21
33	165	0.53	159	9,365	14	9,351	467.40	9,351	0.21
34	170	0.43	128	9,479	14	9,465	467.42	9,465	0.22
35	175	0.43	128	9,594	14	9,580	467.45	9,580	0.22
36	180	0.03	9	9,589	14	9,575	467.45	9,575	0.22

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.03	10	10	14	-	465.00	-	0.00
2	10	0.04	12	12	14	-	465.00	-	0.00
3	15	0.04	12	12	14	-	465.00	-	0.00
4	20	0.04	12	12	14	-	465.00	-	0.00
5	25	0.04	12	12	14	-	465.00	-	0.00
6	30	0.05	14	14	14	0	465.00	0	0.00
7	35	0.05	14	14	14	0	465.00	0	0.00
8	40	0.05	14	14	14	0	465.00	0	0.00
9	45	0.05	14	14	14	0	465.00	0	0.00
10	50	0.05	14	14	14	0	465.00	0	0.00
11	55	0.05	14	14	14	0	465.00	0	0.00
12	60	0.04	13	13	14	-	465.00	-	0.00
13	65	0.04	13	13	14	-	465.00	-	0.00
14	70	0.04	13	13	14	-	465.00	-	0.00
15	75	0.04	13	13	14	-	465.00	-	0.00
16	80	0.04	13	13	14	-	465.00	-	0.00
17	85	0.04	13	13	14	-	465.00	-	0.00
18	90	0.04	13	13	14	-	465.00	-	0.00
19	95	0.04	13	13	14	-	465.00	-	0.00
20	100	0.04	13	13	14	-	465.00	-	0.00
21	105	0.04	13	13	14	-	465.00	-	0.00
22	110	0.04	13	13	14	-	465.00	-	0.00
23	115	0.04	13	13	14	-	465.00	-	0.00
24	120	0.11	33	33	14	19	465.01	19	0.00
25	125	0.04	13	32	14	18	465.01	18	0.00
26	130	0.11	33	51	14	37	465.01	37	0.00
27	135	0.11	33	70	14	56	465.02	56	0.00
28	140	0.11	33	89	14	75	465.02	75	0.00
29	145	0.11	33	108	14	94	465.03	94	0.00
30	150	0.11	33	128	14	113	465.03	113	0.00
31	155	0.11	33	147	14	133	465.04	133	0.00
32	160	0.11	33	166	14	152	465.05	152	0.00
33	165	0.18	53	205	14	191	465.06	191	0.00
34	170	0.18	53	244	14	230	465.07	230	0.01
35	175	0.18	53	283	14	269	465.08	269	0.01
36	180	0.18	53	322	14	308	465.09	308	0.01
37	185	0.18	53	362	14	348	465.10	348	0.01
38	190	0.24	73	421	14	407	465.12	407	0.01
39	195	0.24	73	480	14	466	465.14	466	0.01
40	200	0.24	73	540	14	526	465.16	526	0.01
41	205	0.31	94	619	14	605	465.18	605	0.01
42	210	0.38	114	719	14	705	465.21	705	0.02
43	215	0.45	134	838	14	824	465.25	824	0.02
44	220	0.45	134	958	14	944	465.28	944	0.02
45	225	0.51	154	1,098	14	1,084	465.32	1,084	0.02
46	230	0.51	154	1,237	14	1,223	465.36	1,223	0.03
47	235	0.58	174	1,397	14	1,383	465.41	1,383	0.03
48	240	0.58	174	1,557	14	1,543	465.46	1,543	0.04
49	245	0.65	194	1,737	14	1,723	465.51	1,723	0.04
50	250	0.71	214	1,937	14	1,923	465.57	1,923	0.04
51	255	0.78	234	2,158	14	2,144	465.64	2,144	0.05
52	260	0.85	254	2,398	14	2,384	465.71	2,384	0.05
53	265	0.92	275	2,658	14	2,644	465.79	2,644	0.06
54	270	0.92	275	2,919	14	2,905	465.86	2,905	0.07
55	275	0.98	295	3,200	14	3,185	465.95	3,185	0.07

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.05	315	3,500	14	3,486	466.03	3,486	0.08
57	285	1.12	335	3,821	14	3,807	466.11	3,807	0.09
58	290	1.12	335	4,142	14	4,128	466.19	4,128	0.09
59	295	1.18	355	4,483	14	4,469	466.27	4,469	0.10
60	300	1.25	375	4,844	14	4,830	466.36	4,830	0.11
61	305	1.59	476	5,306	14	5,291	466.47	5,291	0.12
62	310	1.92	576	5,868	14	5,854	466.61	5,854	0.13
63	315	2.12	637	6,490	14	6,476	466.77	6,476	0.15
64	320	2.32	697	7,173	14	7,159	466.93	7,159	0.16
65	325	2.66	798	7,957	14	7,943	467.11	7,943	0.18
66	330	3.26	979	8,921	14	8,907	467.31	8,907	0.20
67	335	0.78	234	9,142	14	9,127	467.35	9,127	0.21
68	340	0.11	33	9,161	14	9,147	467.36	9,147	0.21
69	345	0.04	12	9,159	14	9,145	467.36	9,145	0.21
70	350	0.03	10	9,155	14	9,140	467.36	9,140	0.21
71	355	0.02	6	9,147	14	9,132	467.35	9,132	0.21
72	360	0.01	4	9,136	14	9,122	467.35	9,122	0.21

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.01	6	6	42	-	465.00	-	0.00
2	30	0.01	10	10	42	-	465.00	-	0.00
3	45	0.01	10	10	42	-	465.00	-	0.00
4	60	0.01	13	13	42	-	465.00	-	0.00
5	75	0.01	10	10	42	-	465.00	-	0.00
6	90	0.01	10	10	42	-	465.00	-	0.00
7	105	0.01	10	10	42	-	465.00	-	0.00
8	120	0.01	13	13	42	-	465.00	-	0.00
9	135	0.01	13	13	42	-	465.00	-	0.00
10	150	0.01	13	13	42	-	465.00	-	0.00
11	165	0.02	16	16	42	-	465.00	-	0.00
12	180	0.02	16	16	42	-	465.00	-	0.00
13	195	0.02	16	16	42	-	465.00	-	0.00
14	210	0.02	16	16	42	-	465.00	-	0.00
15	225	0.02	16	16	42	-	465.00	-	0.00
16	240	0.02	19	19	42	-	465.00	-	0.00
17	255	0.02	19	19	42	-	465.00	-	0.00
18	270	0.03	23	23	42	-	465.00	-	0.00
19	285	0.03	23	23	42	-	465.00	-	0.00
20	300	0.03	26	26	42	-	465.00	-	0.00
21	315	0.02	19	19	42	-	465.00	-	0.00
22	330	0.03	23	23	42	-	465.00	-	0.00
23	345	0.03	26	26	42	-	465.00	-	0.00
24	360	0.03	26	26	42	-	465.00	-	0.00
25	375	0.03	29	29	42	-	465.00	-	0.00
26	390	0.03	29	29	42	-	465.00	-	0.00
27	405	0.04	32	32	42	-	465.00	-	0.00
28	420	0.04	32	32	42	-	465.00	-	0.00
29	435	0.04	32	32	42	-	465.00	-	0.00
30	450	0.04	36	36	42	-	465.00	-	0.00
31	465	0.04	39	39	42	-	465.00	-	0.00
32	480	0.05	42	42	42	-	465.00	-	0.00
33	495	0.05	49	49	42	6	465.00	6	0.00
34	510	0.05	49	55	42	13	465.00	13	0.00
35	525	0.01	12	24	42	-	465.00	-	0.00
36	540	0.06	51	51	42	9	465.00	9	0.00
37	555	0.14	123	132	42	90	465.03	90	0.00
38	570	0.18	162	252	42	210	465.06	210	0.00
39	585	0.22	202	411	42	369	465.11	369	0.01
40	600	0.27	241	610	42	568	465.17	568	0.01
41	615	0.02	21	589	42	547	465.16	547	0.01
42	630	0.03	28	575	42	532	465.16	532	0.01
43	645	0.22	196	729	42	687	465.20	687	0.02
44	660	0.23	203	889	42	847	465.25	847	0.02
45	675	0.20	177	1,024	42	982	465.29	982	0.02
46	690	0.20	184	1,166	42	1,123	465.33	1,123	0.03
47	705	0.14	125	1,249	42	1,206	465.36	1,206	0.03
48	720	0.18	164	1,370	42	1,328	465.39	1,328	0.03
49	735	0.44	397	1,725	42	1,682	465.50	1,682	0.04
50	750	0.48	435	2,117	42	2,075	465.62	2,075	0.05
51	765	0.56	506	2,581	42	2,539	465.76	2,539	0.06
52	780	0.60	544	3,083	42	3,041	465.90	3,041	0.07
53	795	0.79	712	3,753	42	3,711	466.09	3,711	0.09
54	810	0.80	718	4,428	42	4,386	466.25	4,386	0.10
55	825	0.41	368	4,754	42	4,712	466.33	4,712	0.11
56	840	0.42	374	5,085	42	5,043	466.41	5,043	0.12
57	855	0.57	509	5,551	42	5,509	466.53	5,509	0.13
58	870	0.54	482	5,991	42	5,949	466.64	5,949	0.14

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.54	487	6,436	42	6,394	466.75	6,394	0.15
60	900	0.51	460	6,854	42	6,812	466.85	6,812	0.16
61	915	0.48	433	7,245	42	7,203	466.94	7,203	0.17
62	930	0.45	406	7,609	42	7,567	467.03	7,567	0.17
63	945	0.31	282	7,849	42	7,807	467.08	7,807	0.18
64	960	0.32	287	8,094	42	8,052	467.13	8,052	0.18
65	975	0.01	13	8,065	42	8,022	467.12	8,022	0.18
66	990	0.01	13	8,035	42	7,993	467.12	7,993	0.18
67	1005	0.01	10	8,003	42	7,961	467.11	7,961	0.18
68	1020	0.01	10	7,970	42	7,928	467.10	7,928	0.18
69	1035	0.02	16	7,944	42	7,902	467.10	7,902	0.18
70	1050	0.02	16	7,918	42	7,876	467.09	7,876	0.18
71	1065	0.02	16	7,892	42	7,850	467.09	7,850	0.18
72	1080	0.01	13	7,863	42	7,821	467.08	7,821	0.18
73	1095	0.01	13	7,833	42	7,791	467.08	7,791	0.18
74	1110	0.01	13	7,804	42	7,762	467.07	7,762	0.18
75	1125	0.01	10	7,772	42	7,729	467.06	7,729	0.18
76	1140	0.01	6	7,736	42	7,694	467.06	7,694	0.18
77	1155	0.01	10	7,703	42	7,661	467.05	7,661	0.18
78	1170	0.01	13	7,674	42	7,632	467.04	7,632	0.18
79	1185	0.01	10	7,642	42	7,599	467.04	7,599	0.17
80	1200	0.01	6	7,606	42	7,564	467.03	7,564	0.17
81	1215	0.01	10	7,573	42	7,531	467.02	7,531	0.17
82	1230	0.01	10	7,541	42	7,499	467.01	7,499	0.17
83	1245	0.01	10	7,508	42	7,466	467.01	7,466	0.17
84	1260	0.01	6	7,473	42	7,430	467.00	7,430	0.17
85	1275	0.01	10	7,440	42	7,398	466.99	7,398	0.17
86	1290	0.01	6	7,404	42	7,362	466.98	7,362	0.17
87	1305	0.01	10	7,372	42	7,330	466.98	7,330	0.17
88	1320	0.01	6	7,336	42	7,294	466.97	7,294	0.17
89	1335	0.01	10	7,303	42	7,261	466.96	7,261	0.17
90	1350	0.01	6	7,268	42	7,225	466.95	7,225	0.17
91	1365	0.01	6	7,232	42	7,190	466.94	7,190	0.17
92	1380	0.01	6	7,196	42	7,154	466.93	7,154	0.16
93	1395	0.01	6	7,160	42	7,118	466.92	7,118	0.16
94	1410	0.01	6	7,125	42	7,082	466.92	7,082	0.16
95	1425	0.01	6	7,089	42	7,047	466.91	7,047	0.16
96	1440	0.01	6	7,053	42	7,011	466.90	7,011	0.16

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 2		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.51		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	7.46		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.6		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	724		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	100		
30				
31	ELEVATION OF HEADWATER	472		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15600	
45		466	17120	
46		467	18710	
47		468	20350	
48		468.5	21200	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD — PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
BASIC DATA CALCULATION FORM — JOB # 0
SHORTCUT METHOD — BY ES R. BAZUA, P.E. — DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 2
[3] AREA - ACRES	10.570
[4] L-FEET	724
[5] L-MILES	0.137
[6] La-FEET	100.00
[7] La-MILES	0.019
[8] ELEVATION OF HEADWATER	472
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.5
[11] S-FEET/MILE	25.5
[12] S^0.5	5.05
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	1.6
[17] 100% OF LAG-MINUTES	1.6
[18] 200% OF LAG-MINUTES	3.2
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.24

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	10.570	1.00	2.12	2.78	10.570	1.00	2.78	4.47	10.570	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.57	SUM [7]	2.12	SUM [9]	10.57	SUM [11]	2.78	SUM [13]	10.57	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.54	1.64	1.79
FLOOD VOLUME	(cu-ft)	59,174	63,009	68,653
	(acre-ft)	1.36	1.45	1.58
REQUIRED STORAGE	(cu-ft)	56,096	57,661	56,204
	(acre-ft)	1.29	1.32	1.29
PEAK FLOW	(cfs)	20.00	17.69	4.66
MAXIMUM WSEL	(ft)	468.11	468.19	468.12

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.51	0.237	0.0123
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	7.46	0.706	0.1523
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.60	0.057	0.0295
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	10.57	SUM	0.1942

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.097085525

C= 0.00180

Ft=C(24-(T/60))^1.55 = 0.00180 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.19
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.19	0.30	0.14	1.44	360.41
2	10	0.17	1.3	0.331	0.19	0.30	0.14	1.44	360.41
3	15	0.25	1.1	0.280	0.19	0.25	0.09	0.91	199.07
4	20	0.33	1.5	0.382	0.19	0.34	0.19	1.98	521.75
5	25	0.42	1.5	0.382	0.19	0.34	0.19	1.98	521.75
6	30	0.50	1.8	0.458	0.19	0.41	0.26	2.79	763.76
7	35	0.58	1.5	0.382	0.19	0.34	0.19	1.98	521.75
8	40	0.67	1.8	0.458	0.19	0.41	0.26	2.79	763.76
9	45	0.75	1.8	0.458	0.19	0.41	0.26	2.79	763.76
10	50	0.83	1.5	0.382	0.19	0.34	0.19	1.98	521.75
11	55	0.92	1.6	0.407	0.19	0.37	0.21	2.25	602.42
12	60	1.00	1.8	0.458	0.19	0.41	0.26	2.79	763.76
13	65	1.08	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
14	70	1.17	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
15	75	1.25	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
16	80	1.33	2.0	0.509	0.19	0.46	0.31	3.33	925.11
17	85	1.42	2.6	0.661	0.19	0.60	0.47	4.94	1409.13
18	90	1.50	2.7	0.687	0.19	0.62	0.49	5.21	1489.80
19	95	1.58	2.4	0.611	0.19	0.55	0.42	4.40	1247.79
20	100	1.67	2.7	0.687	0.19	0.62	0.49	5.21	1489.80
21	105	1.75	3.3	0.840	0.19	0.76	0.65	6.82	1973.82
22	110	1.83	3.1	0.789	0.19	0.71	0.59	6.28	1812.48
23	115	1.92	2.9	0.738	0.19	0.66	0.54	5.75	1651.14
24	120	2.00	3.0	0.763	0.19	0.69	0.57	6.01	1731.81
25	125	2.08	3.1	0.789	0.19	0.71	0.59	6.28	1812.48
26	130	2.17	4.2	1.068	0.19	0.96	0.87	9.24	2699.85
27	135	2.25	5.0	1.272	0.19	1.14	1.08	11.39	3345.21
28	140	2.33	3.5	0.890	0.19	0.80	0.70	7.36	2135.16
29	145	2.42	6.8	1.730	0.19	1.56	1.54	16.23	4797.28
30	150	2.50	7.3	1.857	0.19	1.67	1.66	17.58	5200.63
31	155	2.58	8.2	2.086	0.19	1.88	1.89	20.00	5926.66
32	160	2.67	5.9	1.501	0.19	1.35	1.31	13.81	4071.24
33	165	2.75	2.0	0.509	0.19	0.46	0.31	3.33	925.11
34	170	2.83	1.8	0.458	0.19	0.41	0.26	2.79	763.76
35	175	2.92	1.8	0.458	0.19	0.41	0.26	2.79	763.76
36	180	3.00	0.6	0.153	0.19	0.14	0.02	0.16	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.54
FLOOD VOLUME (acft)	1.36
FLOOD VOLUME (cuft)	59173.82
REQUIRED STORAGE (acft)	1.29
REQUIRED STORAGE (cuft)	56095.73
PEAK FLOW RATE (cfs)	20.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.194
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.167	0.19	0.15	0.02	0.18	0.00
2	10	0.17	0.6	0.200	0.19	0.18	0.01	0.06	0.00
3	15	0.25	0.6	0.200	0.19	0.18	0.01	0.06	0.00
4	20	0.33	0.6	0.200	0.19	0.18	0.01	0.06	0.00
5	25	0.42	0.6	0.200	0.19	0.18	0.01	0.06	0.00
6	30	0.50	0.7	0.234	0.19	0.21	0.04	0.42	52.19
7	35	0.58	0.7	0.234	0.19	0.21	0.04	0.42	52.19
8	40	0.67	0.7	0.234	0.19	0.21	0.04	0.42	52.19
9	45	0.75	0.7	0.234	0.19	0.21	0.04	0.42	52.19
10	50	0.83	0.7	0.234	0.19	0.21	0.04	0.42	52.19
11	55	0.92	0.7	0.234	0.19	0.21	0.04	0.42	52.19
12	60	1.00	0.8	0.267	0.19	0.24	0.07	0.77	157.98
13	65	1.08	0.8	0.267	0.19	0.24	0.07	0.77	157.98
14	70	1.17	0.8	0.267	0.19	0.24	0.07	0.77	157.98
15	75	1.25	0.8	0.267	0.19	0.24	0.07	0.77	157.98
16	80	1.33	0.8	0.267	0.19	0.24	0.07	0.77	157.98
17	85	1.42	0.8	0.267	0.19	0.24	0.07	0.77	157.98
18	90	1.50	0.8	0.267	0.19	0.24	0.07	0.77	157.98
19	95	1.58	0.8	0.267	0.19	0.24	0.07	0.77	157.98
20	100	1.67	0.8	0.267	0.19	0.24	0.07	0.77	157.98
21	105	1.75	0.8	0.267	0.19	0.24	0.07	0.77	157.98
22	110	1.83	0.8	0.267	0.19	0.24	0.07	0.77	157.98
23	115	1.92	0.8	0.267	0.19	0.24	0.07	0.77	157.98
24	120	2.00	0.9	0.300	0.19	0.27	0.11	1.12	263.76
25	125	2.08	0.8	0.267	0.19	0.24	0.07	0.77	157.98
26	130	2.17	0.9	0.300	0.19	0.27	0.11	1.12	263.76
27	135	2.25	0.9	0.300	0.19	0.27	0.11	1.12	263.76
28	140	2.33	0.9	0.300	0.19	0.27	0.11	1.12	263.76
29	145	2.42	0.9	0.300	0.19	0.27	0.11	1.12	263.76
30	150	2.50	0.9	0.300	0.19	0.27	0.11	1.12	263.76
31	155	2.58	0.9	0.300	0.19	0.27	0.11	1.12	263.76
32	160	2.67	0.9	0.300	0.19	0.27	0.11	1.12	263.76
33	165	2.75	1.0	0.334	0.19	0.30	0.14	1.47	369.55
34	170	2.83	1.0	0.334	0.19	0.30	0.14	1.47	369.55
35	175	2.92	1.0	0.334	0.19	0.30	0.14	1.47	369.55
36	180	3.00	1.0	0.334	0.19	0.30	0.14	1.47	369.55
37	185	3.08	1.0	0.334	0.19	0.30	0.14	1.47	369.55
38	190	3.17	1.1	0.367	0.19	0.33	0.17	1.83	475.33
39	195	3.25	1.1	0.367	0.19	0.33	0.17	1.83	475.33
40	200	3.33	1.1	0.367	0.19	0.33	0.17	1.83	475.33
41	205	3.42	1.2	0.400	0.19	0.36	0.21	2.18	581.11
42	210	3.50	1.3	0.434	0.19	0.39	0.24	2.53	686.90
43	215	3.58	1.4	0.467	0.19	0.42	0.27	2.88	792.68
44	220	3.67	1.4	0.467	0.19	0.42	0.27	2.88	792.68
45	225	3.75	1.5	0.500	0.19	0.45	0.31	3.24	898.47
46	230	3.83	1.5	0.500	0.19	0.45	0.31	3.24	898.47
47	235	3.92	1.6	0.534	0.19	0.48	0.34	3.59	1004.25
48	240	4.00	1.6	0.534	0.19	0.48	0.34	3.59	1004.25
49	245	4.08	1.7	0.567	0.19	0.51	0.37	3.94	1110.04
50	250	4.17	1.8	0.600	0.19	0.54	0.41	4.29	1215.82
51	255	4.25	1.9	0.634	0.19	0.57	0.44	4.65	1321.61
52	260	4.33	2.0	0.667	0.19	0.60	0.47	5.00	1427.39
53	265	4.42	2.1	0.701	0.19	0.63	0.51	5.35	1533.18
54	270	4.50	2.1	0.701	0.19	0.63	0.51	5.35	1533.18
55	275	4.58	2.2	0.734	0.19	0.66	0.54	5.71	1638.96
56	280	4.67	2.3	0.767	0.19	0.69	0.57	6.06	1744.75

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.62		
UNIT TIME-PERCENT OF LAG	308.6		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.194		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.24 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.801	0.19	0.72	0.61	6.41	1850.53
58	290	4.83	2.4	0.801	0.19	0.72	0.61	6.41	1850.53
59	295	4.92	2.5	0.834	0.19	0.75	0.64	6.76	1956.31
60	300	5.00	2.6	0.867	0.19	0.78	0.67	7.12	2062.10
61	305	5.08	3.1	1.034	0.19	0.93	0.84	8.88	2591.02
62	310	5.17	3.6	1.201	0.19	1.08	1.01	10.64	3119.94
63	315	5.25	3.9	1.301	0.19	1.17	1.11	11.70	3437.30
64	320	5.33	4.2	1.401	0.19	1.26	1.21	12.76	3754.65
65	325	5.42	4.7	1.568	0.19	1.41	1.37	14.52	4283.57
66	330	5.50	5.6	1.868	0.19	1.68	1.67	17.69	5235.64
67	335	5.58	1.9	0.634	0.19	0.57	0.44	4.65	1321.61
68	340	5.67	0.9	0.300	0.19	0.27	0.11	1.12	263.76
69	345	5.75	0.6	0.200	0.19	0.18	0.01	0.06	0.00
70	350	5.83	0.5	0.167	0.19	0.15	0.02	0.18	0.00
71	355	5.92	0.3	0.100	0.19	0.09	0.01	0.11	0.00
72	360	6.00	0.2	0.067	0.19	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.64
FLOOD VOLUME (acft)	1.45
FLOOD VOLUME (cuft)	63008.73
REQUIRED STORAGE (acft)	1.32
REQUIRED STORAGE (cuft)	57661.37
PEAK FLOW RATE (cfs)	17.69

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.343	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.339	0.048	0.005	0.06	0.00
3	45	0.75	0.3	0.054	0.335	0.048	0.005	0.06	0.00
4	60	1.00	0.4	0.072	0.331	0.064	0.007	0.08	0.00
5	75	1.25	0.3	0.054	0.327	0.048	0.005	0.06	0.00
6	90	1.50	0.3	0.054	0.323	0.048	0.005	0.06	0.00
7	105	1.75	0.3	0.054	0.319	0.048	0.005	0.06	0.00
8	120	2.00	0.4	0.072	0.316	0.064	0.007	0.08	0.00
9	135	2.25	0.4	0.072	0.312	0.064	0.007	0.08	0.00
10	150	2.50	0.4	0.072	0.308	0.064	0.007	0.08	0.00
11	165	2.75	0.5	0.089	0.304	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.300	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.297	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.293	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.289	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.286	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.282	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.278	0.113	0.013	0.13	0.00
19	285	4.75	0.7	0.125	0.275	0.113	0.013	0.13	0.00
20	300	5.00	0.8	0.143	0.271	0.129	0.014	0.15	0.00
21	315	5.25	0.6	0.107	0.268	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.264	0.113	0.013	0.13	0.00
23	345	5.75	0.8	0.143	0.261	0.129	0.014	0.15	0.00
24	360	6.00	0.8	0.143	0.257	0.129	0.014	0.15	0.00
25	375	6.25	0.9	0.161	0.254	0.145	0.016	0.17	0.00
26	390	6.50	0.9	0.161	0.251	0.145	0.016	0.17	0.00
27	405	6.75	1.0	0.179	0.247	0.161	0.018	0.19	0.00
28	420	7.00	1.0	0.179	0.244	0.161	0.018	0.19	0.00
29	435	7.25	1.0	0.179	0.241	0.161	0.018	0.19	0.00
30	450	7.50	1.1	0.197	0.237	0.177	0.020	0.21	0.00
31	465	7.75	1.2	0.215	0.234	0.193	0.021	0.23	0.00
32	480	8.00	1.3	0.232	0.231	0.209	0.002	0.02	0.00
33	495	8.25	1.5	0.268	0.228	0.241	0.041	0.43	167.88
34	510	8.50	1.5	0.268	0.224	0.241	0.044	0.46	198.07
35	525	8.75	1.6	0.286	0.221	0.257	0.065	0.68	398.09
36	540	9.00	1.7	0.304	0.218	0.274	0.086	0.91	597.84
37	555	9.25	1.9	0.340	0.215	0.306	0.125	1.32	967.41
38	570	9.50	2.0	0.358	0.212	0.322	0.146	1.54	1166.63
39	585	9.75	2.1	0.375	0.209	0.338	0.166	1.76	1365.57
40	600	10.00	2.2	0.393	0.206	0.354	0.187	1.98	1564.23
41	615	10.25	1.5	0.268	0.203	0.241	0.065	0.69	401.88
42	630	10.50	1.5	0.268	0.200	0.241	0.068	0.72	429.90
43	645	10.75	2.0	0.358	0.197	0.322	0.160	1.70	1308.09
44	660	11.00	2.0	0.358	0.194	0.322	0.163	1.73	1335.54
45	675	11.25	1.9	0.340	0.191	0.306	0.148	1.57	1192.62
46	690	11.50	1.9	0.340	0.189	0.306	0.151	1.60	1219.49
47	705	11.75	1.7	0.304	0.186	0.274	0.118	1.25	905.90
48	720	12.00	1.8	0.322	0.183	0.290	0.139	1.47	1102.28
49	735	12.25	2.5	0.447	0.180	0.402	0.267	2.82	2318.92
50	750	12.50	2.6	0.465	0.178	0.418	0.287	3.04	2514.71
51	765	12.75	2.8	0.501	0.175	0.451	0.326	3.44	2880.29
52	780	13.00	2.9	0.519	0.172	0.467	0.346	3.66	3075.47
53	795	13.25	3.4	0.608	0.170	0.547	0.438	4.63	3950.71
54	810	13.50	3.4	0.608	0.167	0.547	0.441	4.66	3975.18
55	825	13.75	2.3	0.411	0.165	0.370	0.247	2.61	2128.32
56	840	14.00	2.3	0.411	0.162	0.370	0.249	2.63	2152.16
57	855	14.25	2.7	0.483	0.160	0.434	0.323	3.42	2856.04
58	870	14.50	2.6	0.465	0.157	0.418	0.308	3.25	2709.14
59	885	14.75	2.6	0.465	0.155	0.418	0.310	3.28	2732.00
60	900	15.00	2.5	0.447	0.152	0.402	0.295	3.11	2584.44
61	915	15.25	2.4	0.429	0.150	0.386	0.279	2.95	2436.54
62	930	15.50	2.3	0.411	0.148	0.370	0.263	2.78	2288.29
63	945	15.75	1.9	0.340	0.146	0.306	0.194	2.05	1629.43
64	960	16.00	1.9	0.340	0.143	0.306	0.196	2.08	1650.58
65	975	16.25	0.4	0.072	0.141	0.064	0.007	0.08	0.00
66	990	16.50	0.4	0.072	0.139	0.064	0.007	0.08	0.00
67	1005	16.75	0.3	0.054	0.137	0.048	0.005	0.06	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.135	0.048	0.005	0.06	0.00
69	1035	17.25	0.5	0.089	0.133	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.131	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.129	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.127	0.064	0.007	0.08	0.00
73	1095	18.25	0.4	0.072	0.125	0.064	0.007	0.08	0.00
74	1110	18.50	0.4	0.072	0.123	0.064	0.007	0.08	0.00
75	1125	18.75	0.3	0.054	0.121	0.048	0.005	0.06	0.00
76	1140	19.00	0.2	0.036	0.120	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.118	0.048	0.005	0.06	0.00
78	1170	19.50	0.4	0.072	0.116	0.064	0.007	0.08	0.00
79	1185	19.75	0.3	0.054	0.115	0.048	0.005	0.06	0.00
80	1200	20.00	0.2	0.036	0.113	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.112	0.048	0.005	0.06	0.00
82	1230	20.50	0.3	0.054	0.110	0.048	0.005	0.06	0.00
83	1245	20.75	0.3	0.054	0.109	0.048	0.005	0.06	0.00
84	1260	21.00	0.2	0.036	0.108	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.106	0.048	0.005	0.06	0.00
86	1290	21.50	0.2	0.036	0.105	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.104	0.048	0.005	0.06	0.00
88	1320	22.00	0.2	0.036	0.103	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.102	0.048	0.005	0.06	0.00
90	1350	22.50	0.2	0.036	0.101	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.100	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.099	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.099	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.098	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.097	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.097	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	1.79
FLOOD VOLUME (acft)	1.58
FLOOD VOLUME (cuft)	68652.95
REQUIRED STORAGE (acft)	1.29
REQUIRED STORAGE (cuft)	56203.65
PEAK FLOW (cfs)	4.66

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15600	0	0	0.00
466	1	1	1520	17120	16360	16360	0.38
467	1	2	1590	18710	17915	34275	0.79
468	1	3	1640	20350	19530	53805	1.24
468.5	0.5	3.5	850	21200	10388	64193	1.47

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.24 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.24 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.44	433	433	73	360	465.02	360	0.01
2	10	1.44	433	793	73	721	465.04	721	0.02
3	15	0.91	272	992	73	920	465.06	920	0.02
4	20	1.98	594	1,514	73	1,442	465.09	1,442	0.03
5	25	1.98	594	2,036	73	1,963	465.12	1,963	0.05
6	30	2.79	836	2,800	73	2,727	465.17	2,727	0.06
7	35	1.98	594	3,322	73	3,249	465.20	3,249	0.07
8	40	2.79	836	4,085	73	4,013	465.25	4,013	0.09
9	45	2.79	836	4,849	73	4,776	465.29	4,776	0.11
10	50	1.98	594	5,371	73	5,298	465.32	5,298	0.12
11	55	2.25	675	5,973	73	5,901	465.36	5,901	0.14
12	60	2.79	836	6,737	73	6,664	465.41	6,664	0.15
13	65	3.86	1,159	7,823	73	7,751	465.47	7,751	0.18
14	70	3.86	1,159	8,910	73	8,837	465.54	8,837	0.20
15	75	3.86	1,159	9,996	73	9,924	465.61	9,924	0.23
16	80	3.33	998	10,921	73	10,849	465.66	10,849	0.25
17	85	4.94	1,482	12,331	73	12,258	465.75	12,258	0.28
18	90	5.21	1,562	13,820	73	13,748	465.84	13,748	0.32
19	95	4.40	1,320	15,068	73	14,996	465.92	14,996	0.34
20	100	5.21	1,562	16,558	73	16,485	466.01	16,485	0.38
21	105	6.82	2,046	18,532	73	18,459	466.12	18,459	0.42
22	110	6.28	1,885	20,344	73	20,272	466.22	20,272	0.47
23	115	5.75	1,724	21,995	73	21,923	466.31	21,923	0.50
24	120	6.01	1,804	23,727	73	23,655	466.41	23,655	0.54
25	125	6.28	1,885	25,540	73	25,467	466.51	25,467	0.58
26	130	9.24	2,772	28,239	73	28,167	466.66	28,167	0.65
27	135	11.39	3,418	31,585	73	31,512	466.85	31,512	0.72
28	140	7.36	2,208	33,720	73	33,647	466.96	33,647	0.77
29	145	16.23	4,870	38,517	73	38,445	467.21	38,445	0.88
30	150	17.58	5,273	43,718	73	43,645	467.48	43,645	1.00
31	155	20.00	5,999	49,644	73	49,572	467.78	49,572	1.14
32	160	13.81	4,144	53,716	73	53,643	467.99	53,643	1.23
33	165	3.33	998	54,641	73	54,568	468.04	54,568	1.25
34	170	2.79	836	55,405	73	55,332	468.07	55,332	1.27
35	175	2.79	836	56,168	73	56,096	468.11	56,096	1.29
36	180	0.16	48	56,144	73	56,072	468.11	56,072	1.29

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.18	53	53	73	-	465.00	-	0.00
2	10	0.06	19	19	73	-	465.00	-	0.00
3	15	0.06	19	19	73	-	465.00	-	0.00
4	20	0.06	19	19	73	-	465.00	-	0.00
5	25	0.06	19	19	73	-	465.00	-	0.00
6	30	0.42	125	125	73	52	465.00	52	0.00
7	35	0.42	125	177	73	104	465.01	104	0.00
8	40	0.42	125	229	73	157	465.01	157	0.00
9	45	0.42	125	281	73	209	465.01	209	0.00
10	50	0.42	125	334	73	261	465.02	261	0.01
11	55	0.42	125	386	73	313	465.02	313	0.01
12	60	0.77	231	544	73	471	465.03	471	0.01
13	65	0.77	231	702	73	629	465.04	629	0.01
14	70	0.77	231	860	73	787	465.05	787	0.02
15	75	0.77	231	1,018	73	945	465.06	945	0.02
16	80	0.77	231	1,176	73	1,103	465.07	1,103	0.03
17	85	0.77	231	1,334	73	1,261	465.08	1,261	0.03
18	90	0.77	231	1,492	73	1,419	465.09	1,419	0.03
19	95	0.77	231	1,650	73	1,577	465.10	1,577	0.04
20	100	0.77	231	1,808	73	1,735	465.11	1,735	0.04
21	105	0.77	231	1,966	73	1,893	465.12	1,893	0.04
22	110	0.77	231	2,123	73	2,051	465.13	2,051	0.05
23	115	0.77	231	2,281	73	2,209	465.14	2,209	0.05
24	120	1.12	336	2,545	73	2,473	465.15	2,473	0.06
25	125	0.77	231	2,703	73	2,631	465.16	2,631	0.06
26	130	1.12	336	2,967	73	2,894	465.18	2,894	0.07
27	135	1.12	336	3,231	73	3,158	465.19	3,158	0.07
28	140	1.12	336	3,494	73	3,422	465.21	3,422	0.08
29	145	1.12	336	3,758	73	3,686	465.23	3,686	0.08
30	150	1.12	336	4,022	73	3,949	465.24	3,949	0.09
31	155	1.12	336	4,286	73	4,213	465.26	4,213	0.10
32	160	1.12	336	4,550	73	4,477	465.27	4,477	0.10
33	165	1.47	442	4,919	73	4,846	465.30	4,846	0.11
34	170	1.47	442	5,289	73	5,216	465.32	5,216	0.12
35	175	1.47	442	5,658	73	5,586	465.34	5,586	0.13
36	180	1.47	442	6,028	73	5,955	465.36	5,955	0.14
37	185	1.47	442	6,397	73	6,325	465.39	6,325	0.15
38	190	1.83	548	6,873	73	6,800	465.42	6,800	0.16
39	195	1.83	548	7,348	73	7,275	465.44	7,275	0.17
40	200	1.83	548	7,823	73	7,751	465.47	7,751	0.18
41	205	2.18	654	8,404	73	8,332	465.51	8,332	0.19
42	210	2.53	759	9,091	73	9,019	465.55	9,019	0.21
43	215	2.88	865	9,884	73	9,811	465.60	9,811	0.23
44	220	2.88	865	10,677	73	10,604	465.65	10,604	0.24
45	225	3.24	971	11,575	73	11,503	465.70	11,503	0.26
46	230	3.24	971	12,474	73	12,401	465.76	12,401	0.28
47	235	3.59	1,077	13,478	73	13,405	465.82	13,405	0.31
48	240	3.59	1,077	14,482	73	14,409	465.88	14,409	0.33
49	245	3.94	1,183	15,592	73	15,520	465.95	15,520	0.36
50	250	4.29	1,288	16,808	73	16,735	466.02	16,735	0.38
51	255	4.65	1,394	18,130	73	18,057	466.09	18,057	0.41
52	260	5.00	1,500	19,557	73	19,484	466.17	19,484	0.45
53	265	5.35	1,606	21,090	73	21,018	466.26	21,018	0.48
54	270	5.35	1,606	22,623	73	22,551	466.35	22,551	0.52
55	275	5.71	1,712	24,262	73	24,190	466.44	24,190	0.56

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	6.06	1,817	26,007	73	25,934	466.53	25,934	0.60
57	285	6.41	1,923	27,858	73	27,785	466.64	27,785	0.64
58	290	6.41	1,923	29,708	73	29,635	466.74	29,635	0.68
59	295	6.76	2,029	31,664	73	31,592	466.85	31,592	0.73
60	300	7.12	2,135	33,726	73	33,654	466.97	33,654	0.77
61	305	8.88	2,664	36,317	73	36,245	467.10	36,245	0.83
62	310	10.64	3,193	39,437	73	39,365	467.26	39,365	0.90
63	315	11.70	3,510	42,875	73	42,802	467.44	42,802	0.98
64	320	12.76	3,827	46,629	73	46,557	467.63	46,557	1.07
65	325	14.52	4,356	50,913	73	50,840	467.85	50,840	1.17
66	330	17.69	5,308	56,149	73	56,076	468.11	56,076	1.29
67	335	4.65	1,394	57,470	73	57,398	468.17	57,398	1.32
68	340	1.12	336	57,734	73	57,661	468.19	57,661	1.32
69	345	0.06	19	57,680	73	57,608	468.18	57,608	1.32
70	350	0.18	53	57,661	73	57,588	468.18	57,588	1.32
71	355	0.11	32	57,620	73	57,547	468.18	57,547	1.32
72	360	0.07	21	57,568	73	57,496	468.18	57,496	1.32

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	34	34	218	-	465.00	-	0.00
2	30	0.06	51	51	218	-	465.00	-	0.00
3	45	0.06	51	51	218	-	465.00	-	0.00
4	60	0.08	68	68	218	-	465.00	-	0.00
5	75	0.06	51	51	218	-	465.00	-	0.00
6	90	0.06	51	51	218	-	465.00	-	0.00
7	105	0.06	51	51	218	-	465.00	-	0.00
8	120	0.08	68	68	218	-	465.00	-	0.00
9	135	0.08	68	68	218	-	465.00	-	0.00
10	150	0.08	68	68	218	-	465.00	-	0.00
11	165	0.09	85	85	218	-	465.00	-	0.00
12	180	0.09	85	85	218	-	465.00	-	0.00
13	195	0.09	85	85	218	-	465.00	-	0.00
14	210	0.09	85	85	218	-	465.00	-	0.00
15	225	0.09	85	85	218	-	465.00	-	0.00
16	240	0.11	102	102	218	-	465.00	-	0.00
17	255	0.11	102	102	218	-	465.00	-	0.00
18	270	0.13	119	119	218	-	465.00	-	0.00
19	285	0.13	119	119	218	-	465.00	-	0.00
20	300	0.15	136	136	218	-	465.00	-	0.00
21	315	0.11	102	102	218	-	465.00	-	0.00
22	330	0.13	119	119	218	-	465.00	-	0.00
23	345	0.15	136	136	218	-	465.00	-	0.00
24	360	0.15	136	136	218	-	465.00	-	0.00
25	375	0.17	153	153	218	-	465.00	-	0.00
26	390	0.17	153	153	218	-	465.00	-	0.00
27	405	0.19	170	170	218	-	465.00	-	0.00
28	420	0.19	170	170	218	-	465.00	-	0.00
29	435	0.19	170	170	218	-	465.00	-	0.00
30	450	0.21	187	187	218	-	465.00	-	0.00
31	465	0.23	204	204	218	-	465.00	-	0.00
32	480	0.02	15	15	218	-	465.00	-	0.00
33	495	0.43	386	386	218	168	465.01	168	0.00
34	510	0.46	416	584	218	366	465.02	366	0.01
35	525	0.68	616	982	218	764	465.05	764	0.02
36	540	0.91	816	1,580	218	1,362	465.08	1,362	0.03
37	555	1.32	1,185	2,547	218	2,329	465.14	2,329	0.05
38	570	1.54	1,384	3,714	218	3,496	465.21	3,496	0.08
39	585	1.76	1,583	5,079	218	4,861	465.30	4,861	0.11
40	600	1.98	1,782	6,643	218	6,426	465.39	6,426	0.15
41	615	0.69	620	7,045	218	6,828	465.42	6,828	0.16
42	630	0.72	648	7,475	218	7,257	465.44	7,257	0.17
43	645	1.70	1,526	8,783	218	8,566	465.52	8,566	0.20
44	660	1.73	1,553	10,119	218	9,901	465.61	9,901	0.23
45	675	1.57	1,410	11,311	218	11,094	465.68	11,094	0.25
46	690	1.60	1,437	12,531	218	12,313	465.75	12,313	0.28
47	705	1.25	1,124	13,437	218	13,219	465.81	13,219	0.30
48	720	1.47	1,320	14,539	218	14,321	465.88	14,321	0.33
49	735	2.82	2,537	16,858	218	16,640	466.02	16,640	0.38
50	750	3.04	2,732	19,373	218	19,155	466.16	19,155	0.44
51	765	3.44	3,098	22,253	218	22,035	466.32	22,035	0.51
52	780	3.66	3,293	25,329	218	25,111	466.49	25,111	0.58
53	795	4.63	4,168	29,279	218	29,062	466.71	29,062	0.67
54	810	4.66	4,193	33,254	218	33,037	466.93	33,037	0.76
55	825	2.61	2,346	35,383	218	35,165	467.05	35,165	0.81
56	840	2.63	2,370	37,535	218	37,317	467.16	37,317	0.86
57	855	3.42	3,074	40,391	218	40,173	467.30	40,173	0.92
58	870	3.25	2,927	43,100	218	42,882	467.44	42,882	0.98

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	3.28	2,950	45,832	218	45,614	467.58	45,614	1.05
60	900	3.11	2,802	48,417	218	48,199	467.71	48,199	1.11
61	915	2.95	2,654	50,853	218	50,635	467.84	50,635	1.16
62	930	2.78	2,506	53,141	218	52,924	467.95	52,924	1.21
63	945	2.05	1,847	54,771	218	54,553	468.04	54,553	1.25
64	960	2.08	1,868	56,421	218	56,204	468.12	56,204	1.29
65	975	0.08	68	56,272	218	56,054	468.11	56,054	1.29
66	990	0.08	68	56,122	218	55,904	468.10	55,904	1.28
67	1005	0.06	51	55,955	218	55,738	468.09	55,738	1.28
68	1020	0.06	51	55,789	218	55,571	468.08	55,571	1.28
69	1035	0.09	85	55,656	218	55,438	468.08	55,438	1.27
70	1050	0.09	85	55,523	218	55,305	468.07	55,305	1.27
71	1065	0.09	85	55,390	218	55,173	468.07	55,173	1.27
72	1080	0.08	68	55,241	218	55,023	468.06	55,023	1.26
73	1095	0.08	68	55,091	218	54,873	468.05	54,873	1.26
74	1110	0.08	68	54,941	218	54,724	468.04	54,724	1.26
75	1125	0.06	51	54,775	218	54,557	468.04	54,557	1.25
76	1140	0.04	34	54,591	218	54,373	468.03	54,373	1.25
77	1155	0.06	51	54,424	218	54,206	468.02	54,206	1.24
78	1170	0.08	68	54,274	218	54,057	468.01	54,057	1.24
79	1185	0.06	51	54,108	218	53,890	468.00	53,890	1.24
80	1200	0.04	34	53,924	218	53,706	467.99	53,706	1.23
81	1215	0.06	51	53,757	218	53,539	467.99	53,539	1.23
82	1230	0.06	51	53,590	218	53,373	467.98	53,373	1.23
83	1245	0.06	51	53,424	218	53,206	467.97	53,206	1.22
84	1260	0.04	34	53,240	218	53,022	467.96	53,022	1.22
85	1275	0.06	51	53,073	218	52,856	467.95	52,856	1.21
86	1290	0.04	34	52,890	218	52,672	467.94	52,672	1.21
87	1305	0.06	51	52,723	218	52,505	467.93	52,505	1.21
88	1320	0.04	34	52,539	218	52,321	467.92	52,321	1.20
89	1335	0.06	51	52,372	218	52,155	467.92	52,155	1.20
90	1350	0.04	34	52,189	218	51,971	467.91	51,971	1.19
91	1365	0.04	34	52,005	218	51,787	467.90	51,787	1.19
92	1380	0.04	34	51,821	218	51,603	467.89	51,603	1.18
93	1395	0.04	34	51,637	218	51,420	467.88	51,420	1.18
94	1410	0.04	34	51,454	218	51,236	467.87	51,236	1.18
95	1425	0.04	34	51,270	218	51,052	467.86	51,052	1.17
96	1440	0.04	34	51,086	218	50,869	467.85	50,869	1.17

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 3		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.56		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.65		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	1.04		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	750		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	170		
30				
31	ELEVATION OF HEADWATER	471.8		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15000	
45		466	16600	
46		467	18250	
47		468	19960	
48		468.5	20831	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 3
[3] AREA - ACRES	10.250
[4] L-FEET	750
[5] L-MILES	0.142
[6] La-FEET	170.00
[7] La-MILES	0.032
[8] ELEVATION OF HEADWATER	471.8
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.3
[11] S-FEET/MILE	23.2
[12] S^0.5	4.82
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	2.0
[17] 100% OF LAG-MINUTES	2.0
[18] 200% OF LAG-MINUTES	4.1
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.23

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	10.250	1.00	2.12	2.78	10.250	1.00	2.78	4.47	10.250	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.25	SUM [7]	2.12	SUM [9]	10.25	SUM [11]	2.78	SUM [13]	10.25	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.51	1.59	1.71
FLOOD VOLUME	(cu-ft)	56,125	59,056	63,525
	(acre-ft)	1.29	1.36	1.46
REQUIRED STORAGE	(cu-ft)	53,172	53,709	51,340
	(acre-ft)	1.22	1.23	1.18
PEAK FLOW	(cfs)	19.27	17.04	4.42
MAXIMUM WSEL	(ft)	468.04	468.07	467.95

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.56	0.250	0.0130
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.65	0.649	0.1400
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	1.04	0.101	0.0528
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.25	SUM	0.2058

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102877561

C= 0.00191

Ft=C(24-(T/60))^1.55 = 0.00191 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.21
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.21	0.30	0.12	1.28	314.48
2	10	0.17	1.3	0.331	0.21	0.30	0.12	1.28	314.48
3	15	0.25	1.1	0.280	0.21	0.25	0.07	0.76	158.02
4	20	0.33	1.5	0.382	0.21	0.34	0.18	1.80	470.93
5	25	0.42	1.5	0.382	0.21	0.34	0.18	1.80	470.93
6	30	0.50	1.8	0.458	0.21	0.41	0.25	2.58	705.62
7	35	0.58	1.5	0.382	0.21	0.34	0.18	1.80	470.93
8	40	0.67	1.8	0.458	0.21	0.41	0.25	2.58	705.62
9	45	0.75	1.8	0.458	0.21	0.41	0.25	2.58	705.62
10	50	0.83	1.5	0.382	0.21	0.34	0.18	1.80	470.93
11	55	0.92	1.6	0.407	0.21	0.37	0.20	2.06	549.16
12	60	1.00	1.8	0.458	0.21	0.41	0.25	2.58	705.62
13	65	1.08	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
14	70	1.17	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
15	75	1.25	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
16	80	1.33	2.0	0.509	0.21	0.46	0.30	3.11	862.07
17	85	1.42	2.6	0.661	0.21	0.60	0.46	4.67	1331.44
18	90	1.50	2.7	0.687	0.21	0.62	0.48	4.93	1409.67
19	95	1.58	2.4	0.611	0.21	0.55	0.40	4.15	1174.98
20	100	1.67	2.7	0.687	0.21	0.62	0.48	4.93	1409.67
21	105	1.75	3.3	0.840	0.21	0.76	0.63	6.50	1879.04
22	110	1.83	3.1	0.789	0.21	0.71	0.58	5.97	1722.58
23	115	1.92	2.9	0.738	0.21	0.66	0.53	5.45	1566.12
24	120	2.00	3.0	0.763	0.21	0.69	0.56	5.71	1644.35
25	125	2.08	3.1	0.789	0.21	0.71	0.58	5.97	1722.58
26	130	2.17	4.2	1.068	0.21	0.96	0.86	8.84	2583.09
27	135	2.25	5.0	1.272	0.21	1.14	1.07	10.93	3208.91
28	140	2.33	3.5	0.890	0.21	0.80	0.68	7.02	2035.49
29	145	2.42	6.8	1.730	0.21	1.56	1.52	15.62	4617.02
30	150	2.50	7.3	1.857	0.21	1.67	1.65	16.93	5008.16
31	155	2.58	8.2	2.086	0.21	1.88	1.88	19.27	5712.21
32	160	2.67	5.9	1.501	0.21	1.35	1.30	13.28	3912.96
33	165	2.75	2.0	0.509	0.21	0.46	0.30	3.11	862.07
34	170	2.83	1.8	0.458	0.21	0.41	0.25	2.58	705.62
35	175	2.92	1.8	0.458	0.21	0.41	0.25	2.58	705.62
36	180	3.00	0.6	0.153	0.21	0.14	0.02	0.16	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.51
FLOOD VOLUME (acft)	1.29
FLOOD VOLUME (cuft)	56125.24
REQUIRED STORAGE (acft)	1.22
REQUIRED STORAGE (cuft)	53171.53
PEAK FLOW RATE (cfs)	19.27

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.167	0.21	0.15	0.02	0.17	0.00
2	10	0.17	0.6	0.200	0.21	0.18	0.02	0.21	0.00
3	15	0.25	0.6	0.200	0.21	0.18	0.02	0.21	0.00
4	20	0.33	0.6	0.200	0.21	0.18	0.02	0.21	0.00
5	25	0.42	0.6	0.200	0.21	0.18	0.02	0.21	0.00
6	30	0.50	0.7	0.234	0.21	0.21	0.03	0.28	15.59
7	35	0.58	0.7	0.234	0.21	0.21	0.03	0.28	15.59
8	40	0.67	0.7	0.234	0.21	0.21	0.03	0.28	15.59
9	45	0.75	0.7	0.234	0.21	0.21	0.03	0.28	15.59
10	50	0.83	0.7	0.234	0.21	0.21	0.03	0.28	15.59
11	55	0.92	0.7	0.234	0.21	0.21	0.03	0.28	15.59
12	60	1.00	0.8	0.267	0.21	0.24	0.06	0.63	118.17
13	65	1.08	0.8	0.267	0.21	0.24	0.06	0.63	118.17
14	70	1.17	0.8	0.267	0.21	0.24	0.06	0.63	118.17
15	75	1.25	0.8	0.267	0.21	0.24	0.06	0.63	118.17
16	80	1.33	0.8	0.267	0.21	0.24	0.06	0.63	118.17
17	85	1.42	0.8	0.267	0.21	0.24	0.06	0.63	118.17
18	90	1.50	0.8	0.267	0.21	0.24	0.06	0.63	118.17
19	95	1.58	0.8	0.267	0.21	0.24	0.06	0.63	118.17
20	100	1.67	0.8	0.267	0.21	0.24	0.06	0.63	118.17
21	105	1.75	0.8	0.267	0.21	0.24	0.06	0.63	118.17
22	110	1.83	0.8	0.267	0.21	0.24	0.06	0.63	118.17
23	115	1.92	0.8	0.267	0.21	0.24	0.06	0.63	118.17
24	120	2.00	0.9	0.300	0.21	0.27	0.09	0.97	220.75
25	125	2.08	0.8	0.267	0.21	0.24	0.06	0.63	118.17
26	130	2.17	0.9	0.300	0.21	0.27	0.09	0.97	220.75
27	135	2.25	0.9	0.300	0.21	0.27	0.09	0.97	220.75
28	140	2.33	0.9	0.300	0.21	0.27	0.09	0.97	220.75
29	145	2.42	0.9	0.300	0.21	0.27	0.09	0.97	220.75
30	150	2.50	0.9	0.300	0.21	0.27	0.09	0.97	220.75
31	155	2.58	0.9	0.300	0.21	0.27	0.09	0.97	220.75
32	160	2.67	0.9	0.300	0.21	0.27	0.09	0.97	220.75
33	165	2.75	1.0	0.334	0.21	0.30	0.13	1.31	323.33
34	170	2.83	1.0	0.334	0.21	0.30	0.13	1.31	323.33
35	175	2.92	1.0	0.334	0.21	0.30	0.13	1.31	323.33
36	180	3.00	1.0	0.334	0.21	0.30	0.13	1.31	323.33
37	185	3.08	1.0	0.334	0.21	0.30	0.13	1.31	323.33
38	190	3.17	1.1	0.367	0.21	0.33	0.16	1.65	425.91
39	195	3.25	1.1	0.367	0.21	0.33	0.16	1.65	425.91
40	200	3.33	1.1	0.367	0.21	0.33	0.16	1.65	425.91
41	205	3.42	1.2	0.400	0.21	0.36	0.19	1.99	528.50
42	210	3.50	1.3	0.434	0.21	0.39	0.23	2.34	631.08
43	215	3.58	1.4	0.467	0.21	0.42	0.26	2.68	733.66
44	220	3.67	1.4	0.467	0.21	0.42	0.26	2.68	733.66
45	225	3.75	1.5	0.500	0.21	0.45	0.29	3.02	836.24
46	230	3.83	1.5	0.500	0.21	0.45	0.29	3.02	836.24
47	235	3.92	1.6	0.534	0.21	0.48	0.33	3.36	938.82
48	240	4.00	1.6	0.534	0.21	0.48	0.33	3.36	938.82
49	245	4.08	1.7	0.567	0.21	0.51	0.36	3.70	1041.41
50	250	4.17	1.8	0.600	0.21	0.54	0.39	4.05	1143.99
51	255	4.25	1.9	0.634	0.21	0.57	0.43	4.39	1246.57
52	260	4.33	2.0	0.667	0.21	0.60	0.46	4.73	1349.15
53	265	4.42	2.1	0.701	0.21	0.63	0.49	5.07	1451.73
54	270	4.50	2.1	0.701	0.21	0.63	0.49	5.07	1451.73
55	275	4.58	2.2	0.734	0.21	0.66	0.53	5.41	1554.32
56	280	4.67	2.3	0.767	0.21	0.69	0.56	5.76	1656.90

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.05		
UNIT TIME-PERCENT OF LAG	244.5		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.206		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.23 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.801	0.21	0.72	0.59	6.10	1759.48
58	290	4.83	2.4	0.801	0.21	0.72	0.59	6.10	1759.48
59	295	4.92	2.5	0.834	0.21	0.75	0.63	6.44	1862.06
60	300	5.00	2.6	0.867	0.21	0.78	0.66	6.78	1964.64
61	305	5.08	3.1	1.034	0.21	0.93	0.83	8.49	2477.55
62	310	5.17	3.6	1.201	0.21	1.08	1.00	10.20	2990.46
63	315	5.25	3.9	1.301	0.21	1.17	1.10	11.23	3298.21
64	320	5.33	4.2	1.401	0.21	1.26	1.20	12.25	3605.96
65	325	5.42	4.7	1.568	0.21	1.41	1.36	13.96	4118.87
66	330	5.50	5.6	1.868	0.21	1.68	1.66	17.04	5042.10
67	335	5.58	1.9	0.634	0.21	0.57	0.43	4.39	1246.57
68	340	5.67	0.9	0.300	0.21	0.27	0.09	0.97	220.75
69	345	5.75	0.6	0.200	0.21	0.18	0.02	0.21	0.00
70	350	5.83	0.5	0.167	0.21	0.15	0.02	0.17	0.00
71	355	5.92	0.3	0.100	0.21	0.09	0.01	0.10	0.00
72	360	6.00	0.2	0.067	0.21	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.59
FLOOD VOLUME (acft)	1.36
FLOOD VOLUME (cuft)	59055.81
REQUIRED STORAGE (acft)	1.23
REQUIRED STORAGE (cuft)	53709.02
PEAK FLOW RATE (cfs)	17.04

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
	Minutes	Hours	(Plate E-5.9)		Max	Low			
1	15	0.25	0.2	0.036	0.363	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.359	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.355	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.351	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.347	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.343	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.338	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.334	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.330	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.326	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.322	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.318	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.314	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.310	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.307	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.303	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.299	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.295	0.113	0.013	0.13	0.00
19	285	4.75	0.7	0.125	0.291	0.113	0.013	0.13	0.00
20	300	5.00	0.8	0.143	0.288	0.129	0.014	0.15	0.00
21	315	5.25	0.6	0.107	0.284	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.280	0.113	0.013	0.13	0.00
23	345	5.75	0.8	0.143	0.276	0.129	0.014	0.15	0.00
24	360	6.00	0.8	0.143	0.273	0.129	0.014	0.15	0.00
25	375	6.25	0.9	0.161	0.269	0.145	0.016	0.16	0.00
26	390	6.50	0.9	0.161	0.266	0.145	0.016	0.16	0.00
27	405	6.75	1.0	0.179	0.262	0.161	0.018	0.18	0.00
28	420	7.00	1.0	0.179	0.258	0.161	0.018	0.18	0.00
29	435	7.25	1.0	0.179	0.255	0.161	0.018	0.18	0.00
30	450	7.50	1.1	0.197	0.252	0.177	0.020	0.20	0.00
31	465	7.75	1.2	0.215	0.248	0.193	0.021	0.22	0.00
32	480	8.00	1.3	0.232	0.245	0.209	0.023	0.24	5.05
33	495	8.25	1.5	0.268	0.241	0.241	0.027	0.28	39.29
34	510	8.50	1.5	0.268	0.238	0.241	0.030	0.31	70.31
35	525	8.75	1.6	0.286	0.235	0.257	0.052	0.53	266.00
36	540	9.00	1.7	0.304	0.231	0.274	0.073	0.75	461.42
37	555	9.25	1.9	0.340	0.228	0.306	0.112	1.15	821.51
38	570	9.50	2.0	0.358	0.225	0.322	0.133	1.36	1016.37
39	585	9.75	2.1	0.375	0.222	0.338	0.154	1.58	1210.96
40	600	10.00	2.2	0.393	0.218	0.354	0.175	1.79	1405.26
41	615	10.25	1.5	0.268	0.215	0.241	0.053	0.54	279.74
42	630	10.50	1.5	0.268	0.212	0.241	0.056	0.58	308.53
43	645	10.75	2.0	0.358	0.209	0.322	0.149	1.52	1161.74
44	660	11.00	2.0	0.358	0.206	0.322	0.152	1.55	1189.95
45	675	11.25	1.9	0.340	0.203	0.306	0.137	1.40	1052.92
46	690	11.50	1.9	0.340	0.200	0.306	0.140	1.43	1080.54
47	705	11.75	1.7	0.304	0.197	0.274	0.107	1.10	777.97
48	720	12.00	1.8	0.322	0.194	0.290	0.128	1.31	969.93
49	735	12.25	2.5	0.447	0.191	0.402	0.256	2.62	2151.25
50	750	12.50	2.6	0.465	0.188	0.418	0.277	2.84	2342.59
51	765	12.75	2.8	0.501	0.185	0.451	0.315	3.23	2698.57
52	780	13.00	2.9	0.519	0.183	0.467	0.336	3.44	2889.30
53	795	13.25	3.4	0.608	0.180	0.547	0.428	4.39	3739.48
54	810	13.50	3.4	0.608	0.177	0.547	0.431	4.42	3764.62
55	825	13.75	2.3	0.411	0.174	0.370	0.237	2.43	1975.07
56	840	14.00	2.3	0.411	0.172	0.370	0.239	2.45	1999.56
57	855	14.25	2.7	0.483	0.169	0.434	0.314	3.21	2683.50
58	870	14.50	2.6	0.465	0.167	0.418	0.298	3.06	2542.39
59	885	14.75	2.6	0.465	0.164	0.418	0.301	3.08	2565.88
60	900	15.00	2.5	0.447	0.162	0.402	0.285	2.93	2424.08
61	915	15.25	2.4	0.429	0.159	0.386	0.270	2.77	2281.94
62	930	15.50	2.3	0.411	0.157	0.370	0.255	2.61	2139.45
63	945	15.75	1.9	0.340	0.154	0.306	0.185	1.90	1501.78
64	960	16.00	1.9	0.340	0.152	0.306	0.188	1.93	1523.52
65	975	16.25	0.4	0.072	0.150	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.147	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.145	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.143	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.141	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.139	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.137	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.134	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.133	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.131	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.129	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.127	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.125	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.123	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.122	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.120	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.118	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.117	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.115	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.114	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.113	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.111	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.110	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.109	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.108	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.107	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.106	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.105	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.104	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.104	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.103	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.103	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	1.71
FLOOD VOLUME (acft)	1.46
FLOOD VOLUME (cuft)	63525.46
REQUIRED STORAGE (acft)	1.18
REQUIRED STORAGE (cuft)	51340.48
PEAK FLOW (cfs)	4.42

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15000	0	0	0.00
466	1	1	1600	16600	15800	15800	0.36
467	1	2	1650	18250	17425	33225	0.76
468	1	3	1710	19960	19105	52330	1.20
468.5	0.5	3.5	871	20831	10198	62528	1.44

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.23 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.23 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.28	384	384	70	314	465.02	314	0.01
2	10	1.28	384	699	70	629	465.04	629	0.01
3	15	0.76	228	857	70	787	465.05	787	0.02
4	20	1.80	541	1,328	70	1,258	465.08	1,258	0.03
5	25	1.80	541	1,799	70	1,729	465.11	1,729	0.04
6	30	2.58	775	2,504	70	2,434	465.15	2,434	0.06
7	35	1.80	541	2,975	70	2,905	465.18	2,905	0.07
8	40	2.58	775	3,681	70	3,611	465.23	3,611	0.08
9	45	2.58	775	4,386	70	4,317	465.27	4,317	0.10
10	50	1.80	541	4,857	70	4,788	465.30	4,788	0.11
11	55	2.06	619	5,406	70	5,337	465.34	5,337	0.12
12	60	2.58	775	6,112	70	6,042	465.38	6,042	0.14
13	65	3.63	1,088	7,131	70	7,061	465.45	7,061	0.16
14	70	3.63	1,088	8,149	70	8,079	465.51	8,079	0.19
15	75	3.63	1,088	9,168	70	9,098	465.58	9,098	0.21
16	80	3.11	932	10,030	70	9,960	465.63	9,960	0.23
17	85	4.67	1,401	11,361	70	11,291	465.71	11,291	0.26
18	90	4.93	1,479	12,771	70	12,701	465.80	12,701	0.29
19	95	4.15	1,245	13,946	70	13,876	465.88	13,876	0.32
20	100	4.93	1,479	15,356	70	15,286	465.97	15,286	0.35
21	105	6.50	1,949	17,235	70	17,165	466.08	17,165	0.39
22	110	5.97	1,792	18,957	70	18,887	466.18	18,887	0.43
23	115	5.45	1,636	20,523	70	20,453	466.27	20,453	0.47
24	120	5.71	1,714	22,168	70	22,098	466.36	22,098	0.51
25	125	5.97	1,792	23,890	70	23,820	466.46	23,820	0.55
26	130	8.84	2,653	26,473	70	26,403	466.61	26,403	0.61
27	135	10.93	3,279	29,682	70	29,612	466.79	29,612	0.68
28	140	7.02	2,105	31,718	70	31,648	466.91	31,648	0.73
29	145	15.62	4,687	36,335	70	36,265	467.16	36,265	0.83
30	150	16.93	5,078	41,343	70	41,273	467.42	41,273	0.95
31	155	19.27	5,782	47,055	70	46,985	467.72	46,985	1.08
32	160	13.28	3,983	50,968	70	50,898	467.93	50,898	1.17
33	165	3.11	932	51,830	70	51,760	467.97	51,760	1.19
34	170	2.58	775	52,536	70	52,466	468.01	52,466	1.20
35	175	2.58	775	53,241	70	53,172	468.04	53,172	1.22
36	180	0.16	47	53,218	70	53,149	468.04	53,149	1.22

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	70	-	465.00	-	0.00
2	10	0.21	62	62	70	-	465.00	-	0.00
3	15	0.21	62	62	70	-	465.00	-	0.00
4	20	0.21	62	62	70	-	465.00	-	0.00
5	25	0.21	62	62	70	-	465.00	-	0.00
6	30	0.28	85	85	70	16	465.00	16	0.00
7	35	0.28	85	101	70	31	465.00	31	0.00
8	40	0.28	85	117	70	47	465.00	47	0.00
9	45	0.28	85	132	70	62	465.00	62	0.00
10	50	0.28	85	148	70	78	465.00	78	0.00
11	55	0.28	85	163	70	94	465.01	94	0.00
12	60	0.63	188	281	70	212	465.01	212	0.00
13	65	0.63	188	400	70	330	465.02	330	0.01
14	70	0.63	188	518	70	448	465.03	448	0.01
15	75	0.63	188	636	70	566	465.04	566	0.01
16	80	0.63	188	754	70	684	465.04	684	0.02
17	85	0.63	188	872	70	803	465.05	803	0.02
18	90	0.63	188	990	70	921	465.06	921	0.02
19	95	0.63	188	1,109	70	1,039	465.07	1,039	0.02
20	100	0.63	188	1,227	70	1,157	465.07	1,157	0.03
21	105	0.63	188	1,345	70	1,275	465.08	1,275	0.03
22	110	0.63	188	1,463	70	1,393	465.09	1,393	0.03
23	115	0.63	188	1,581	70	1,512	465.10	1,512	0.03
24	120	0.97	291	1,802	70	1,732	465.11	1,732	0.04
25	125	0.63	188	1,920	70	1,850	465.12	1,850	0.04
26	130	0.97	291	2,141	70	2,071	465.13	2,071	0.05
27	135	0.97	291	2,362	70	2,292	465.15	2,292	0.05
28	140	0.97	291	2,582	70	2,513	465.16	2,513	0.06
29	145	0.97	291	2,803	70	2,733	465.17	2,733	0.06
30	150	0.97	291	3,024	70	2,954	465.19	2,954	0.07
31	155	0.97	291	3,245	70	3,175	465.20	3,175	0.07
32	160	0.97	291	3,465	70	3,396	465.21	3,396	0.08
33	165	1.31	393	3,789	70	3,719	465.24	3,719	0.09
34	170	1.31	393	4,112	70	4,042	465.26	4,042	0.09
35	175	1.31	393	4,435	70	4,366	465.28	4,366	0.10
36	180	1.31	393	4,759	70	4,689	465.30	4,689	0.11
37	185	1.31	393	5,082	70	5,012	465.32	5,012	0.12
38	190	1.65	496	5,508	70	5,438	465.34	5,438	0.12
39	195	1.65	496	5,934	70	5,864	465.37	5,864	0.13
40	200	1.65	496	6,360	70	6,290	465.40	6,290	0.14
41	205	1.99	598	6,888	70	6,819	465.43	6,819	0.16
42	210	2.34	701	7,519	70	7,450	465.47	7,450	0.17
43	215	2.68	803	8,253	70	8,183	465.52	8,183	0.19
44	220	2.68	803	8,987	70	8,917	465.56	8,917	0.20
45	225	3.02	906	9,823	70	9,753	465.62	9,753	0.22
46	230	3.02	906	10,659	70	10,589	465.67	10,589	0.24
47	235	3.36	1,009	11,598	70	11,528	465.73	11,528	0.26
48	240	3.36	1,009	12,537	70	12,467	465.79	12,467	0.29
49	245	3.70	1,111	13,578	70	13,509	465.85	13,509	0.31
50	250	4.05	1,214	14,722	70	14,652	465.93	14,652	0.34
51	255	4.39	1,316	15,969	70	15,899	466.01	15,899	0.36
52	260	4.73	1,419	17,318	70	17,248	466.08	17,248	0.40
53	265	5.07	1,522	18,770	70	18,700	466.17	18,700	0.43
54	270	5.07	1,522	20,221	70	20,152	466.25	20,152	0.46
55	275	5.41	1,624	21,776	70	21,706	466.34	21,706	0.50

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	5.76	1,727	23,433	70	23,363	466.43	23,363	0.54
57	285	6.10	1,829	25,192	70	25,122	466.53	25,122	0.58
58	290	6.10	1,829	26,952	70	26,882	466.64	26,882	0.62
59	295	6.44	1,932	28,814	70	28,744	466.74	28,744	0.66
60	300	6.78	2,034	30,778	70	30,709	466.86	30,709	0.70
61	305	8.49	2,547	33,256	70	33,186	467.00	33,186	0.76
62	310	10.20	3,060	36,246	70	36,177	467.15	36,177	0.83
63	315	11.23	3,368	39,545	70	39,475	467.33	39,475	0.91
64	320	12.25	3,676	43,151	70	43,081	467.52	43,081	0.99
65	325	13.96	4,189	47,269	70	47,200	467.73	47,200	1.08
66	330	17.04	5,112	52,311	70	52,242	468.00	52,242	1.20
67	335	4.39	1,316	53,558	70	53,488	468.06	53,488	1.23
68	340	0.97	291	53,779	70	53,709	468.07	53,709	1.23
69	345	0.21	62	53,771	70	53,701	468.07	53,701	1.23
70	350	0.17	51	53,752	70	53,682	468.07	53,682	1.23
71	355	0.10	31	53,713	70	53,643	468.06	53,643	1.23
72	360	0.07	21	53,664	70	53,594	468.06	53,594	1.23

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	33	33	209	-	465.00	-	0.00
2	30	0.05	49	49	209	-	465.00	-	0.00
3	45	0.05	49	49	209	-	465.00	-	0.00
4	60	0.07	66	66	209	-	465.00	-	0.00
5	75	0.05	49	49	209	-	465.00	-	0.00
6	90	0.05	49	49	209	-	465.00	-	0.00
7	105	0.05	49	49	209	-	465.00	-	0.00
8	120	0.07	66	66	209	-	465.00	-	0.00
9	135	0.07	66	66	209	-	465.00	-	0.00
10	150	0.07	66	66	209	-	465.00	-	0.00
11	165	0.09	82	82	209	-	465.00	-	0.00
12	180	0.09	82	82	209	-	465.00	-	0.00
13	195	0.09	82	82	209	-	465.00	-	0.00
14	210	0.09	82	82	209	-	465.00	-	0.00
15	225	0.09	82	82	209	-	465.00	-	0.00
16	240	0.11	99	99	209	-	465.00	-	0.00
17	255	0.11	99	99	209	-	465.00	-	0.00
18	270	0.13	115	115	209	-	465.00	-	0.00
19	285	0.13	115	115	209	-	465.00	-	0.00
20	300	0.15	132	132	209	-	465.00	-	0.00
21	315	0.11	99	99	209	-	465.00	-	0.00
22	330	0.13	115	115	209	-	465.00	-	0.00
23	345	0.15	132	132	209	-	465.00	-	0.00
24	360	0.15	132	132	209	-	465.00	-	0.00
25	375	0.16	148	148	209	-	465.00	-	0.00
26	390	0.16	148	148	209	-	465.00	-	0.00
27	405	0.18	165	165	209	-	465.00	-	0.00
28	420	0.18	165	165	209	-	465.00	-	0.00
29	435	0.18	165	165	209	-	465.00	-	0.00
30	450	0.20	181	181	209	-	465.00	-	0.00
31	465	0.22	198	198	209	-	465.00	-	0.00
32	480	0.24	214	214	209	5	465.00	5	0.00
33	495	0.28	249	254	209	44	465.00	44	0.00
34	510	0.31	280	324	209	115	465.01	115	0.00
35	525	0.53	475	590	209	381	465.02	381	0.01
36	540	0.75	671	1,051	209	842	465.05	842	0.02
37	555	1.15	1,031	1,873	209	1,664	465.11	1,664	0.04
38	570	1.36	1,226	2,889	209	2,680	465.17	2,680	0.06
39	585	1.58	1,420	4,100	209	3,891	465.25	3,891	0.09
40	600	1.79	1,615	5,506	209	5,296	465.34	5,296	0.12
41	615	0.54	489	5,785	209	5,576	465.35	5,576	0.13
42	630	0.58	518	6,094	209	5,884	465.37	5,884	0.14
43	645	1.52	1,371	7,256	209	7,046	465.45	7,046	0.16
44	660	1.55	1,399	8,446	209	8,236	465.52	8,236	0.19
45	675	1.40	1,262	9,498	209	9,289	465.59	9,289	0.21
46	690	1.43	1,290	10,579	209	10,370	465.66	10,370	0.24
47	705	1.10	987	11,357	209	11,148	465.71	11,148	0.26
48	720	1.31	1,179	12,327	209	12,117	465.77	12,117	0.28
49	735	2.62	2,361	14,478	209	14,269	465.90	14,269	0.33
50	750	2.84	2,552	16,821	209	16,611	466.05	16,611	0.38
51	765	3.23	2,908	19,519	209	19,310	466.20	19,310	0.44
52	780	3.44	3,099	22,409	209	22,199	466.37	22,199	0.51
53	795	4.39	3,949	26,148	209	25,939	466.58	25,939	0.60
54	810	4.42	3,974	29,913	209	29,703	466.80	29,703	0.68
55	825	2.43	2,184	31,888	209	31,678	466.91	31,678	0.73
56	840	2.45	2,209	33,887	209	33,678	467.02	33,678	0.77
57	855	3.21	2,893	36,571	209	36,361	467.16	36,361	0.83
58	870	3.06	2,752	39,113	209	38,904	467.30	38,904	0.89

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	3.08	2,775	41,679	209	41,470	467.43	41,470	0.95
60	900	2.93	2,633	44,103	209	43,894	467.56	43,894	1.01
61	915	2.77	2,491	46,385	209	46,176	467.68	46,176	1.06
62	930	2.61	2,349	48,525	209	48,315	467.79	48,315	1.11
63	945	1.90	1,711	50,026	209	49,817	467.87	49,817	1.14
64	960	1.93	1,733	51,550	209	51,340	467.95	51,340	1.18
65	975	0.07	66	51,406	209	51,197	467.94	51,197	1.18
66	990	0.07	66	51,263	209	51,054	467.93	51,054	1.17
67	1005	0.05	49	51,103	209	50,894	467.92	50,894	1.17
68	1020	0.05	49	50,943	209	50,734	467.92	50,734	1.16
69	1035	0.09	82	50,816	209	50,607	467.91	50,607	1.16
70	1050	0.09	82	50,689	209	50,480	467.90	50,480	1.16
71	1065	0.09	82	50,563	209	50,353	467.90	50,353	1.16
72	1080	0.07	66	50,419	209	50,210	467.89	50,210	1.15
73	1095	0.07	66	50,276	209	50,066	467.88	50,066	1.15
74	1110	0.07	66	50,132	209	49,923	467.87	49,923	1.15
75	1125	0.05	49	49,972	209	49,763	467.87	49,763	1.14
76	1140	0.04	33	49,796	209	49,587	467.86	49,587	1.14
77	1155	0.05	49	49,636	209	49,427	467.85	49,427	1.13
78	1170	0.07	66	49,493	209	49,283	467.84	49,283	1.13
79	1185	0.05	49	49,333	209	49,124	467.83	49,124	1.13
80	1200	0.04	33	49,157	209	48,947	467.82	48,947	1.12
81	1215	0.05	49	48,997	209	48,787	467.81	48,787	1.12
82	1230	0.05	49	48,837	209	48,627	467.81	48,627	1.12
83	1245	0.05	49	48,677	209	48,467	467.80	48,467	1.11
84	1260	0.04	33	48,500	209	48,291	467.79	48,291	1.11
85	1275	0.05	49	48,341	209	48,131	467.78	48,131	1.10
86	1290	0.04	33	48,164	209	47,955	467.77	47,955	1.10
87	1305	0.05	49	48,004	209	47,795	467.76	47,795	1.10
88	1320	0.04	33	47,828	209	47,619	467.75	47,619	1.09
89	1335	0.05	49	47,668	209	47,459	467.75	47,459	1.09
90	1350	0.04	33	47,492	209	47,282	467.74	47,282	1.09
91	1365	0.04	33	47,315	209	47,106	467.73	47,106	1.08
92	1380	0.04	33	47,139	209	46,929	467.72	46,929	1.08
93	1395	0.04	33	46,962	209	46,753	467.71	46,753	1.07
94	1410	0.04	33	46,786	209	46,577	467.70	46,577	1.07
95	1425	0.04	33	46,610	209	46,400	467.69	46,400	1.07
96	1440	0.04	33	46,433	209	46,224	467.68	46,224	1.06

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 4		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.33		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.56		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.9		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	620		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	70		
30				
31	ELEVATION OF HEADWATER	470.5		
32	ELEVATION OF CONCENTRATION POINT	468		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		464.5	13730	
45		465.5	15200	
46		466.5	16700	
47		467.5	18270	
48		468	19075	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 4
[3] AREA - ACRES	9.790
[4] L-FEET	620
[5] L-MILES	0.117
[6] La-FEET	70.00
[7] La-MILES	0.013
[8] ELEVATION OF HEADWATER	470.5
[9] ELEVATION OF CONCENTRATION POINT	468
[10] H-FEET	2.5
[11] S-FEET/MILE	21.3
[12] S^0.5	4.61
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.4
[17] 100% OF LAG-MINUTES	1.4
[18] 200% OF LAG-MINUTES	2.8
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.21

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	9.790	1.00	2.12	2.78	9.790	1.00	2.78	4.47	9.790	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.79	SUM [7]	2.12	SUM [9]	9.79	SUM [11]	2.78	SUM [13]	9.79	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.51	1.59	1.71
FLOOD VOLUME	(cu-ft)	53,707	56,587	60,936
	(acre-ft)	1.23	1.30	1.40
REQUIRED STORAGE	(cu-ft)	50,983	51,654	49,570
	(acre-ft)	1.17	1.19	1.14
PEAK FLOW	(cfs)	18.42	16.28	4.23
MAXIMUM WSEL	(ft)	467.67	467.70	467.59

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.33	0.238	0.0124
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.56	0.670	0.1446
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.90	0.092	0.0478
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.79	SUM	0.2048

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102390603

C= 0.00190

Ft=C(24-(T/60))^1.55 = 0.00190 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.20
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.20	0.30	0.13	1.23	306.00
2	10	0.17	1.3	0.331	0.20	0.30	0.13	1.23	306.00
3	15	0.25	1.1	0.280	0.20	0.25	0.08	0.73	156.57
4	20	0.33	1.5	0.382	0.20	0.34	0.18	1.73	455.43
5	25	0.42	1.5	0.382	0.20	0.34	0.18	1.73	455.43
6	30	0.50	1.8	0.458	0.20	0.41	0.25	2.48	679.59
7	35	0.58	1.5	0.382	0.20	0.34	0.18	1.73	455.43
8	40	0.67	1.8	0.458	0.20	0.41	0.25	2.48	679.59
9	45	0.75	1.8	0.458	0.20	0.41	0.25	2.48	679.59
10	50	0.83	1.5	0.382	0.20	0.34	0.18	1.73	455.43
11	55	0.92	1.6	0.407	0.20	0.37	0.20	1.98	530.15
12	60	1.00	1.8	0.458	0.20	0.41	0.25	2.48	679.59
13	65	1.08	2.2	0.560	0.20	0.50	0.35	3.47	978.46
14	70	1.17	2.2	0.560	0.20	0.50	0.35	3.47	978.46
15	75	1.25	2.2	0.560	0.20	0.50	0.35	3.47	978.46
16	80	1.33	2.0	0.509	0.20	0.46	0.30	2.98	829.02
17	85	1.42	2.6	0.661	0.20	0.60	0.46	4.47	1277.32
18	90	1.50	2.7	0.687	0.20	0.62	0.48	4.72	1352.04
19	95	1.58	2.4	0.611	0.20	0.55	0.41	3.97	1127.89
20	100	1.67	2.7	0.687	0.20	0.62	0.48	4.72	1352.04
21	105	1.75	3.3	0.840	0.20	0.76	0.63	6.21	1800.35
22	110	1.83	3.1	0.789	0.20	0.71	0.58	5.72	1650.91
23	115	1.92	2.9	0.738	0.20	0.66	0.53	5.22	1501.48
24	120	2.00	3.0	0.763	0.20	0.69	0.56	5.47	1576.19
25	125	2.08	3.1	0.789	0.20	0.71	0.58	5.72	1650.91
26	130	2.17	4.2	1.068	0.20	0.96	0.86	8.46	2472.80
27	135	2.25	5.0	1.272	0.20	1.14	1.07	10.45	3070.54
28	140	2.33	3.5	0.890	0.20	0.80	0.69	6.71	1949.78
29	145	2.42	6.8	1.730	0.20	1.56	1.53	14.93	4415.45
30	150	2.50	7.3	1.857	0.20	1.67	1.65	16.18	4789.04
31	155	2.58	8.2	2.086	0.20	1.88	1.88	18.42	5461.49
32	160	2.67	5.9	1.501	0.20	1.35	1.30	12.69	3742.99
33	165	2.75	2.0	0.509	0.20	0.46	0.30	2.98	829.02
34	170	2.83	1.8	0.458	0.20	0.41	0.25	2.48	679.59
35	175	2.92	1.8	0.458	0.20	0.41	0.25	2.48	679.59
36	180	3.00	0.6	0.153	0.20	0.14	0.02	0.15	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.51
FLOOD VOLUME (acft)	1.23
FLOOD VOLUME (cuft)	53707.39
REQUIRED STORAGE (acft)	1.17
REQUIRED STORAGE (cuft)	50982.60
PEAK FLOW RATE (cfs)	18.42

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.205
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.167	0.20	0.15	0.02	0.16	0.00
2	10	0.17	0.6	0.200	0.20	0.18	0.02	0.20	0.00
3	15	0.25	0.6	0.200	0.20	0.18	0.02	0.20	0.00
4	20	0.33	0.6	0.200	0.20	0.18	0.02	0.20	0.00
5	25	0.42	0.6	0.200	0.20	0.18	0.02	0.20	0.00
6	30	0.50	0.7	0.234	0.20	0.21	0.03	0.28	20.52
7	35	0.58	0.7	0.234	0.20	0.21	0.03	0.28	20.52
8	40	0.67	0.7	0.234	0.20	0.21	0.03	0.28	20.52
9	45	0.75	0.7	0.234	0.20	0.21	0.03	0.28	20.52
10	50	0.83	0.7	0.234	0.20	0.21	0.03	0.28	20.52
11	55	0.92	0.7	0.234	0.20	0.21	0.03	0.28	20.52
12	60	1.00	0.8	0.267	0.20	0.24	0.06	0.61	118.50
13	65	1.08	0.8	0.267	0.20	0.24	0.06	0.61	118.50
14	70	1.17	0.8	0.267	0.20	0.24	0.06	0.61	118.50
15	75	1.25	0.8	0.267	0.20	0.24	0.06	0.61	118.50
16	80	1.33	0.8	0.267	0.20	0.24	0.06	0.61	118.50
17	85	1.42	0.8	0.267	0.20	0.24	0.06	0.61	118.50
18	90	1.50	0.8	0.267	0.20	0.24	0.06	0.61	118.50
19	95	1.58	0.8	0.267	0.20	0.24	0.06	0.61	118.50
20	100	1.67	0.8	0.267	0.20	0.24	0.06	0.61	118.50
21	105	1.75	0.8	0.267	0.20	0.24	0.06	0.61	118.50
22	110	1.83	0.8	0.267	0.20	0.24	0.06	0.61	118.50
23	115	1.92	0.8	0.267	0.20	0.24	0.06	0.61	118.50
24	120	2.00	0.9	0.300	0.20	0.27	0.10	0.93	216.48
25	125	2.08	0.8	0.267	0.20	0.24	0.06	0.61	118.50
26	130	2.17	0.9	0.300	0.20	0.27	0.10	0.93	216.48
27	135	2.25	0.9	0.300	0.20	0.27	0.10	0.93	216.48
28	140	2.33	0.9	0.300	0.20	0.27	0.10	0.93	216.48
29	145	2.42	0.9	0.300	0.20	0.27	0.10	0.93	216.48
30	150	2.50	0.9	0.300	0.20	0.27	0.10	0.93	216.48
31	155	2.58	0.9	0.300	0.20	0.27	0.10	0.93	216.48
32	160	2.67	0.9	0.300	0.20	0.27	0.10	0.93	216.48
33	165	2.75	1.0	0.334	0.20	0.30	0.13	1.26	314.46
34	170	2.83	1.0	0.334	0.20	0.30	0.13	1.26	314.46
35	175	2.92	1.0	0.334	0.20	0.30	0.13	1.26	314.46
36	180	3.00	1.0	0.334	0.20	0.30	0.13	1.26	314.46
37	185	3.08	1.0	0.334	0.20	0.30	0.13	1.26	314.46
38	190	3.17	1.1	0.367	0.20	0.33	0.16	1.59	412.44
39	195	3.25	1.1	0.367	0.20	0.33	0.16	1.59	412.44
40	200	3.33	1.1	0.367	0.20	0.33	0.16	1.59	412.44
41	205	3.42	1.2	0.400	0.20	0.36	0.20	1.91	510.41
42	210	3.50	1.3	0.434	0.20	0.39	0.23	2.24	608.39
43	215	3.58	1.4	0.467	0.20	0.42	0.26	2.57	706.37
44	220	3.67	1.4	0.467	0.20	0.42	0.26	2.57	706.37
45	225	3.75	1.5	0.500	0.20	0.45	0.30	2.89	804.35
46	230	3.83	1.5	0.500	0.20	0.45	0.30	2.89	804.35
47	235	3.92	1.6	0.534	0.20	0.48	0.33	3.22	902.33
48	240	4.00	1.6	0.534	0.20	0.48	0.33	3.22	902.33
49	245	4.08	1.7	0.567	0.20	0.51	0.36	3.55	1000.31
50	250	4.17	1.8	0.600	0.20	0.54	0.40	3.87	1098.28
51	255	4.25	1.9	0.634	0.20	0.57	0.43	4.20	1196.26
52	260	4.33	2.0	0.667	0.20	0.60	0.46	4.53	1294.24
53	265	4.42	2.1	0.701	0.20	0.63	0.50	4.85	1392.22
54	270	4.50	2.1	0.701	0.20	0.63	0.50	4.85	1392.22
55	275	4.58	2.2	0.734	0.20	0.66	0.53	5.18	1490.20
56	280	4.67	2.3	0.767	0.20	0.69	0.56	5.51	1588.18

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.38		
UNIT TIME-PERCENT OF LAG	362.1		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.205		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.21 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.801	0.20	0.72	0.60	5.83	1686.15
58	290	4.83	2.4	0.801	0.20	0.72	0.60	5.83	1686.15
59	295	4.92	2.5	0.834	0.20	0.75	0.63	6.16	1784.13
60	300	5.00	2.6	0.867	0.20	0.78	0.66	6.49	1882.11
61	305	5.08	3.1	1.034	0.20	0.93	0.83	8.12	2372.00
62	310	5.17	3.6	1.201	0.20	1.08	1.00	9.75	2861.89
63	315	5.25	3.9	1.301	0.20	1.17	1.10	10.73	3155.83
64	320	5.33	4.2	1.401	0.20	1.26	1.20	11.71	3449.76
65	325	5.42	4.7	1.568	0.20	1.41	1.36	13.35	3939.66
66	330	5.50	5.6	1.868	0.20	1.68	1.66	16.28	4821.46
67	335	5.58	1.9	0.634	0.20	0.57	0.43	4.20	1196.26
68	340	5.67	0.9	0.300	0.20	0.27	0.10	0.93	216.48
69	345	5.75	0.6	0.200	0.20	0.18	0.02	0.20	0.00
70	350	5.83	0.5	0.167	0.20	0.15	0.02	0.16	0.00
71	355	5.92	0.3	0.100	0.20	0.09	0.01	0.10	0.00
72	360	6.00	0.2	0.067	0.20	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.59
FLOOD VOLUME (acft)	1.30
FLOOD VOLUME (cuft)	56587.21
REQUIRED STORAGE (acft)	1.19
REQUIRED STORAGE (cuft)	51653.82
PEAK FLOW RATE (cfs)	16.28

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.362	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.357	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.353	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.349	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.345	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.341	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.337	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.333	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.329	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.325	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.321	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.317	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.313	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.309	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.305	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.301	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.297	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.294	0.113	0.013	0.12	0.00
19	285	4.75	0.7	0.125	0.290	0.113	0.013	0.12	0.00
20	300	5.00	0.8	0.143	0.286	0.129	0.014	0.14	0.00
21	315	5.25	0.6	0.107	0.282	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.279	0.113	0.013	0.12	0.00
23	345	5.75	0.8	0.143	0.275	0.129	0.014	0.14	0.00
24	360	6.00	0.8	0.143	0.272	0.129	0.014	0.14	0.00
25	375	6.25	0.9	0.161	0.268	0.145	0.016	0.16	0.00
26	390	6.50	0.9	0.161	0.264	0.145	0.016	0.16	0.00
27	405	6.75	1.0	0.179	0.261	0.161	0.018	0.18	0.00
28	420	7.00	1.0	0.179	0.257	0.161	0.018	0.18	0.00
29	435	7.25	1.0	0.179	0.254	0.161	0.018	0.18	0.00
30	450	7.50	1.1	0.197	0.250	0.177	0.020	0.19	0.00
31	465	7.75	1.2	0.215	0.247	0.193	0.021	0.21	0.00
32	480	8.00	1.3	0.232	0.243	0.209	0.023	0.23	13.15
33	495	8.25	1.5	0.268	0.240	0.241	0.028	0.28	55.92
34	510	8.50	1.5	0.268	0.237	0.241	0.031	0.31	85.41
35	525	8.75	1.6	0.286	0.233	0.257	0.053	0.52	272.18
36	540	9.00	1.7	0.304	0.230	0.274	0.074	0.72	458.69
37	555	9.25	1.9	0.340	0.227	0.306	0.113	1.10	802.48
38	570	9.50	2.0	0.358	0.224	0.322	0.134	1.31	988.46
39	585	9.75	2.1	0.375	0.220	0.338	0.155	1.52	1174.18
40	600	10.00	2.2	0.393	0.217	0.354	0.176	1.72	1359.63
41	615	10.25	1.5	0.268	0.214	0.241	0.054	0.53	284.49
42	630	10.50	1.5	0.268	0.211	0.241	0.057	0.56	311.86
43	645	10.75	2.0	0.358	0.208	0.322	0.150	1.46	1126.65
44	660	11.00	2.0	0.358	0.205	0.322	0.153	1.49	1153.47
45	675	11.25	1.9	0.340	0.202	0.306	0.138	1.35	1022.46
46	690	11.50	1.9	0.340	0.199	0.306	0.141	1.38	1048.71
47	705	11.75	1.7	0.304	0.196	0.274	0.108	1.06	759.60
48	720	12.00	1.8	0.322	0.193	0.290	0.129	1.26	942.83
49	735	12.25	2.5	0.447	0.190	0.402	0.257	2.51	2071.00
50	750	12.50	2.6	0.465	0.187	0.418	0.278	2.72	2253.64
51	765	12.75	2.8	0.501	0.185	0.451	0.316	3.09	2593.53
52	780	13.00	2.9	0.519	0.182	0.467	0.337	3.30	2775.58
53	795	13.25	3.4	0.608	0.179	0.547	0.429	4.20	3587.49
54	810	13.50	3.4	0.608	0.176	0.547	0.432	4.23	3611.39
55	825	13.75	2.3	0.411	0.174	0.370	0.238	2.33	1902.04
56	840	14.00	2.3	0.411	0.171	0.370	0.240	2.35	1925.32
57	855	14.25	2.7	0.483	0.168	0.434	0.314	3.08	2578.46
58	870	14.50	2.6	0.465	0.166	0.418	0.299	2.93	2443.57
59	885	14.75	2.6	0.465	0.163	0.418	0.302	2.95	2465.90
60	900	15.00	2.5	0.447	0.161	0.402	0.286	2.80	2330.36
61	915	15.25	2.4	0.429	0.158	0.386	0.271	2.65	2194.50
62	930	15.50	2.3	0.411	0.156	0.370	0.255	2.50	2058.30
63	945	15.75	1.9	0.340	0.153	0.306	0.186	1.82	1449.14
64	960	16.00	1.9	0.340	0.151	0.306	0.189	1.85	1469.81
65	975	16.25	0.4	0.072	0.149	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.147	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.144	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
	Minutes	Hours	(Plate E-5.9)		Max	Low			
68	1020	17.00	0.3	0.054	0.142	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.140	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.138	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.136	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.134	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.132	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.130	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.128	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.126	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.124	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.123	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.121	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.119	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.118	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.116	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.115	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.113	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.112	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.111	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.110	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.108	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.107	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.106	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.105	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.105	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.104	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.103	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.103	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.102	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	1.71
FLOOD VOLUME (acft)	1.40
FLOOD VOLUME (cuft)	60935.59
REQUIRED STORAGE (acft)	1.14
REQUIRED STORAGE (cuft)	49570.20
PEAK FLOW (cfs)	4.23

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
464.5	0	0		13730	0	0	0.00
465.5	1	1	1470	15200	14465	14465	0.33
466.5	1	2	1500	16700	15950	30415	0.70
467.5	1	3	1570	18270	17485	47900	1.10
468	0.5	3.5	805	19075	9336	57236	1.31

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.21 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.21 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.23	370	370	64	306	464.52	306	0.01
2	10	1.23	370	676	64	612	464.54	612	0.01
3	15	0.73	220	832	64	769	464.55	769	0.02
4	20	1.73	519	1,288	64	1,224	464.58	1,224	0.03
5	25	1.73	519	1,743	64	1,679	464.62	1,679	0.04
6	30	2.48	743	2,423	64	2,359	464.66	2,359	0.05
7	35	1.73	519	2,878	64	2,814	464.69	2,814	0.06
8	40	2.48	743	3,558	64	3,494	464.74	3,494	0.08
9	45	2.48	743	4,238	64	4,174	464.79	4,174	0.10
10	50	1.73	519	4,693	64	4,629	464.82	4,629	0.11
11	55	1.98	594	5,223	64	5,159	464.86	5,159	0.12
12	60	2.48	743	5,903	64	5,839	464.90	5,839	0.13
13	65	3.47	1,042	6,881	64	6,817	464.97	6,817	0.16
14	70	3.47	1,042	7,860	64	7,796	465.04	7,796	0.18
15	75	3.47	1,042	8,838	64	8,774	465.11	8,774	0.20
16	80	2.98	893	9,667	64	9,603	465.16	9,603	0.22
17	85	4.47	1,341	10,944	64	10,881	465.25	10,881	0.25
18	90	4.72	1,416	12,296	64	12,233	465.35	12,233	0.28
19	95	3.97	1,192	13,424	64	13,360	465.42	13,360	0.31
20	100	4.72	1,416	14,776	64	14,712	465.52	14,712	0.34
21	105	6.21	1,864	16,577	64	16,513	465.63	16,513	0.38
22	110	5.72	1,715	18,228	64	18,164	465.73	18,164	0.42
23	115	5.22	1,565	19,729	64	19,665	465.83	19,665	0.45
24	120	5.47	1,640	21,305	64	21,241	465.92	21,241	0.49
25	125	5.72	1,715	22,956	64	22,892	466.03	22,892	0.53
26	130	8.46	2,537	25,429	64	25,365	466.18	25,365	0.58
27	135	10.45	3,134	28,500	64	28,436	466.38	28,436	0.65
28	140	6.71	2,014	30,449	64	30,385	466.50	30,385	0.70
29	145	14.93	4,479	34,865	64	34,801	466.75	34,801	0.80
30	150	16.18	4,853	39,654	64	39,590	467.02	39,590	0.91
31	155	18.42	5,525	45,115	64	45,051	467.34	45,051	1.03
32	160	12.69	3,807	48,858	64	48,794	467.55	48,794	1.12
33	165	2.98	893	49,687	64	49,623	467.59	49,623	1.14
34	170	2.48	743	50,367	64	50,303	467.63	50,303	1.15
35	175	2.48	743	51,046	64	50,983	467.67	50,983	1.17
36	180	0.15	45	51,027	64	50,964	467.66	50,964	1.17

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	49	49	64	-	464.50	-	0.00
2	10	0.20	59	59	64	-	464.50	-	0.00
3	15	0.20	59	59	64	-	464.50	-	0.00
4	20	0.20	59	59	64	-	464.50	-	0.00
5	25	0.20	59	59	64	-	464.50	-	0.00
6	30	0.28	84	84	64	21	464.50	21	0.00
7	35	0.28	84	105	64	41	464.50	41	0.00
8	40	0.28	84	125	64	62	464.50	62	0.00
9	45	0.28	84	146	64	82	464.51	82	0.00
10	50	0.28	84	166	64	103	464.51	103	0.00
11	55	0.28	84	187	64	123	464.51	123	0.00
12	60	0.61	182	306	64	242	464.52	242	0.01
13	65	0.61	182	424	64	360	464.52	360	0.01
14	70	0.61	182	543	64	479	464.53	479	0.01
15	75	0.61	182	661	64	597	464.54	597	0.01
16	80	0.61	182	780	64	716	464.55	716	0.02
17	85	0.61	182	898	64	834	464.56	834	0.02
18	90	0.61	182	1,017	64	953	464.57	953	0.02
19	95	0.61	182	1,135	64	1,071	464.57	1,071	0.02
20	100	0.61	182	1,254	64	1,190	464.58	1,190	0.03
21	105	0.61	182	1,372	64	1,308	464.59	1,308	0.03
22	110	0.61	182	1,491	64	1,427	464.60	1,427	0.03
23	115	0.61	182	1,609	64	1,545	464.61	1,545	0.04
24	120	0.93	280	1,826	64	1,762	464.62	1,762	0.04
25	125	0.61	182	1,944	64	1,880	464.63	1,880	0.04
26	130	0.93	280	2,161	64	2,097	464.64	2,097	0.05
27	135	0.93	280	2,377	64	2,313	464.66	2,313	0.05
28	140	0.93	280	2,593	64	2,530	464.67	2,530	0.06
29	145	0.93	280	2,810	64	2,746	464.69	2,746	0.06
30	150	0.93	280	3,026	64	2,963	464.70	2,963	0.07
31	155	0.93	280	3,243	64	3,179	464.72	3,179	0.07
32	160	0.93	280	3,459	64	3,395	464.73	3,395	0.08
33	165	1.26	378	3,774	64	3,710	464.76	3,710	0.09
34	170	1.26	378	4,088	64	4,024	464.78	4,024	0.09
35	175	1.26	378	4,403	64	4,339	464.80	4,339	0.10
36	180	1.26	378	4,717	64	4,653	464.82	4,653	0.11
37	185	1.26	378	5,032	64	4,968	464.84	4,968	0.11
38	190	1.59	476	5,444	64	5,380	464.87	5,380	0.12
39	195	1.59	476	5,857	64	5,793	464.90	5,793	0.13
40	200	1.59	476	6,269	64	6,205	464.93	6,205	0.14
41	205	1.91	574	6,779	64	6,716	464.96	6,716	0.15
42	210	2.24	672	7,388	64	7,324	465.01	7,324	0.17
43	215	2.57	770	8,094	64	8,030	465.06	8,030	0.18
44	220	2.57	770	8,801	64	8,737	465.10	8,737	0.20
45	225	2.89	868	9,605	64	9,541	465.16	9,541	0.22
46	230	2.89	868	10,409	64	10,345	465.22	10,345	0.24
47	235	3.22	966	11,312	64	11,248	465.28	11,248	0.26
48	240	3.22	966	12,214	64	12,150	465.34	12,150	0.28
49	245	3.55	1,064	13,214	64	13,150	465.41	13,150	0.30
50	250	3.87	1,162	14,312	64	14,249	465.49	14,249	0.33
51	255	4.20	1,260	15,509	64	15,445	465.56	15,445	0.35
52	260	4.53	1,358	16,803	64	16,739	465.64	16,739	0.38
53	265	4.85	1,456	18,195	64	18,131	465.73	18,131	0.42
54	270	4.85	1,456	19,587	64	19,524	465.82	19,524	0.45
55	275	5.18	1,554	21,078	64	21,014	465.91	21,014	0.48

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	5.51	1,652	22,666	64	22,602	466.01	22,602	0.52
57	285	5.83	1,750	24,352	64	24,288	466.12	24,288	0.56
58	290	5.83	1,750	26,038	64	25,974	466.22	25,974	0.60
59	295	6.16	1,848	27,822	64	27,758	466.33	27,758	0.64
60	300	6.49	1,946	29,704	64	29,640	466.45	29,640	0.68
61	305	8.12	2,436	32,076	64	32,012	466.59	32,012	0.73
62	310	9.75	2,926	34,938	64	34,874	466.76	34,874	0.80
63	315	10.73	3,220	38,094	64	38,030	466.94	38,030	0.87
64	320	11.71	3,514	41,544	64	41,480	467.13	41,480	0.95
65	325	13.35	4,004	45,483	64	45,420	467.36	45,420	1.04
66	330	16.28	4,885	50,305	64	50,241	467.63	50,241	1.15
67	335	4.20	1,260	51,501	64	51,437	467.69	51,437	1.18
68	340	0.93	280	51,718	64	51,654	467.70	51,654	1.19
69	345	0.20	59	51,713	64	51,649	467.70	51,649	1.19
70	350	0.16	49	51,698	64	51,634	467.70	51,634	1.19
71	355	0.10	29	51,663	64	51,599	467.70	51,599	1.18
72	360	0.07	20	51,619	64	51,555	467.70	51,555	1.18

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	32	32	192	-	464.50	-	0.00
2	30	0.05	47	47	192	-	464.50	-	0.00
3	45	0.05	47	47	192	-	464.50	-	0.00
4	60	0.07	63	63	192	-	464.50	-	0.00
5	75	0.05	47	47	192	-	464.50	-	0.00
6	90	0.05	47	47	192	-	464.50	-	0.00
7	105	0.05	47	47	192	-	464.50	-	0.00
8	120	0.07	63	63	192	-	464.50	-	0.00
9	135	0.07	63	63	192	-	464.50	-	0.00
10	150	0.07	63	63	192	-	464.50	-	0.00
11	165	0.09	79	79	192	-	464.50	-	0.00
12	180	0.09	79	79	192	-	464.50	-	0.00
13	195	0.09	79	79	192	-	464.50	-	0.00
14	210	0.09	79	79	192	-	464.50	-	0.00
15	225	0.09	79	79	192	-	464.50	-	0.00
16	240	0.11	95	95	192	-	464.50	-	0.00
17	255	0.11	95	95	192	-	464.50	-	0.00
18	270	0.12	110	110	192	-	464.50	-	0.00
19	285	0.12	110	110	192	-	464.50	-	0.00
20	300	0.14	126	126	192	-	464.50	-	0.00
21	315	0.11	95	95	192	-	464.50	-	0.00
22	330	0.12	110	110	192	-	464.50	-	0.00
23	345	0.14	126	126	192	-	464.50	-	0.00
24	360	0.14	126	126	192	-	464.50	-	0.00
25	375	0.16	142	142	192	-	464.50	-	0.00
26	390	0.16	142	142	192	-	464.50	-	0.00
27	405	0.18	158	158	192	-	464.50	-	0.00
28	420	0.18	158	158	192	-	464.50	-	0.00
29	435	0.18	158	158	192	-	464.50	-	0.00
30	450	0.19	173	173	192	-	464.50	-	0.00
31	465	0.21	189	189	192	-	464.50	-	0.00
32	480	0.23	205	205	192	13	464.50	13	0.00
33	495	0.28	248	261	192	69	464.50	69	0.00
34	510	0.31	277	346	192	154	464.51	154	0.00
35	525	0.52	464	618	192	427	464.53	427	0.01
36	540	0.72	650	1,077	192	885	464.56	885	0.02
37	555	1.10	994	1,879	192	1,688	464.62	1,688	0.04
38	570	1.31	1,180	2,868	192	2,676	464.69	2,676	0.06
39	585	1.52	1,366	4,042	192	3,850	464.77	3,850	0.09
40	600	1.72	1,551	5,402	192	5,210	464.86	5,210	0.12
41	615	0.53	476	5,686	192	5,495	464.88	5,495	0.13
42	630	0.56	504	5,998	192	5,806	464.90	5,806	0.13
43	645	1.46	1,318	7,125	192	6,933	464.98	6,933	0.16
44	660	1.49	1,345	8,278	192	8,087	465.06	8,087	0.19
45	675	1.35	1,214	9,301	192	9,109	465.13	9,109	0.21
46	690	1.38	1,240	10,349	192	10,158	465.20	10,158	0.23
47	705	1.06	951	11,109	192	10,917	465.25	10,917	0.25
48	720	1.26	1,134	12,052	192	11,860	465.32	11,860	0.27
49	735	2.51	2,263	14,123	192	13,931	465.46	13,931	0.32
50	750	2.72	2,445	16,376	192	16,185	465.61	16,185	0.37
51	765	3.09	2,785	18,970	192	18,778	465.77	18,778	0.43
52	780	3.30	2,967	21,746	192	21,554	465.94	21,554	0.49
53	795	4.20	3,779	25,333	192	25,141	466.17	25,141	0.58
54	810	4.23	3,803	28,944	192	28,753	466.40	28,753	0.66
55	825	2.33	2,094	30,846	192	30,655	466.51	30,655	0.70
56	840	2.35	2,117	32,772	192	32,580	466.62	32,580	0.75
57	855	3.08	2,770	35,350	192	35,159	466.77	35,159	0.81
58	870	2.93	2,635	37,794	192	37,602	466.91	37,602	0.86

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	2.95	2,658	40,260	192	40,068	467.05	40,068	0.92
60	900	2.80	2,522	42,590	192	42,398	467.19	42,398	0.97
61	915	2.65	2,386	44,785	192	44,593	467.31	44,593	1.02
62	930	2.50	2,250	46,843	192	46,651	467.43	46,651	1.07
63	945	1.82	1,641	48,292	192	48,100	467.51	48,100	1.10
64	960	1.85	1,661	49,762	192	49,570	467.59	49,570	1.14
65	975	0.07	63	49,633	192	49,442	467.58	49,442	1.14
66	990	0.07	63	49,505	192	49,313	467.58	49,313	1.13
67	1005	0.05	47	49,360	192	49,169	467.57	49,169	1.13
68	1020	0.05	47	49,216	192	49,024	467.56	49,024	1.13
69	1035	0.09	79	49,103	192	48,911	467.55	48,911	1.12
70	1050	0.09	79	48,990	192	48,798	467.55	48,798	1.12
71	1065	0.09	79	48,877	192	48,686	467.54	48,686	1.12
72	1080	0.07	63	48,749	192	48,557	467.54	48,557	1.11
73	1095	0.07	63	48,620	192	48,428	467.53	48,428	1.11
74	1110	0.07	63	48,491	192	48,300	467.52	48,300	1.11
75	1125	0.05	47	48,347	192	48,155	467.51	48,155	1.11
76	1140	0.04	32	48,187	192	47,995	467.51	47,995	1.10
77	1155	0.05	47	48,042	192	47,851	467.50	47,851	1.10
78	1170	0.07	63	47,914	192	47,722	467.49	47,722	1.10
79	1185	0.05	47	47,769	192	47,578	467.48	47,578	1.09
80	1200	0.04	32	47,609	192	47,418	467.47	47,418	1.09
81	1215	0.05	47	47,465	192	47,273	467.46	47,273	1.09
82	1230	0.05	47	47,320	192	47,129	467.46	47,129	1.08
83	1245	0.05	47	47,176	192	46,984	467.45	46,984	1.08
84	1260	0.04	32	47,016	192	46,824	467.44	46,824	1.07
85	1275	0.05	47	46,872	192	46,680	467.43	46,680	1.07
86	1290	0.04	32	46,711	192	46,520	467.42	46,520	1.07
87	1305	0.05	47	46,567	192	46,375	467.41	46,375	1.06
88	1320	0.04	32	46,407	192	46,215	467.40	46,215	1.06
89	1335	0.05	47	46,262	192	46,071	467.40	46,071	1.06
90	1350	0.04	32	46,102	192	45,911	467.39	45,911	1.05
91	1365	0.04	32	45,942	192	45,751	467.38	45,751	1.05
92	1380	0.04	32	45,782	192	45,590	467.37	45,590	1.05
93	1395	0.04	32	45,622	192	45,430	467.36	45,430	1.04
94	1410	0.04	32	45,462	192	45,270	467.35	45,270	1.04
95	1425	0.04	32	45,302	192	45,110	467.34	45,110	1.04
96	1440	0.04	32	45,142	192	44,950	467.33	44,950	1.03

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 5		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.95		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	4.71		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	2.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	950		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	310		
30				
31	ELEVATION OF HEADWATER	471		
32	ELEVATION OF CONCENTRATION POINT	467		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		463.5	17610	
45		464.5	19400	
46		465.5	21240	
47		466.5	23140	
48		467	24110	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 5
[3] AREA - ACRES	9.490
[4] L-FEET	950
[5] L-MILES	0.180
[6] La-FEET	310.00
[7] La-MILES	0.059
[8] ELEVATION OF HEADWATER	471
[9] ELEVATION OF CONCENTRATION POINT	467
[10] H-FEET	4
[11] S-FEET/MILE	22.2
[12] S^0.5	4.72
[13] L*LCA/S^0.5	0.002
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.05
[16] LAG TIME-MINUTES	2.8
[17] 100% OF LAG-MINUTES	2.8
[18] 200% OF LAG-MINUTES	5.7
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.27

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	9.490	1.00	2.12	2.78	9.490	1.00	2.78	4.47	9.490	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.49	SUM [7]	2.12	SUM [9]	9.49	SUM [11]	2.78	SUM [13]	9.49	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.31	1.30	1.28
FLOOD VOLUME	(cu-ft)	45,222	44,840	44,164
	(acre-ft)	1.04	1.03	1.01
REQUIRED STORAGE	(cu-ft)	41,999	39,086	31,405
	(acre-ft)	0.96	0.90	0.72
PEAK FLOW	(cfs)	17.21	15.14	3.54
MAXIMUM WSEL	(ft)	465.64	465.51	465.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.95	0.205	0.0107
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	4.71	0.496	0.1071
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	2.83	0.298	0.1551
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.49	SUM	0.2729

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.136428767

C= 0.00253

Ft=C(24-(T/60))^1.55 = 0.00253 (24-(T/60))^1.55 + 0.14 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.27
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.27	0.30	0.06	0.55	82.80
2	10	0.17	1.3	0.331	0.27	0.30	0.06	0.55	82.80
3	15	0.25	1.1	0.280	0.27	0.25	0.01	0.07	0.00
4	20	0.33	1.5	0.382	0.27	0.34	0.11	1.03	227.65
5	25	0.42	1.5	0.382	0.27	0.34	0.11	1.03	227.65
6	30	0.50	1.8	0.458	0.27	0.41	0.19	1.76	444.94
7	35	0.58	1.5	0.382	0.27	0.34	0.11	1.03	227.65
8	40	0.67	1.8	0.458	0.27	0.41	0.19	1.76	444.94
9	45	0.75	1.8	0.458	0.27	0.41	0.19	1.76	444.94
10	50	0.83	1.5	0.382	0.27	0.34	0.11	1.03	227.65
11	55	0.92	1.6	0.407	0.27	0.37	0.13	1.27	300.08
12	60	1.00	1.8	0.458	0.27	0.41	0.19	1.76	444.94
13	65	1.08	2.2	0.560	0.27	0.50	0.29	2.72	734.65
14	70	1.17	2.2	0.560	0.27	0.50	0.29	2.72	734.65
15	75	1.25	2.2	0.560	0.27	0.50	0.29	2.72	734.65
16	80	1.33	2.0	0.509	0.27	0.46	0.24	2.24	589.79
17	85	1.42	2.6	0.661	0.27	0.60	0.39	3.69	1024.36
18	90	1.50	2.7	0.687	0.27	0.62	0.41	3.93	1096.79
19	95	1.58	2.4	0.611	0.27	0.55	0.34	3.20	879.50
20	100	1.67	2.7	0.687	0.27	0.62	0.41	3.93	1096.79
21	105	1.75	3.3	0.840	0.27	0.76	0.57	5.38	1531.35
22	110	1.83	3.1	0.789	0.27	0.71	0.52	4.89	1386.50
23	115	1.92	2.9	0.738	0.27	0.66	0.46	4.41	1241.64
24	120	2.00	3.0	0.763	0.27	0.69	0.49	4.65	1314.07
25	125	2.08	3.1	0.789	0.27	0.71	0.52	4.89	1386.50
26	130	2.17	4.2	1.068	0.27	0.96	0.80	7.55	2183.20
27	135	2.25	5.0	1.272	0.27	1.14	1.00	9.48	2762.62
28	140	2.33	3.5	0.890	0.27	0.80	0.62	5.86	1676.21
29	145	2.42	6.8	1.730	0.27	1.56	1.46	13.83	4066.32
30	150	2.50	7.3	1.857	0.27	1.67	1.58	15.03	4428.46
31	155	2.58	8.2	2.086	0.27	1.88	1.81	17.21	5080.31
32	160	2.67	5.9	1.501	0.27	1.35	1.23	11.65	3414.47
33	165	2.75	2.0	0.509	0.27	0.46	0.24	2.24	589.79
34	170	2.83	1.8	0.458	0.27	0.41	0.19	1.76	444.94
35	175	2.92	1.8	0.458	0.27	0.41	0.19	1.76	444.94
36	180	3.00	0.6	0.153	0.27	0.14	0.02	0.14	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.31
FLOOD VOLUME (acft)	1.04
FLOOD VOLUME (cuft)	45221.59
REQUIRED STORAGE (acft)	0.96
REQUIRED STORAGE (cuft)	41998.54
PEAK FLOW RATE (cfs)	17.21

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.273
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.167	0.27	0.15	0.02	0.16	0.00
2	10	0.17	0.6	0.200	0.27	0.18	0.02	0.19	0.00
3	15	0.25	0.6	0.200	0.27	0.18	0.02	0.19	0.00
4	20	0.33	0.6	0.200	0.27	0.18	0.02	0.19	0.00
5	25	0.42	0.6	0.200	0.27	0.18	0.02	0.19	0.00
6	30	0.50	0.7	0.234	0.27	0.21	0.02	0.22	0.00
7	35	0.58	0.7	0.234	0.27	0.21	0.02	0.22	0.00
8	40	0.67	0.7	0.234	0.27	0.21	0.02	0.22	0.00
9	45	0.75	0.7	0.234	0.27	0.21	0.02	0.22	0.00
10	50	0.83	0.7	0.234	0.27	0.21	0.02	0.22	0.00
11	55	0.92	0.7	0.234	0.27	0.21	0.02	0.22	0.00
12	60	1.00	0.8	0.267	0.27	0.24	0.03	0.25	0.00
13	65	1.08	0.8	0.267	0.27	0.24	0.03	0.25	0.00
14	70	1.17	0.8	0.267	0.27	0.24	0.03	0.25	0.00
15	75	1.25	0.8	0.267	0.27	0.24	0.03	0.25	0.00
16	80	1.33	0.8	0.267	0.27	0.24	0.03	0.25	0.00
17	85	1.42	0.8	0.267	0.27	0.24	0.03	0.25	0.00
18	90	1.50	0.8	0.267	0.27	0.24	0.03	0.25	0.00
19	95	1.58	0.8	0.267	0.27	0.24	0.03	0.25	0.00
20	100	1.67	0.8	0.267	0.27	0.24	0.03	0.25	0.00
21	105	1.75	0.8	0.267	0.27	0.24	0.03	0.25	0.00
22	110	1.83	0.8	0.267	0.27	0.24	0.03	0.25	0.00
23	115	1.92	0.8	0.267	0.27	0.24	0.03	0.25	0.00
24	120	2.00	0.9	0.300	0.27	0.27	0.03	0.26	0.00
25	125	2.08	0.8	0.267	0.27	0.24	0.03	0.25	0.00
26	130	2.17	0.9	0.300	0.27	0.27	0.03	0.26	0.00
27	135	2.25	0.9	0.300	0.27	0.27	0.03	0.26	0.00
28	140	2.33	0.9	0.300	0.27	0.27	0.03	0.26	0.00
29	145	2.42	0.9	0.300	0.27	0.27	0.03	0.26	0.00
30	150	2.50	0.9	0.300	0.27	0.27	0.03	0.26	0.00
31	155	2.58	0.9	0.300	0.27	0.27	0.03	0.26	0.00
32	160	2.67	0.9	0.300	0.27	0.27	0.03	0.26	0.00
33	165	2.75	1.0	0.334	0.27	0.30	0.06	0.58	91.00
34	170	2.83	1.0	0.334	0.27	0.30	0.06	0.58	91.00
35	175	2.92	1.0	0.334	0.27	0.30	0.06	0.58	91.00
36	180	3.00	1.0	0.334	0.27	0.30	0.06	0.58	91.00
37	185	3.08	1.0	0.334	0.27	0.30	0.06	0.58	91.00
38	190	3.17	1.1	0.367	0.27	0.33	0.09	0.89	185.97
39	195	3.25	1.1	0.367	0.27	0.33	0.09	0.89	185.97
40	200	3.33	1.1	0.367	0.27	0.33	0.09	0.89	185.97
41	205	3.42	1.2	0.400	0.27	0.36	0.13	1.21	280.95
42	210	3.50	1.3	0.434	0.27	0.39	0.16	1.53	375.93
43	215	3.58	1.4	0.467	0.27	0.42	0.19	1.84	470.90
44	220	3.67	1.4	0.467	0.27	0.42	0.19	1.84	470.90
45	225	3.75	1.5	0.500	0.27	0.45	0.23	2.16	565.88
46	230	3.83	1.5	0.500	0.27	0.45	0.23	2.16	565.88
47	235	3.92	1.6	0.534	0.27	0.48	0.26	2.48	660.85
48	240	4.00	1.6	0.534	0.27	0.48	0.26	2.48	660.85
49	245	4.08	1.7	0.567	0.27	0.51	0.29	2.79	755.83
50	250	4.17	1.8	0.600	0.27	0.54	0.33	3.11	850.81
51	255	4.25	1.9	0.634	0.27	0.57	0.36	3.43	945.78
52	260	4.33	2.0	0.667	0.27	0.60	0.39	3.74	1040.76
53	265	4.42	2.1	0.701	0.27	0.63	0.43	4.06	1135.73
54	270	4.50	2.1	0.701	0.27	0.63	0.43	4.06	1135.73
55	275	4.58	2.2	0.734	0.27	0.66	0.46	4.38	1230.71
56	280	4.67	2.3	0.767	0.27	0.69	0.49	4.69	1325.69

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.83		
UNIT TIME-PERCENT OF LAG	176.4		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.273		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.27 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.801	0.27	0.72	0.53	5.01	1420.66
58	290	4.83	2.4	0.801	0.27	0.72	0.53	5.01	1420.66
59	295	4.92	2.5	0.834	0.27	0.75	0.56	5.33	1515.64
60	300	5.00	2.6	0.867	0.27	0.78	0.59	5.64	1610.61
61	305	5.08	3.1	1.034	0.27	0.93	0.76	7.22	2085.49
62	310	5.17	3.6	1.201	0.27	1.08	0.93	8.81	2560.37
63	315	5.25	3.9	1.301	0.27	1.17	1.03	9.76	2845.30
64	320	5.33	4.2	1.401	0.27	1.26	1.13	10.71	3130.23
65	325	5.42	4.7	1.568	0.27	1.41	1.30	12.29	3605.11
66	330	5.50	5.6	1.868	0.27	1.68	1.60	15.14	4459.89
67	335	5.58	1.9	0.634	0.27	0.57	0.36	3.43	945.78
68	340	5.67	0.9	0.300	0.27	0.27	0.03	0.26	0.00
69	345	5.75	0.6	0.200	0.27	0.18	0.02	0.19	0.00
70	350	5.83	0.5	0.167	0.27	0.15	0.02	0.16	0.00
71	355	5.92	0.3	0.100	0.27	0.09	0.01	0.09	0.00
72	360	6.00	0.2	0.067	0.27	0.06	0.01	0.06	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.30
FLOOD VOLUME (acft)	1.03
FLOOD VOLUME (cuft)	44839.99
REQUIRED STORAGE (acft)	0.90
REQUIRED STORAGE (cuft)	39085.84
PEAK FLOW RATE (cfs)	15.14

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.482	0.032	0.004	0.03	0.00
2	30	0.50	0.3	0.054	0.476	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.471	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.465	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.460	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.454	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.449	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.443	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.438	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.433	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.427	0.080	0.009	0.08	0.00
12	180	3.00	0.5	0.089	0.422	0.080	0.009	0.08	0.00
13	195	3.25	0.5	0.089	0.417	0.080	0.009	0.08	0.00
14	210	3.50	0.5	0.089	0.412	0.080	0.009	0.08	0.00
15	225	3.75	0.5	0.089	0.407	0.080	0.009	0.08	0.00
16	240	4.00	0.6	0.107	0.401	0.097	0.011	0.10	0.00
17	255	4.25	0.6	0.107	0.396	0.097	0.011	0.10	0.00
18	270	4.50	0.7	0.125	0.391	0.113	0.013	0.12	0.00
19	285	4.75	0.7	0.125	0.386	0.113	0.013	0.12	0.00
20	300	5.00	0.8	0.143	0.381	0.129	0.014	0.14	0.00
21	315	5.25	0.6	0.107	0.376	0.097	0.011	0.10	0.00
22	330	5.50	0.7	0.125	0.371	0.113	0.013	0.12	0.00
23	345	5.75	0.8	0.143	0.367	0.129	0.014	0.14	0.00
24	360	6.00	0.8	0.143	0.362	0.129	0.014	0.14	0.00
25	375	6.25	0.9	0.161	0.357	0.145	0.016	0.15	0.00
26	390	6.50	0.9	0.161	0.352	0.145	0.016	0.15	0.00
27	405	6.75	1.0	0.179	0.347	0.161	0.018	0.17	0.00
28	420	7.00	1.0	0.179	0.343	0.161	0.018	0.17	0.00
29	435	7.25	1.0	0.179	0.338	0.161	0.018	0.17	0.00
30	450	7.50	1.1	0.197	0.334	0.177	0.020	0.19	0.00
31	465	7.75	1.2	0.215	0.329	0.193	0.021	0.20	0.00
32	480	8.00	1.3	0.232	0.324	0.209	0.023	0.22	0.00
33	495	8.25	1.5	0.268	0.320	0.241	0.027	0.25	0.00
34	510	8.50	1.5	0.268	0.315	0.241	0.027	0.25	0.00
35	525	8.75	1.6	0.286	0.311	0.257	0.029	0.27	0.00
36	540	9.00	1.7	0.304	0.307	0.274	0.030	0.29	13.81
37	555	9.25	1.9	0.340	0.302	0.306	0.037	0.35	73.64
38	570	9.50	2.0	0.358	0.298	0.322	0.060	0.57	263.09
39	585	9.75	2.1	0.375	0.294	0.338	0.082	0.78	452.20
40	600	10.00	2.2	0.393	0.290	0.354	0.104	0.99	640.96
41	615	10.25	1.5	0.268	0.285	0.241	0.027	0.25	0.00
42	630	10.50	1.5	0.268	0.281	0.241	0.027	0.25	0.00
43	645	10.75	2.0	0.358	0.277	0.322	0.080	0.76	441.57
44	660	11.00	2.0	0.358	0.273	0.322	0.085	0.80	476.21
45	675	11.25	1.9	0.340	0.269	0.306	0.071	0.67	357.77
46	690	11.50	1.9	0.340	0.265	0.306	0.075	0.71	391.68
47	705	11.75	1.7	0.304	0.261	0.274	0.043	0.41	119.79
48	720	12.00	1.8	0.322	0.257	0.290	0.065	0.61	305.68
49	735	12.25	2.5	0.447	0.253	0.402	0.194	1.84	1407.47
50	750	12.50	2.6	0.465	0.250	0.418	0.215	2.04	1592.60
51	765	12.75	2.8	0.501	0.246	0.451	0.255	2.42	1930.06
52	780	13.00	2.9	0.519	0.242	0.467	0.276	2.62	2114.43
53	795	13.25	3.4	0.608	0.239	0.547	0.369	3.51	2909.26
54	810	13.50	3.4	0.608	0.235	0.547	0.373	3.54	2940.13
55	825	13.75	2.3	0.411	0.231	0.370	0.180	1.71	1290.76
56	840	14.00	2.3	0.411	0.228	0.370	0.183	1.74	1320.84
57	855	14.25	2.7	0.483	0.224	0.434	0.258	2.45	1961.36
58	870	14.50	2.6	0.465	0.221	0.418	0.244	2.32	1837.90
59	885	14.75	2.6	0.465	0.218	0.418	0.247	2.35	1866.75
60	900	15.00	2.5	0.447	0.214	0.402	0.233	2.21	1742.46
61	915	15.25	2.4	0.429	0.211	0.386	0.218	2.07	1617.74
62	930	15.50	2.3	0.411	0.208	0.370	0.204	1.93	1492.59
63	945	15.75	1.9	0.340	0.205	0.306	0.135	1.28	908.87
64	960	16.00	1.9	0.340	0.201	0.306	0.138	1.31	935.56
65	975	16.25	0.4	0.072	0.198	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.195	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.192	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
	Minutes	Hours	(Plate E-5.9)		Max	Low			
68	1020	17.00	0.3	0.054	0.189	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.187	0.080	0.009	0.08	0.00
70	1050	17.50	0.5	0.089	0.184	0.080	0.009	0.08	0.00
71	1065	17.75	0.5	0.089	0.181	0.080	0.009	0.08	0.00
72	1080	18.00	0.4	0.072	0.178	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.176	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.173	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.171	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.168	0.032	0.004	0.03	0.00
77	1155	19.25	0.3	0.054	0.166	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.164	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.161	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.159	0.032	0.004	0.03	0.00
81	1215	20.25	0.3	0.054	0.157	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.155	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.153	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.151	0.032	0.004	0.03	0.00
85	1275	21.25	0.3	0.054	0.149	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.148	0.032	0.004	0.03	0.00
87	1305	21.75	0.3	0.054	0.146	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.145	0.032	0.004	0.03	0.00
89	1335	22.25	0.3	0.054	0.143	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.142	0.032	0.004	0.03	0.00
91	1365	22.75	0.2	0.036	0.141	0.032	0.004	0.03	0.00
92	1380	23.00	0.2	0.036	0.139	0.032	0.004	0.03	0.00
93	1395	23.25	0.2	0.036	0.138	0.032	0.004	0.03	0.00
94	1410	23.50	0.2	0.036	0.138	0.032	0.004	0.03	0.00
95	1425	23.75	0.2	0.036	0.137	0.032	0.004	0.03	0.00
96	1440	24.00	0.2	0.036	0.137	0.032	0.004	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	1.28
FLOOD VOLUME (acft)	1.01
FLOOD VOLUME (cuft)	44164.39
REQUIRED STORAGE (acft)	0.72
REQUIRED STORAGE (cuft)	31405.17
PEAK FLOW (cfs)	3.54

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
463.5	0	0		17610	0	0	0.00
464.5	1	1	1790	19400	18505	18505	0.42
465.5	1	2	1840	21240	20320	38825	0.89
466.5	1	3	1900	23140	22190	61015	1.40
467	0.5	3.5	970	24110	11813	72828	1.67

PERCOLATION CALCULATIONS

PERCOLATION RATE	0.67 in/hr	0.27 cfs

MAXWELL IV DRYWELLS

NUMBER USED	0	
RATE/DRYWELL	0 cfs	
TOTAL DISSIPATED		0 cfs

TOTAL PERCOLATION RATE 0.27 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.55	165	165	82	83	463.50	83	0.00
2	10	0.55	165	248	82	166	463.51	166	0.00
3	15	0.07	20	185	82	104	463.51	104	0.00
4	20	1.03	310	413	82	331	463.52	331	0.01
5	25	1.03	310	641	82	559	463.53	559	0.01
6	30	1.76	527	1,086	82	1,004	463.55	1,004	0.02
7	35	1.03	310	1,313	82	1,231	463.57	1,231	0.03
8	40	1.76	527	1,758	82	1,676	463.59	1,676	0.04
9	45	1.76	527	2,203	82	2,121	463.61	2,121	0.05
10	50	1.03	310	2,431	82	2,349	463.63	2,349	0.05
11	55	1.27	382	2,731	82	2,649	463.64	2,649	0.06
12	60	1.76	527	3,176	82	3,094	463.67	3,094	0.07
13	65	2.72	817	3,911	82	3,829	463.71	3,829	0.09
14	70	2.72	817	4,645	82	4,563	463.75	4,563	0.10
15	75	2.72	817	5,380	82	5,298	463.79	5,298	0.12
16	80	2.24	672	5,970	82	5,888	463.82	5,888	0.14
17	85	3.69	1,106	6,994	82	6,912	463.87	6,912	0.16
18	90	3.93	1,179	8,091	82	8,009	463.93	8,009	0.18
19	95	3.20	961	8,970	82	8,888	463.98	8,888	0.20
20	100	3.93	1,179	10,067	82	9,985	464.04	9,985	0.23
21	105	5.38	1,613	11,598	82	11,517	464.12	11,517	0.26
22	110	4.89	1,468	12,985	82	12,903	464.20	12,903	0.30
23	115	4.41	1,324	14,227	82	14,145	464.26	14,145	0.32
24	120	4.65	1,396	15,541	82	15,459	464.34	15,459	0.35
25	125	4.89	1,468	16,927	82	16,845	464.41	16,845	0.39
26	130	7.55	2,265	19,110	82	19,028	464.53	19,028	0.44
27	135	9.48	2,845	21,873	82	21,791	464.66	21,791	0.50
28	140	5.86	1,758	23,549	82	23,467	464.74	23,467	0.54
29	145	13.83	4,148	27,616	82	27,534	464.94	27,534	0.63
30	150	15.03	4,510	32,044	82	31,962	465.16	31,962	0.73
31	155	17.21	5,162	37,124	82	37,042	465.41	37,042	0.85
32	160	11.65	3,496	40,539	82	40,457	465.57	40,457	0.93
33	165	2.24	672	41,129	82	41,047	465.60	41,047	0.94
34	170	1.76	527	41,573	82	41,492	465.62	41,492	0.95
35	175	1.76	527	42,018	82	41,936	465.64	41,936	0.96
36	180	0.14	43	41,980	82	41,898	465.64	41,898	0.96

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	47	47	82	-	463.50	-	0.00
2	10	0.19	57	57	82	-	463.50	-	0.00
3	15	0.19	57	57	82	-	463.50	-	0.00
4	20	0.19	57	57	82	-	463.50	-	0.00
5	25	0.19	57	57	82	-	463.50	-	0.00
6	30	0.22	66	66	82	-	463.50	-	0.00
7	35	0.22	66	66	82	-	463.50	-	0.00
8	40	0.22	66	66	82	-	463.50	-	0.00
9	45	0.22	66	66	82	-	463.50	-	0.00
10	50	0.22	66	66	82	-	463.50	-	0.00
11	55	0.22	66	66	82	-	463.50	-	0.00
12	60	0.25	76	76	82	-	463.50	-	0.00
13	65	0.25	76	76	82	-	463.50	-	0.00
14	70	0.25	76	76	82	-	463.50	-	0.00
15	75	0.25	76	76	82	-	463.50	-	0.00
16	80	0.25	76	76	82	-	463.50	-	0.00
17	85	0.25	76	76	82	-	463.50	-	0.00
18	90	0.25	76	76	82	-	463.50	-	0.00
19	95	0.25	76	76	82	-	463.50	-	0.00
20	100	0.25	76	76	82	-	463.50	-	0.00
21	105	0.25	76	76	82	-	463.50	-	0.00
22	110	0.25	76	76	82	-	463.50	-	0.00
23	115	0.25	76	76	82	-	463.50	-	0.00
24	120	0.26	78	78	82	-	463.50	-	0.00
25	125	0.25	76	76	82	-	463.50	-	0.00
26	130	0.26	78	78	82	-	463.50	-	0.00
27	135	0.26	78	78	82	-	463.50	-	0.00
28	140	0.26	78	78	82	-	463.50	-	0.00
29	145	0.26	78	78	82	-	463.50	-	0.00
30	150	0.26	78	78	82	-	463.50	-	0.00
31	155	0.26	78	78	82	-	463.50	-	0.00
32	160	0.26	78	78	82	-	463.50	-	0.00
33	165	0.58	173	173	82	91	463.50	91	0.00
34	170	0.58	173	264	82	182	463.51	182	0.00
35	175	0.58	173	355	82	273	463.51	273	0.01
36	180	0.58	173	446	82	364	463.52	364	0.01
37	185	0.58	173	537	82	455	463.52	455	0.01
38	190	0.89	268	723	82	641	463.53	641	0.01
39	195	0.89	268	909	82	827	463.54	827	0.02
40	200	0.89	268	1,095	82	1,013	463.55	1,013	0.02
41	205	1.21	363	1,376	82	1,294	463.57	1,294	0.03
42	210	1.53	458	1,752	82	1,670	463.59	1,670	0.04
43	215	1.84	553	2,223	82	2,141	463.62	2,141	0.05
44	220	1.84	553	2,694	82	2,612	463.64	2,612	0.06
45	225	2.16	648	3,259	82	3,177	463.67	3,177	0.07
46	230	2.16	648	3,825	82	3,743	463.70	3,743	0.09
47	235	2.48	743	4,486	82	4,404	463.74	4,404	0.10
48	240	2.48	743	5,147	82	5,065	463.77	5,065	0.12
49	245	2.79	838	5,903	82	5,821	463.81	5,821	0.13
50	250	3.11	933	6,754	82	6,672	463.86	6,672	0.15
51	255	3.43	1,028	7,699	82	7,617	463.91	7,617	0.17
52	260	3.74	1,123	8,740	82	8,658	463.97	8,658	0.20
53	265	4.06	1,218	9,876	82	9,794	464.03	9,794	0.22
54	270	4.06	1,218	11,012	82	10,930	464.09	10,930	0.25
55	275	4.38	1,313	12,242	82	12,160	464.16	12,160	0.28

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	4.69	1,408	13,568	82	13,486	464.23	13,486	0.31
57	285	5.01	1,503	14,989	82	14,907	464.31	14,907	0.34
58	290	5.01	1,503	16,409	82	16,327	464.38	16,327	0.37
59	295	5.33	1,598	17,925	82	17,843	464.46	17,843	0.41
60	300	5.64	1,693	19,536	82	19,454	464.55	19,454	0.45
61	305	7.22	2,167	21,621	82	21,539	464.65	21,539	0.49
62	310	8.81	2,642	24,181	82	24,100	464.78	24,100	0.55
63	315	9.76	2,927	27,027	82	26,945	464.92	26,945	0.62
64	320	10.71	3,212	30,157	82	30,075	465.07	30,075	0.69
65	325	12.29	3,687	33,762	82	33,680	465.25	33,680	0.77
66	330	15.14	4,542	38,222	82	38,140	465.47	38,140	0.88
67	335	3.43	1,028	39,168	82	39,086	465.51	39,086	0.90
68	340	0.26	78	39,164	82	39,082	465.51	39,082	0.90
69	345	0.19	57	39,139	82	39,057	465.51	39,057	0.90
70	350	0.16	47	39,104	82	39,022	465.51	39,022	0.90
71	355	0.09	28	39,051	82	38,969	465.51	38,969	0.89
72	360	0.06	19	38,988	82	38,906	465.50	38,906	0.89

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.03	31	31	246	-	463.50	-	0.00
2	30	0.05	46	46	246	-	463.50	-	0.00
3	45	0.05	46	46	246	-	463.50	-	0.00
4	60	0.07	61	61	246	-	463.50	-	0.00
5	75	0.05	46	46	246	-	463.50	-	0.00
6	90	0.05	46	46	246	-	463.50	-	0.00
7	105	0.05	46	46	246	-	463.50	-	0.00
8	120	0.07	61	61	246	-	463.50	-	0.00
9	135	0.07	61	61	246	-	463.50	-	0.00
10	150	0.07	61	61	246	-	463.50	-	0.00
11	165	0.08	76	76	246	-	463.50	-	0.00
12	180	0.08	76	76	246	-	463.50	-	0.00
13	195	0.08	76	76	246	-	463.50	-	0.00
14	210	0.08	76	76	246	-	463.50	-	0.00
15	225	0.08	76	76	246	-	463.50	-	0.00
16	240	0.10	92	92	246	-	463.50	-	0.00
17	255	0.10	92	92	246	-	463.50	-	0.00
18	270	0.12	107	107	246	-	463.50	-	0.00
19	285	0.12	107	107	246	-	463.50	-	0.00
20	300	0.14	122	122	246	-	463.50	-	0.00
21	315	0.10	92	92	246	-	463.50	-	0.00
22	330	0.12	107	107	246	-	463.50	-	0.00
23	345	0.14	122	122	246	-	463.50	-	0.00
24	360	0.14	122	122	246	-	463.50	-	0.00
25	375	0.15	137	137	246	-	463.50	-	0.00
26	390	0.15	137	137	246	-	463.50	-	0.00
27	405	0.17	153	153	246	-	463.50	-	0.00
28	420	0.17	153	153	246	-	463.50	-	0.00
29	435	0.17	153	153	246	-	463.50	-	0.00
30	450	0.19	168	168	246	-	463.50	-	0.00
31	465	0.20	183	183	246	-	463.50	-	0.00
32	480	0.22	199	199	246	-	463.50	-	0.00
33	495	0.25	229	229	246	-	463.50	-	0.00
34	510	0.25	229	229	246	-	463.50	-	0.00
35	525	0.27	244	244	246	-	463.50	-	0.00
36	540	0.29	260	260	246	14	463.50	14	0.00
37	555	0.35	319	333	246	87	463.50	87	0.00
38	570	0.57	509	596	246	351	463.52	351	0.01
39	585	0.78	698	1,049	246	803	463.54	803	0.02
40	600	0.99	887	1,689	246	1,444	463.58	1,444	0.03
41	615	0.25	229	1,673	246	1,427	463.58	1,427	0.03
42	630	0.25	229	1,656	246	1,410	463.58	1,410	0.03
43	645	0.76	687	2,098	246	1,852	463.60	1,852	0.04
44	660	0.80	722	2,574	246	2,328	463.63	2,328	0.05
45	675	0.67	604	2,932	246	2,686	463.65	2,686	0.06
46	690	0.71	637	3,323	246	3,077	463.67	3,077	0.07
47	705	0.41	366	3,443	246	3,197	463.67	3,197	0.07
48	720	0.61	551	3,749	246	3,503	463.69	3,503	0.08
49	735	1.84	1,653	5,156	246	4,910	463.77	4,910	0.11
50	750	2.04	1,838	6,749	246	6,503	463.85	6,503	0.15
51	765	2.42	2,176	8,679	246	8,433	463.96	8,433	0.19
52	780	2.62	2,360	10,793	246	10,547	464.07	10,547	0.24
53	795	3.51	3,155	13,703	246	13,457	464.23	13,457	0.31
54	810	3.54	3,186	16,643	246	16,397	464.39	16,397	0.38
55	825	1.71	1,537	17,933	246	17,688	464.46	17,688	0.41
56	840	1.74	1,567	19,254	246	19,008	464.52	19,008	0.44
57	855	2.45	2,207	21,216	246	20,970	464.62	20,970	0.48
58	870	2.32	2,084	23,054	246	22,808	464.71	22,808	0.52

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	2.35	2,113	24,920	246	24,674	464.80	24,674	0.57
60	900	2.21	1,988	26,663	246	26,417	464.89	26,417	0.61
61	915	2.07	1,864	28,280	246	28,035	464.97	28,035	0.64
62	930	1.93	1,738	29,773	246	29,527	465.04	29,527	0.68
63	945	1.28	1,155	30,682	246	30,436	465.09	30,436	0.70
64	960	1.31	1,181	31,618	246	31,372	465.13	31,372	0.72
65	975	0.07	61	31,433	246	31,187	465.12	31,187	0.72
66	990	0.07	61	31,248	246	31,002	465.12	31,002	0.71
67	1005	0.05	46	31,048	246	30,802	465.11	30,802	0.71
68	1020	0.05	46	30,848	246	30,602	465.10	30,602	0.70
69	1035	0.08	76	30,679	246	30,433	465.09	30,433	0.70
70	1050	0.08	76	30,509	246	30,263	465.08	30,263	0.69
71	1065	0.08	76	30,340	246	30,094	465.07	30,094	0.69
72	1080	0.07	61	30,155	246	29,909	465.06	29,909	0.69
73	1095	0.07	61	29,970	246	29,724	465.05	29,724	0.68
74	1110	0.07	61	29,786	246	29,540	465.04	29,540	0.68
75	1125	0.05	46	29,586	246	29,340	465.03	29,340	0.67
76	1140	0.03	31	29,370	246	29,125	465.02	29,125	0.67
77	1155	0.05	46	29,170	246	28,925	465.01	28,925	0.66
78	1170	0.07	61	28,986	246	28,740	465.00	28,740	0.66
79	1185	0.05	46	28,786	246	28,540	464.99	28,540	0.66
80	1200	0.03	31	28,570	246	28,325	464.98	28,325	0.65
81	1215	0.05	46	28,370	246	28,125	464.97	28,125	0.65
82	1230	0.05	46	28,170	246	27,925	464.96	27,925	0.64
83	1245	0.05	46	27,970	246	27,725	464.95	27,725	0.64
84	1260	0.03	31	27,755	246	27,509	464.94	27,509	0.63
85	1275	0.05	46	27,555	246	27,309	464.93	27,309	0.63
86	1290	0.03	31	27,340	246	27,094	464.92	27,094	0.62
87	1305	0.05	46	27,140	246	26,894	464.91	26,894	0.62
88	1320	0.03	31	26,925	246	26,679	464.90	26,679	0.61
89	1335	0.05	46	26,725	246	26,479	464.89	26,479	0.61
90	1350	0.03	31	26,509	246	26,264	464.88	26,264	0.60
91	1365	0.03	31	26,294	246	26,048	464.87	26,048	0.60
92	1380	0.03	31	26,079	246	25,833	464.86	25,833	0.59
93	1395	0.03	31	25,864	246	25,618	464.85	25,618	0.59
94	1410	0.03	31	25,648	246	25,402	464.84	25,402	0.58
95	1425	0.03	31	25,433	246	25,187	464.83	25,187	0.58
96	1440	0.03	31	25,218	246	24,972	464.82	24,972	0.57

IV STREET FLOWRATE CAPACITY

On-site street curb and gutter systems will be designed to convey runoff to the on-site retention basin systems via surface flow. The project site will be designed to ensure that surface runoff generated during the 100 year storm event can be contained within the street right of way per City of Coachella drainage standards

In terms of on-site drainage, the site is divided into 4 separate quadrants, each draining to a separate surface retention basin. Within each quadrant, the maximum tributary area contributing runoff to any single street is 5 acres. Rational method calculations based on the 100 year design storm for 5 acres drainage area are provided in this section to quantify the maximum flowrate (Q) that must be conveyed by any on-site interior street. Manning's equation for open channel flow has then been used to show that the 100 year maximum flowrate (Q) can be contained within the street section right of way.

Q(100) MAX. = 10.92 CFS

MAX. STREET CAPACITY = 13.86 CFS

```
                Riverside County Rational Hydrology Program

     CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version
7.1
           Rational Hydrology Study        Date: 09/25/24
File:CALHOUN100STREET.out
     ---------------------------------------------------------------
------
     CALHOUN 100 YEAR - 5 ACRE STUDY


     ---------------------------------------------------------------
------
      *********   Hydrology Study Control Information **********

      English (in-lb) Units used in input data file

     ---------------------------------------------------------------
------


     Program License Serial Number 6253

     ---------------------------------------------------------------
------
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual

     Storm event (year) =  100.00 Antecedent Moisture Condition = 2

     2 year, 1 hour precipitation =  0.350(In.)
     100 year, 1 hour precipitation =  1.330(In.)

     Storm event year = 100.0
     Calculated rainfall intensity data:
     1 hour intensity =  1.330(In/Hr)
     Slope of intensity duration curve = 0.5900




     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++
     Process from Point/Station      100.000 to Point/Station
200.000
     **** INITIAL AREA EVALUATION ****
     ________________________________________________________________
____
     Initial area flow distance =  1000.000(Ft.)
     Top (of initial area) elevation =   450.000(Ft.)
     Bottom (of initial area) elevation =   446.500(Ft.)
     Difference in elevation =     3.500(Ft.)
     Slope =    0.00350  s(percent)=       0.35
     TC = k(0.370)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration =   18.171 min.
     Rainfall intensity =      2.691(In/Hr) for a   100.0 year storm
```

```
CONDOMINIUM subarea type
Runoff Coefficient = 0.812
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     10.922(CFS)
Total initial stream area =        5.000(Ac.)
Pervious area fraction = 0.350
End of computations, total study area =            5.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  56.0
```

100 YEAR STREET CAPACITY

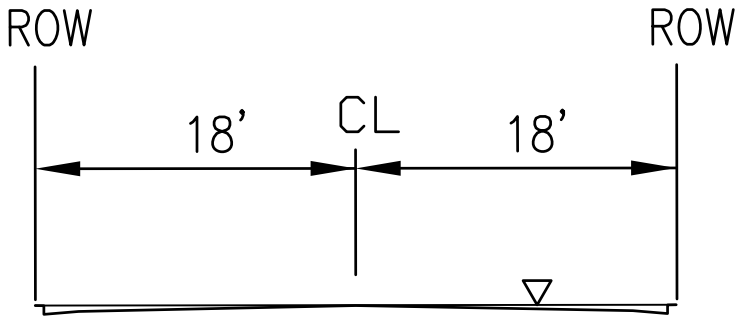
WITHIN PROJECT HALF STREET
(NO CURB GUTTER AND SIDEWALK IMPROVEMENTS ON NON-PROJECT SIDE)

$n=0.016$

$S=0.0035$

$R=A/P= 0.196$

$Q=(1.49/n)AR^{2/3}S^{1/2} = 13.86cfs$



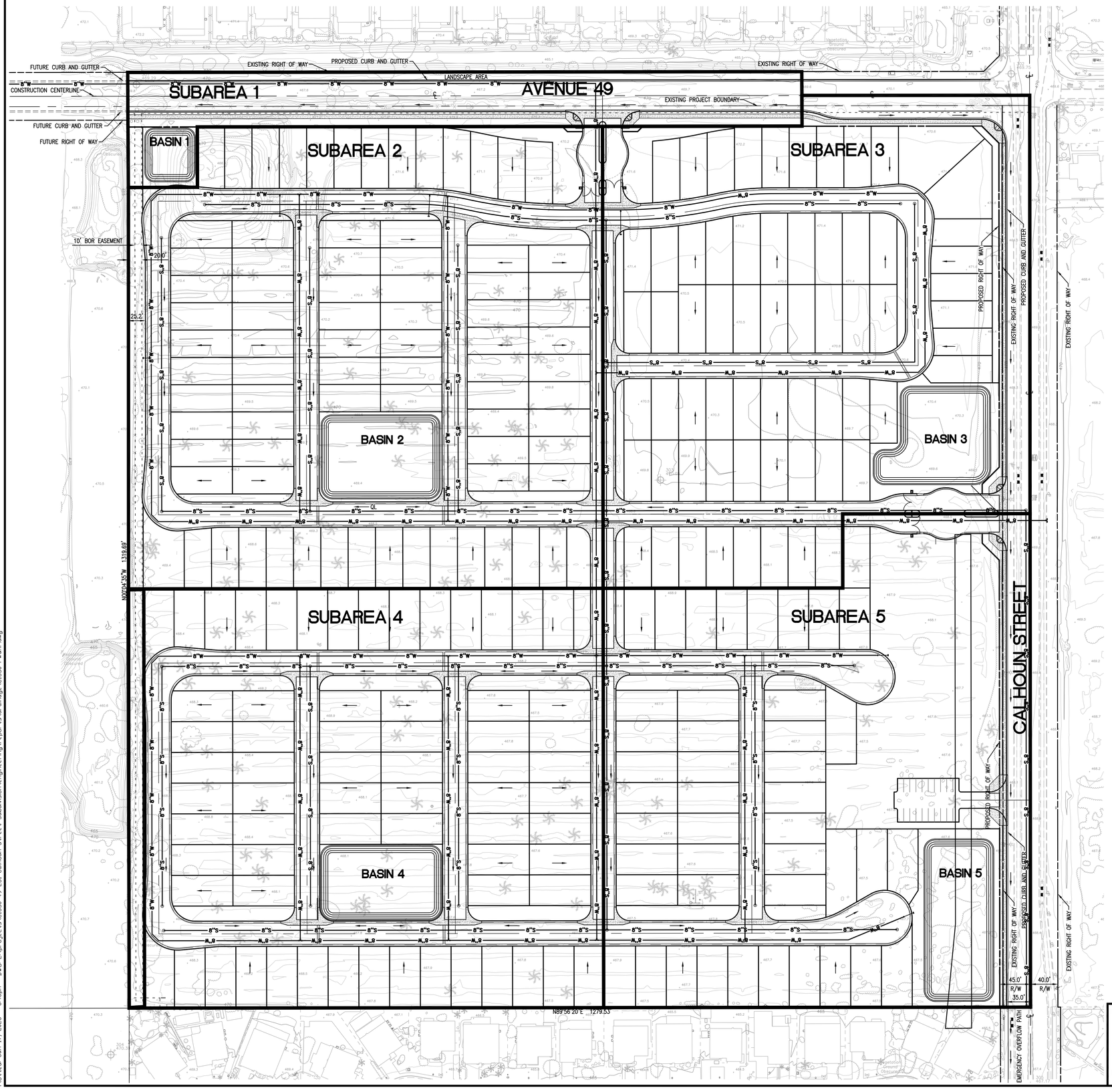
WETTED PERIMETER (P)=38.02

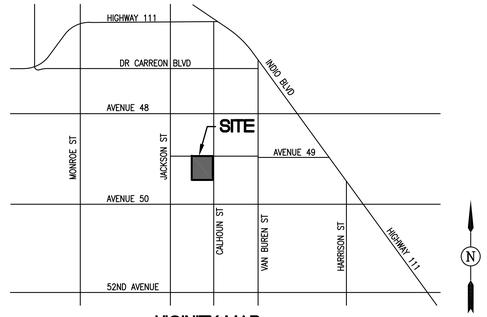
CROSS SECTION AREA (A)=7.46

V APPENDIX

PRELIMINARY HYDROLOGY/WATER QUALITY MANAGEMENT MAP

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA





VICINITY MAP

NOT TO SCALE

LEGEND

SUBAREA BOUNDARY

DIRECTIONAL DRAINAGE ARROWS

NOAA POINT RAINFALL DATA

2 YEAR – 1 HR = 0.35 IN.
10 YEAR – 1 HR = 0.70 IN. 100 YEAR – 1 HR = 1.37 IN.
10 YEAR – 3 HR = 1.04 IN. 100 YEAR – 3 HR = 2.12 IN.
10 YEAR – 6 HR = 1.36 IN. 100 YEAR – 6 HR = 2.78 IN.
10 YEAR – 24 HR = 2.23 IN. 100 YEAR – 24 HR = 4.47 IN.

INFILTRATION RATE

DESIGN INFILTRATION RATE = 0.67 IN/HR

HYDROLOGIC SOIL GROUP

HYDROLOGIC SOIL GROUP "B"

SITE DATA

PROJECT SITE AREA: 38.8 AC.
PROJECT SITE & OFFSITE IMPROVEMENT AREA: 42.50 AC.

SUBAREA 1

AREA: 2.01 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 2.01 AC. = 100%

PROPOSED IMPERVIOUS AREA: 1.18 AC. = 59%
PROPOSED PERVIOUS AREA: 0.83 AC. = 41%

RETENTION VOLUME REQUIRED = 9,580 C.F.
RETENTION VOLUME PROVIDED = 12,250 C.F.

100 YR STORED W.S. DEPTH = 2.45'
10 YR STORED W.S. DEPTH = 0.72'

SUBAREA 2

AREA: 10.57 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.36 AC. = 100%

PROPOSED IMPERVIOUS AREA: 7.36 AC. = 70%
PROPOSED PERVIOUS AREA: 3.21 AC. = 30%

RETENTION VOLUME REQUIRED = 57,661 C.F.
RETENTION VOLUME PROVIDED = 64,193 C.F.

100 YR STORED W.S. DEPTH = 3.19'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 3

AREA: 9.36 AC.

EXISTING IMPERVIOUS AREA: 0.34 AC. = 4%
EXISTING PERVIOUS AREA: 9.02 AC. = 96%

PROPOSED IMPERVIOUS AREA: 6.88 AC. = 74%
PROPOSED PERVIOUS AREA: 2.48 AC. = 26%

RETENTION VOLUME REQUIRED = 53,709 C.F.
RETENTION VOLUME PROVIDED = 62,528 C.F.

100 YR STORED W.S. DEPTH = 3.07'
10 YR STORED W.S. DEPTH = 0.94'

SUBAREA 4

AREA: 9.79 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.79 AC. = 100%

PROPOSED IMPERVIOUS AREA: 6.59 AC. = 67%
PROPOSED PERVIOUS AREA: 3.20 AC. = 33%

RETENTION VOLUME REQUIRED = 51,654 C.F.
RETENTION VOLUME PROVIDED = 57,236 C.F.

100 YR STORED W.S. DEPTH = 3.20'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 5

AREA: 9.49 AC.

EXISTING IMPERVIOUS AREA: 0.53 AC. = 6%
EXISTING PERVIOUS AREA: 8.96 AC. = 94%

PROPOSED IMPERVIOUS AREA: 5.01 AC. = 53%
PROPOSED PERVIOUS AREA: 4.48 AC. = 47%

RETENTION VOLUME REQUIRED = 41,999 C.F.
RETENTION VOLUME PROVIDED = 72,828 C.F.

100 YR STORED W.S. DEPTH = 2.14'
10 YR STORED W.S. DEPTH = 0.54'

N

GRAPHIC SCALE
SCALE 1"=60'
0 30 60 120 180 240

PREPARED BY:
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ENGINEERING | PLANNING | SURVEY | ENVIRONMENTAL

CITY OF COACHELLA, CALIFORNIA

PRELIMINARY HYDROLOGY/
WATER QUALITY MANAGEMENT PLAN

FOR: CALHOUN STREET SUBDIVISION

SHEET NO.

Plotted: Jan 17, 2025 - 3:43pm DWG: L:\projects\C1530 49-251 Calhoun Street Subdivision\engineering\reports\drainage\C1530 PWQMP.dwg

NOAA Atlas 14, Volume 6, Version 2
Location name: Coachella, California, USA*
Latitude: 33.6909°, Longitude: -116.2099°
Elevation: -31 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.064** (0.053-0.077)	**0.100** (0.083-0.121)	**0.152** (0.126-0.184)	**0.198** (0.163-0.242)	**0.266** (0.212-0.338)	**0.325** (0.253-0.421)	**0.390** (0.297-0.518)	**0.464** (0.343-0.634)	**0.576** (0.408-0.821)	**0.674** (0.461-0.997)
10-min	**0.092** (0.076-0.111)	**0.143** (0.119-0.173)	**0.217** (0.181-0.264)	**0.283** (0.233-0.347)	**0.382** (0.304-0.484)	**0.466** (0.363-0.604)	**0.559** (0.425-0.743)	**0.665** (0.491-0.909)	**0.825** (0.584-1.18)	**0.967** (0.661-1.43)
15-min	**0.111** (0.092-0.134)	**0.173** (0.144-0.210)	**0.263** (0.218-0.319)	**0.343** (0.282-0.420)	**0.462** (0.368-0.586)	**0.564** (0.439-0.730)	**0.676** (0.514-0.899)	**0.804** (0.594-1.10)	**0.998** (0.706-1.42)	**1.17** (0.799-1.73)
30-min	**0.160** (0.134-0.194)	**0.251** (0.209-0.304)	**0.381** (0.316-0.463)	**0.496** (0.409-0.608)	**0.669** (0.533-0.848)	**0.816** (0.636-1.06)	**0.979** (0.745-1.30)	**1.16** (0.860-1.59)	**1.44** (1.02-2.06)	**1.69** (1.16-2.50)
60-min	**0.225** (0.188-0.272)	**0.352** (0.293-0.426)	**0.534** (0.444-0.649)	**0.696** (0.573-0.853)	**0.938** (0.747-1.19)	**1.14** (0.892-1.48)	**1.37** (1.04-1.83)	**1.63** (1.21-2.23)	**2.03** (1.44-2.89)	**2.38** (1.62-3.51)
2-hr	**0.311** (0.260-0.377)	**0.462** (0.385-0.560)	**0.687** (0.571-0.835)	**0.891** (0.734-1.09)	**1.21** (0.961-1.53)	**1.48** (1.15-1.92)	**1.79** (1.36-2.38)	**2.14** (1.58-2.93)	**2.69** (1.90-3.83)	**3.17** (2.17-4.68)
3-hr	**0.375** (0.313-0.454)	**0.547** (0.456-0.663)	**0.806** (0.669-0.979)	**1.04** (0.861-1.28)	**1.42** (1.13-1.80)	**1.74** (1.36-2.26)	**2.12** (1.61-2.82)	**2.55** (1.88-3.49)	**3.22** (2.28-4.60)	**3.82** (2.61-5.65)
6-hr	**0.495** (0.413-0.599)	**0.715** (0.596-0.866)	**1.05** (0.871-1.27)	**1.36** (1.12-1.66)	**1.84** (1.47-2.34)	**2.28** (1.78-2.95)	**2.78** (2.11-3.69)	**3.36** (2.48-4.59)	**4.27** (3.02-6.08)	**5.08** (3.47-7.51)
12-hr	**0.598** (0.499-0.724)	**0.883** (0.736-1.07)	**1.31** (1.09-1.59)	**1.70** (1.40-2.09)	**2.31** (1.84-2.93)	**2.85** (2.22-3.69)	**3.46** (2.63-4.60)	**4.17** (3.08-5.70)	**5.27** (3.73-7.52)	**6.25** (4.27-9.23)
24-hr	**0.751** (0.665-0.866)	**1.14** (1.01-1.32)	**1.72** (1.51-1.98)	**2.23** (1.95-2.60)	**3.02** (2.56-3.64)	**3.71** (3.08-4.56)	**4.47** (3.63-5.63)	**5.34** (4.22-6.91)	**6.67** (5.06-8.97)	**7.83** (5.75-10.9)
2-day	**0.871** (0.770-1.00)	**1.34** (1.18-1.55)	**2.02** (1.78-2.34)	**2.63** (2.30-3.06)	**3.53** (2.99-4.26)	**4.30** (3.57-5.29)	**5.15** (4.18-6.48)	**6.10** (4.82-7.89)	**7.53** (5.71-10.1)	**8.74** (6.42-12.2)
3-day	**0.933** (0.825-1.08)	**1.44** (1.28-1.67)	**2.18** (1.92-2.52)	**2.82** (2.47-3.30)	**3.79** (3.21-4.56)	**4.60** (3.82-5.65)	**5.49** (4.46-6.91)	**6.49** (5.12-8.38)	**7.96** (6.04-10.7)	**9.21** (6.76-12.8)
4-day	**0.983** (0.870-1.13)	**1.52** (1.34-1.76)	**2.29** (2.02-2.65)	**2.97** (2.60-3.47)	**3.98** (3.37-4.79)	**4.82** (4.01-5.93)	**5.75** (4.66-7.23)	**6.78** (5.35-8.75)	**8.29** (6.29-11.2)	**9.58** (7.03-13.3)
7-day	**1.04** (0.923-1.20)	**1.61** (1.42-1.86)	**2.41** (2.12-2.79)	**3.12** (2.73-3.64)	**4.16** (3.52-5.01)	**5.03** (4.18-6.18)	**5.98** (4.85-7.52)	**7.03** (5.55-9.08)	**8.57** (6.50-11.5)	**9.88** (7.25-13.7)
10-day	**1.08** (0.955-1.24)	**1.66** (1.47-1.92)	**2.48** (2.19-2.87)	**3.21** (2.80-3.74)	**4.27** (3.62-5.14)	**5.16** (4.29-6.34)	**6.13** (4.97-7.71)	**7.19** (5.68-9.30)	**8.76** (6.65-11.8)	**10.1** (7.40-14.0)
20-day	**1.15** (1.02-1.33)	**1.78** (1.58-2.06)	**2.68** (2.36-3.10)	**3.46** (3.03-4.04)	**4.61** (3.91-5.55)	**5.56** (4.62-6.84)	**6.60** (5.35-8.30)	**7.73** (6.10-9.99)	**9.38** (7.12-12.6)	**10.8** (7.90-15.0)
30-day	**1.20** (1.06-1.38)	**1.88** (1.66-2.17)	**2.86** (2.52-3.31)	**3.71** (3.25-4.33)	**4.97** (4.21-5.98)	**6.00** (4.98-7.38)	**7.12** (5.77-8.95)	**8.33** (6.58-10.8)	**10.1** (7.66-13.6)	**11.5** (8.47-16.0)
45-day	**1.30** (1.15-1.49)	**2.07** (1.83-2.39)	**3.18** (2.80-3.68)	**4.14** (3.62-4.83)	**5.56** (4.72-6.70)	**6.74** (5.60-8.28)	**8.00** (6.49-10.1)	**9.36** (7.39-12.1)	**11.3** (8.59-15.2)	**12.9** (9.50-18.0)
60-day	**1.36** (1.21-1.57)	**2.21** (1.95-2.55)	**3.42** (3.01-3.96)	**4.48** (3.92-5.22)	**6.03** (5.11-7.26)	**7.31** (6.07-8.98)	**8.68** (7.04-10.9)	**10.2** (8.03-13.1)	**12.3** (9.33-16.5)	**14.0** (10.3-19.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

Appendix E
Calhoun Street Housing Development Preliminary Water Quality Management Plan

Project Specific
Preliminary Water Quality Management Plan

Calhoun Street Subdivision

49-251 Calhoun Street Subdivision

DEVELOPMENT NO. **ASSESSOR'S PARCEL NO. 612-260-010**
DESIGN REVIEW NO. **CUP #**

Prepared for:

Rod Vandenburg
43-584 Via Magellan Drive
Palm Desert, CA 92201
Telephone: (760) 799-8227

Prepared by:

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1/17/26

James Bazua
RCE 58394

Date
Exp. 12/31/26

REGISTERED PROFESSIONAL ENGINEER
JAMES RON BAZUA
No 58394
Exp. 12/31/26
CIVIL
STATE OF CALIFORNIA

Original Date Prepared: January 17, 2025

Revision Date(s):

OWNER'S CERTIFICATION

This project-specific Preliminary Water Quality Management Plan (WQMP) has been prepared for:

Rod Vandenburg by **The Altum Group** for the project known as **Calhoun Street Subdivision** at **49-251 Calhoun Street, Coachella, CA 92236.**

.

This Preliminary WQMP is intended to comply with the requirements of The City of Coachella for **ASSESSOR'S PARCEL NUMBERS: 612-260-010** which includes the requirement for the preparation and implementation of a project-specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of the WQMP and will ensure that the WQMP is amended as appropriate to reflect up-to-date conditions on the site. This Preliminary WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of the WQMP. At least one copy of the Final WQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of the Final WQMP. The undersigned is aware that implementation of the WQMP is enforceable under The City of Coachella Water Quality Ordinance (City of Coachella Ordinance 1057, Section 5 Chapter 13.6).

If the undersigned transfers its interest in the subject property/project, the undersigned shall notify the successor in interest of its responsibility to implement the WQMP.

"I, the undersigned, certify under penalty of law that I am the owner of the property that is the subject of the WQMP, and that the provisions of the WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

_____
Owner's Signature

_____
Owner's Printed Name

Owner
Rod Vandenburg
Owner's Title/Position

_____
Date

43-584 Via Magellan Drive
Palm Desert, CA 92201
(760) 799-8227

ATTEST

_____
Notary Signature

_____
Printed Name

_____
Title/Position

_____
Date

THIS FORM SHALL BE NOTARIZED BEFORE ACCEPTANCE OF THE FINAL PROJECT SPECIFIC WQMP

Contents

SECTION **PAGE**

I. Project Description 1
II. Site Characterization 5
III. Pollutants of Concern 7
IV. Hydrologic Conditions of Concern 8
V. Best Management Practices 9
V.1 Site Design BMP Concepts, LID/Site Design and Treatment Control BMPs 9
V.1.A Site Design BMP Concepts and LID/Site Design BMPs 11
V.1.B Treatment Control BMPs 17
V.1.C Measurable Goal Summary 19
V.2 Source Control BMPs 20
V.3 Equivalent Treatment Control BMP Alternatives 24
V.4 Regionally-Based BMPs 24
VI. Operation and Maintenance Responsibility for BMPs 25
VII. Funding 28

TABLES

Table 1. Pollutant of Concern Summary 7
Table 2. BMP Selection Matrix Based Upon Pollutant of Concern Removal Efficiency 10
Table 3. Implementation of Site Design BMP Concepts 12
Table 4. LID/Site Design BMPs Meeting the LID/Site Design Measurable Goal 16
Table 5: Treatment Control BMP Summary 18
Table 6: Measurable Goal Summary 19
Table 7. Source Control BMPs 20

APPENDICES

A. Conditions of Approval
B. Vicinity Map, WQMP Site Plan, and Receiving Waters Map
C. Supporting Detail Related to Hydrologic Conditions of Concern (If Applicable)
D. Educational Materials
E. Soils Report (if applicable)
F. Structural BMP and/or Retention Facility Sizing Calculations and Design Details
G. Agreements – CC&Rs, Covenant and Agreements, BMP Maintenance Agreements and/or Other Mechanisms for ensuring ongoing Operation, Maintenance, Funding and Transfer of Requirements for this project-specific WQMP
H. Phase 1 Environmental Site Assessment – Summary of Site Remediation Conducted and Use Restrictions
I. Project-Specific WQMP Summary Data Form

I. Project Description

Project Owner: **Pacific Coast Properties**
43-584 Via Magellan Drive
Palm Desert, CA 92201
Telephone: **(760) 799-8227**

Ron Vandenburg - Owner

WQMP Preparer:

James R. Bazua, PE

44-600 Village Court Suite 100
Palm Desert, CA 92260
Telephone: (760) 346 – 4750
james.bazua@thealtumgroup.com

_____

James Bazua — Date

RCE 58394 — Exp. 12/31/26

Project Site Address:	**49-251 Calhoun Street** **Coachella, CA 92236**
Planning Area/ Community Name/ Development Name:	**General Neighborhood**
APN Number(s):	**612-260-010**
Latitude & Longitude:	**33.6915, -116.2099**
Receiving Water:	**Coachella Valley Stormwater Channel**
Project Site Size:	**39.98 acres**

Standard Industrial Classification (SIC) Code: **6552 Land Subdividers and Developers**

Formation of Home Owners' Association (HOA)
or Property Owners Association (POA): Y ☐ N ☒

Additional Permits/Approvals required for the Project:

AGENCY	Permit required
State Department of Fish and Wildlife, Fish and Game Code §1602 Streambed Alteration Agreement	Y ☐ N☒
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Certification	Y ☐ N☒
US Army Corps of Engineers, CWA Section 404 permit	Y ☐ N☒
US Fish and Wildlife, Endangered Species Act Section 7 biological opinion	Y ☐ N☒
Statewide Construction General Permit Coverage	Y ☒ N☐
Statewide Industrial General Permit Coverage	Y ☐ N☒
South Coast Air Quality Management District – PM10 Approval to comply with Rule 403	Y ☒ N☐
Other: City of Coachella Grading Permit and Building Permit	Y ☒ N☐

Project Description

The proposed Calhoun Street Subdivision (Project) is located at 49-251 Calhoun Street, at Calhoun Street & Avenue 49, Coachella, CA 92236. The Accessor's Parcel Number is 612-260-010. The total Project area is 39.98 acres and is vacant under the existing condition. Proposed improvements will consist of the construction of a 257-lot residential subdivision that will disturb 100% of the existing vacant land. Included in project construction activities are clearing and grubbing, rough and precise grading, construction of roadways, buildings for each lot, landscaping areas, and a 1.96 acre park on the east side of the project along Calhoun Street.

Under post development conditions, storm runoff generated on-site will surface flow via local surface streets toward on-site retention basin collection systems. The on-site retention basin systems are designed to store 100% of runoff generated during the worst case 100-year design storm event.

Flows exceeding the storage capacity of the on-site retention basin systems in an emergency overflow condition will exit the project and flow onto Calhoun Street, then follow a northerly direction, toward Avenue 48, where it will continue east until entering the existing MS4 storm drain inlet facility on Van Buren Street, then continues underground toward the east (approximately 1 mile) until it empties into the Coachella Valley Storm Channel.

Appendix A of the project-specific Final WQMP will include a complete copy of the Conditions of Approval. Appendix B of this project-specific Preliminary WQMP includes:

a. A Vicinity Map identifying the project site and surrounding planning areas in sufficient detail; and

b. A Site Plan for the project. The Site Plan included as part of Appendix B depicts the following project features:

- Location and identification of all structural BMPs, including Source Control, LID/Site Design and Treatment Control BMPs.
- Landscaped areas.
- Paved areas and intended uses (i.e., parking, outdoor work area, outdoor material storage area, sidewalks, patios, tennis courts, etc.).
- Number and type of structures and intended uses (i.e., buildings, tenant spaces, dwelling units, community facilities such as pools, recreation facilities, tot lots, etc.).
- Infrastructure (i.e., streets, storm drains, etc.) that will revert to public agency ownership and operation.
- Location of existing and proposed public and private storm drainage facilities (i.e., storm drains, channels, basins, etc.), including catch basins and other inlets/outlet structures. Existing and proposed drainage facilities should be clearly differentiated.
- Location(s) of Receiving Waters to which the project directly or indirectly discharges.
- Location of points where onsite (or tributary offsite) flows exit the property/project site.
- Delineation of proposed drainage area boundaries, including tributary offsite areas, for each location where flows exit the project site and existing site (where existing site flows are required to be addressed). Each tributary area should be clearly denoted.

- Pre- and post-project topography.

Appendix I is a one-page form that summarizes pertinent information relative to the project-specific WQMP.

II. Site Characterization

Land Use Designation or Zoning: **General Neighborhood**

Current Property Use: **Vacant Land**

Proposed Property Use: **General Neighborhood – Residential Subdivision**

Availability of Soils Report: Y ☐ N ☒ *Note: A soils report is required if infiltration BMPs are utilized. Report will be included with Final WQMP Appendix E.*

Phase 1 Site Assessment: Y ☒ N ☐ *Note: If prepared, attached remediation summary and use restrictions in Appendix H.*

Receiving Waters for Urban Runoff from Site

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use Designated Receiving Waters
Coachella Valley Stormwater Channel	DDT, Dieldrin, Pathogens, Toxaphene, Toxicity, Total Ammonia	FRSH, REC 1, REC 2, WARM, WILD, RARE	Designated as RARE (18.0 miles)

III. Pollutants of Concern

Table 1. Pollutant of Concern Summary

Pollutant Category	Potential for Project and/or Existing Site	Causing Receiving Water Impairment
Bacteria/Virus	YES	YES
Heavy Metals	YES	NO
Nutrients	YES	NO
Toxic Organic Compounds	YES	YES
Sediment/Turbidity	YES	NO
Trash & Debris	YES	NO
Oil & Grease	YES	NO
Toxaphene	NO	YES

1) Pathogens are disease causing virus or bacteria. Pathogens are an impairment in the Coachella Valley Storm Water Channel from Dillon Road to the Salton Sea.

2) Toxaphene is an insecticide which was banned from use in the United States in 1990. Therefore, it is not a potential for the project but is currently a receiving water impairment.

3) Petroleum hydrocarbons are one of the most common organic compounds associated with street and parking lots and is a potential pollutant for the site. See Section V.2 for a description of appropriate Source Control BMPs.

4) Oil and Grease associated with landscaping and onsite operations are potential pollutants for the development. See Section V.2 for a description of appropriate Source Control BMP's.

5) PCBs, Dieldrin, and DDT are banned substances in the US.

IV. Hydrologic Conditions of Concern

Local Jurisdiction Requires On-Site Retention of Urban Runoff:

Yes ☒ The project will be required to retain urban runoff onsite in conformance with local ordinance (See Table 6 of the WQMP Guidance document, "Local Land use Authorities Requiring Onsite Retention of Stormwater"). This section does not need to be completed; however, retention facility design details and sizing calculations must be included in Appendix F.

No ☐ This section must be completed.

This Project meets the following condition:

☐ **Condition A**: 1) Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4 or engineered and maintained channel, 2) the discharge is in full compliance with local land use authority requirements for connections and discharges to the MS4 (including both quality and quantity requirements), 3) the discharge would not significantly impact stream habitat in proximate Receiving Waters, **and** 4) the discharge is authorized by the local land use authority.

☐ **Condition B**: The project disturbs less than 1 acre and is not part of a larger common plan of development that exceeds 1 acre of disturbance. The disturbed area calculation must include all disturbances associated with larger plans of development.

☐ **Condition C**: The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by, where applicable, complying with the local land use authority's on-site retention ordinance, or minimizing impervious area on a site and incorporating other Site-Design BMP concepts and LID/Site Design BMPs that assure non-exceedance of pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the local land use authority.

☐ **None:** Refer to Section 3.4 of the Whitewater River Region WQMP Guidance document for additional requirements.

Supporting engineering studies, calculations, and reports are included in Appendix C.

	2 year – 24 hour		10 year – 24 hour	
	Precondition	**Post-condition**	**Precondition**	**Post-condition**
Discharge (cfs)				
Velocity (fps)				
Volume (cubic feet)				
Duration (minutes)				

V. Best Management Practices

This project implements Best Management Practices (BMPs) to address the Pollutants of Concern that may potentially be generated from the use of the project site. These BMPs have been selected and implemented to comply with Section 3.5 of the WQMP Guidance document, and consist of Site Design BMP concepts, Source Control, LID/Site Design and, if/where necessary, Treatment Control BMPs as described herein.

V.1 Site Design BMP Concepts, LID/Site Design and Treatment Control BMPs

Local Jurisdiction Requires On-Site Retention of Urban Runoff:

Yes ☒ The project will be required to retain Urban Runoff onsite in conformance with local ordinance (See Table 6 of the WQMP Guidance document, "Local Land use Authorities Requiring Onsite Retention of Stormwater). **The LID/Site Design measurable goal has thus been met (100%), and Sections V.1.A and V.1.B do not need to be completed**; however, retention facility design details and sizing calculations must be included in Appendix F, and '100%' should be entered into Column 3 of Table 6 below.

No ☐ Section V.1 must be completed.

This section of the Project-Specific WQMP documents the LID/Site Design BMPs and, if/where necessary, the Treatment Control BMPs that will be implemented on the project to meet the requirements detailed within Section 3.5.1 of the WQMP Guidance document. Section 3.5.1 includes requirements to implement Site Design Concepts and BMPs, and includes requirements to address Pollutants of Concern with BMPs. Further, sub-section 3.5.1.1 specifically requires that Pollutants of Concern be addressed with LID/Site Design BMPs to the extent feasible.

LID/Site Design BMPs are those BMPs listed within Table 2 below which promote retention and/or feature a natural treatment mechanism; off-site and regionally-based BMPs are also LID/Site Design BMPs, and therefore count towards the measurable goal, if they fit these criteria. This project incorporates LID/Site Design BMPs to fully address the Treatment Control BMP requirement where and to the extent feasible. If and where it has been acceptably demonstrated to the local land use authority that it is infeasible to fully meet this requirement with LID/Site Design BMPs, Section V.1.B (below) includes a description of the conventional Treatment Control BMPs that will be substituted to meet the same requirements.

In addressing Pollutants of Concern, BMPs are selected using Table 2 below.

Table 2. BMP Selection Matrix Based Upon Pollutant of Concern Removal Efficiency (1)

(Sources: Riverside County Flood Control & Water Conservation District Design Handbook for Low Impact Development Best Management Practices, dated September 2011, the Orange County Technical Guidance Document for Water Quality Management Plans, dated May 19, 2011, and the Caltrans Treatment BMP Technology Report, dated April 2010 and April 2008)

Pollutant of Concern	Landscape Swale[2, 3]	Landscape Strip[2, 3]	Biofiltration (with underdrain)[2, 3]	Extended Detention Basin[2]	Sand Filter Basin[2]	Infiltration Basin[2]	Infiltration Trench[2]	Permeable Pavement[2]	Bioretention (w/o underdrain)[2, 3]	Other BMPs Including Proprietary BMPs[4, 6]
Sediment & Turbidity	M	M	H	M	H	H	H	H	H	Varies by Product[5]
Nutrients	L/M	L/M	M	L/M	L/M	H	H	H	H	
Toxic Organic Compounds	M/H	M/H	M/H	L	L/M	H	H	H	H	
Trash & Debris	L	L	H	H	H	H	H	L	H	
Bacteria & Viruses (also: Pathogens)	L	M	H	L	M	H	H	H	H	
Oil & Grease	M	M	H	M	H	H	H	H	H	
Heavy Metals	M	M/H	M/H	L/M	M	H	H	H	H	

Abbreviations:

L: Low removal efficiency M: Medium removal efficiency H: High removal efficiency

Notes:

(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.

(2) Expected performance when designed in accordance with the most current edition of the document, "Riverside County, Whitewater River Region Stormwater Quality Best Management Practice Design Handbook".

(3) Performance dependent upon design which includes implementation of thick vegetative cover. Local water conservation and/or landscaping requirements should be considered; approval is based on the discretion of the local land use authority.

(4) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this WQMP (including proprietary filters, hydrodynamic separators, inserts, etc.), or newly developed/emerging stormwater treatment technologies.

(5) Expected performance should be based on evaluation of unit processes provided by BMP and available testing data. Approval is based on the discretion of the local land use authority.

(6) When used for primary treatment as opposed to pre-treatment, requires site-specific approval by the local land use authority.

V.1.A SITE DESIGN BMP CONCEPTS AND LID/SITE DESIGN BMPS

This section documents the Site Design BMP concepts and LID/Site Design BMPs that will be implemented on this project to comply with the requirements detailed in Section 3.5.1 of the WQMP Guidance document.

- Table 3 herein documents the implementation of the Site Design BMP Concepts described in sub-sections 3.5.1.3 and 3.5.1.4.
- Table 4 herein documents the extent to which this project has implemented the LID/Site Design goals described in sub-section 3.5.1.1.

Table 3. Implementation of Site Design BMP Concepts

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A	Brief Reason for BMPs Indicated as No or N/A
Site Design BMP Concept 1	**Minimize Urban Runoff, Minimize Impervious Footprint, and Conserve Natural Areas (See WQMP Section 3.5.1.3)**	Conserve natural areas by concentrating or clustering development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition.	☐	☐	☐	
		Conserve natural areas by incorporating the goals of the Multi-Species Habitat Conservation Plan or other natural resource plans.	☐	☐	☐	
		Preserve natural drainage features and natural depressional storage areas on the site.	☐	☐	☐	
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	☐	☐	☐	
		Use natural drainage systems.	☐	☐	☐	
		Where applicable, incorporate Self-Treating Areas	☐	☐	☐	
		Where applicable, incorporate Self-Retaining Areas	☐	☐	☐	
		Increase the building floor to area ratio (i.e., number of stories above or below ground).	☐	☐	☐	
		Construct streets, sidewalks and parking lot aisles to minimum widths necessary, provided that public safety and a walkable environment for pedestrians are not compromised.	☐	☐	☐	
		Reduce widths of streets where off-street parking is available.	☐	☐	☐	
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.	☐	☐	☐	
		Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☐	☐	☐	

Table 3. Site Design BMP Concepts (continued)

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A	Brief Reason for Each BMP Indicated as No or N/A
Site Design BMP Concept 2	**Minimize Directly Connected Impervious Area (See WQMP Section 3.5.1.4)**	Design residential and commercial sites to contain and infiltrate roof runoff, or direct roof runoff to landscaped swales or buffer areas.	☐	☐	☐	
		Drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.	☐	☐	☐	
		Incorporate landscaped buffer areas between sidewalks and streets.	☐	☐	☐	
		Use natural or landscaped drainage swales in lieu of underground piping or imperviously lined swales.	☐	☐	☐	
		Where soil conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration.	☐	☐	☐	
		Maximize the permeable area by constructing walkways, trails, patios, overflow parking, alleys, driveways, low-traffic streets, and other low-traffic areas with open-jointed paving materials or permeable surfaces such as pervious concrete, porous asphalt, unit pavers, and granular materials.	☐	☐	☐	
		Use one or more of the following:				
		Rural swale system: street sheet flows to landscaped swale or gravel shoulder, curbs used at street corners, and culverts used under driveways and street crossings.	☐	☐	☐	
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to landscaped swale or biofilter.	☐	☐	☐	
		Dual drainage system: first flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder; high flows connect directly to MS4s.	☐	☐	☐	
		Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☐	☐	☐	
		Use one or more of the following for design of driveways and private residential parking areas:				
		Design driveways with shared access, flared (single lane at street), or wheel strips (paving only under the tires).	☐	☐	☐	
		Uncovered temporary or guest parking on residential lots paved with a permeable surface, or designed to drain into landscaping.	☐	☐	☐	

Table 3. Site Design BMP Concepts (continued)

Design Concept	Technique	Specific BMP	Included: Yes	Included: No	Included: N/A	Brief Reason for Each BMP Indicated as No or N/A
Site Design BMP Concept 2 (cont'd)	**Minimize Directly Connected Impervious Area (See WQMP Section 3.5.1.4)**	Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☐	☐	☐	
		Use one or more of the following for design of parking areas:				
		Where landscaping is proposed in parking areas, incorporate parking area landscaping into the drainage design.	☐	☐	☐	
		Overflow parking (parking stalls provided in excess of the Permittee's minimum parking requirements) may be constructed with permeable pavement.	☐	☐	☐	
		Other comparable and equally effective Site Design BMP (or BMPs) as approved by the local land use authority (Note: Additional narrative required describing BMP and how it addresses site design concept).	☐	☐	☐	

Project Site Design BMP Concepts:

The site design BMPs will include a Infiltration Basin system BMP designed to capture 100% of the 100 year storm event per City of Coachella standards.

Alternative Project Site Design BMP Concepts:

N/A

Table 4. LID/Site Design BMPs Meeting the LID/Site Design Measurable Goal

(1) DRAINAGE SUB-AREA ID OR NO.	(2) LID/SITE DESIGN BMP TYPE* (See Table 2)	(3) POTENTIAL POLLUTANTS OF CONCERN WITHIN DRAINAGE SUB-AREA (Refer to Table 1)	(4) POTENTIAL POLLUTANTS WITHIN SUB-AREA CAUSING RECEIVING WATER IMPAIRMENTS (Refer to Table 1)	(5) EFFECTIVENESS OF LID/SITE DESIGN BMP AT ADDRESSING IDENTIFIED POTENTIAL POLLUTANTS (U, L, M, H/M, H; see Table 2)	(6) BMP MEETS WHICH DESIGN CRITERIA? (Identify as V_{BMP} OR Q_{BMP})	(7) TOTAL AREA WITHIN DRAINAGE SUB-AREA (Nearest 0.1 acre)
TOTAL PROJECT AREA TREATED WITH LID/SITE DESIGN BMPs (NEAREST 0.1 ACRE)						**39.98**

*** LID/Site Design BMPs listed in this table are those that <u>completely</u> address the 'Treatment Control BMP requirement' for their drainage sub-area.**

Justification of infeasibility for sub-areas not addressed with LID/Site Design BMPs

Not applicable; Treatment Control & Site Design BMP's are addressed by the Infiltration Basin design system.

V.1.B TREATMENT CONTROL BMPS

Conventional Treatment Control BMPs shall be implemented to address the project's Pollutants of Concern as required in WQMP Section 3.5.1 where, and to the extent that, Section V.1.A has demonstrated that it is infeasible to meet these requirements through implementation of LID/Site Design BMPs.

☒ The LID/Site Design BMPs described in Section V.1.A of this project-specific WQMP completely address the 'Treatment Control BMP requirement' for the entire project site (and where applicable, entire existing site) as required in Section 3.5.1.1 of the WQMP Guidance document. Supporting documentation for the sizing of these LID/Site Design BMPs is included in Appendix F. ***Section V.1.B does not need to be completed**.

☐ The LID/Site Design BMPs described in Section V.1.A of this project-specific WQMP do **NOT** completely address the 'Treatment Control BMP requirement' for the entire project site (or where applicable, entire existing site) as required in Section 3.5.1.1 of the WQMP. ***Section V.1.B must be completed.**

The Treatment Control BMPs identified in this section are selected, sized and implemented to treat the design criteria of V_{BMP} and/or Q_{BMP} for all project (and if required, existing site) drainage sub-areas which were not fully addressed using LID/Site Design BMPs. Supporting documentation for the sizing of these Treatment Control BMPs is included in Appendix F.

Table 5: Treatment Control BMP Summary

(1) DRAINAGE SUB-AREA ID OR NO.	(2) TREATMENT CONTROL BMP TYPE* (See Table 2)	(3) POTENTIAL POLLUTANTS OF CONCERN WITHIN DRAINAGE SUB-AREA (Refer to Table 1)	(4) POTENTIAL POLLUTANTS WITHIN SUB-AREA CAUSING RECEIVING WATER IMPAIRMENTS (Refer to Table 1)	(5) EFFECTIVENESS OF TREATMENT CONTROL BMP AT ADDRESSING IDENTIFIED POTENTIAL POLLUTANTS (U, L, M, H/M, H; see Table 2)	(6) BMP MEETS WHICH DESIGN CRITERIA? (Identify as V_{BMP} OR Q_{BMP})	(7) TOTAL AREA WITHIN DRAINAGE SUB-AREA (Nearest 0.1 acre)
TOTAL PROJECT AREA TREATED WITH TREATMENT CONTROL BMPs (NEAREST 0.1 ACRE)						0.0

V.1.C MEASURABLE GOAL SUMMARY

This section documents the extent to which this project has met the measurable goal described in WQMP Section 3.5.1.1 of addressing 100% of the project's 'Treatment Control BMP requirement' with LID/Site Design BMPs. Projects required to retain Urban Runoff onsite in conformance with local ordinance are considered to have met the measurable goal; for these instances, '100%' is entered into Column 3 of the Table.

Table 6: Measurable Goal Summary

(1) **Total Area Treated with LID/Site Design BMPs** (Last row of Table 4)	(2) **Total Area Treated with Treatment Control BMPs** (Last row of Table 5)	(3) **% of Treatment Control BMP Requirement addressed with LID/Site Design BMPs**
39.98 ac	0.0 ac	100%

V.2 SOURCE CONTROL BMPS

This section identifies and describes the Source Control BMPs applicable and implemented on this project.

Table 7. Source Control BMPs

BMP Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	☒	☐	
Activity Restrictions	☒	☐	
Irrigation System and Landscape Maintenance	☒	☐	
Common Area Litter Control	☒	☐	
Street Sweeping Private Streets and Parking Lots	☒	☐	
Drainage Facility Inspection and Maintenance	☒	☐	
Structural Source Control BMPs			
Storm Drain Inlet Stenciling and Signage	☐	☒	
Landscape and Irrigation System Design	☒	☐	
Protect Slopes and Channels	☒	☐	
Provide Community Car Wash Racks	☐	☒	Not part of the project design.
Properly Design*:			
Fueling Areas	☐	☒	
Air/Water Supply Area Drainage	☐	☒	No facilities.
Trash Storage Areas	☒	☐	
Loading Docks	☐	☒	No facilities.
Maintenance Bays	☐	☒	No facilities.
Vehicle and Equipment Wash Areas	☐	☒	No facilities.
Outdoor Material Storage Areas	☐	☒	No facilities.
Outdoor Work Areas or Processing Areas	☐	☒	No facilities.
Provide Wash Water Controls for Food Preparation Areas	☐	☒	No facilities.

*Details demonstrating proper design must be included in Appendix F.

5.2.1 Non-Structural Source Control BMPs

5.2.1.1 Education

Yes

The owner, as responsible party for implementing the Final WQMP, will ensure that owner's employees, operators, and managers are properly trained and attend continuing education classes.

5.2.1.2 Activity Restrictions

Yes

Certain activities within the project area may be restricted to enable the owner/operator to meet the City's water quality requirements. For example, maintenance of vehicles (which contributes to storm water contamination by oil and grease) is not authorized in this area.

5.2.1.3 Irrigation System and Landscape Maintenance

Yes

Owner shall ensure that the irrigation systems within the project site are operating properly. Owner shall also ensure that the ground's landscaping is maintained regularly so that the project site is in compliance with all City water quality requirements.

5.2.1.4 Common Area Litter Control

Yes

Owner shall ensure that employees regularly patrol the site in an effort to keep it free of litter so that the project site is in compliance with all City water quality requirements.

5.2.1.5 Street Sweeping

Yes

Owner shall ensure that the streets is regularly swept so that the project site is in compliance with all City water quality requirements. Streets/driveways and parking lots shall be swept at least quarterly, including just prior to start of the rainy season (October 1st). The frequency shall be no less than the frequency of street sweeping by the Co-Permittee on public streets.

5.2.1.6 Drainage Facility Inspection and Maintenance

Yes

Owner shall ensure that drainage facilities within the project area are regularly inspected (at least annually) and maintained properly so that the project site is in compliance with all City water quality requirements. At a minimum, routine maintenance of drainage facilities should take place in the late summer or early fall prior to the start of the rainy season (October 1st).

5.2.2 Structural Source Control BMPs

5.2.2.1 MS4 Stenciling and Signage

No

The existing site does not drain directly to MS4 facilities as the redevelopment area will

include a retention basin infiltration facility (BMP) which will intercept a 100% of the post-development storm flow. Also, no curb inlets are proposed on-site.

5.2.2.2 Landscape and Irrigation System Design

Yes

The project will be designed to include native, drought-tolerant plants. These plants use less water, and help reduce the use of fertilizers and pesticides. The irrigation system will be programmable and utilize drip emitters, limiting excess irrigation runoff. The landscape and irrigation system will be designed in accordance with the City's water quality requirements.

5.2.2.3 Protect Slopes and Channels

Yes

Project plans shall include Source Control BMPs to decrease the potential for erosion of slopes. The following design principles shall be considered, and incorporated and implemented where determined applicable and feasible by the local land use authority:

- Convey runoff safely from the tops of slopes.
- Plant slopes with native or drought tolerant vegetation.

5.2.2.4 Provide Community Car Wash Racks

No

The project site will not include community car wash racks as part of the project design.

5.2.2.5 Fueling Areas

No

Project development does not include the construction of fueling areas.

5.2.2.6 Air/Water Supply Area Drainage

No

The project site will not include air/water supply areas.

5.2.2.7 Trash Storage Areas

Yes

The project site will include trash storage areas. Trash storage (or trash enclosures) will be located on-site. Also, trash dumpsters will have attached covers and shall be leak proof. The entire trash storage surface area will be concrete.

5.2.2.8 Loading Docks

No

The project site will not include loading docks.

5.2.2.9 Maintenance Bays

No

The project site will not include maintenance bays.

5.2.2.10 Vehicle and Equipment Wash Areas

No

The project site will not include vehicle and equipment wash areas.

5.2.2.11 Outdoor Material Storage Areas

No

The project site will not Outdoor Material Storage Areas

5.2.2.12 Outdoor Work Areas or Processing Areas

No

The project site will not include outdoor work areas or processing areas.

5.2.2.13 Wash Water Areas for Food Preparation Areas

No

The project site will not include outdoor work areas or processing areas.

Appendix D includes copies of the educational materials (described in Section 3.5.2.1 of the WQMP Guidance document) that will be used in implementing the project-specific WQMP.

V.3 EQUIVALENT TREATMENT CONTROL BMP ALTERNATIVES

The project site will not include any other treatment control alternatives.

V.4 REGIONALLY-BASED BMPS

100% of the runoff generated on-site during 100 year design frequency storm will be retained on-site in an infiltration type retention basin.

VI. Operation and Maintenance Responsibility for BMPs

Appendix G of the project-specific WQMP will include copies of CC&Rs, Covenant and Agreements, BMP Maintenance Agreement and/or other mechanisms used to ensure the ongoing operation, maintenance, funding, transfer and implementation of the project-specific WQMP requirements.

Operations and maintenance (O&M) will be performed, as necessary, by Pacific Coast Properties, their agents, and/or their assignees. The BMPs for the project are a infiltration type retention basins designed with a capacity to store the runoff generated during the 100-year storm event.

Maintenance of the site and on-site storm drain and retention basin system consists primarily of the removal of trash and debris, repair and removal/reinstallation of facilities if damaged or saturated by native material (due to wind and water erosion) or sediment and organic material from human activity. Any removed material must be hauled away to an approved disposal facility. See Appendix D for a recommended "Infiltration System Maintenance Plan".

Routine inspection and required maintenance of all BMPs and the site should begin immediately upon completion of construction and continue throughout the life of the project. Records of all inspection and repair/modifications shall be kept by the owner. The following persons shall be responsible for all O&M and inspections, until such time as another staff member is designated:

Rod Vandenburg
Pacific Coast Properties
43-584 Via Magellan Drive
Coachella, CA 92201
Telephone: (760) 403- 6647

(1) **ALL BMPS REQUIRING MAINTENANCE**	(2) **DESCRIPTION OF O&M ACTIVITIES**	(3) **START DATE**	(4) **O&M FREQUENCY**	(5) **PARTY RESPONSIBLE FOR O&M**	(6) **SELF INSPECTION AND RECORD KEEPING REQUIREMENTS**
EDUCATION FOR PROPERTY OWNERS OPERATORS, OR EMPLOYEES	MATERIALS WILL BE AVAILABLE TO EMPLOYEES, MAINTENANCE CREWS AND CONTRACTORS. PROVIDE EDUCATIONAL MATERIALS ON AN ANNUAL BASIS AND UPON HIRING OF EMPLOYEES.	AT PROJECT COMPLETION	ANNUALLY	PACIFIC COAST PROPERTIES	SEE ATTCHED EXAMPLE OF TRAINING / EDUCATION LOG. RECORD TRAINING OF EMPLOYEES
ACTIVITY RESTRICTIONS	PROVIDE ACCESS TO WQMP FOR ALL EMPLOYEES AND CONTRACTORS THAT PERFORM MAINTENANCE WORK.	AT PROJECT COMPLETION	ANNUALLY	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
IRRIGATION SYSTEM AND LANDSCAPE MANAGEMENT	INSPECT ALL COMMON LANDSCAPE AREAS AND REPLACE DEAD VEGETATION. INSPECT, ADJUST AND REPAIR IRRIGATION SYSTEM.	UPON COMPLETION OF LANDSCAPED AREAS	WEEKLY DURING REGULAR MAINTENANCE	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
COMMON AREA LITTER CONTROL	INSPECT AND REMOVE ALL LITTER AND DEBRIS LOCATED IN ALL COMMON AREAS, INCLUDING STREETS, PARKWAYS AND SIDEWALKS	AT PROJECT COMPLETION	AS NEEDED	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
STREET SWEEPING	INSPECT FOR SEDIMENT DURING ROUTINE MAINTENANCE ADJUST FREQUENCY OF SWEEPING OPERATIONS	PROJECT COMPLETION	BI-MONTHLY AND AS NEEDED	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG

DRAINAGE FACILITY PROTECTION	INSPECT ALL CATCH BASINS AND STORM DRAIN PIPES, REMOVE LITTER DEBRIS AND ANY LIQUIDS	UPON INSTALLATION OF STORM DRAIN SYSTEM ADDITIONS	QUARTERLY AND AFTER A QUALIFYING RAIN EVENT OF 0.5" /24HRS	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
LANDSCAPE AND IRRIGATION SYSTEM DESIGN	INSPECT AND REPAIR LANDSCAPE IRRIGATION TIMERS. INSPECT AND REPAIR ALL SPRINKLER HEADS AS NEEDED,	UPON COMPLETION OF LANDSCAPED AREAS	WEEKLY	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
TRASH STORAGE AREA	INSPECT INTEGRITY OF STRUCTURAL ELEMENTS REPLACE CONTAINERS WHEN NEEDED	AT PROJECT COMPLETION	MONTHLY AND AS NEEDED	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG
RETENTION BASIN	INSPECT AND REMOVE LITTER AND DEBRIS, MAINTAIN LANDSCAPE, REMOVE DEAD VEGETATION	AT PROJECT COMPLETION	QUARTERLY DURING DRY SEASON, MONTHLY DURING RAINY SEASON	PACIFIC COAST PROPERTIES	SEE ATTACHED EXAMPLE OF BMP OPERATION AND MAINTENANCE LOG

VII. Funding

Source funding and long term funding of operations and maintenance of the project BMP will be provided by Pacific Coast Properties (Owner), their agents, and/or assignees. Funding will be addressed in a covenant agreement entered into between City of Coachella and the Owner before approval of the Final WQMP.

Appendix A

Conditions of Approval

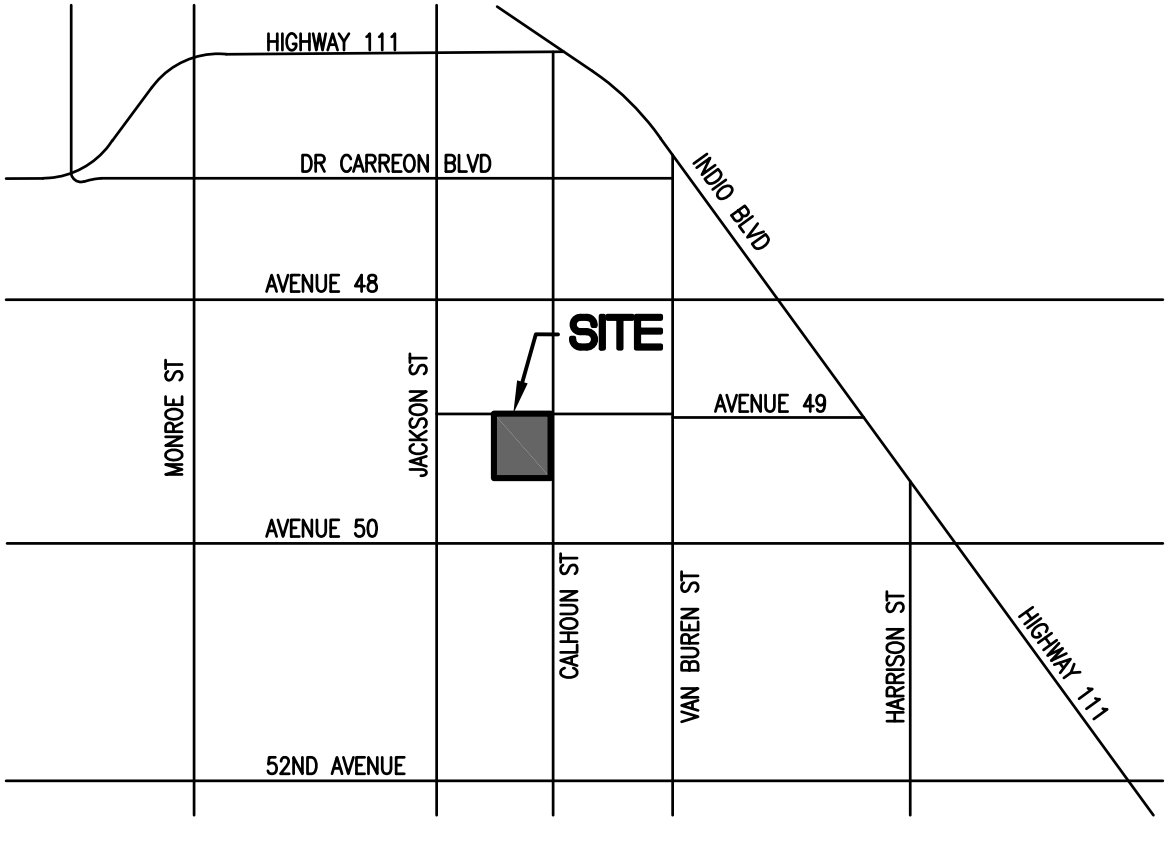
N/A

Planning Commission Resolution _____

Dated _____

Appendix B

Vicinity Map, WQMP Site Plan, and Receiving Waters Map

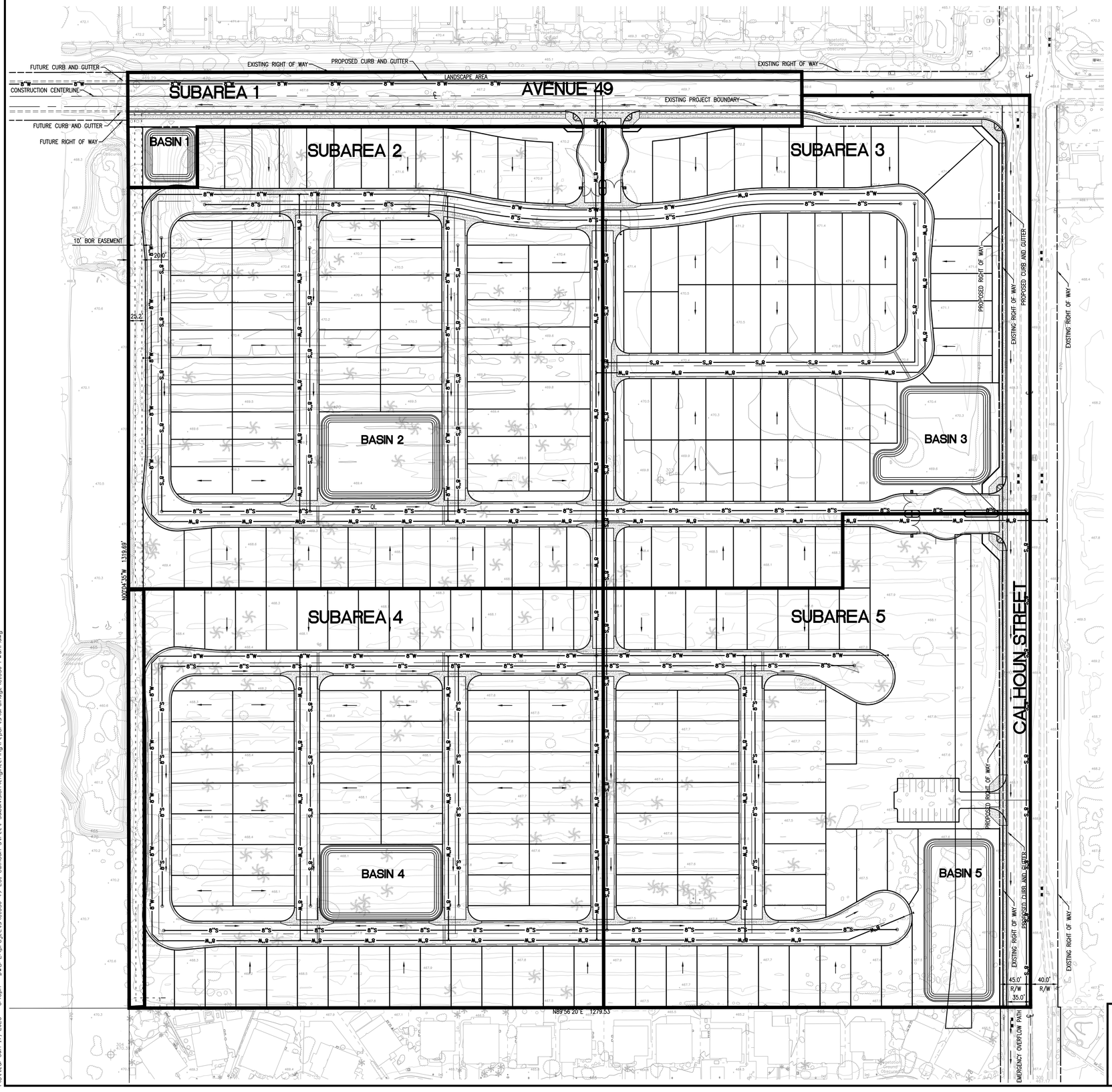


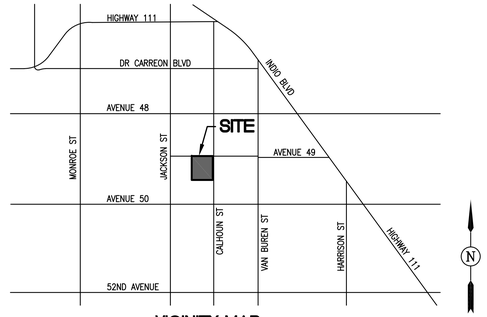
VICINITY MAP

NOT TO SCALE

PRELIMINARY HYDROLOGY/WATER QUALITY MANAGEMENT MAP

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA





VICINITY MAP

NOT TO SCALE

LEGEND

SUBAREA BOUNDARY

DIRECTIONAL DRAINAGE ARROWS

NOAA POINT RAINFALL DATA

2 YEAR – 1 HR = 0.35 IN.
10 YEAR – 1 HR = 0.70 IN. 100 YEAR – 1 HR = 1.37 IN.
10 YEAR – 3 HR = 1.04 IN. 100 YEAR – 3 HR = 2.12 IN.
10 YEAR – 6 HR = 1.36 IN. 100 YEAR – 6 HR = 2.78 IN.
10 YEAR – 24 HR = 2.23 IN. 100 YEAR – 24 HR = 4.47 IN.

INFILTRATION RATE

DESIGN INFILTRATION RATE = 0.67 IN/HR

HYDROLOGIC SOIL GROUP

HYDROLOGIC SOIL GROUP "B"

SITE DATA

PROJECT SITE AREA: 38.8 AC.
PROJECT SITE & OFFSITE IMPROVEMENT AREA: 42.50 AC.

SUBAREA 1

AREA: 2.01 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 2.01 AC. = 100%

PROPOSED IMPERVIOUS AREA: 1.18 AC. = 59%
PROPOSED PERVIOUS AREA: 0.83 AC. = 41%

RETENTION VOLUME REQUIRED = 9,580 C.F.
RETENTION VOLUME PROVIDED = 12,250 C.F.

100 YR STORED W.S. DEPTH = 2.45'
10 YR STORED W.S. DEPTH = 0.72'

SUBAREA 2

AREA: 10.57 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.36 AC. = 100%

PROPOSED IMPERVIOUS AREA: 7.36 AC. = 70%
PROPOSED PERVIOUS AREA: 3.21 AC. = 30%

RETENTION VOLUME REQUIRED = 57,661 C.F.
RETENTION VOLUME PROVIDED = 64,193 C.F.

100 YR STORED W.S. DEPTH = 3.19'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 3

AREA: 9.36 AC.

EXISTING IMPERVIOUS AREA: 0.34 AC. = 4%
EXISTING PERVIOUS AREA: 9.02 AC. = 96%

PROPOSED IMPERVIOUS AREA: 6.88 AC. = 74%
PROPOSED PERVIOUS AREA: 2.48 AC. = 26%

RETENTION VOLUME REQUIRED = 53,709 C.F.
RETENTION VOLUME PROVIDED = 62,528 C.F.

100 YR STORED W.S. DEPTH = 3.07'
10 YR STORED W.S. DEPTH = 0.94'

SUBAREA 4

AREA: 9.79 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.79 AC. = 100%

PROPOSED IMPERVIOUS AREA: 6.59 AC. = 67%
PROPOSED PERVIOUS AREA: 3.20 AC. = 33%

RETENTION VOLUME REQUIRED = 51,654 C.F.
RETENTION VOLUME PROVIDED = 57,236 C.F.

100 YR STORED W.S. DEPTH = 3.20'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 5

AREA: 9.49 AC.

EXISTING IMPERVIOUS AREA: 0.53 AC. = 6%
EXISTING PERVIOUS AREA: 8.96 AC. = 94%

PROPOSED IMPERVIOUS AREA: 5.01 AC. = 53%
PROPOSED PERVIOUS AREA: 4.48 AC. = 47%

RETENTION VOLUME REQUIRED = 41,999 C.F.
RETENTION VOLUME PROVIDED = 72,828 C.F.

100 YR STORED W.S. DEPTH = 2.14'
10 YR STORED W.S. DEPTH = 0.54'

N

GRAPHIC SCALE
SCALE 1"=60'
0 30 60 120 180 240

PREPARED BY:
The Altum Group
44-600 Village Court, Suite 100
Palm Desert, CA 92260
t.760.346.4750 f. 760.340.0089
TheAltumGroup.com
ENGINEERING | PLANNING | SURVEY | ENVIRONMENTAL

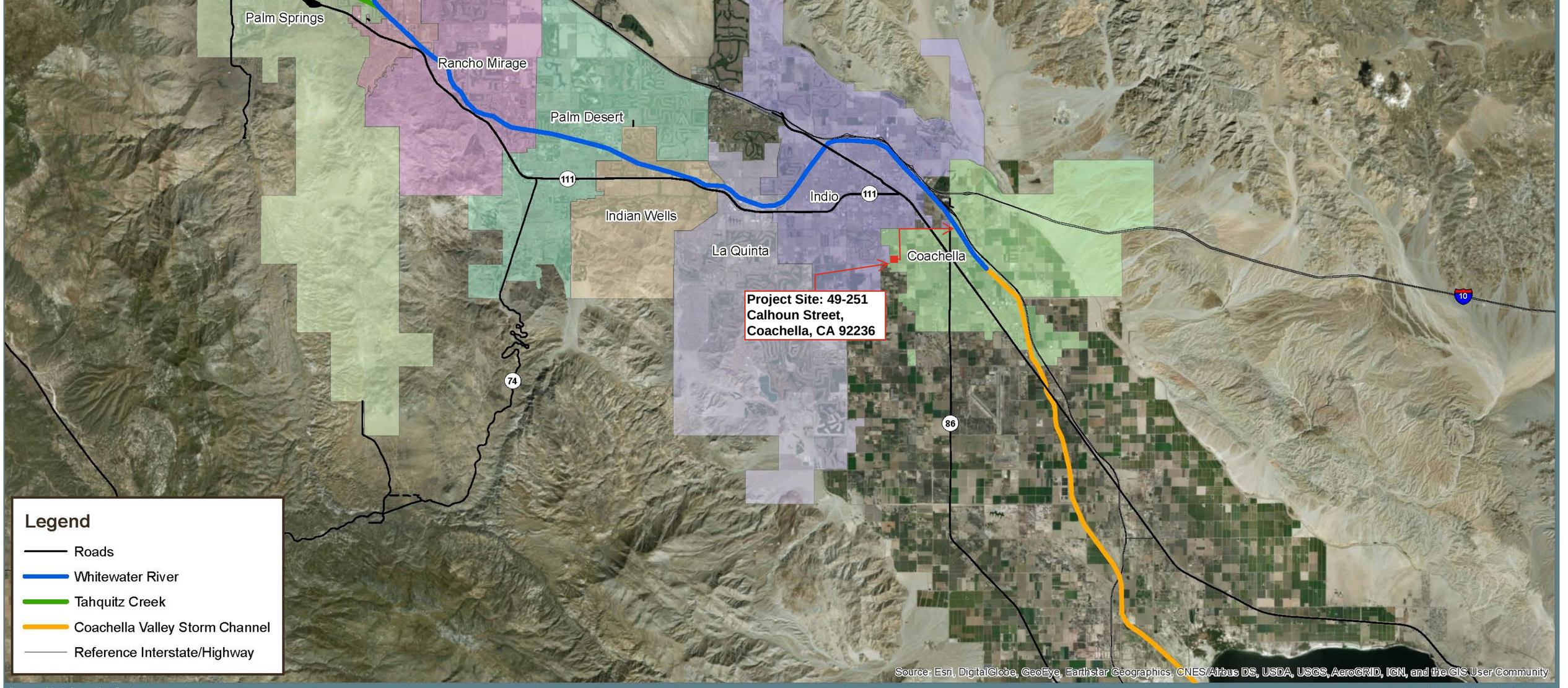
CITY OF COACHELLA, CALIFORNIA

PRELIMINARY HYDROLOGY/
WATER QUALITY MANAGEMENT PLAN

FOR: CALHOUN STREET SUBDIVISION

SHEET NO.

Plotted: Jan 17, 2025 - 3:43pm DWG: L:\projects\C1530 49-251 Calhoun Street Subdivision\engineering\reports\drainage\C1530 PWQMP.dwg



Geographic Information Systems

Cartographic Design By: Randee Martin

TheAltumGroup
Strive Higher
44-600 Village Ct Suite 100, Palm Desert, CA 92260
Phone: (760) 346 - 4750 TheAltumGroup.com

1 inch = 2.755735 miles

Receiving Water Exhibit

N

Appendix C

Supporting Detail Related to Hydrologic Conditions of Concern

N/A

Appendix D

Educational Materials

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

After the Storm

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

EPA 833-B-03-002

January 2003

Internet Address (URL) • HTTP://www.epa.gov
Recycled/Recyclable • Printed With Vegetable Oil Based Inks on 100% Postconsumer, Process Chlorine Free Recycled Paper

A Citizen's Guide to Understanding Stormwater

Stormwater Pollution Solutions

Residential

Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

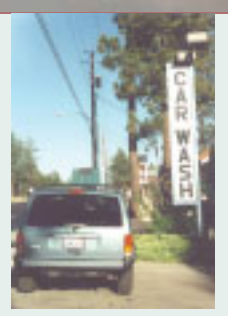
- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

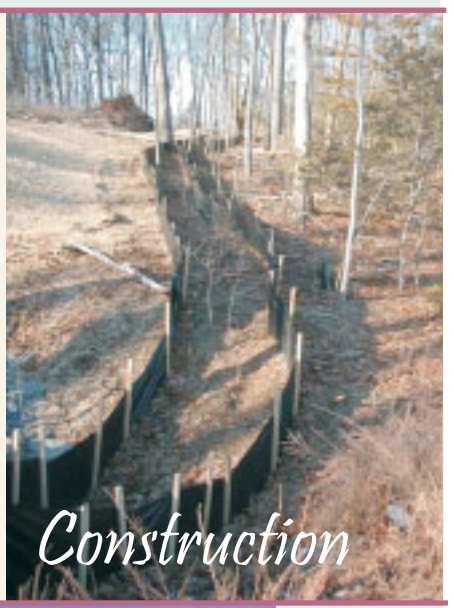
Commercial

Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



Construction

Agriculture

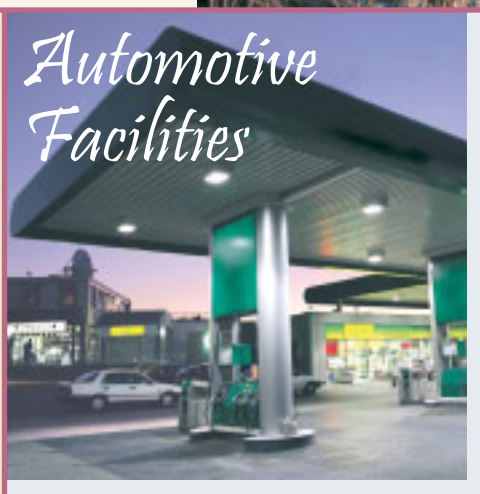
Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.



Automotive Facilities

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

RIVERSIDE COUNTY
ANIMAL SERVICES LOCATIONS:

www.rcdas.org

BLYTHE
16450 West Hobson Way
Blythe, CA 92225
760-921-7857

COACHELLA VALLEY ANIMAL CAMPUS
72-050 Petland Place
Thousand Palms, CA 92276
760-343-3644

RIVERSIDE COUNTY ANIMAL SERVICES
6851 Van Buren Blvd.
Riverside, CA 92509
951-688-4340

OTHER ANIMAL SHELTERS:

ANIMAL CARE CENTER OF INDIO
45-355 Van Buren
Indio, CA 92201
760-391-4138

ANIMAL FRIENDS OF THE VALLEYS
29001 Bastron Avenue
Lake Elsinore, CA 92530
951-674-0618
(Serving incorporated Temecula, Wildomar, Lake Elsinore, Murrieta and Canyon Lake)

MARY S. ROBERTS PET ADOPTION CENTER
6185 Industrial Avenue
Riverside, CA 92504
951-688-4340

RAMONA HUMANE SOCIETY
690 Humane Way
San Jacinto 92586
951-654-8002
(Serving Sun City, Menifee, Romoland and Homeland)

Looking to adopt a pet?
This website is linked to many animal shelters.
www.petfinder.com

To report illegal storm drain disposal, call
1-800-506-2555

Or visit our website at www.rcflood.org

E-mail fcnpdes@rcflood.org

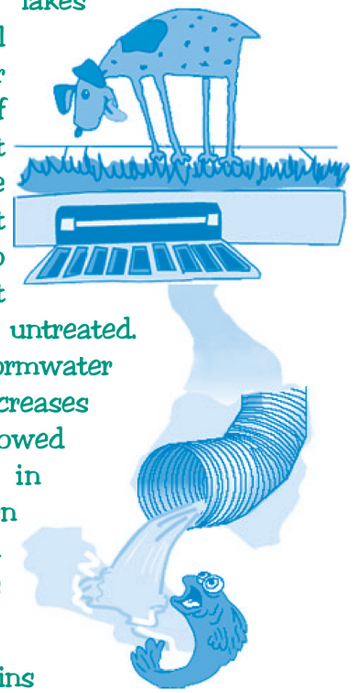
What's the Scoop?

Tips for a Healthy Pet and a Healthier Environment

CREATE A HEALTHY ENVIRONMENT in and around your home by following these simple pet practices. Your pet, family and neighbors will appreciate their clean comfortable surroundings.

HOUSEHOLD PETS

We all love our pets, but pet waste is a subject everyone likes to avoid. Pet waste left on trails, sidewalks, streets and grassy areas can be washed into the nearest waterway when it rains. Even if you can't see streams or lakes near you, rainfall (stormwater) or sprinkler runoff can wash pet waste into the storm drains that carry runoff to the nearest streams or lakes untreated. The risk of stormwater contamination increases if pet waste is allowed to accumulate in outdoor animal pen areas or left on sidewalks, streets or driveways.



Pet waste contains nutrients and bacteria. Nutrients can promote the growth of algae in streams and lakes. Algae can cause fish kills and other environmental damage if it is fed too many nutrients. Pet Waste also contains e. Coli and fecal bacteria, which can cause disease in other animals and humans that come in contact with it when swimming or splashing in streams and lakes. Dogs also carry salmonella and giardia, which can make people sick.

Pet waste that is not picked up and properly disposed can also increase vector problems. Flies and other insects are not only attracted to and feed on pet waste, but can also be infected with diseases and spread those diseases to humans and other animals.

WHAT CAN YOU DO?

- SCOOP up pet waste and flush it down the toilet or place in trash can.
- NEVER DUMP pet waste into a storm drain or catch basin.
- USE the complimentary bags or mutt mitts offered in dispensers at local parks.
- CARRY EXTRA BAGS when walking your dog and make them available to other pet owners who are without.
- TEACH CHILDREN how to properly clean up after a pet.
- TELL FRIENDS AND NEIGHBORS about the ill effects of animal waste on the environment. Encourage them to clean up after pets.

Call 1-800-506-2555 TOLL FREE to report illegal dumping to the storm drain, find the dates and times of local Household Hazardous Waste Collection Events, obtain additional information on stormwater problems and solutions, request presentations about stormwater pollution in your child's classroom, or learn about free grasscycling and composting workshops.

SCOOP THE POOP

Many communities have "Scoop the Poop" laws that govern pet waste cleanup. Some of these laws specifically require anyone who walks an animal off their property to carry a bag, shovel, or scooper. Any waste left by the animal must be cleaned up immediately. CALL YOUR LOCAL CODE ENFORCEMENT OFFICE to find out more about pet waste regulations.

OTHER WAYS TO PROTECT YOUR PETS AND THE ENVIRONMENT

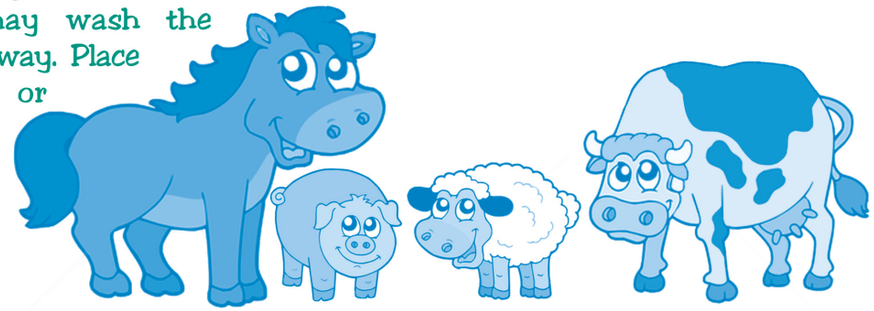
Pets are only one of many sources that contribute to water pollution. However, these other sources of water pollution cannot only harm the environment but also harm your pet. Improperly used or stored lawn fertilizers, pesticides, soaps, grease and vehicle fluids cannot only be washed into local streams and lakes, these chemicals can also harm your pet if they ingest or touch these chemicals. Call 1-800-506-2555 for information regarding how to properly dispose of household hazardous wastes such as these. You can also keep your pets and our environment healthy by properly maintaining your vehicles, and limiting use of pesticides and fertilizers to only the amount that is absolutely needed.

Make sure to not only protect your pets, but to also protect your neighbors pets. NEVER HOSE VEHICLE FLUIDS into the street or gutter. USE ABSORBENT MATERIALS such as cat litter to clean-up spills. SWEEP UP used absorbent materials and place it in the trash.

HORSES AND LIVESTOCK

Fortunate enough to own a horse or livestock? You, too, can play a part in protecting and cleaning up our water resources. The following are a few simple Best Management Practices (BMPs) specifically designed for horses and livestock.

- STORE your manure properly. Do not store unprotected piles of manure in places where stormwater runoff may wash the manure away. Place a cover or tarp over the pile to keep rainwater out.



- BUILD a manure storage facility to protect your pets, property and the environment. These structures usually consist of a concrete pad to protect groundwater and a short wall on one or two sides to make manure handling easier.
- READ the Only Rain Down the Storm Drain brochure titled "Tips for Horse Care" for additional guidance and recommendations. This brochure should be available from your local city office or for download at www.rcflood.org/stormwater.
- KEEP animals out of streams - Horses and livestock can deficate in streams causing stormwater pollution. Livestock and horses in streams can also disturb sensitive habitat and vegetation, causing additional environmental damage. Keep livestock and horses away from streams and use designated stream crossings whenever possible.
- MATERIAL STORAGE SAFETY TIPS Many of the chemicals found in barns require careful handling and proper disposal. When using these chemicals, be certain to follow these common sense guidelines:
  - Buy only what you need.
  - Treat spills of hoof oils like a fuel spill. Use kitty litter to soak up the oil and dispose of it in a tightly sealed plastic bag.
  - Store pesticides in a locked, dry, well-ventilated area.
  - Protect stored fertilizer and pesticides from rain and surface water.

RESOURCE CONSERVATION DISTRICTS CAN HELP

Call 1-800-506-2555 for assistance with locating a local conservation district that can help you properly manage your manure, re-establish healthy pastures, control weeds, or identify appropriate grasses for your soils.

Thank you for doing your part to protect your watershed, the environment, your pets and your community!

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

Flood Control District	(951) 955-1200
County of Riverside	(951) 955-1000
City of Banning	(951) 922-3105
City of Beaumont	(951) 769-8520
City of Calimesa	(909) 795-9801
City of Canyon Lake	(951) 244-2955
Cathedral City	(760) 770-0327
City of Coachella	(760) 398-4978
City of Corona	(951) 736-2447
City of Desert Hot Springs	(760) 329-6411
City of Eastvale	(951) 361-0900
City of Hemet	(951) 765-2300
City of Indian Wells	(760) 346-2489
City of Indio	(760) 391-4000
City of Lake Elsinore	(951) 674-3124
City of La Quinta	(760) 777-7000
City of Menifee	(951) 672-6777
City of Moreno Valley	(951) 413-3000
City of Murrieta	(951) 304-2489
City of Norco	(951) 270-5607
City of Palm Desert	(760) 346-0611
City of Palm Springs	(760) 323-8299
City of Perris	(951) 943-6100
City of Rancho Mirage	(760) 324-4511
City of Riverside	(951) 361-0900
City of San Jacinto	(951) 654-7337
City of Temecula	(951) 694-6444
City of Wildomar	(951) 677-7751

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers

Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

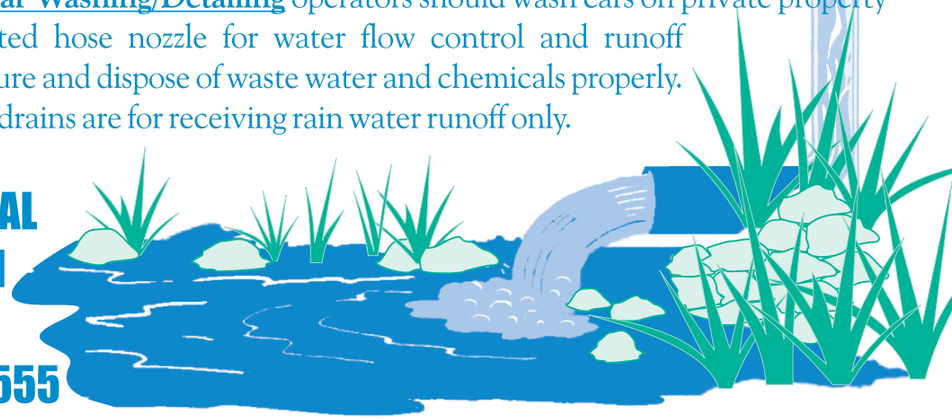
Do you know where street flows actually go?

Storm drains are NOT connected to sanitary sewer systems and treatment plants!

The primary purpose of storm drains is to carry *rain* water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555



Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep stormwater clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing of wash water into the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.

Report illegal storm drain disposal
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them with being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.

When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlets by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

Saltwater Pools

- Salt water pools, although different from regular pools, are in fact, sanitized using chlorine. A salt-chlorine generator separates the chlorine and sodium molecules in salt and reintroduces them into the pool water. The same harmful effects of chlorine still apply.
- A salt water pool is still maintained with chemicals such as Muriatic acid, soda ash and sodium carbonate to help keep a proper pH, total Alkalinity, Calcium Hardness and Stabilizer levels.

- It may be illegal to discharge salt water to land. The salt may kill plants and the build-up of salt in soil puts animals, plants, and groundwater at risk. Consult your city representatives to determine local requirements regarding salt water drainage.

NEVER put unused chemicals into the trash, onto the ground or down a storm drain.

IMPORTANT: The discharge of pollutants into the street, gutter, storm drain system or waterways - without a permit or waiver - is strictly prohibited by local ordinances, state and federal law. Violations may result in monetary fines and enforcement actions.

Helpful telephone numbers and links

Riverside County Water Agencies:

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley Municipal Water District	(951) 674 3146
Elsinore Water District	(951) 674-2168
Farm Mutual Water Company	(951) 244-4198
Idyllwild Water District	(951) 659-2143
Indio Water Authority	(760) 391-4129
Jurupa Community Services District	(951) 685-7434
Lee Lake Water	(951) 658-3241
Mission Springs Water	(760) 329-6448
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

CALL 1-800-506-2555 to:

- Report clogged storm drains or illegal storm drain disposal from residential, industrial, construction and commercial sites into public streets, storm drains and/or water bodies.
- Find out about our various storm drain pollution prevention materials.
- Locate the dates and times of Household Hazardous Waste (HHW) Collection Events.
- Request adult, neighborhood, or classroom presentations.
- Locate other County environmental services.
- Receive grasscycling information and composting workshop information.

Or visit our
Riverside County Flood Control and Water Conservation District
website at: www.rcflood.org

Other links to additional storm drain pollution information:

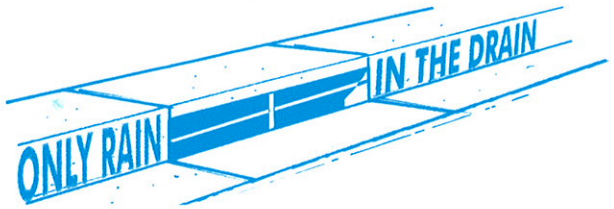
- County of Riverside Environmental Health: www.rivcoeh.org
- State Water Resources Control Board: www.waterboards.ca.gov
- California Stormwater Quality Association: www.casqa.org
- United States Environmental Protection Agency (EPA): www.epa.gov/compliance/assistance (compliance assistance information)

Riverside County's, "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

Guidelines for Maintaining your...

Swimming Pool, Jacuzzi and Garden Fountain

Where does the water go?



Pool, Jacuzzi and Fountain wastewater and rain water runoff (also called stormwater) that reach streets can enter the storm drain and be conveyed directly into local streams, rivers and lakes.

A storm drain's purpose is to prevent flooding by carrying rain water away from developed areas. Storm drains are not connected to sanitary sewers systems and treatment plants!

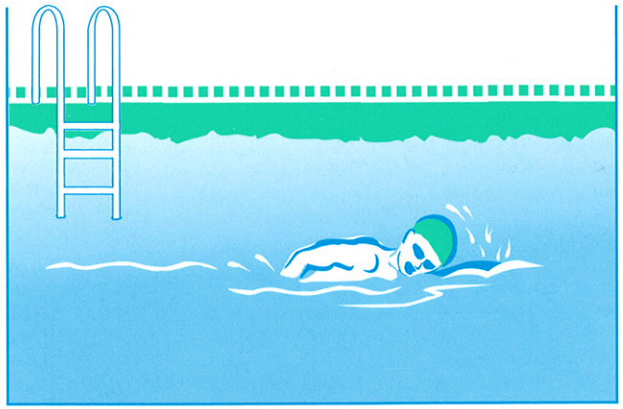
Wastewater, from residential swimming pools, Jacuzzis, fishponds and fountains, often contains chemicals used for sanitizing or cleansing purposes. Toxic chemicals (such as chlorine or copper-based algaecides) may pollute the environment when discharged into a storm drain system.

The Cities and County of Riverside have adopted ordinances that prohibit the discharge of wastewater to the street and storm drain system.

Discharge Regulations

Regulatory requirements for discharging wastewater from your pool may differ from city to city. Chlorinated water should not be discharged into the street, storm drain or surface waters. Check with your water agency to see if disposal to the sanitary sewer line is allowed for pool discharges (see reverse for Riverside County sewer agencies).

If allowed, a hose can be run from the pool Jacuzzi, or fountain to the private sewer cleanout, washing machine drain or a sink or bathtub.

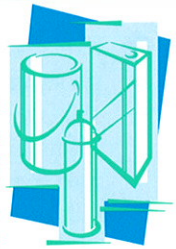


If you cannot discharge to the sewer, you may drain your fountain, pool, or jacuzzi to your landscaping by following these guidelines:

First, reduce or eliminate solids (e.g. debris, leaves or dirt) in the pool water and allow the chemicals in the pool water to dissipate before draining the pool (this could take up to 7 days, verify using a home pool test kit).

Second, slowly drain to a landscaped area away from buildings or structures. Control the flow to prevent soil erosion; it may take more than one day to empty. Do not allow sediment to enter the street, gutter or storm drain.

Maintenance & Chemicals



Cleaning Filters

Filter rinse water and backwash must be discharged to the sanitary sewer, on-site septic tank and drain field system (if properly designed and adequately sized), or a seepage pit. Alternatively, rinse water or backwash may be diverted to landscaped or dirt areas. Filter media and other non-hazardous solids should be picked up and disposed of in the trash.

Algaecides

Avoid using copper-based algaecides unless absolutely necessary. Control algae with chlorine, organic polymers or other alternatives to copper-based pool chemicals. Copper is a heavy metal that can be toxic to aquatic life when you drain your pool.

Chemical Storage and Handling

- Use only the amount indicated on product labels
- Store chlorine and other chemicals in a covered area to prevent runoff. Keep out of reach of children and pets.
- Chlorine kits, available at retail swimming pool equipment and supply stores, should be used to monitor the chlorine and pH levels before draining your pool.
- Chlorine and other pool chemicals should never be allowed to flow into the gutter or storm drain system.

Take unwanted chemicals to a Household Hazardous Waste (HHW) Collection Event. There's no cost for taking HHW items to collection events – it's FREE! Call **1-800-506-2555** for a schedule of HHW events in your community.

Infiltration System
Inspection and Maintenance Checklist

Property Address: _____ Property Owner: _____

Treatment Measure No.: _____ Date of Inspection: _____ Type of Inspection: ☐ Monthly ☐ Pre-Wet Season
☐ After heavy runoff (1" or greater)

Inspector(s): _____ ☐ End of Wet Season ☐ Other:_____

Defect	**Conditions When Maintenance Is Needed**	**Maintenance Needed? (Yes/No)**	**Comments** (Describe maintenance completed and if needed maintenance was not conducted, note when it will be done)	**Results Expected When Maintenance Is Performed**
1. Standing Water	When water stands in the infiltration system between storms and does not drain within 3 days after rainfall.			There should be no areas of standing water once inflow has ceased. Any of the following may apply: sediment or trash blockages removed, improved grade from head to foot of infiltration system.
2. Trash and Debris Accumulation	Trash and debris accumulated in the infiltration system.			Trash and debris removed from infiltration system and disposed of properly.
3. Sediment	Evidence of sedimentation in system.			Material removed and disposed of properly so that there is no clogging or blockage.
4. Inlet/Outlet	Inlet/outlet areas clogged with sediment or debris, and/or eroded.			Material removed and disposed of properly so that there is no clogging or blockage in the inlet and outlet areas.
5. Overflow Spillway	Clogged with sediment or debris, and/or eroded.			Material removed and disposed of properly so that there is no clogging or blockage, and system is restored to design condition.
6. Miscellaneous	Any condition not covered above that needs attention in order for the infiltration system to function as designed.			Meet the design specifications.

SAMPLE

Infiltration System Maintenance Plan
for

Routine Maintenance Activities

The principal maintenance objective is to prevent sediment buildup and clogging, which reduces pollutant removal efficiency and may lead to system failure. Routine maintenance activities, and the frequency at which they will be conducted, are shown in Table 1.

Table 1
Routine Maintenance Activities for Infiltration Systems

No.	Maintenance Task	Frequency of Task
1	Remove obstructions, debris and trash from infiltration system and dispose of properly. Drywells may cleaned by vacuuming the upper chamber with a vacuum truck.	Monthly, or as needed after storm events
2	Inspect system to ensure that it drains between storms, and within 3 days after rainfall. Check drywell/observation well 2-3 days after storm to confirm drainage.	Monthly during wet season, or as needed after storm events
3	For drywells, replace filter material (and screen if it is damaged) in accordance with City of Rancho Mirage Standard Detail No. 306 (see attached).	Monthly, or as needed after storm events
4	Monitor drywell/observation well to confirm that system has drained during dry season.	Annually, during dry season
5	Remove any trash, grass clippings and other debris in the streets, gutters or parking area (see BMP SC-43) and near the system perimeter. Dispose of properly.	As needed
6	Inspect infiltration system using the inspection checklist.	Monthly, or after storm events 1" or greater, and after removal of accumulated debris or material

Mosquito Abatement

Standing water shall not remain in the treatment measures for more than three days, to prevent mosquito generation.

Inspections

The Infiltration System Inspection and Maintenance Checklist provided shall be used to conduct inspections monthly (or as needed), identify needed maintenance, and record maintenance that is conducted.

10. PUBLIC EDUCATION AND OUTREACH

WATERSHED SPECIFIC EDUCATIONAL ACTIVITIES CONDUCTED DURING THE REPORTING PERIOD

This section provides an overview of watershed specific education activities conducted by the Permittees. During the reporting period **Appendix E** contains images of most public education materials that are described in this section.

Program Overview

The Riverside County NPDES Permittees have established an ongoing watershed based public education and outreach program known as the "**Only Rain Down the Storm Drain"** pollution prevention program. The specific objectives of the public education program include:

- Fostering a broad public awareness of water pollution concerns;
- Increasing public acceptance of pollution prevention activities to curtail everyday human behaviors that contribute to water quality problems;
- Educating/informing the general public, regulators and key local government and state decision makers on Urban Runoff conditions in Riverside County; and
- Promoting stewardship of local water resources.

The "Only Rain Down the Storm Drain" program implements the public awareness objectives by focusing on three areas of pollutant reduction/prevention:

- Public Behavior;
- Proper Management of Pollutants; and
- Business Specific Education Outreach.

In addition, when attempting to make use of the finite resources available to the Public Education Program, the Permittees use these management goals to ensure that resources are used effectively:

- Focusing on pollutants of concern specific to each watershed region;
- Coordinating public education efforts with adjacent storm water management programs and other related education programs to share resources, coordinate outreach efforts, and avoid costly duplication of effort; and
- Adapt public education programs and objectives, based on effectiveness analysis, to address changing MS4 programs and objectives.

Program Highlights

The public education program continues to develop changes for the better. Highlights include:

- The public education program has developed surveys in both English and Spanish. The purpose of these surveys is to evaluate the effectiveness of the public education program and are distributed to the public at community events. The results of these surveys are contained in **Appendix E**. Two surveys were also developed for the K-3 and 4 through 6 grades education outreach programs.

- The public education web page continues to be revamped and improved.
- The program continues to update brochures and develop outreach programs specific to the needs of the MS4.
- As part of the on-going effectiveness evaluation for the municipal training programs, testing has been incorporated into the training for evaluation of its efficiency. In addition, the overall training program was evaluated and is included in the Assessment and Enhancement Analysis of the NPDES Traning Program, August 2006 in **Appendix E.**
- Each month, the County hosts a New Employee Orientation to an average of forty new employees. All the attendees receive "Only Rain Down the Storm Drain" materials and promotionals. The Toll Free 800 Number the message to call to report illegal storm drain disposal is incorporated into all materials.

Santa Ana Pollutants of Concern

Based on monitoring data collected to date, the current 303(d) list and discussions among the Co-Permittees, and stakeholders, the following preventative pollutants of concern were established for this watershed. More discussion on the selection of preventative pollutants of concern can be found in the monitoring section of this report. After each identified pollutant, specific BMP outreach activities are identified to address the pollutant:

- Sedimentation associated with Urban Development and Land Uses
    - Specific section on construction, municipal, industrial/commercial and new development training focusing on the need to address sedimentation within the watershed;
    - Distribution of dust pans at public education outreach events to promote dry cleaning of drive ways and impervious surfaces;
    - Construction BMP Poster;
    - School/Student program incorporates education on controlling soil erosion;
    - The "After the Storm" and Storm Water Pollution, what you should know brochures
    - General Construction Activities & Outdoor Activities brochure

- Nutrients and pathogens associated with Urban Development and Land Uses
    - Specific section on construction, municipal, industrial/commercial and new development training focusing on the need to address increased nutrients within the watershed;
    - Pet Waste "What's the Scoop" brochure;
    - Partnership with SGA Advertising to place pet waste information in pet stores, veterinarian clinics, kennels and pet grooming facilities;
    - Coordination with Riverside County Animal Control Department to distribute "What's the Scoop" and "After the Storm" brochures to families adopting pets;
    - The Agricultural Commissioner assist in educating on water conservation, fertilizer management and integrated pest management practices. In conjunction with County Waste Management's Composting Workshop, the "After the Storm" brochure and

Household Hazardous Waste flyer is included in the adult informational packet.
- o "Keep Our Water Clean" video to cover proper use of fertilizers as well as excess runoff from sprinklers;
- o Earth Day mailing inserts were developed to inform residents about the problem of storm water pollution and provide simple pollution prevention activities in gardening;
- o Adult presentations conducted by RCRCD discussing the effects of fertilizers and pesticides on local waterways;
- o The "After the Storm" brochure; and
- o Construction BMP Activities brochure and poster.

In addition, the District has developed other outreach materials to focus on other pollutants and pollutant causing activities/businesses commonly associated with urban runoff. Outreach methods can be combined to focus on specific pollutants that may exist within the watershed.

24-hour Watershed-Wide Outreach Portals

The Permittees maintain three 24-hour/7 days per week watershed wide portals to receive and distribute information regarding the "Only Rain Down the Storm Drain" program. These portals include a website, 1-800 number, and an e-mail address.

Storm Water Protection Program Website

The District operates a website that provides information on how to report illegal dumping, clogged storm drains, facility signage and worn or missing curb markers, as well as provide information on upcoming activities, opportunities for public participation in program development and general information about Urban Runoff pollution prevention techniques. The website is located at:

http://www.floodcontrol.co.riverside.ca.us/stormwater/

Almost all of the District's outreach materials have been scanned into an electronic .pdf format and are available for download. Online Order forms and phone numbers are also available to assist in obtaining information that might not be available online.

The website contains pages specific to the following target audiences:
- General Public/Residents
- Businesses
- Developers
- Contractors
- Schools and Teachers
- Kids Page

In addition the website contains links to:

- Assist viewers in locating their watershed
- An online media library
- Materials order form
- 1-800 information to report storm drain pollution

The District tracks the number of hits to its public education website. The website was completely revamped during the previous reporting period and the web-page counter replaced this reporting period. Results of the webpage counter report are included in **Appendix E.**

Storm Water toll free 1-800 Hotline

On October 1994, a Toll Free "800" telephone number for reporting suspected Urban Runoff pollution and obtaining pollution prevention information was established.

1. This call line offers easy to understand instructions for connecting to County Environmental Health or Waste Management to obtain grasscycling, composting, or household hazardous waste collection dates and locations.
2. The 24-hour Hotline also allows callers to report clogged catch basin inlets, illegal dumping and other illicit discharge violations.
3. Finally, the hotline allows people to order public education materials and/or request storm water presentations for schools or community groups. The Permittees advertise the hotline in all appropriate County telephone directories, public education outreach materials, and in other appropriate venues and locations. Callers to the hotline are given options to seek emergency services if the spill is of a suspicious origin or a safety issue.

The 1-800 line diverts callers to appropriate Permittee departments based on caller selections. Callers requesting information on pollution collection activities are diverted to either County Environmental Health or Waste Management depending on their specific selection. Callers reporting illicit discharges are directed to County Code Enforcement, who accepts the calls and then re-directs them to appropriate Permittee Code Enforcement Departments. Calls for public education materials or presentations are directed to the district's front desk and then to the District's Public Education Staff. School presentation inquiries are directed to the Riverside County Conservation District office, who have been contracted to provide education to elementary schools in the Santa Ana Region. The specific text to the hotline is included as **Exhibit A**.

The provider of the 1-800 line, Riverside County Communication, tracks the number of incoming calls to the line. This tracking mechanism was discontinued during past reporting period but restored this reporting period.

Exhibit A
"ONLY RAIN DOWN THE STORM DRAIN" POLLUTION PREVENTION PROGRAM

TOLL FREE 1-800 LINE DIALOGUE

Thank you for calling the "Only Rain Down the Storm Drain" Pollution Prevention Program. To better serve the needs of our County communities, please listen carefully to the following options:

If this is an emergency, or you wish to report a significant release or threatened releases of hazardous material into the storm drain or elsewhere in the environment, please hang up and immediately Dial 911.

(Si esta llamada es una emergencia o decea reportar desechos de contaminantes peligrosos en las alcantarillas o en el medio ambiente, por favor cuelge y llame 911.)

For water service connection, disconnection, or any other water utility information, call your local water service provider.

To report illegal dumping at residential, commercial, industrial or construction sites, please call Environmental Health at 951.955.8982, or press #1 to be directly connected.

For information regarding Household Hazardous Waste Collection Events, please Press #2.

To report clogged storm drains, please call your local municipal public works department. To report faded or missing "Only Rain Down the Storm Drain" storm drain markers, please press #3.

For General or specific business pollution prevention information or to receive other pollution prevention information please press #3.

(Drop Off Dialogue)

Thank you for your interest in obtaining information on storm drain pollution protection. Basic, construction, industrial, commercial and children's storm water protection outreach packets are available. For a quick response to your request, please slowly and clearly leave your name, address, city and zip code. Also state the type and quantity of the materials you are interested in receiving. Should you need additional assistance, provide your area code and phone number and someone will contact you as soon as possible.

To inquire about our free storm water classroom presentations, workshops, youth group activities and other outreach programs, please press #4.

(Drop Off Dialogue)

The "Only Rain Down the Storm Drain" public education program offers classroom presentations, workshops, youth group activities, special event opportunities and other programs. For inquiries for the Temecula or Murrieta area, please press #1 (Drops to Mission Resource Conservation District)

For inquiries in all other Riverside County areas, press 2 (drops to Riverside/Corona Resource Conservation District).

For Grasscycling and composting information or workshops, please PRESS #5. (to 951.486.3200)

For additional assistance regarding our storm drain pollution prevention program during regular business office hours, Monday through Thursday from 7:30 am to 5:30 pm and on Friday from 7:30 am to 4:30 pm

E-mail

The Permittees also maintain an e-mail address that can be used to report illicit discharges or request storm water related public information. The e-mail address is:

Flood.fcnpdes@co.riverside.ca.us

E-mails are received by the District's Public Information Specialist and are responded to, in most cases, within 2 business days.

Program Coordination with other Stakeholders

The "Only Rain Down the Storm Drain" program has used partnerships to leverage and increase available resources. The Permittees utilize every opportunity to work with Co-permittees, local environmental groups, and other public, private and business organizations to maximize use of existing distribution outlets, events, programs and materials. Impressions, attendance, and other measures of effectiveness relative to these programs are included in **Appendix E** (Public Education) of this Watershed Annual Report.

To facilitate statewide awareness of storm water public education, educate local and state decision makers, and assist in the development of more effective public education outreach programs, the District participates in the following public education committees:

- Public Information Public Participation Committee (PIPP) – A subcommittee of the California Storm Water Quality Association, and
- Western Regional Pollution Prevention Network (WRPPN)

To leverage education outreach resources and coordinate public education activities with other environmental programs, the Permittees closely coordinate and/or have existing partnerships with the following entities/organizations:

- Household Hazardous Waste Information Exchange (HHWIE); This is an eGroup that provides household hazardous waste affiliates the ability to better communicate, share ideas and the latest in legislative rulings.
- Riverside-Corona Resource Conservation District (RCRCD);
- Partnership to provide student education outreach in the Santa Ana and Whitewater Watersheds
- Partnership to provide adult education outreach activities in the Santa Ana and Whitewater Watersheds
- Partnership to provide support services for public education outreach activities at community events
- Mission Resource Conservation District (RCRCD);
- Partnership to provide student education outreach in the Santa Ana and Santa Margarita Watersheds
- Partnership to provide adult education outreach activities in the Santa Ana and Santa Margarita Watersheds

  - Partnership to provide support services for public education outreach activities at community events

- California Regional Environmental Education Community Network (CREEC)
  - A network whose mission is to develop a communication network which provides educators with access to high quality environmental education resources to enhance the environmental literacy of California students.

- Santa Ana River Watershed Clean Up Stakeholders Group in coordination with Riverside Corona Conservation District, Keep Riverside Clean and Beautiful and the California Coastal Commission's Coast. This collaboration of environmental partners support and encourage volunteers, allies and groups to gather for a day to remove trash and debris from the Santa Ana River that might otherwise flow downstream, through the river to the ocean.

- In addition the "Only Rain Down the Storm Drain" program also coordinates with the following City/County departments to distribute appropriate storm water education outreach materials:

  - City/County/District Front Counters
  - County Waste Management
  - County Public Health Department
  - Agriculture Department
  - County Executive Offices
  - Code Enforcement
  - County Parks
  - Animal Control;
  - Economic Development Agency
  - County Assessor/Recorders Office
  - Bio-terrorism
  - Fleet Services
  - Human Resources
  - Library System
  - Central Mail
    - Stamp on every piece of mail sent by the County that identifies the 1-800 Number and requests that citizens call it to report storm drain pollution.
  - County Safety
  - County DPSS
  - Transportation and Land Management

In general, brochures and promotional items are provided to these departments for distribution in public lobbies, training sessions, through customer interactions and new employee orientations.

Finally, the "Only Drain Down the Storm Drain" Program also coordinates with the following state and/or local government or business entities to distribute public education information:

- Western Riverside Council of Governments
- Santa Ana Regional Water Quality Control Board
- Orange County Watershed & Coastal Resources Division
- Santa Ana Watershed Association
- South Coast Air Quality Management District
- Santa Rosa Plateau
- Bureau of Reclamation
- Elsinore Valley Municipal Water District
- Metropolitan Water District
- Lake Elsinore/San Jacinto Watershed Authority
- Eastern Municipal Water District
- The Water Education Center
- Rancho California Water District
- Valley Greeters
- Department of Water Resources Southern District
- Western Municipal Water District
- Business Industrial Association (BIA)
- Caltrans

Outreach Tools to Change Public Behavior

The "Only Rain Down the Storm Drain" program conducts a wide range of outreach activities to residents, students, community groups, new home owners, homeowner associations; informing them of how their "everyday activities" may contribute to the pollution of Receiving Waters, and encouraging them to adopt alternatives that will lessen or eliminate pollution-causing behaviors. Program efforts include providing information on pollution prevention techniques and informing residents about the proper disposal of household hazardous wastes, construction materials, used motor oil, pet waste and litter. Public education materials and media emphasize the theme that all citizens have a role to play in reducing and preventing the polluting of Receiving Waters. The goal is to present a clear and consistent message that explains the simple connections between people's everyday activities and their impacts upon Receiving Water quality.

As the public education and outreach program continues to be implemented and enhanced, the Permittees hope to broaden public awareness of Urban Runoff quality problems, promote proper disposal of household hazardous waste and motor oil, encourage illegal discharge reporting, foster good stewardship of Receiving Waters, and take personal responsibility for their actions in preventing pollution.

While public education outreach at events indicates that most people are willing to act in an environmentally responsible manner if given simple ways to change their behavior to avoid polluting our water bodies; most are unaware of the sources of pollution from everyday urban land use. The "Only Rain Down the Storm Drain" pollution prevention program using various media forms educates the County's population about modified behaviors to prevent storm water pollution by focusing on residents, general public, students, home gardeners, do-it-yourselfers, mobile businesses, etc.

Direct Outreach Methods

The "Only Rain Down the Storm Drain" program interfaces directly via program staff, or through contracts and partnerships, to the public through attendance at community events, school education programs, adult education programs and/or by providing classroom based training. Specific outreach activities, segregated by target audiences, are described below.

General Community Outreach

The "Only Rain Down the Storm Drain" program participates in various community events to ensure that our message is delivered to the largest possible municipal audience. At these community events, surveys, to assess overall program effectiveness, have been used.

In addition, the "Only Rain Down the Storm Drain" program has partnered with County Environmental Health to ensure that a storm drain pollution prevention material is available and distributed at all Household Hazardous Waste and Antifreeze, Batteries, Oil and Paint Collection Centers and/or Events throughout each of the Watershed Region's within Riverside County. These events provide free disposal sites for receiving common pollutants that can impair Receiving Waters.

Elementary School Outreach

Elementary (K-6)

The Riverside County Resource Conservation District (RCRCD) continues to provide a variety of K-6 education programs for the "Only Rain Down the Storm Drain" Program. The K-6 education program includes materials such as the Storm Water Pollution Prevention Patrol workbook, the Fancy Fin hands-on classroom presentation and accompanying coloring book, various word match and crossword activity sheets and videos. A second story line featuring Fancy Fin and her friend Phinnious J. Green (a Pacific Tree Frog) educate students about point and non-point pollution and their effects on the environment and other creatures in the watershed. School materials are offered to all public and provide schools in the Santa Ana Watershed Region, as well as to youth groups such as the boy and girl scouts.

Secondary Schools

A video entitled "How to Conduct an Environmentally Friendly Car Wash and Make Money Too" was developed for the "Car Wash Challenge" program. An accompanying flyer is also used which informs students/groups of the potential storm water problems generated from car wash runoff, and provides practical BMPs to minimize or eliminate contaminated runoff. The original focus of the program was high school clubs. However, after contacting several high schools, it was discovered that car washing fundraisers are relatively rare and revenue deficient in comparison with other high

school fund raising activities. Nevertheless, church groups, scout troops and other organizations do conduct car wash fundraisers. Thus, the scope of the Car Wash Challenge program has been expanded to include these additional fundraising organizations.

Adult Outreach

Valley Greeters is a "Welcoming Wagon" business taking discount coupons, product samples and general vicinity information door to door to new residents and homeowners to the Temecula, Murrieta and Lake Elsinore area. For the past four years, Valley Greeters has included our MS4 materials, (After the Storm; What's the Scoop; Pool, Spa and Fountain Maintenance and HHW Collection Schedule). This information is accompanied with a handy full size dustpan, shop cloth and vehicle air freshener. Every material and promotional is clearly imprinted with the 1-800 Toll Free number for reporting illegal discharges into the storm drain. Young family members receive a copy of Fancy Finn and box of crayons. This business is solely dependent on the status of the construction economy and by January, 07 experienced a considerable slowdown.

The "Only Rain Down the Storm Drain" program contracts with the Riverside/Corona Resource Conservation District for public outreach. Storm Water Pollution Prevention presentations are given to community groups who call and request such services.

Steve Groner & Associates has been retained to prepare and present workshops at major home improvement stores throughout Riverside County. The workshops include passing out reading material regarding targeted BMPs to the public through established corporate partnerships (paint, hardware, home show coordinators, home improvement, garden centers, nurseries and pet stores). All commercial employees are informed about storm water impacts that could occur from the improper application of all types of home and garden hazardous chemicals. In turn, the employees are then able to share with customers on the proper use and disposal of products that are potential storm drain pollutants. Attendees at the workshop receive "Only Rain Down the Storm Drain" promotionals to help emphasize the storm water pollution prevention message. Fixed advertising tools such as counter displays, tear sheets have been placed throughout to attract attention.

Brochures

Residential: After the Storm; Storm Water Pollution and the Solutions, Household Hazardous Waste Collection Schedule, Outdoor Activities; Swimming Pool, Jacuzzi and Fountain Maintenance; and What's the Scoop (Pet waste).

Outreach Materials

In addition to the brochures mentioned above, the program utilizes other effective outreach materials such as, magnets, a billboard ad, videos, newspaper supplements, flyers, door knob hangers, calendars, promotionals items, workbooks, curriculum, shop rags, shelf talkers, tear sheets, posters and print ads to cultivate interest in the program.

A door hanger is also being utilized to help address problem discharges that are commonly observed in residential settings. The door hanger notifies the recipient that a problem discharge was observed flowing in to the street and offering help by following recommended pollution prevention activities. The door hanger is provided to all cities and is used by various County departments and the NPDES staff when conducting field or site activities/inspections.

Mailing Inserts/Slugs

The "Only Rain Down the Storm Drain" Pollution Prevention Program encourages advertising the County's Household Hazardous Waste Collection events via the use of mail inserts. The inserts are included in various utility bills and special notice mass mailings.

In addition, the "Only Rain Down the Storm Drain" program has coordinated with the County Mail Department to have the postage meter carry the "Only Rain Down the Storm Drain" message and the 1-800 Toll Free number to report an illegal storm drain disposal or spill. In 05/06, over 5,000,000 pieces of outgoing County mail were stamped with the message. In November of 06, the postage system was replaced with more sophisticated postage meter units but the cost of the ink in the new system far exceeded the costs and benefits from other media options and therefore this media venue was dissolved.

Media Outreach

The "Only Rain Down the Storm Drain" Program continues to utilize various mass media to reach the public and promote the storm water pollution prevention. Special newspaper inserts, fliers, and advertisements help increase public awareness of storm water pollution and environmental protection.

- Our Sixth Edition of a four-page insert called the National Pollution Prevention or P-2, (National Pollution Prevention Week recognization), was distributed Countywide through the PennySaver. The insert included topics on proper disposal of pet waste, pesticide alternatives, motor oil recycling, grass-cycling, pool and spa best management practices, storm drain marking program, storm water school presentations, general storm drain pollution protection, business storm water pollution information, household hazardous waste (HHW) collection events, syringe disposal program, composting workshops and motor oil specific recycling locations. The insert is released to over 650,500 Riverside County homes generating an increase of calls to the 800 Toll Free Hotline and District IC/ID investigations.

Cooperative Used Oil Program

The Western Riverside Council of Governments (WRCOG) is responsible for administering the Used Oil Block Cycle Grant on behalf of ten cities within WRCOG's boundaries. These cities include: Banning, Beaumont, Canyon Lake, Lake Elsinore, Murrieta, Norco, Perris, Riverside, San Jacinto and Temecula.

The objective of the Used Oil Block Grant is to make it convenient for Do-It-Yourselfers (DIYers) to recycle their used oil and to make it easy for them to find a Certified Center accepting used oil. In order for these centers to be certified, they need to apply for certification with the California Integrated Waste Management Board (CIWMB). As a grant recipient, WRCOG contacts non-certified centers in the jurisdiction to interest them in becoming certified used motor oil collection center. The goal is to see a significant decrease in the amount of illegally dumped motor oil by adding more oil collection centers within close proximity to users.

Through the same grant funding source, WRCOG also provides used oil containers for distribution to DIYers who need proper containers for automotive fluids. Through WRCOG efforts, all certified centers in the County are in compliance to state and local mandates.

The Storm Drain Pollution Prevention Program assists WRCOG's efforts by making available our MS4 information and supporting promotionals for distributions to their targeted groups.

At various venues, WRCOG staff obtain participant responses to a ten question survey. The survey examines the public's understanding on:

- used oil recycling,
- used oil drop-off locations,
- curbside programs, and other local recycling programs.

The program also maintains an English and Spanish 800 hotline that can be used to get answers to any recycling question a resident may have regarding, "where the nearest Certified Center is located?" and "where can I find a used oil container?". The phone number is printed on all distributed materials including the oil containers.

Cleanest County in the West Program

Through another grant funding source, WRCOG created the "Cleanest County in the West" program to address issues relating to litter and illegal dumping. The program was designed to assist jurisdictions in meeting the 50% diversion goals mandated by Assembly Bill 939. AB 939 was a state mandate signed in 1989 that required cities to reduce their waste by 50% by the Year 2000.

The core of the program is the elementary school assembly. WRCOG partners with Radio Disney AM 1290 to present an interactive and informational presentation for children in grades K-6th. This program continually reinforces the responsibility of everyone to recycle and pick up litter.

WRCOG at the end of the assembly gives the school two recycling containers for the collection of cans and bottles. During the 06/07 school year, over 18,000 students and 600 teachers have experienced the assembly. Each student receives an environmental activity book and an application to join the Riverside County Kids Recycle Club where they will receive a quarterly newspaper. This club has over 200 members.

Like the "Only Rain Down the Storm Drain" Program which promotes litter reduction and recycling throughout the Santa Ana Region, WRCOG also participates in events to promote litter reduction and beverage container recycling. These events gives staff an opportunity to assess how informed the local community is regarding recycling and also allows us to distribute brochures and informational flyers that will assist people in finding the nearest recycling center. During these events promotional items made from recycled content are also given out to show examples on how used items such as money can be recycled into new things such as a pencil, a promotional product first used by the "Only Rain Down the Storm Drain" Program. This particular promotional item especially increases the interest of the people visiting out booth and demonstrates how almost anything can be recycled and reused.

Outreach tools specific to Business Specific

The "Only Rain Down the Storm Drain" Program conducts a wide range of outreach activities to businesses; informing them of how their "everyday activities" may contribute to the pollution of Receiving Waters, and encouraging them to adopt alternatives that will lessen or eliminate polluting-causing activities. Program efforts include providing information on pollution prevention techniques and informing businesses about the proper disposal of wastes. Public education materials and media emphasize the theme that all businesses have a role to play in reducing and preventing the polluting of Receiving waters. The goal is to present a clear and consistent message that explains the simple connections between a business' everyday activities and their impacts upon Receiving Water quality.

Originally, the business education program mainly consisted of the development and distribution of formal BMP guidance and outreach to business associations. The program has now expanded to include direct outreach to businesses through classroom formats, advertising in business trade papers and providing exhibits at various business specific symposiums.

Discussion of the current Business Specific Outreach tools implemented by the Permittees are discussed below.

Direct Business Outreach Activities

The "Only Rain Down the Storm Drain" Program partners with various entities to provide training and education. Currently, the District has allowed AEI-CASC Engineering, a consultant who provides the Permittees internal education programs to train developers and consultants regarding the new WQMP/SUSMP requirements for Riverside County. The District has partnered with Riverside/Corona Resource Conservation District, to develop a Water Quality Design class that focuses on sub-regional solutions and low impact development. This class was offered for the first time through UCR extension in October 2005. Additionally, the District presented at Construction Storm Water Compliance Workshop hosted by the Building Industry Association of Southern California (BIA/SC) on March 22, 2006. The workshop focused on state and municipal construction requirements for contractors, developers, and consultants.

Through the Compliance Assistance Program (CAP), a partnership with County Environmental Health restaurants and businesses that handle hazardous wastes are reviewed for potential storm water impacts from their activities. Each business is provided with storm drain pollution prevention public education outreach information specific to their activities.

Steve Groner Associates has been retained to prepare and present workshops at major home improvement stores throughout Riverside County. The workshops include a handout educating the store's employees about storm water impacts that could occur from improper application of paint, pesticides or fertilizers. Attendees at the workshop also receive "Only Rain Down the Storm Drain" information and promotionals to help highlight the storm water protection message. Employees are then able to share with customers the proper use and disposal of products that are potential storm drain pollutants. Point of purchase displays, tearsheets, and counter displays have been installed at strategic locations to educate the public directly.

Each new business trade in Riverside County that is listed in the Inland Business Press newspaper is provided with an "Only Rain Down the Storm Drain" Pollution Prevention packet.

Brochures

Commercial*:* After the Storm; Food Facilities; Outdoor Cleaning Activities and Non-Point Source Discharges; Automotive Maintenance & Car Care. Note: (Staff is revising the Outdoor Activity brochure to include broader examples of urban pollution causing activities such as, power washers and mobile vehicle maintenance operators).

Industrial*:* After the Storm; Outdoor Cleaning Activities and Non-Point Source Discharges; and Your Facility May Need a Storm Water Permit.

Construction*:* After the Storm; Outdoor Cleaning Activities and Non-Point Source Discharges; General Construction & Site Supervision The revision to the construction brochure is pending the finalization of the construction permit.

Posters

BMP posters for automotive, food service establishments (available in Spanish) and construction employees are available. The posters address activities associated with the automotive repair industry, and the food/restaurant industry that may pose a threat to water quality. There are also two new posters for the Fueling Stations and Service Bay Service centers. All the posters recommend storm water BMPs and are designed to serve as informative and attractive visual reminders for employees.

Media Outreach

In March, 07, a full-page ad was placed in the Inland Business Press newspaper to draw the attention of Inland Empire businesses whose urban runoff activities might be threatening local

water quality. The ad also provided links to the District's and CASQA's website for more detailed BMP information.

Supplemental Environmental Projects (SEP)

In an effort to change the behaviors of large storm drain pollution prevention offenders in the County, Environmental Health established a Supplemental Environmental Project (S.E.P.). The S.E.P. requires from the violator a monetary fine and/or the violator's cooperation for the development of a public education tool on the effects of polluted urban run off. S.E.P.'s to date include:

- A Downs Energy SEP project resulted in the development of a billboard ad that has been greeting commuters traveling Westbound on the 60 Freeway lanes.

Outreach tools specific to Pollutants

"Only Rain Down the Storm Drain" Pollution Prevention Program conducts a wide range of outreach activities focusing on reduction of certain pollutants in the receiving waters. These outreach activities focus on sources of those pollutants whether it is residential, business, municipal or some other state or federal source. Education materials explain how "everyday activities" of potential sources may contribute to the pollution of receiving waters, and encourage the sources to adopt alternative approaches to pollutant management that will lessen or eliminate polluting-causing activities. Program efforts include providing information on pollution prevention techniques and informing sources about the proper disposal of pollutants. Public education materials and media emphasize the theme that all citizens/businesses have a role to play in reducing and preventing the polluting of receiving waters. The goal is to present a clear and consistent message that explains the simple connections between a business' everyday activities and their impacts upon receiving water quality.

Each subsection that follows identifies how existing outreach materials previously described address specific potential pollutant sources in the watershed.

Use of pesticides, fertilizers, and herbicides

A. The Riverside County Agricultural Commissioner's Pesticide Applicator's License renewal information package includes materials on the proper use of pesticides and offers information on training workshops. The license renewal process requires continuing education of applicants and detailed record keeping of pesticide applications. Municipal employees that are responsible for the application of pesticides are encouraged to obtain and maintain credentials as Certified Applicators and/or licensed Pest Control Advisors.

B. The "Home Garden Care" materials are being revised to draw and attract the interest of the general public and amateur gardener. The new materials will include Integrated Pest Management and plant selection and materials from the State Water Resource Control Board, Central Contra Costa IPM Outreach Program, University of California and The

Orange County Storm Water Program are being used. All the materials selected offer alternatives to using chemically based pesticides, herbicides and fertilizers.

C. The "Keep Our Water Clean" video covers proper use of pesticides, fertilizers and herbicides as well as excess runoff from sprinklers.

D. The September annual “Only Rain Down The Storm Drain’s” participation in the National Pollution Prevention Week insert informs residents about the problem of storm water pollution and provides simple pollution prevention activities in gardening.

E. The “Only Rain Down The Storm Drain” adult presentations conducted by RCRCD discusses the effects of pesticides and fertilizers on local waterways. The materials distributed following the presentation promote alternatives to pesticide use in the yard and garden.

F. The 2006 Environmental Calendar included a wide array of storm water protection information. It is designed to attract the adult audience by listing best management practices, scheduled special events, household hazardous waste collection sites, used oil collection sites, composting workshops, citywide clean ups, and each of the watersheds along with geographical information. Throughout the calendar the main message is “Only Rain Down The Storm Drain” and the hotline number to call for additional home garden care information.

G. Steve Groner Associates has been retained to prepare and present employee workshops at major home improvement stores throughout Riverside County. This information is then passed on to the public via the shelf talkers accessible to the public or when an employee is addressed with a question. The workshops include information on BMPs the public should be aware of for pesticide and fertilizer application, use, and storage.

Appendix E

Soils Report

Appendix F

Structural BMP and/or Retention Facility Sizing Calculations and Design Details

SW CORNER – CALHOUN ATREET AT 49TH AVENUE SUBDIVISION

COACHELLA, CA

PRELIMINARY HYDROLOGY REPORT

PREPARED FOR:
PACIFIC COAST PROPERTIES
43-584 VIA MAGELLAN DRIVE
PALM DESERT, CA 92211
(760) 799-8227

PREPARED BY:
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January 17, 2025

Prepared Under the Supervision of:

James Bazua, PE
R.C.E. 58394
Expiration Date: December 31, 2026

SW CORNER – CALHOUN ATREET AT 49TH AVENUE SUBDIVISION

PRELIMINARY HYDROLOGY REPORT

TABLE OF CONTENTS:

I PURPOSE AND SCOPE

II DESIGN METHODOLOGY

III RCFCD SYNTHETIC UNIT HYDROGRAPH CALCULATIONS

IV STREET FLOWRATE CAPACITY

V APPENDIX – REFERENCE MATERIAL

I. PURPOSE AND SCOPE

This report was prepared in support of the Calhoun Street at 49th Avenue Subdivision entitlement package submittal. The purpose of this preliminary report is to analyze the existing and proposed drainage patterns, discuss the on-site drainage design and size the proposed on-site drainage facilities to meet the City of Coachella drainage ordinance requirements.

The existing project site is an undeveloped lot at the southwesterly corner of the intersection of Calhoun Street and 49th Avenue in Coachella, CA. The proposed project improvements include the addition of residential lots with an interior access drive serving the lots on a 38.76 acre parcel. The site is bound to the north and east with fully improved public streets, to the east by a residential subdivision under development and to the south by an existing residential subdivision. The project proposes to obtain access to the site from Calhoun Street to the east, and from 49th Avenue to the north. The site will be drain via street surface flow to a series of on-site retention basins designed to capture and and store the storm run off generated during the 100 year design storm event. In general, the existing site is not subject to offsite storm flows.

II. DESIGN METHODOLOGY AND CALCULATIONS

The Calhoun Street project will provide five (5) on-site storm drain infiltration retention basin systems designed to capture and store the runoff generated from the "worst case" 100 year design storm based on City of Coachella requirements. The five retention basins have a combined volume capacity designed to store the runoff generated on-site during the 100 year design storm as well as runoff from the Calhoun Street half street project frontage and the 49 Avenue full width street frontage within the public right of way. The low point on the existing project site occurs on the project's easterly frontage. Runoff that exceeds the capacity of the on-site retention basin storage systems in an emergency overflow condition is designed to overflow onto interior surface streets and exit via surface flow onto Calhoun Street following the historical drainage pattern toward the south.

Riverside County Flood Control District Synthetic Unit Hydrograph methods are used to quantify the runoff volume generated and stored on-site during the 100 year "worst case" design storm return period. The program data and results prepared for this project are included in the Appendix of this report. The program model typically accounts for the volume of runoff lost due to infiltration in the basins and the allowable design retention basin infiltration rate of 10 gal./s.f./day (0.67 in/hr) established by City of Coachella will be applied over the surface area of the basin bottoms. The combined capacity of all five on-site basins will be compared to the total design runoff volume calculated for the Calhoun Street project to show that runoff generated during the 100 year design storm can be stored within the basins at a depth not to exceed 3ft and the runoff generated during the 10 year storm event can be stored within the on-site basins at a depth not to exceed 1.5 feet in accordance with City of Coachella retention basin criteria.

City of Coachella requires that runoff water stored on-site must be evacuated completely via infiltration within a period of 72 hours in order to comply with vector control concerns. In order to help facilitate this requirement, City of Coachella has limited the maximum depth of

stored runoff within any basin to 1.5' during the 10 year storm event and the maximum depth of any on-site retention basin must not exceed 3.5 feet.

On-site street curb and gutter systems will be designed to convey runoff to the on-site retention basin systems via surface flow. The project site will be designed to ensure that surface runoff generated during the 10 year storm is contained below the top of the proposed street curbs and runoff generated during the 100 year storm event is contained within street right of way. Street flowrates (Q) will be calculated by applying the Rational Method using CivilD software.

DESIGN CRITERIA

The following Riverside County Flood Control District (RCFCD) parameters were used in the preparation of the analyses:

- 2 year – 1 hour Precipitation 0.35" (NOAA)
- 10 year – 1 hour Precipitation 0.70" (NOAA)
- 10 year – 3 hour Precipitation 1.04" (NOAA)
- 10 year – 6 hour Precipitation 1.36" (NOAA)
- 10 year – 24 hour Precipitation 1.04" (NOAA)
- 100 year – 1 hour Precipitation 1.37" (NOAA)
- 100 year – 3 hour Precipitation 2.12" (NOAA)
- 100 year – 6 hour Precipitation 2.78" (NOAA)
- 100 year – 24 hour Precipitation 4.47" (NOAA)
- Hydrologic Soil Type "B" US Dept. of Agriculture, SCS
- Runoff Index Number 56 (RCFC&WCD Plate E-6.1)
- Assumed Design Percolation Rate 0.67 in/hr
- Slope Intensity Duration Curve 0.59 (RCFC&WCD Plate D-4.6)

III RCFCD SYNTHETIC UNIT HYDROGRAPH CALCULATED RETENTION VOLUMES

SUBAREA	100 YR. VOLUME REQUIRED (CU.FT.)	BASIN VOLUME PROVIDED (CU.FT.)	100 YR. BASIN STORAGE DEPTH	10 YR. BASIN STORAGE DEPTH
1	9,580	12,250	2.45	0.72
2	57,661	64,193	3.19’	0.99’
3	53,709	62,528	3.07’	0.94’
4	51,654	57,236	3.20	0.99
5	41,999	72,828	2.14’	0.54

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 1		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.18		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	1000		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	15		
30				
31	ELEVATION OF HEADWATER	471.5		
32	ELEVATION OF CONCENTRATION POINT	468.8		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	3025	
45		466	3700	
46		467	4430	
47		468	5215	
48		468.5	5630	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 1
[3] AREA - ACRES	2.010
[4] L-FEET	1000
[5] L-MILES	0.189
[6] La-FEET	15.00
[7] La-MILES	0.003
[8] ELEVATION OF HEADWATER	471.5
[9] ELEVATION OF CONCENTRATION POINT	468.8
[10] H-FEET	2.7
[11] S-FEET/MILE	14.3
[12] S^0.5	3.78
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.0
[17] 100% OF LAG-MINUTES	1.0
[18] 200% OF LAG-MINUTES	2.0
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.05

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	2.010	1.00	1.04	1.36	2.010	1.00	1.36	2.23	2.010	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	2.01	SUM [7]	1.04	SUM [9]	2.01	SUM [11]	1.36	SUM [13]	2.01	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.40	0.39	0.26
FLOOD VOLUME	(cu-ft)	2,906	2,880	1,903
	(acre-ft)	0.07	0.07	0.04
REQUIRED STORAGE	(cu-ft)	2,439	2,140	370
	(acre-ft)	0.06	0.05	0.01
PEAK FLOW	(cfs)	1.56	1.34	0.19
MAXIMUM WSEL	(ft)	465.72	465.64	465.10

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.18	0.587	0.0305
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	0.00	0.000	0.0000
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.83	0.413	0.2147
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	2.01	SUM	0.2453

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.122626866

C= 0.00227

Ft=C(24-(T/60))^1.55 = 0.00227 (24-(T/60))^1.55 + 0.12 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.25
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.25	0.15	0.02	0.03	0.00
2	10	0.17	1.3	0.162	0.25	0.15	0.02	0.03	0.00
3	15	0.25	1.1	0.137	0.25	0.12	0.01	0.03	0.00
4	20	0.33	1.5	0.187	0.25	0.17	0.02	0.04	0.00
5	25	0.42	1.5	0.187	0.25	0.17	0.02	0.04	0.00
6	30	0.50	1.8	0.225	0.25	0.20	0.02	0.05	0.00
7	35	0.58	1.5	0.187	0.25	0.17	0.02	0.04	0.00
8	40	0.67	1.8	0.225	0.25	0.20	0.02	0.05	0.00
9	45	0.75	1.8	0.225	0.25	0.20	0.02	0.05	0.00
10	50	0.83	1.5	0.187	0.25	0.17	0.02	0.04	0.00
11	55	0.92	1.6	0.200	0.25	0.18	0.02	0.04	0.00
12	60	1.00	1.8	0.225	0.25	0.20	0.02	0.05	0.00
13	65	1.08	2.2	0.275	0.25	0.25	0.03	0.06	3.60
14	70	1.17	2.2	0.275	0.25	0.25	0.03	0.06	3.60
15	75	1.25	2.2	0.275	0.25	0.25	0.03	0.06	3.60
16	80	1.33	2.0	0.250	0.25	0.22	0.00	0.01	0.00
17	85	1.42	2.6	0.324	0.25	0.29	0.08	0.16	33.70
18	90	1.50	2.7	0.337	0.25	0.30	0.09	0.18	41.22
19	95	1.58	2.4	0.300	0.25	0.27	0.05	0.11	18.65
20	100	1.67	2.7	0.337	0.25	0.30	0.09	0.18	41.22
21	105	1.75	3.3	0.412	0.25	0.37	0.17	0.33	86.38
22	110	1.83	3.1	0.387	0.25	0.35	0.14	0.28	71.33
23	115	1.92	2.9	0.362	0.25	0.33	0.12	0.23	56.28
24	120	2.00	3.0	0.374	0.25	0.34	0.13	0.26	63.80
25	125	2.08	3.1	0.387	0.25	0.35	0.14	0.28	71.33
26	130	2.17	4.2	0.524	0.25	0.47	0.28	0.56	154.11
27	135	2.25	5.0	0.624	0.25	0.56	0.38	0.76	214.31
28	140	2.33	3.5	0.437	0.25	0.39	0.19	0.39	101.43
29	145	2.42	6.8	0.849	0.25	0.76	0.60	1.21	349.77
30	150	2.50	7.3	0.911	0.25	0.82	0.67	1.34	387.39
31	155	2.58	8.2	1.023	0.25	0.92	0.78	1.56	455.12
32	160	2.67	5.9	0.736	0.25	0.66	0.49	0.99	282.04
33	165	2.75	2.0	0.250	0.25	0.22	0.00	0.01	0.00
34	170	2.83	1.8	0.225	0.25	0.20	0.02	0.05	0.00
35	175	2.92	1.8	0.225	0.25	0.20	0.02	0.05	0.00
36	180	3.00	0.6	0.075	0.25	0.07	0.01	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.40
FLOOD VOLUME (acft)	0.07
FLOOD VOLUME (cuft)	2906.38
REQUIRED STORAGE (acft)	0.06
REQUIRED STORAGE (cuft)	2438.86
PEAK FLOW RATE (cfs)	1.56

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.00		
UNIT TIME-PERCENT OF LAG	502.5		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.245		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.05 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.082	0.25	0.07	0.01	0.02	0.00
2	10	0.17	0.6	0.098	0.25	0.09	0.01	0.02	0.00
3	15	0.25	0.6	0.098	0.25	0.09	0.01	0.02	0.00
4	20	0.33	0.6	0.098	0.25	0.09	0.01	0.02	0.00
5	25	0.42	0.6	0.098	0.25	0.09	0.01	0.02	0.00
6	30	0.50	0.7	0.114	0.25	0.10	0.01	0.02	0.00
7	35	0.58	0.7	0.114	0.25	0.10	0.01	0.02	0.00
8	40	0.67	0.7	0.114	0.25	0.10	0.01	0.02	0.00
9	45	0.75	0.7	0.114	0.25	0.10	0.01	0.02	0.00
10	50	0.83	0.7	0.114	0.25	0.10	0.01	0.02	0.00
11	55	0.92	0.7	0.114	0.25	0.10	0.01	0.02	0.00
12	60	1.00	0.8	0.131	0.25	0.12	0.01	0.03	0.00
13	65	1.08	0.8	0.131	0.25	0.12	0.01	0.03	0.00
14	70	1.17	0.8	0.131	0.25	0.12	0.01	0.03	0.00
15	75	1.25	0.8	0.131	0.25	0.12	0.01	0.03	0.00
16	80	1.33	0.8	0.131	0.25	0.12	0.01	0.03	0.00
17	85	1.42	0.8	0.131	0.25	0.12	0.01	0.03	0.00
18	90	1.50	0.8	0.131	0.25	0.12	0.01	0.03	0.00
19	95	1.58	0.8	0.131	0.25	0.12	0.01	0.03	0.00
20	100	1.67	0.8	0.131	0.25	0.12	0.01	0.03	0.00
21	105	1.75	0.8	0.131	0.25	0.12	0.01	0.03	0.00
22	110	1.83	0.8	0.131	0.25	0.12	0.01	0.03	0.00
23	115	1.92	0.8	0.131	0.25	0.12	0.01	0.03	0.00
24	120	2.00	0.9	0.147	0.25	0.13	0.01	0.03	0.00
25	125	2.08	0.8	0.131	0.25	0.12	0.01	0.03	0.00
26	130	2.17	0.9	0.147	0.25	0.13	0.01	0.03	0.00
27	135	2.25	0.9	0.147	0.25	0.13	0.01	0.03	0.00
28	140	2.33	0.9	0.147	0.25	0.13	0.01	0.03	0.00
29	145	2.42	0.9	0.147	0.25	0.13	0.01	0.03	0.00
30	150	2.50	0.9	0.147	0.25	0.13	0.01	0.03	0.00
31	155	2.58	0.9	0.147	0.25	0.13	0.01	0.03	0.00
32	160	2.67	0.9	0.147	0.25	0.13	0.01	0.03	0.00
33	165	2.75	1.0	0.163	0.25	0.15	0.02	0.03	0.00
34	170	2.83	1.0	0.163	0.25	0.15	0.02	0.03	0.00
35	175	2.92	1.0	0.163	0.25	0.15	0.02	0.03	0.00
36	180	3.00	1.0	0.163	0.25	0.15	0.02	0.03	0.00
37	185	3.08	1.0	0.163	0.25	0.15	0.02	0.03	0.00
38	190	3.17	1.1	0.180	0.25	0.16	0.02	0.04	0.00
39	195	3.25	1.1	0.180	0.25	0.16	0.02	0.04	0.00
40	200	3.33	1.1	0.180	0.25	0.16	0.02	0.04	0.00
41	205	3.42	1.2	0.196	0.25	0.18	0.02	0.04	0.00
42	210	3.50	1.3	0.212	0.25	0.19	0.02	0.04	0.00
43	215	3.58	1.4	0.228	0.25	0.21	0.02	0.05	0.00
44	220	3.67	1.4	0.228	0.25	0.21	0.02	0.05	0.00
45	225	3.75	1.5	0.245	0.25	0.22	0.02	0.05	0.69
46	230	3.83	1.5	0.245	0.25	0.22	0.02	0.05	0.69
47	235	3.92	1.6	0.261	0.25	0.24	0.02	0.03	0.00
48	240	4.00	1.6	0.261	0.25	0.24	0.02	0.03	0.00
49	245	4.08	1.7	0.277	0.25	0.25	0.03	0.06	5.33
50	250	4.17	1.8	0.294	0.25	0.26	0.05	0.10	15.17
51	255	4.25	1.9	0.310	0.25	0.28	0.06	0.13	25.02
52	260	4.33	2.0	0.326	0.25	0.29	0.08	0.16	34.86
53	265	4.42	2.1	0.343	0.25	0.31	0.10	0.20	44.70
54	270	4.50	2.1	0.343	0.25	0.31	0.10	0.20	44.70
55	275	4.58	2.2	0.359	0.25	0.32	0.11	0.23	54.54
56	280	4.67	2.3	0.375	0.25	0.34	0.13	0.26	64.38

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.00		
UNIT TIME-PERCENT OF LAG	502.5		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.245		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.05 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.392	0.25	0.35	0.15	0.29	74.22
58	290	4.83	2.4	0.392	0.25	0.35	0.15	0.29	74.22
59	295	4.92	2.5	0.408	0.25	0.37	0.16	0.33	84.06
60	300	5.00	2.6	0.424	0.25	0.38	0.18	0.36	93.90
61	305	5.08	3.1	0.506	0.25	0.46	0.26	0.52	143.11
62	310	5.17	3.6	0.588	0.25	0.53	0.34	0.69	192.31
63	315	5.25	3.9	0.636	0.25	0.57	0.39	0.79	221.83
64	320	5.33	4.2	0.685	0.25	0.62	0.44	0.88	251.36
65	325	5.42	4.7	0.767	0.25	0.69	0.52	1.05	300.56
66	330	5.50	5.6	0.914	0.25	0.82	0.67	1.34	389.13
67	335	5.58	1.9	0.310	0.25	0.28	0.06	0.13	25.02
68	340	5.67	0.9	0.147	0.25	0.13	0.01	0.03	0.00
69	345	5.75	0.6	0.098	0.25	0.09	0.01	0.02	0.00
70	350	5.83	0.5	0.082	0.25	0.07	0.01	0.02	0.00
71	355	5.92	0.3	0.049	0.25	0.04	0.00	0.01	0.00
72	360	6.00	0.2	0.033	0.25	0.03	0.00	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.39
FLOOD VOLUME (acft)	0.07
FLOOD VOLUME (cuft)	2879.82
REQUIRED STORAGE (acft)	0.05
REQUIRED STORAGE (cuft)	2139.79
PEAK FLOW RATE (cfs)	1.34

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.433	0.016	0.002	0.00	0.00
2	30	0.50	0.3	0.027	0.428	0.024	0.003	0.01	0.00
3	45	0.75	0.3	0.027	0.423	0.024	0.003	0.01	0.00
4	60	1.00	0.4	0.036	0.418	0.032	0.004	0.01	0.00
5	75	1.25	0.3	0.027	0.413	0.024	0.003	0.01	0.00
6	90	1.50	0.3	0.027	0.408	0.024	0.003	0.01	0.00
7	105	1.75	0.3	0.027	0.403	0.024	0.003	0.01	0.00
8	120	2.00	0.4	0.036	0.399	0.032	0.004	0.01	0.00
9	135	2.25	0.4	0.036	0.394	0.032	0.004	0.01	0.00
10	150	2.50	0.4	0.036	0.389	0.032	0.004	0.01	0.00
11	165	2.75	0.5	0.045	0.384	0.040	0.004	0.01	0.00
12	180	3.00	0.5	0.045	0.379	0.040	0.004	0.01	0.00
13	195	3.25	0.5	0.045	0.375	0.040	0.004	0.01	0.00
14	210	3.50	0.5	0.045	0.370	0.040	0.004	0.01	0.00
15	225	3.75	0.5	0.045	0.365	0.040	0.004	0.01	0.00
16	240	4.00	0.6	0.054	0.361	0.048	0.005	0.01	0.00
17	255	4.25	0.6	0.054	0.356	0.048	0.005	0.01	0.00
18	270	4.50	0.7	0.062	0.352	0.056	0.006	0.01	0.00
19	285	4.75	0.7	0.062	0.347	0.056	0.006	0.01	0.00
20	300	5.00	0.8	0.071	0.343	0.064	0.007	0.01	0.00
21	315	5.25	0.6	0.054	0.338	0.048	0.005	0.01	0.00
22	330	5.50	0.7	0.062	0.334	0.056	0.006	0.01	0.00
23	345	5.75	0.8	0.071	0.330	0.064	0.007	0.01	0.00
24	360	6.00	0.8	0.071	0.325	0.064	0.007	0.01	0.00
25	375	6.25	0.9	0.080	0.321	0.072	0.008	0.02	0.00
26	390	6.50	0.9	0.080	0.317	0.072	0.008	0.02	0.00
27	405	6.75	1.0	0.089	0.312	0.080	0.009	0.02	0.00
28	420	7.00	1.0	0.089	0.308	0.080	0.009	0.02	0.00
29	435	7.25	1.0	0.089	0.304	0.080	0.009	0.02	0.00
30	450	7.50	1.1	0.098	0.300	0.088	0.010	0.02	0.00
31	465	7.75	1.2	0.107	0.296	0.096	0.011	0.02	0.00
32	480	8.00	1.3	0.116	0.292	0.104	0.012	0.02	0.00
33	495	8.25	1.5	0.134	0.288	0.120	0.013	0.03	0.00
34	510	8.50	1.5	0.134	0.284	0.120	0.013	0.03	0.00
35	525	8.75	1.6	0.143	0.280	0.128	0.014	0.03	0.00
36	540	9.00	1.7	0.152	0.276	0.136	0.015	0.03	0.00
37	555	9.25	1.9	0.169	0.272	0.153	0.017	0.03	0.00
38	570	9.50	2.0	0.178	0.268	0.161	0.018	0.04	0.00
39	585	9.75	2.1	0.187	0.264	0.169	0.019	0.04	0.00
40	600	10.00	2.2	0.196	0.260	0.177	0.020	0.04	0.00
41	615	10.25	1.5	0.134	0.256	0.120	0.013	0.03	0.00
42	630	10.50	1.5	0.134	0.253	0.120	0.013	0.03	0.00
43	645	10.75	2.0	0.178	0.249	0.161	0.018	0.04	0.00
44	660	11.00	2.0	0.178	0.245	0.161	0.018	0.04	0.00
45	675	11.25	1.9	0.169	0.242	0.153	0.017	0.03	0.00
46	690	11.50	1.9	0.169	0.238	0.153	0.017	0.03	0.00
47	705	11.75	1.7	0.152	0.235	0.136	0.015	0.03	0.00
48	720	12.00	1.8	0.161	0.231	0.145	0.016	0.03	0.00
49	735	12.25	2.5	0.223	0.228	0.201	0.022	0.04	0.00
50	750	12.50	2.6	0.232	0.224	0.209	0.008	0.02	0.00
51	765	12.75	2.8	0.250	0.221	0.225	0.029	0.06	9.79
52	780	13.00	2.9	0.259	0.218	0.233	0.041	0.08	31.95
53	795	13.25	3.4	0.303	0.214	0.273	0.089	0.18	118.58
54	810	13.50	3.4	0.303	0.211	0.273	0.092	0.19	124.46
55	825	13.75	2.3	0.205	0.208	0.185	0.021	0.04	0.00
56	840	14.00	2.3	0.205	0.205	0.185	0.000	0.00	0.00
57	855	14.25	2.7	0.241	0.202	0.217	0.039	0.08	28.68
58	870	14.50	2.6	0.232	0.199	0.209	0.033	0.07	18.11
59	885	14.75	2.6	0.232	0.196	0.209	0.036	0.07	23.61
60	900	15.00	2.5	0.223	0.193	0.201	0.030	0.06	12.88
61	915	15.25	2.4	0.214	0.190	0.193	0.024	0.05	2.07

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate		Effective Rain	Flood Hydrograph	Required Storage
	Minutes	Hours	Percent	in/hr	in/hr			Flow	
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.187	0.185	0.018	0.04	0.00
63	945	15.75	1.9	0.169	0.184	0.153	0.017	0.03	0.00
64	960	16.00	1.9	0.169	0.181	0.153	0.017	0.03	0.00
65	975	16.25	0.4	0.036	0.178	0.032	0.004	0.01	0.00
66	990	16.50	0.4	0.036	0.176	0.032	0.004	0.01	0.00
67	1005	16.75	0.3	0.027	0.173	0.024	0.003	0.01	0.00
68	1020	17.00	0.3	0.027	0.170	0.024	0.003	0.01	0.00
69	1035	17.25	0.5	0.045	0.168	0.040	0.004	0.01	0.00
70	1050	17.50	0.5	0.045	0.165	0.040	0.004	0.01	0.00
71	1065	17.75	0.5	0.045	0.163	0.040	0.004	0.01	0.00
72	1080	18.00	0.4	0.036	0.160	0.032	0.004	0.01	0.00
73	1095	18.25	0.4	0.036	0.158	0.032	0.004	0.01	0.00
74	1110	18.50	0.4	0.036	0.156	0.032	0.004	0.01	0.00
75	1125	18.75	0.3	0.027	0.153	0.024	0.003	0.01	0.00
76	1140	19.00	0.2	0.018	0.151	0.016	0.002	0.00	0.00
77	1155	19.25	0.3	0.027	0.149	0.024	0.003	0.01	0.00
78	1170	19.50	0.4	0.036	0.147	0.032	0.004	0.01	0.00
79	1185	19.75	0.3	0.027	0.145	0.024	0.003	0.01	0.00
80	1200	20.00	0.2	0.018	0.143	0.016	0.002	0.00	0.00
81	1215	20.25	0.3	0.027	0.141	0.024	0.003	0.01	0.00
82	1230	20.50	0.3	0.027	0.139	0.024	0.003	0.01	0.00
83	1245	20.75	0.3	0.027	0.138	0.024	0.003	0.01	0.00
84	1260	21.00	0.2	0.018	0.136	0.016	0.002	0.00	0.00
85	1275	21.25	0.3	0.027	0.134	0.024	0.003	0.01	0.00
86	1290	21.50	0.2	0.018	0.133	0.016	0.002	0.00	0.00
87	1305	21.75	0.3	0.027	0.131	0.024	0.003	0.01	0.00
88	1320	22.00	0.2	0.018	0.130	0.016	0.002	0.00	0.00
89	1335	22.25	0.3	0.027	0.129	0.024	0.003	0.01	0.00
90	1350	22.50	0.2	0.018	0.127	0.016	0.002	0.00	0.00
91	1365	22.75	0.2	0.018	0.126	0.016	0.002	0.00	0.00
92	1380	23.00	0.2	0.018	0.125	0.016	0.002	0.00	0.00
93	1395	23.25	0.2	0.018	0.124	0.016	0.002	0.00	0.00
94	1410	23.50	0.2	0.018	0.124	0.016	0.002	0.00	0.00
95	1425	23.75	0.2	0.018	0.123	0.016	0.002	0.00	0.00
96	1440	24.00	0.2	0.018	0.123	0.016	0.002	0.00	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.26
FLOOD VOLUME (acft)	0.04
FLOOD VOLUME (cuft)	1902.84
REQUIRED STORAGE (acft)	0.01
REQUIRED STORAGE (cuft)	370.13
PEAK FLOW (cfs)	0.19

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		3025	0	0	0.00
466	1	1	675	3700	3363	3363	0.08
467	1	2	730	4430	4065	7428	0.17
468	1	3	785	5215	4823	12250	0.28
468.5	0.5	3.5	415	5630	2711	14961	0.34

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.05 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.05 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.03	10	10	14	-	465.00	-	0.00
2	10	0.03	10	10	14	-	465.00	-	0.00
3	15	0.03	8	8	14	-	465.00	-	0.00
4	20	0.04	11	11	14	-	465.00	-	0.00
5	25	0.04	11	11	14	-	465.00	-	0.00
6	30	0.05	14	14	14	-	465.00	-	0.00
7	35	0.04	11	11	14	-	465.00	-	0.00
8	40	0.05	14	14	14	-	465.00	-	0.00
9	45	0.05	14	14	14	-	465.00	-	0.00
10	50	0.04	11	11	14	-	465.00	-	0.00
11	55	0.04	12	12	14	-	465.00	-	0.00
12	60	0.05	14	14	14	-	465.00	-	0.00
13	65	0.06	18	18	14	4	465.00	4	0.00
14	70	0.06	18	21	14	7	465.00	7	0.00
15	75	0.06	18	25	14	11	465.00	11	0.00
16	80	0.01	3	13	14	-	465.00	-	0.00
17	85	0.16	48	48	14	34	465.01	34	0.00
18	90	0.18	55	89	14	75	465.02	75	0.00
19	95	0.11	33	108	14	94	465.03	94	0.00
20	100	0.18	55	149	14	135	465.04	135	0.00
21	105	0.33	100	235	14	221	465.07	221	0.01
22	110	0.28	85	307	14	292	465.09	292	0.01
23	115	0.23	70	363	14	349	465.10	349	0.01
24	120	0.26	78	427	14	413	465.12	413	0.01
25	125	0.28	85	498	14	484	465.14	484	0.01
26	130	0.56	168	652	14	638	465.19	638	0.01
27	135	0.76	228	866	14	852	465.25	852	0.02
28	140	0.39	116	968	14	954	465.28	954	0.02
29	145	1.21	364	1,318	14	1,304	465.39	1,304	0.03
30	150	1.34	401	1,705	14	1,691	465.50	1,691	0.04
31	155	1.56	469	2,160	14	2,146	465.64	2,146	0.05
32	160	0.99	296	2,442	14	2,428	465.72	2,428	0.06
33	165	0.01	3	2,431	14	2,417	465.72	2,417	0.06
34	170	0.05	14	2,430	14	2,416	465.72	2,416	0.06
35	175	0.05	14	2,430	14	2,416	465.72	2,416	0.06
36	180	0.02	5	2,420	14	2,406	465.72	2,406	0.06

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.02	5	5	14	-	465.00	-	0.00
2	10	0.02	6	6	14	-	465.00	-	0.00
3	15	0.02	6	6	14	-	465.00	-	0.00
4	20	0.02	6	6	14	-	465.00	-	0.00
5	25	0.02	6	6	14	-	465.00	-	0.00
6	30	0.02	7	7	14	-	465.00	-	0.00
7	35	0.02	7	7	14	-	465.00	-	0.00
8	40	0.02	7	7	14	-	465.00	-	0.00
9	45	0.02	7	7	14	-	465.00	-	0.00
10	50	0.02	7	7	14	-	465.00	-	0.00
11	55	0.02	7	7	14	-	465.00	-	0.00
12	60	0.03	8	8	14	-	465.00	-	0.00
13	65	0.03	8	8	14	-	465.00	-	0.00
14	70	0.03	8	8	14	-	465.00	-	0.00
15	75	0.03	8	8	14	-	465.00	-	0.00
16	80	0.03	8	8	14	-	465.00	-	0.00
17	85	0.03	8	8	14	-	465.00	-	0.00
18	90	0.03	8	8	14	-	465.00	-	0.00
19	95	0.03	8	8	14	-	465.00	-	0.00
20	100	0.03	8	8	14	-	465.00	-	0.00
21	105	0.03	8	8	14	-	465.00	-	0.00
22	110	0.03	8	8	14	-	465.00	-	0.00
23	115	0.03	8	8	14	-	465.00	-	0.00
24	120	0.03	9	9	14	-	465.00	-	0.00
25	125	0.03	8	8	14	-	465.00	-	0.00
26	130	0.03	9	9	14	-	465.00	-	0.00
27	135	0.03	9	9	14	-	465.00	-	0.00
28	140	0.03	9	9	14	-	465.00	-	0.00
29	145	0.03	9	9	14	-	465.00	-	0.00
30	150	0.03	9	9	14	-	465.00	-	0.00
31	155	0.03	9	9	14	-	465.00	-	0.00
32	160	0.03	9	9	14	-	465.00	-	0.00
33	165	0.03	10	10	14	-	465.00	-	0.00
34	170	0.03	10	10	14	-	465.00	-	0.00
35	175	0.03	10	10	14	-	465.00	-	0.00
36	180	0.03	10	10	14	-	465.00	-	0.00
37	185	0.03	10	10	14	-	465.00	-	0.00
38	190	0.04	11	11	14	-	465.00	-	0.00
39	195	0.04	11	11	14	-	465.00	-	0.00
40	200	0.04	11	11	14	-	465.00	-	0.00
41	205	0.04	12	12	14	-	465.00	-	0.00
42	210	0.04	13	13	14	-	465.00	-	0.00
43	215	0.05	14	14	14	-	465.00	-	0.00
44	220	0.05	14	14	14	-	465.00	-	0.00
45	225	0.05	15	15	14	1	465.00	1	0.00
46	230	0.05	15	15	14	1	465.00	1	0.00
47	235	0.03	10	11	14	-	465.00	-	0.00
48	240	0.03	10	10	14	-	465.00	-	0.00
49	245	0.06	19	19	14	5	465.00	5	0.00
50	250	0.10	29	35	14	21	465.01	21	0.00
51	255	0.13	39	60	14	46	465.01	46	0.00
52	260	0.16	49	94	14	80	465.02	80	0.00
53	265	0.20	59	139	14	125	465.04	125	0.00
54	270	0.20	59	184	14	170	465.05	170	0.00
55	275	0.23	69	238	14	224	465.07	224	0.01

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.26	78	303	14	289	465.09	289	0.01
57	285	0.29	88	377	14	363	465.11	363	0.01
58	290	0.29	88	451	14	437	465.13	437	0.01
59	295	0.33	98	535	14	521	465.16	521	0.01
60	300	0.36	108	629	14	615	465.18	615	0.01
61	305	0.52	157	772	14	758	465.23	758	0.02
62	310	0.69	206	965	14	951	465.28	951	0.02
63	315	0.79	236	1,186	14	1,172	465.35	1,172	0.03
64	320	0.88	265	1,438	14	1,424	465.42	1,424	0.03
65	325	1.05	315	1,738	14	1,724	465.51	1,724	0.04
66	330	1.34	403	2,127	14	2,113	465.63	2,113	0.05
67	335	0.13	39	2,152	14	2,138	465.64	2,138	0.05
68	340	0.03	9	2,147	14	2,133	465.63	2,133	0.05
69	345	0.02	6	2,139	14	2,125	465.63	2,125	0.05
70	350	0.02	5	2,130	14	2,116	465.63	2,116	0.05
71	355	0.01	3	2,119	14	2,105	465.63	2,105	0.05
72	360	0.01	2	2,107	14	2,093	465.62	2,093	0.05

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.00	3	3	42	-	465.00	-	0.00
2	30	0.01	5	5	42	-	465.00	-	0.00
3	45	0.01	5	5	42	-	465.00	-	0.00
4	60	0.01	6	6	42	-	465.00	-	0.00
5	75	0.01	5	5	42	-	465.00	-	0.00
6	90	0.01	5	5	42	-	465.00	-	0.00
7	105	0.01	5	5	42	-	465.00	-	0.00
8	120	0.01	6	6	42	-	465.00	-	0.00
9	135	0.01	6	6	42	-	465.00	-	0.00
10	150	0.01	6	6	42	-	465.00	-	0.00
11	165	0.01	8	8	42	-	465.00	-	0.00
12	180	0.01	8	8	42	-	465.00	-	0.00
13	195	0.01	8	8	42	-	465.00	-	0.00
14	210	0.01	8	8	42	-	465.00	-	0.00
15	225	0.01	8	8	42	-	465.00	-	0.00
16	240	0.01	10	10	42	-	465.00	-	0.00
17	255	0.01	10	10	42	-	465.00	-	0.00
18	270	0.01	11	11	42	-	465.00	-	0.00
19	285	0.01	11	11	42	-	465.00	-	0.00
20	300	0.01	13	13	42	-	465.00	-	0.00
21	315	0.01	10	10	42	-	465.00	-	0.00
22	330	0.01	11	11	42	-	465.00	-	0.00
23	345	0.01	13	13	42	-	465.00	-	0.00
24	360	0.01	13	13	42	-	465.00	-	0.00
25	375	0.02	15	15	42	-	465.00	-	0.00
26	390	0.02	15	15	42	-	465.00	-	0.00
27	405	0.02	16	16	42	-	465.00	-	0.00
28	420	0.02	16	16	42	-	465.00	-	0.00
29	435	0.02	16	16	42	-	465.00	-	0.00
30	450	0.02	18	18	42	-	465.00	-	0.00
31	465	0.02	19	19	42	-	465.00	-	0.00
32	480	0.02	21	21	42	-	465.00	-	0.00
33	495	0.03	24	24	42	-	465.00	-	0.00
34	510	0.03	24	24	42	-	465.00	-	0.00
35	525	0.03	26	26	42	-	465.00	-	0.00
36	540	0.03	27	27	42	-	465.00	-	0.00
37	555	0.03	31	31	42	-	465.00	-	0.00
38	570	0.04	32	32	42	-	465.00	-	0.00
39	585	0.04	34	34	42	-	465.00	-	0.00
40	600	0.04	35	35	42	-	465.00	-	0.00
41	615	0.03	24	24	42	-	465.00	-	0.00
42	630	0.03	24	24	42	-	465.00	-	0.00
43	645	0.04	32	32	42	-	465.00	-	0.00
44	660	0.04	32	32	42	-	465.00	-	0.00
45	675	0.03	31	31	42	-	465.00	-	0.00
46	690	0.03	31	31	42	-	465.00	-	0.00
47	705	0.03	27	27	42	-	465.00	-	0.00
48	720	0.03	29	29	42	-	465.00	-	0.00
49	735	0.04	40	40	42	-	465.00	-	0.00
50	750	0.02	14	14	42	-	465.00	-	0.00
51	765	0.06	52	52	42	10	465.00	10	0.00
52	780	0.08	74	84	42	42	465.01	42	0.00
53	795	0.18	161	203	42	160	465.05	160	0.00
54	810	0.19	167	327	42	285	465.08	285	0.01
55	825	0.04	37	322	42	280	465.08	280	0.01
56	840	0.00	1	280	42	238	465.07	238	0.01
57	855	0.08	71	309	42	267	465.08	267	0.01
58	870	0.07	60	327	42	285	465.08	285	0.01

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.07	66	351	42	309	465.09	309	0.01
60	900	0.06	55	364	42	321	465.10	321	0.01
61	915	0.05	44	366	42	324	465.10	324	0.01
62	930	0.04	33	357	42	315	465.09	315	0.01
63	945	0.03	31	345	42	303	465.09	303	0.01
64	960	0.03	31	334	42	292	465.09	292	0.01
65	975	0.01	6	298	42	256	465.08	256	0.01
66	990	0.01	6	262	42	220	465.07	220	0.01
67	1005	0.01	5	225	42	183	465.05	183	0.00
68	1020	0.01	5	187	42	145	465.04	145	0.00
69	1035	0.01	8	153	42	111	465.03	111	0.00
70	1050	0.01	8	119	42	77	465.02	77	0.00
71	1065	0.01	8	85	42	43	465.01	43	0.00
72	1080	0.01	6	49	42	7	465.00	7	0.00
73	1095	0.01	6	13	42	-	465.00	-	0.00
74	1110	0.01	6	6	42	-	465.00	-	0.00
75	1125	0.01	5	5	42	-	465.00	-	0.00
76	1140	0.00	3	3	42	-	465.00	-	0.00
77	1155	0.01	5	5	42	-	465.00	-	0.00
78	1170	0.01	6	6	42	-	465.00	-	0.00
79	1185	0.01	5	5	42	-	465.00	-	0.00
80	1200	0.00	3	3	42	-	465.00	-	0.00
81	1215	0.01	5	5	42	-	465.00	-	0.00
82	1230	0.01	5	5	42	-	465.00	-	0.00
83	1245	0.01	5	5	42	-	465.00	-	0.00
84	1260	0.00	3	3	42	-	465.00	-	0.00
85	1275	0.01	5	5	42	-	465.00	-	0.00
86	1290	0.00	3	3	42	-	465.00	-	0.00
87	1305	0.01	5	5	42	-	465.00	-	0.00
88	1320	0.00	3	3	42	-	465.00	-	0.00
89	1335	0.01	5	5	42	-	465.00	-	0.00
90	1350	0.00	3	3	42	-	465.00	-	0.00
91	1365	0.00	3	3	42	-	465.00	-	0.00
92	1380	0.00	3	3	42	-	465.00	-	0.00
93	1395	0.00	3	3	42	-	465.00	-	0.00
94	1410	0.00	3	3	42	-	465.00	-	0.00
95	1425	0.00	3	3	42	-	465.00	-	0.00
96	1440	0.00	3	3	42	-	465.00	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 2		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.51		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	7.46		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.6		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	724		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	100		
30				
31	ELEVATION OF HEADWATER	472		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15600	
45		466	17120	
46		467	18710	
47		468	20350	
48		468.5	21200	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 2
[3] AREA - ACRES	10.570
[4] L-FEET	724
[5] L-MILES	0.137
[6] La-FEET	100.00
[7] La-MILES	0.019
[8] ELEVATION OF HEADWATER	472
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.5
[11] S-FEET/MILE	25.5
[12] S^0.5	5.05
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	1.6
[17] 100% OF LAG-MINUTES	1.6
[18] 200% OF LAG-MINUTES	3.2
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.24

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	10.570	1.00	1.04	1.36	10.570	1.00	1.36	2.23	10.570	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.57	SUM [7]	1.04	SUM [9]	10.57	SUM [11]	1.36	SUM [13]	10.57	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.49	0.49	0.40
FLOOD VOLUME	(cu-ft)	18,821	18,747	15,460
	(acre-ft)	0.43	0.43	0.35
REQUIRED STORAGE	(cu-ft)	16,281	14,878	6,850
	(acre-ft)	0.37	0.34	0.16
PEAK FLOW	(cfs)	8.76	7.61	1.44
MAXIMUM WSEL	(ft)	465.99	465.91	465.42

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.51	0.237	0.0123
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	7.46	0.706	0.1523
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.60	0.057	0.0295
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.57	SUM	0.1942

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.097085525

C= 0.00180

Ft=C(24-(T/60))^1.55 = 0.00180 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.19
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.19	0.15	0.02	0.17	0.00
2	10	0.17	1.3	0.162	0.19	0.15	0.02	0.17	0.00
3	15	0.25	1.1	0.137	0.19	0.12	0.01	0.15	0.00
4	20	0.33	1.5	0.187	0.19	0.17	0.02	0.20	0.00
5	25	0.42	1.5	0.187	0.19	0.17	0.02	0.20	0.00
6	30	0.50	1.8	0.225	0.19	0.20	0.03	0.32	24.03
7	35	0.58	1.5	0.187	0.19	0.17	0.02	0.20	0.00
8	40	0.67	1.8	0.225	0.19	0.20	0.03	0.32	24.03
9	45	0.75	1.8	0.225	0.19	0.20	0.03	0.32	24.03
10	50	0.83	1.5	0.187	0.19	0.17	0.02	0.20	0.00
11	55	0.92	1.6	0.200	0.19	0.18	0.01	0.06	0.00
12	60	1.00	1.8	0.225	0.19	0.20	0.03	0.32	24.03
13	65	1.08	2.2	0.275	0.19	0.25	0.08	0.85	182.33
14	70	1.17	2.2	0.275	0.19	0.25	0.08	0.85	182.33
15	75	1.25	2.2	0.275	0.19	0.25	0.08	0.85	182.33
16	80	1.33	2.0	0.250	0.19	0.22	0.06	0.59	103.18
17	85	1.42	2.6	0.324	0.19	0.29	0.13	1.38	340.63
18	90	1.50	2.7	0.337	0.19	0.30	0.14	1.51	380.20
19	95	1.58	2.4	0.300	0.19	0.27	0.11	1.11	261.48
20	100	1.67	2.7	0.337	0.19	0.30	0.14	1.51	380.20
21	105	1.75	3.3	0.412	0.19	0.37	0.22	2.30	617.64
22	110	1.83	3.1	0.387	0.19	0.35	0.19	2.04	538.50
23	115	1.92	2.9	0.362	0.19	0.33	0.17	1.77	459.35
24	120	2.00	3.0	0.374	0.19	0.34	0.18	1.91	498.92
25	125	2.08	3.1	0.387	0.19	0.35	0.19	2.04	538.50
26	130	2.17	4.2	0.524	0.19	0.47	0.33	3.49	973.81
27	135	2.25	5.0	0.624	0.19	0.56	0.43	4.54	1290.40
28	140	2.33	3.5	0.437	0.19	0.39	0.24	2.56	696.79
29	145	2.42	6.8	0.849	0.19	0.76	0.65	6.92	2002.74
30	150	2.50	7.3	0.911	0.19	0.82	0.72	7.58	2200.61
31	155	2.58	8.2	1.023	0.19	0.92	0.83	8.76	2556.77
32	160	2.67	5.9	0.736	0.19	0.66	0.54	5.73	1646.57
33	165	2.75	2.0	0.250	0.19	0.22	0.06	0.59	103.18
34	170	2.83	1.8	0.225	0.19	0.20	0.03	0.32	24.03
35	175	2.92	1.8	0.225	0.19	0.20	0.03	0.32	24.03
36	180	3.00	0.6	0.075	0.19	0.07	0.01	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.49
FLOOD VOLUME (acft)	0.43
FLOOD VOLUME (cuft)	18821.12
REQUIRED STORAGE (acft)	0.37
REQUIRED STORAGE (cuft)	16280.67
PEAK FLOW RATE (cfs)	8.76

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.62		
UNIT TIME-PERCENT OF LAG	308.6		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.194		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.24 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.082	0.19	0.07	0.01	0.09	0.00
2	10	0.17	0.6	0.098	0.19	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.19	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.19	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.19	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.19	0.10	0.01	0.12	0.00
7	35	0.58	0.7	0.114	0.19	0.10	0.01	0.12	0.00
8	40	0.67	0.7	0.114	0.19	0.10	0.01	0.12	0.00
9	45	0.75	0.7	0.114	0.19	0.10	0.01	0.12	0.00
10	50	0.83	0.7	0.114	0.19	0.10	0.01	0.12	0.00
11	55	0.92	0.7	0.114	0.19	0.10	0.01	0.12	0.00
12	60	1.00	0.8	0.131	0.19	0.12	0.01	0.14	0.00
13	65	1.08	0.8	0.131	0.19	0.12	0.01	0.14	0.00
14	70	1.17	0.8	0.131	0.19	0.12	0.01	0.14	0.00
15	75	1.25	0.8	0.131	0.19	0.12	0.01	0.14	0.00
16	80	1.33	0.8	0.131	0.19	0.12	0.01	0.14	0.00
17	85	1.42	0.8	0.131	0.19	0.12	0.01	0.14	0.00
18	90	1.50	0.8	0.131	0.19	0.12	0.01	0.14	0.00
19	95	1.58	0.8	0.131	0.19	0.12	0.01	0.14	0.00
20	100	1.67	0.8	0.131	0.19	0.12	0.01	0.14	0.00
21	105	1.75	0.8	0.131	0.19	0.12	0.01	0.14	0.00
22	110	1.83	0.8	0.131	0.19	0.12	0.01	0.14	0.00
23	115	1.92	0.8	0.131	0.19	0.12	0.01	0.14	0.00
24	120	2.00	0.9	0.147	0.19	0.13	0.01	0.16	0.00
25	125	2.08	0.8	0.131	0.19	0.12	0.01	0.14	0.00
26	130	2.17	0.9	0.147	0.19	0.13	0.01	0.16	0.00
27	135	2.25	0.9	0.147	0.19	0.13	0.01	0.16	0.00
28	140	2.33	0.9	0.147	0.19	0.13	0.01	0.16	0.00
29	145	2.42	0.9	0.147	0.19	0.13	0.01	0.16	0.00
30	150	2.50	0.9	0.147	0.19	0.13	0.01	0.16	0.00
31	155	2.58	0.9	0.147	0.19	0.13	0.01	0.16	0.00
32	160	2.67	0.9	0.147	0.19	0.13	0.01	0.16	0.00
33	165	2.75	1.0	0.163	0.19	0.15	0.02	0.17	0.00
34	170	2.83	1.0	0.163	0.19	0.15	0.02	0.17	0.00
35	175	2.92	1.0	0.163	0.19	0.15	0.02	0.17	0.00
36	180	3.00	1.0	0.163	0.19	0.15	0.02	0.17	0.00
37	185	3.08	1.0	0.163	0.19	0.15	0.02	0.17	0.00
38	190	3.17	1.1	0.180	0.19	0.16	0.02	0.19	0.00
39	195	3.25	1.1	0.180	0.19	0.16	0.02	0.19	0.00
40	200	3.33	1.1	0.180	0.19	0.16	0.02	0.19	0.00
41	205	3.42	1.2	0.196	0.19	0.18	0.00	0.02	0.00
42	210	3.50	1.3	0.212	0.19	0.19	0.02	0.19	0.00
43	215	3.58	1.4	0.228	0.19	0.21	0.03	0.36	36.21
44	220	3.67	1.4	0.228	0.19	0.21	0.03	0.36	36.21
45	225	3.75	1.5	0.245	0.19	0.22	0.05	0.54	87.96
46	230	3.83	1.5	0.245	0.19	0.22	0.05	0.54	87.96
47	235	3.92	1.6	0.261	0.19	0.24	0.07	0.71	139.71
48	240	4.00	1.6	0.261	0.19	0.24	0.07	0.71	139.71
49	245	4.08	1.7	0.277	0.19	0.25	0.08	0.88	191.46
50	250	4.17	1.8	0.294	0.19	0.26	0.10	1.05	243.21
51	255	4.25	1.9	0.310	0.19	0.28	0.12	1.23	294.96
52	260	4.33	2.0	0.326	0.19	0.29	0.13	1.40	346.71
53	265	4.42	2.1	0.343	0.19	0.31	0.15	1.57	398.47
54	270	4.50	2.1	0.343	0.19	0.31	0.15	1.57	398.47
55	275	4.58	2.2	0.359	0.19	0.32	0.16	1.74	450.22
56	280	4.67	2.3	0.375	0.19	0.34	0.18	1.92	501.97

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.62		
UNIT TIME-PERCENT OF LAG	308.6		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.194		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.24 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.392	0.19	0.35	0.20	2.09	553.72
58	290	4.83	2.4	0.392	0.19	0.35	0.20	2.09	553.72
59	295	4.92	2.5	0.408	0.19	0.37	0.21	2.26	605.47
60	300	5.00	2.6	0.424	0.19	0.38	0.23	2.43	657.22
61	305	5.08	3.1	0.506	0.19	0.46	0.31	3.30	915.97
62	310	5.17	3.6	0.588	0.19	0.53	0.39	4.16	1174.73
63	315	5.25	3.9	0.636	0.19	0.57	0.44	4.68	1329.98
64	320	5.33	4.2	0.685	0.19	0.62	0.49	5.19	1485.23
65	325	5.42	4.7	0.767	0.19	0.69	0.57	6.06	1743.98
66	330	5.50	5.6	0.914	0.19	0.82	0.72	7.61	2209.74
67	335	5.58	1.9	0.310	0.19	0.28	0.12	1.23	294.96
68	340	5.67	0.9	0.147	0.19	0.13	0.01	0.16	0.00
69	345	5.75	0.6	0.098	0.19	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.19	0.07	0.01	0.09	0.00
71	355	5.92	0.3	0.049	0.19	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.19	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.49
FLOOD VOLUME (acft)	0.43
FLOOD VOLUME (cuft)	18747.03
REQUIRED STORAGE (acft)	0.34
REQUIRED STORAGE (cuft)	14877.95
PEAK FLOW RATE (cfs)	7.61

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.343	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.339	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.335	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.331	0.032	0.004	0.04	0.00
5	75	1.25	0.3	0.027	0.327	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.323	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.319	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.316	0.032	0.004	0.04	0.00
9	135	2.25	0.4	0.036	0.312	0.032	0.004	0.04	0.00
10	150	2.50	0.4	0.036	0.308	0.032	0.004	0.04	0.00
11	165	2.75	0.5	0.045	0.304	0.040	0.004	0.05	0.00
12	180	3.00	0.5	0.045	0.300	0.040	0.004	0.05	0.00
13	195	3.25	0.5	0.045	0.297	0.040	0.004	0.05	0.00
14	210	3.50	0.5	0.045	0.293	0.040	0.004	0.05	0.00
15	225	3.75	0.5	0.045	0.289	0.040	0.004	0.05	0.00
16	240	4.00	0.6	0.054	0.286	0.048	0.005	0.06	0.00
17	255	4.25	0.6	0.054	0.282	0.048	0.005	0.06	0.00
18	270	4.50	0.7	0.062	0.278	0.056	0.006	0.07	0.00
19	285	4.75	0.7	0.062	0.275	0.056	0.006	0.07	0.00
20	300	5.00	0.8	0.071	0.271	0.064	0.007	0.08	0.00
21	315	5.25	0.6	0.054	0.268	0.048	0.005	0.06	0.00
22	330	5.50	0.7	0.062	0.264	0.056	0.006	0.07	0.00
23	345	5.75	0.8	0.071	0.261	0.064	0.007	0.08	0.00
24	360	6.00	0.8	0.071	0.257	0.064	0.007	0.08	0.00
25	375	6.25	0.9	0.080	0.254	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.251	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.247	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.244	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.241	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.237	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.234	0.096	0.011	0.11	0.00
32	480	8.00	1.3	0.116	0.231	0.104	0.012	0.12	0.00
33	495	8.25	1.5	0.134	0.228	0.120	0.013	0.14	0.00
34	510	8.50	1.5	0.134	0.224	0.120	0.013	0.14	0.00
35	525	8.75	1.6	0.143	0.221	0.128	0.014	0.15	0.00
36	540	9.00	1.7	0.152	0.218	0.136	0.015	0.16	0.00
37	555	9.25	1.9	0.169	0.215	0.153	0.017	0.18	0.00
38	570	9.50	2.0	0.178	0.212	0.161	0.018	0.19	0.00
39	585	9.75	2.1	0.187	0.209	0.169	0.019	0.20	0.00
40	600	10.00	2.2	0.196	0.206	0.177	0.020	0.21	0.00
41	615	10.25	1.5	0.134	0.203	0.120	0.013	0.14	0.00
42	630	10.50	1.5	0.134	0.200	0.120	0.013	0.14	0.00
43	645	10.75	2.0	0.178	0.197	0.161	0.018	0.19	0.00
44	660	11.00	2.0	0.178	0.194	0.161	0.018	0.19	0.00
45	675	11.25	1.9	0.169	0.191	0.153	0.017	0.18	0.00
46	690	11.50	1.9	0.169	0.189	0.153	0.017	0.18	0.00
47	705	11.75	1.7	0.152	0.186	0.136	0.015	0.16	0.00
48	720	12.00	1.8	0.161	0.183	0.145	0.016	0.17	0.00
49	735	12.25	2.5	0.223	0.180	0.201	0.043	0.45	188.01
50	750	12.50	2.6	0.232	0.178	0.209	0.054	0.57	298.56
51	765	12.75	2.8	0.250	0.175	0.225	0.075	0.79	493.67
52	780	13.00	2.9	0.259	0.172	0.233	0.086	0.91	603.61
53	795	13.25	3.4	0.303	0.170	0.273	0.134	1.41	1052.67
54	810	13.50	3.4	0.303	0.167	0.273	0.136	1.44	1077.14
55	825	13.75	2.3	0.205	0.165	0.185	0.041	0.43	167.88
56	840	14.00	2.3	0.205	0.162	0.185	0.043	0.45	191.72
57	855	14.25	2.7	0.241	0.160	0.217	0.081	0.86	554.66
58	870	14.50	2.6	0.232	0.157	0.209	0.075	0.79	492.99
59	885	14.75	2.6	0.232	0.155	0.209	0.077	0.82	515.85
60	900	15.00	2.5	0.223	0.152	0.201	0.071	0.75	453.52
61	915	15.25	2.4	0.214	0.150	0.193	0.064	0.68	390.86

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.148	0.185	0.057	0.61	327.85
63	945	15.75	1.9	0.169	0.146	0.153	0.024	0.25	9.93
64	960	16.00	1.9	0.169	0.143	0.153	0.026	0.28	31.09
65	975	16.25	0.4	0.036	0.141	0.032	0.004	0.04	0.00
66	990	16.50	0.4	0.036	0.139	0.032	0.004	0.04	0.00
67	1005	16.75	0.3	0.027	0.137	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.135	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.133	0.040	0.004	0.05	0.00
70	1050	17.50	0.5	0.045	0.131	0.040	0.004	0.05	0.00
71	1065	17.75	0.5	0.045	0.129	0.040	0.004	0.05	0.00
72	1080	18.00	0.4	0.036	0.127	0.032	0.004	0.04	0.00
73	1095	18.25	0.4	0.036	0.125	0.032	0.004	0.04	0.00
74	1110	18.50	0.4	0.036	0.123	0.032	0.004	0.04	0.00
75	1125	18.75	0.3	0.027	0.121	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.120	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.116	0.032	0.004	0.04	0.00
79	1185	19.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.113	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.112	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.110	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.109	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.108	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.106	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.105	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.104	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.103	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.102	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.101	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.100	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.099	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.099	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.098	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.097	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.097	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.40
FLOOD VOLUME (acft)	0.35
FLOOD VOLUME (cuft)	15459.88
REQUIRED STORAGE (acft)	0.16
REQUIRED STORAGE (cuft)	6850.04
PEAK FLOW (cfs)	1.44

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15600	0	0	0.00
466	1	1	1520	17120	16360	16360	0.38
467	1	2	1590	18710	17915	34275	0.79
468	1	3	1640	20350	19530	53805	1.24
468.5	0.5	3.5	850	21200	10388	64193	1.47

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.24 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.24 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	73	-	465.00	-	0.00
2	10	0.17	51	51	73	-	465.00	-	0.00
3	15	0.15	44	44	73	-	465.00	-	0.00
4	20	0.20	59	59	73	-	465.00	-	0.00
5	25	0.20	59	59	73	-	465.00	-	0.00
6	30	0.32	97	97	73	24	465.00	24	0.00
7	35	0.20	59	83	73	11	465.00	11	0.00
8	40	0.32	97	107	73	35	465.00	35	0.00
9	45	0.32	97	131	73	59	465.00	59	0.00
10	50	0.20	59	118	73	46	465.00	46	0.00
11	55	0.06	17	63	73	-	465.00	-	0.00
12	60	0.32	97	97	73	24	465.00	24	0.00
13	65	0.85	255	279	73	206	465.01	206	0.00
14	70	0.85	255	461	73	389	465.02	389	0.01
15	75	0.85	255	644	73	571	465.03	571	0.01
16	80	0.59	176	747	73	674	465.04	674	0.02
17	85	1.38	413	1,087	73	1,015	465.06	1,015	0.02
18	90	1.51	453	1,468	73	1,395	465.09	1,395	0.03
19	95	1.11	334	1,729	73	1,657	465.10	1,657	0.04
20	100	1.51	453	2,109	73	2,037	465.12	2,037	0.05
21	105	2.30	690	2,727	73	2,654	465.16	2,654	0.06
22	110	2.04	611	3,265	73	3,193	465.20	3,193	0.07
23	115	1.77	532	3,725	73	3,652	465.22	3,652	0.08
24	120	1.91	572	4,224	73	4,151	465.25	4,151	0.10
25	125	2.04	611	4,762	73	4,690	465.29	4,690	0.11
26	130	3.49	1,046	5,736	73	5,663	465.35	5,663	0.13
27	135	4.54	1,363	7,026	73	6,954	465.43	6,954	0.16
28	140	2.56	769	7,723	73	7,651	465.47	7,651	0.18
29	145	6.92	2,075	9,726	73	9,653	465.59	9,653	0.22
30	150	7.58	2,273	11,927	73	11,854	465.72	11,854	0.27
31	155	8.76	2,629	14,483	73	14,411	465.88	14,411	0.33
32	160	5.73	1,719	16,130	73	16,057	465.98	16,057	0.37
33	165	0.59	176	16,233	73	16,161	465.99	16,161	0.37
34	170	0.32	97	16,257	73	16,185	465.99	16,185	0.37
35	175	0.32	97	16,281	73	16,209	465.99	16,209	0.37
36	180	0.08	24	16,232	73	16,160	465.99	16,160	0.37

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.09	26	26	73	-	465.00	-	0.00
2	10	0.10	31	31	73	-	465.00	-	0.00
3	15	0.10	31	31	73	-	465.00	-	0.00
4	20	0.10	31	31	73	-	465.00	-	0.00
5	25	0.10	31	31	73	-	465.00	-	0.00
6	30	0.12	36	36	73	-	465.00	-	0.00
7	35	0.12	36	36	73	-	465.00	-	0.00
8	40	0.12	36	36	73	-	465.00	-	0.00
9	45	0.12	36	36	73	-	465.00	-	0.00
10	50	0.12	36	36	73	-	465.00	-	0.00
11	55	0.12	36	36	73	-	465.00	-	0.00
12	60	0.14	41	41	73	-	465.00	-	0.00
13	65	0.14	41	41	73	-	465.00	-	0.00
14	70	0.14	41	41	73	-	465.00	-	0.00
15	75	0.14	41	41	73	-	465.00	-	0.00
16	80	0.14	41	41	73	-	465.00	-	0.00
17	85	0.14	41	41	73	-	465.00	-	0.00
18	90	0.14	41	41	73	-	465.00	-	0.00
19	95	0.14	41	41	73	-	465.00	-	0.00
20	100	0.14	41	41	73	-	465.00	-	0.00
21	105	0.14	41	41	73	-	465.00	-	0.00
22	110	0.14	41	41	73	-	465.00	-	0.00
23	115	0.14	41	41	73	-	465.00	-	0.00
24	120	0.16	47	47	73	-	465.00	-	0.00
25	125	0.14	41	41	73	-	465.00	-	0.00
26	130	0.16	47	47	73	-	465.00	-	0.00
27	135	0.16	47	47	73	-	465.00	-	0.00
28	140	0.16	47	47	73	-	465.00	-	0.00
29	145	0.16	47	47	73	-	465.00	-	0.00
30	150	0.16	47	47	73	-	465.00	-	0.00
31	155	0.16	47	47	73	-	465.00	-	0.00
32	160	0.16	47	47	73	-	465.00	-	0.00
33	165	0.17	52	52	73	-	465.00	-	0.00
34	170	0.17	52	52	73	-	465.00	-	0.00
35	175	0.17	52	52	73	-	465.00	-	0.00
36	180	0.17	52	52	73	-	465.00	-	0.00
37	185	0.17	52	52	73	-	465.00	-	0.00
38	190	0.19	57	57	73	-	465.00	-	0.00
39	195	0.19	57	57	73	-	465.00	-	0.00
40	200	0.19	57	57	73	-	465.00	-	0.00
41	205	0.02	5	5	73	-	465.00	-	0.00
42	210	0.19	57	57	73	-	465.00	-	0.00
43	215	0.36	109	109	73	36	465.00	36	0.00
44	220	0.36	109	145	73	72	465.00	72	0.00
45	225	0.54	161	233	73	160	465.01	160	0.00
46	230	0.54	161	321	73	248	465.02	248	0.01
47	235	0.71	212	461	73	388	465.02	388	0.01
48	240	0.71	212	600	73	528	465.03	528	0.01
49	245	0.88	264	792	73	719	465.04	719	0.02
50	250	1.05	316	1,035	73	962	465.06	962	0.02
51	255	1.23	368	1,330	73	1,257	465.08	1,257	0.03
52	260	1.40	419	1,677	73	1,604	465.10	1,604	0.04
53	265	1.57	471	2,075	73	2,003	465.12	2,003	0.05
54	270	1.57	471	2,474	73	2,401	465.15	2,401	0.06
55	275	1.74	523	2,924	73	2,851	465.17	2,851	0.07

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.92	575	3,426	73	3,353	465.20	3,353	0.08
57	285	2.09	626	3,980	73	3,907	465.24	3,907	0.09
58	290	2.09	626	4,533	73	4,461	465.27	4,461	0.10
59	295	2.26	678	5,139	73	5,066	465.31	5,066	0.12
60	300	2.43	730	5,796	73	5,723	465.35	5,723	0.13
61	305	3.30	989	6,712	73	6,639	465.41	6,639	0.15
62	310	4.16	1,247	7,887	73	7,814	465.48	7,814	0.18
63	315	4.68	1,403	9,217	73	9,144	465.56	9,144	0.21
64	320	5.19	1,558	10,702	73	10,629	465.65	10,629	0.24
65	325	6.06	1,817	12,446	73	12,373	465.76	12,373	0.28
66	330	7.61	2,282	14,656	73	14,583	465.89	14,583	0.33
67	335	1.23	368	14,951	73	14,878	465.91	14,878	0.34
68	340	0.16	47	14,925	73	14,852	465.91	14,852	0.34
69	345	0.10	31	14,883	73	14,810	465.91	14,810	0.34
70	350	0.09	26	14,836	73	14,764	465.90	14,764	0.34
71	355	0.05	16	14,779	73	14,707	465.90	14,707	0.34
72	360	0.03	10	14,717	73	14,644	465.90	14,644	0.34

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	17	17	218	-	465.00	-	0.00
2	30	0.03	25	25	218	-	465.00	-	0.00
3	45	0.03	25	25	218	-	465.00	-	0.00
4	60	0.04	34	34	218	-	465.00	-	0.00
5	75	0.03	25	25	218	-	465.00	-	0.00
6	90	0.03	25	25	218	-	465.00	-	0.00
7	105	0.03	25	25	218	-	465.00	-	0.00
8	120	0.04	34	34	218	-	465.00	-	0.00
9	135	0.04	34	34	218	-	465.00	-	0.00
10	150	0.04	34	34	218	-	465.00	-	0.00
11	165	0.05	42	42	218	-	465.00	-	0.00
12	180	0.05	42	42	218	-	465.00	-	0.00
13	195	0.05	42	42	218	-	465.00	-	0.00
14	210	0.05	42	42	218	-	465.00	-	0.00
15	225	0.05	42	42	218	-	465.00	-	0.00
16	240	0.06	51	51	218	-	465.00	-	0.00
17	255	0.06	51	51	218	-	465.00	-	0.00
18	270	0.07	59	59	218	-	465.00	-	0.00
19	285	0.07	59	59	218	-	465.00	-	0.00
20	300	0.08	68	68	218	-	465.00	-	0.00
21	315	0.06	51	51	218	-	465.00	-	0.00
22	330	0.07	59	59	218	-	465.00	-	0.00
23	345	0.08	68	68	218	-	465.00	-	0.00
24	360	0.08	68	68	218	-	465.00	-	0.00
25	375	0.08	76	76	218	-	465.00	-	0.00
26	390	0.08	76	76	218	-	465.00	-	0.00
27	405	0.09	85	85	218	-	465.00	-	0.00
28	420	0.09	85	85	218	-	465.00	-	0.00
29	435	0.09	85	85	218	-	465.00	-	0.00
30	450	0.10	93	93	218	-	465.00	-	0.00
31	465	0.11	102	102	218	-	465.00	-	0.00
32	480	0.12	110	110	218	-	465.00	-	0.00
33	495	0.14	127	127	218	-	465.00	-	0.00
34	510	0.14	127	127	218	-	465.00	-	0.00
35	525	0.15	136	136	218	-	465.00	-	0.00
36	540	0.16	144	144	218	-	465.00	-	0.00
37	555	0.18	161	161	218	-	465.00	-	0.00
38	570	0.19	170	170	218	-	465.00	-	0.00
39	585	0.20	178	178	218	-	465.00	-	0.00
40	600	0.21	187	187	218	-	465.00	-	0.00
41	615	0.14	127	127	218	-	465.00	-	0.00
42	630	0.14	127	127	218	-	465.00	-	0.00
43	645	0.19	170	170	218	-	465.00	-	0.00
44	660	0.19	170	170	218	-	465.00	-	0.00
45	675	0.18	161	161	218	-	465.00	-	0.00
46	690	0.18	161	161	218	-	465.00	-	0.00
47	705	0.16	144	144	218	-	465.00	-	0.00
48	720	0.17	153	153	218	-	465.00	-	0.00
49	735	0.45	406	406	218	188	465.01	188	0.00
50	750	0.57	516	704	218	487	465.03	487	0.01
51	765	0.79	711	1,198	218	980	465.06	980	0.02
52	780	0.91	821	1,802	218	1,584	465.10	1,584	0.04
53	795	1.41	1,270	2,854	218	2,637	465.16	2,637	0.06
54	810	1.44	1,295	3,931	218	3,714	465.23	3,714	0.09
55	825	0.43	386	4,099	218	3,882	465.24	3,882	0.09
56	840	0.45	409	4,291	218	4,073	465.25	4,073	0.09
57	855	0.86	772	4,846	218	4,628	465.28	4,628	0.11
58	870	0.79	711	5,339	218	5,121	465.31	5,121	0.12

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.82	734	5,855	218	5,637	465.34	5,637	0.13
60	900	0.75	671	6,308	218	6,090	465.37	6,090	0.14
61	915	0.68	609	6,699	218	6,481	465.40	6,481	0.15
62	930	0.61	546	7,027	218	6,809	465.42	6,809	0.16
63	945	0.25	228	7,037	218	6,819	465.42	6,819	0.16
64	960	0.28	249	7,068	218	6,850	465.42	6,850	0.16
65	975	0.04	34	6,884	218	6,666	465.41	6,666	0.15
66	990	0.04	34	6,700	218	6,482	465.40	6,482	0.15
67	1005	0.03	25	6,508	218	6,290	465.38	6,290	0.14
68	1020	0.03	25	6,316	218	6,098	465.37	6,098	0.14
69	1035	0.05	42	6,140	218	5,923	465.36	5,923	0.14
70	1050	0.05	42	5,965	218	5,747	465.35	5,747	0.13
71	1065	0.05	42	5,790	218	5,572	465.34	5,572	0.13
72	1080	0.04	34	5,606	218	5,388	465.33	5,388	0.12
73	1095	0.04	34	5,422	218	5,204	465.32	5,204	0.12
74	1110	0.04	34	5,238	218	5,020	465.31	5,020	0.12
75	1125	0.03	25	5,046	218	4,828	465.30	4,828	0.11
76	1140	0.02	17	4,845	218	4,627	465.28	4,627	0.11
77	1155	0.03	25	4,653	218	4,435	465.27	4,435	0.10
78	1170	0.04	34	4,469	218	4,251	465.26	4,251	0.10
79	1185	0.03	25	4,277	218	4,059	465.25	4,059	0.09
80	1200	0.02	17	4,076	218	3,858	465.24	3,858	0.09
81	1215	0.03	25	3,884	218	3,666	465.22	3,666	0.08
82	1230	0.03	25	3,691	218	3,474	465.21	3,474	0.08
83	1245	0.03	25	3,499	218	3,281	465.20	3,281	0.08
84	1260	0.02	17	3,298	218	3,081	465.19	3,081	0.07
85	1275	0.03	25	3,106	218	2,888	465.18	2,888	0.07
86	1290	0.02	17	2,905	218	2,687	465.16	2,687	0.06
87	1305	0.03	25	2,713	218	2,495	465.15	2,495	0.06
88	1320	0.02	17	2,512	218	2,294	465.14	2,294	0.05
89	1335	0.03	25	2,320	218	2,102	465.13	2,102	0.05
90	1350	0.02	17	2,119	218	1,901	465.12	1,901	0.04
91	1365	0.02	17	1,918	218	1,701	465.10	1,701	0.04
92	1380	0.02	17	1,718	218	1,500	465.09	1,500	0.03
93	1395	0.02	17	1,517	218	1,299	465.08	1,299	0.03
94	1410	0.02	17	1,316	218	1,098	465.07	1,098	0.03
95	1425	0.02	17	1,115	218	897	465.05	897	0.02
96	1440	0.02	17	914	218	697	465.04	697	0.02

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 3		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.56		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.65		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	1.04		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	750		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	170		
30				
31	ELEVATION OF HEADWATER	471.8		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15000	
45		466	16600	
46		467	18250	
47		468	19960	
48		468.5	20831	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 3
[3] AREA - ACRES	10.250
[4] L-FEET	750
[5] L-MILES	0.142
[6] La-FEET	170.00
[7] La-MILES	0.032
[8] ELEVATION OF HEADWATER	471.8
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.3
[11] S-FEET/MILE	23.2
[12] S^0.5	4.82
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	2.0
[17] 100% OF LAG-MINUTES	2.0
[18] 200% OF LAG-MINUTES	4.1
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.23

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	10.250	1.00	1.04	1.36	10.250	1.00	1.36	2.23	10.250	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.25	SUM [7]	1.04	SUM [9]	10.25	SUM [11]	1.36	SUM [13]	10.25	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.47	0.46	0.36
FLOOD VOLUME	(cu-ft)	17,326	17,301	13,560
	(acre-ft)	0.40	0.40	0.31
REQUIRED STORAGE	(cu-ft)	14,912	13,552	5,367
	(acre-ft)	0.34	0.31	0.12
PEAK FLOW	(cfs)	8.38	7.26	1.29
MAXIMUM WSEL	(ft)	465.94	465.86	465.34

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.56	0.250	0.0130
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.65	0.649	0.1400
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	1.04	0.101	0.0528
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.25	SUM	0.2058

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102877561

C= 0.00191

Ft=C(24-(T/60))^1.55 = 0.00191 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.21
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.21	0.15	0.02	0.17	0.00
2	10	0.17	1.3	0.162	0.21	0.15	0.02	0.17	0.00
3	15	0.25	1.1	0.137	0.21	0.12	0.01	0.14	0.00
4	20	0.33	1.5	0.187	0.21	0.17	0.02	0.19	0.00
5	25	0.42	1.5	0.187	0.21	0.17	0.02	0.19	0.00
6	30	0.50	1.8	0.225	0.21	0.20	0.02	0.19	0.00
7	35	0.58	1.5	0.187	0.21	0.17	0.02	0.19	0.00
8	40	0.67	1.8	0.225	0.21	0.20	0.02	0.19	0.00
9	45	0.75	1.8	0.225	0.21	0.20	0.02	0.19	0.00
10	50	0.83	1.5	0.187	0.21	0.17	0.02	0.19	0.00
11	55	0.92	1.6	0.200	0.21	0.18	0.02	0.20	0.00
12	60	1.00	1.8	0.225	0.21	0.20	0.02	0.19	0.00
13	65	1.08	2.2	0.275	0.21	0.25	0.07	0.71	141.78
14	70	1.17	2.2	0.275	0.21	0.25	0.07	0.71	141.78
15	75	1.25	2.2	0.275	0.21	0.25	0.07	0.71	141.78
16	80	1.33	2.0	0.250	0.21	0.22	0.04	0.45	65.03
17	85	1.42	2.6	0.324	0.21	0.29	0.12	1.22	295.29
18	90	1.50	2.7	0.337	0.21	0.30	0.13	1.34	333.66
19	95	1.58	2.4	0.300	0.21	0.27	0.09	0.96	218.54
20	100	1.67	2.7	0.337	0.21	0.30	0.13	1.34	333.66
21	105	1.75	3.3	0.412	0.21	0.37	0.21	2.11	563.92
22	110	1.83	3.1	0.387	0.21	0.35	0.18	1.86	487.17
23	115	1.92	2.9	0.362	0.21	0.33	0.16	1.60	410.42
24	120	2.00	3.0	0.374	0.21	0.34	0.17	1.73	448.79
25	125	2.08	3.1	0.387	0.21	0.35	0.18	1.86	487.17
26	130	2.17	4.2	0.524	0.21	0.47	0.32	3.26	909.30
27	135	2.25	5.0	0.624	0.21	0.56	0.42	4.29	1216.31
28	140	2.33	3.5	0.437	0.21	0.39	0.23	2.37	640.67
29	145	2.42	6.8	0.849	0.21	0.76	0.64	6.59	1907.08
30	150	2.50	7.3	0.911	0.21	0.82	0.71	7.23	2098.96
31	155	2.58	8.2	1.023	0.21	0.92	0.82	8.38	2444.34
32	160	2.67	5.9	0.736	0.21	0.66	0.53	5.44	1561.70
33	165	2.75	2.0	0.250	0.21	0.22	0.04	0.45	65.03
34	170	2.83	1.8	0.225	0.21	0.20	0.02	0.19	0.00
35	175	2.92	1.8	0.225	0.21	0.20	0.02	0.19	0.00
36	180	3.00	0.6	0.075	0.21	0.07	0.01	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.40
FLOOD VOLUME (cuft)	17326.37
REQUIRED STORAGE (acft)	0.34
REQUIRED STORAGE (cuft)	14912.39
PEAK FLOW RATE (cfs)	8.38

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.082	0.21	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.21	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.21	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.21	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.21	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.21	0.10	0.01	0.12	0.00
7	35	0.58	0.7	0.114	0.21	0.10	0.01	0.12	0.00
8	40	0.67	0.7	0.114	0.21	0.10	0.01	0.12	0.00
9	45	0.75	0.7	0.114	0.21	0.10	0.01	0.12	0.00
10	50	0.83	0.7	0.114	0.21	0.10	0.01	0.12	0.00
11	55	0.92	0.7	0.114	0.21	0.10	0.01	0.12	0.00
12	60	1.00	0.8	0.131	0.21	0.12	0.01	0.13	0.00
13	65	1.08	0.8	0.131	0.21	0.12	0.01	0.13	0.00
14	70	1.17	0.8	0.131	0.21	0.12	0.01	0.13	0.00
15	75	1.25	0.8	0.131	0.21	0.12	0.01	0.13	0.00
16	80	1.33	0.8	0.131	0.21	0.12	0.01	0.13	0.00
17	85	1.42	0.8	0.131	0.21	0.12	0.01	0.13	0.00
18	90	1.50	0.8	0.131	0.21	0.12	0.01	0.13	0.00
19	95	1.58	0.8	0.131	0.21	0.12	0.01	0.13	0.00
20	100	1.67	0.8	0.131	0.21	0.12	0.01	0.13	0.00
21	105	1.75	0.8	0.131	0.21	0.12	0.01	0.13	0.00
22	110	1.83	0.8	0.131	0.21	0.12	0.01	0.13	0.00
23	115	1.92	0.8	0.131	0.21	0.12	0.01	0.13	0.00
24	120	2.00	0.9	0.147	0.21	0.13	0.01	0.15	0.00
25	125	2.08	0.8	0.131	0.21	0.12	0.01	0.13	0.00
26	130	2.17	0.9	0.147	0.21	0.13	0.01	0.15	0.00
27	135	2.25	0.9	0.147	0.21	0.13	0.01	0.15	0.00
28	140	2.33	0.9	0.147	0.21	0.13	0.01	0.15	0.00
29	145	2.42	0.9	0.147	0.21	0.13	0.01	0.15	0.00
30	150	2.50	0.9	0.147	0.21	0.13	0.01	0.15	0.00
31	155	2.58	0.9	0.147	0.21	0.13	0.01	0.15	0.00
32	160	2.67	0.9	0.147	0.21	0.13	0.01	0.15	0.00
33	165	2.75	1.0	0.163	0.21	0.15	0.02	0.17	0.00
34	170	2.83	1.0	0.163	0.21	0.15	0.02	0.17	0.00
35	175	2.92	1.0	0.163	0.21	0.15	0.02	0.17	0.00
36	180	3.00	1.0	0.163	0.21	0.15	0.02	0.17	0.00
37	185	3.08	1.0	0.163	0.21	0.15	0.02	0.17	0.00
38	190	3.17	1.1	0.180	0.21	0.16	0.02	0.18	0.00
39	195	3.25	1.1	0.180	0.21	0.16	0.02	0.18	0.00
40	200	3.33	1.1	0.180	0.21	0.16	0.02	0.18	0.00
41	205	3.42	1.2	0.196	0.21	0.18	0.02	0.20	0.00
42	210	3.50	1.3	0.212	0.21	0.19	0.01	0.07	0.00
43	215	3.58	1.4	0.228	0.21	0.21	0.02	0.23	0.09
44	220	3.67	1.4	0.228	0.21	0.21	0.02	0.23	0.09
45	225	3.75	1.5	0.245	0.21	0.22	0.04	0.40	50.27
46	230	3.83	1.5	0.245	0.21	0.22	0.04	0.40	50.27
47	235	3.92	1.6	0.261	0.21	0.24	0.06	0.57	100.46
48	240	4.00	1.6	0.261	0.21	0.24	0.06	0.57	100.46
49	245	4.08	1.7	0.277	0.21	0.25	0.07	0.73	150.64
50	250	4.17	1.8	0.294	0.21	0.26	0.09	0.90	200.82
51	255	4.25	1.9	0.310	0.21	0.28	0.10	1.07	251.01
52	260	4.33	2.0	0.326	0.21	0.29	0.12	1.24	301.19
53	265	4.42	2.1	0.343	0.21	0.31	0.14	1.40	351.38
54	270	4.50	2.1	0.343	0.21	0.31	0.14	1.40	351.38
55	275	4.58	2.2	0.359	0.21	0.32	0.15	1.57	401.56
56	280	4.67	2.3	0.375	0.21	0.34	0.17	1.74	451.74

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.05		
UNIT TIME-PERCENT OF LAG	244.5		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.206		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.23 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.392	0.21	0.35	0.19	1.91	501.93
58	290	4.83	2.4	0.392	0.21	0.35	0.19	1.91	501.93
59	295	4.92	2.5	0.408	0.21	0.37	0.20	2.07	552.11
60	300	5.00	2.6	0.424	0.21	0.38	0.22	2.24	602.30
61	305	5.08	3.1	0.506	0.21	0.46	0.30	3.08	853.22
62	310	5.17	3.6	0.588	0.21	0.53	0.38	3.91	1104.14
63	315	5.25	3.9	0.636	0.21	0.57	0.43	4.41	1254.69
64	320	5.33	4.2	0.685	0.21	0.62	0.48	4.92	1405.24
65	325	5.42	4.7	0.767	0.21	0.69	0.56	5.75	1656.16
66	330	5.50	5.6	0.914	0.21	0.82	0.71	7.26	2107.82
67	335	5.58	1.9	0.310	0.21	0.28	0.10	1.07	251.01
68	340	5.67	0.9	0.147	0.21	0.13	0.01	0.15	0.00
69	345	5.75	0.6	0.098	0.21	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.21	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.21	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.21	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.46
FLOOD VOLUME (acft)	0.40
FLOOD VOLUME (cuft)	17301.15
REQUIRED STORAGE (acft)	0.31
REQUIRED STORAGE (cuft)	13551.86
PEAK FLOW RATE (cfs)	7.26

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.363	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.359	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.355	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.351	0.032	0.004	0.04	0.00
5	75	1.25	0.3	0.027	0.347	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.343	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.338	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.334	0.032	0.004	0.04	0.00
9	135	2.25	0.4	0.036	0.330	0.032	0.004	0.04	0.00
10	150	2.50	0.4	0.036	0.326	0.032	0.004	0.04	0.00
11	165	2.75	0.5	0.045	0.322	0.040	0.004	0.05	0.00
12	180	3.00	0.5	0.045	0.318	0.040	0.004	0.05	0.00
13	195	3.25	0.5	0.045	0.314	0.040	0.004	0.05	0.00
14	210	3.50	0.5	0.045	0.310	0.040	0.004	0.05	0.00
15	225	3.75	0.5	0.045	0.307	0.040	0.004	0.05	0.00
16	240	4.00	0.6	0.054	0.303	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.299	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.295	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.291	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.288	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.284	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.280	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.276	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.273	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.269	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.266	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.262	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.258	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.255	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.252	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.248	0.096	0.011	0.11	0.00
32	480	8.00	1.3	0.116	0.245	0.104	0.012	0.12	0.00
33	495	8.25	1.5	0.134	0.241	0.120	0.013	0.14	0.00
34	510	8.50	1.5	0.134	0.238	0.120	0.013	0.14	0.00
35	525	8.75	1.6	0.143	0.235	0.128	0.014	0.15	0.00
36	540	9.00	1.7	0.152	0.231	0.136	0.015	0.16	0.00
37	555	9.25	1.9	0.169	0.228	0.153	0.017	0.17	0.00
38	570	9.50	2.0	0.178	0.225	0.161	0.018	0.18	0.00
39	585	9.75	2.1	0.187	0.222	0.169	0.019	0.19	0.00
40	600	10.00	2.2	0.196	0.218	0.177	0.020	0.20	0.00
41	615	10.25	1.5	0.134	0.215	0.120	0.013	0.14	0.00
42	630	10.50	1.5	0.134	0.212	0.120	0.013	0.14	0.00
43	645	10.75	2.0	0.178	0.209	0.161	0.018	0.18	0.00
44	660	11.00	2.0	0.178	0.206	0.161	0.018	0.18	0.00
45	675	11.25	1.9	0.169	0.203	0.153	0.017	0.17	0.00
46	690	11.50	1.9	0.169	0.200	0.153	0.017	0.17	0.00
47	705	11.75	1.7	0.152	0.197	0.136	0.015	0.16	0.00
48	720	12.00	1.8	0.161	0.194	0.145	0.016	0.16	0.00
49	735	12.25	2.5	0.223	0.191	0.201	0.032	0.33	84.85
50	750	12.50	2.6	0.232	0.188	0.209	0.044	0.45	193.54
51	765	12.75	2.8	0.250	0.185	0.225	0.064	0.66	384.21
52	780	13.00	2.9	0.259	0.183	0.233	0.076	0.78	492.27
53	795	13.25	3.4	0.303	0.180	0.273	0.123	1.27	929.17
54	810	13.50	3.4	0.303	0.177	0.273	0.126	1.29	954.32
55	825	13.75	2.3	0.205	0.174	0.185	0.031	0.31	73.98
56	840	14.00	2.3	0.205	0.172	0.185	0.033	0.34	98.48
57	855	14.25	2.7	0.241	0.169	0.217	0.072	0.73	451.79
58	870	14.50	2.6	0.232	0.167	0.209	0.065	0.67	393.33
59	885	14.75	2.6	0.232	0.164	0.209	0.068	0.70	416.82
60	900	15.00	2.5	0.223	0.162	0.201	0.061	0.63	357.68
61	915	15.25	2.4	0.214	0.159	0.193	0.055	0.56	298.20

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.157	0.185	0.049	0.50	238.37
63	945	15.75	1.9	0.169	0.154	0.153	0.015	0.16	0.00
64	960	16.00	1.9	0.169	0.152	0.153	0.018	0.18	0.00
65	975	16.25	0.4	0.036	0.150	0.032	0.004	0.04	0.00
66	990	16.50	0.4	0.036	0.147	0.032	0.004	0.04	0.00
67	1005	16.75	0.3	0.027	0.145	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.143	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.141	0.040	0.004	0.05	0.00
70	1050	17.50	0.5	0.045	0.139	0.040	0.004	0.05	0.00
71	1065	17.75	0.5	0.045	0.137	0.040	0.004	0.05	0.00
72	1080	18.00	0.4	0.036	0.134	0.032	0.004	0.04	0.00
73	1095	18.25	0.4	0.036	0.133	0.032	0.004	0.04	0.00
74	1110	18.50	0.4	0.036	0.131	0.032	0.004	0.04	0.00
75	1125	18.75	0.3	0.027	0.129	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.127	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.125	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.123	0.032	0.004	0.04	0.00
79	1185	19.75	0.3	0.027	0.122	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.120	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.117	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.114	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.113	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.111	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.110	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.109	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.108	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.107	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.106	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.105	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.104	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.104	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.103	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.103	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.36
FLOOD VOLUME (acft)	0.31
FLOOD VOLUME (cuft)	13560.19
REQUIRED STORAGE (acft)	0.12
REQUIRED STORAGE (cuft)	5367.00
PEAK FLOW (cfs)	1.29

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15000	0	0	0.00
466	1	1	1600	16600	15800	15800	0.36
467	1	2	1650	18250	17425	33225	0.76
468	1	3	1710	19960	19105	52330	1.20
468.5	0.5	3.5	871	20831	10198	62528	1.44

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.23 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.23 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	50	50	70	-	465.00	-	0.00
2	10	0.17	50	50	70	-	465.00	-	0.00
3	15	0.14	42	42	70	-	465.00	-	0.00
4	20	0.19	58	58	70	-	465.00	-	0.00
5	25	0.19	58	58	70	-	465.00	-	0.00
6	30	0.19	58	58	70	-	465.00	-	0.00
7	35	0.19	58	58	70	-	465.00	-	0.00
8	40	0.19	58	58	70	-	465.00	-	0.00
9	45	0.19	58	58	70	-	465.00	-	0.00
10	50	0.19	58	58	70	-	465.00	-	0.00
11	55	0.20	61	61	70	-	465.00	-	0.00
12	60	0.19	58	58	70	-	465.00	-	0.00
13	65	0.71	212	212	70	142	465.01	142	0.00
14	70	0.71	212	353	70	284	465.02	284	0.01
15	75	0.71	212	495	70	425	465.03	425	0.01
16	80	0.45	135	560	70	490	465.03	490	0.01
17	85	1.22	365	855	70	786	465.05	786	0.02
18	90	1.34	403	1,189	70	1,119	465.07	1,119	0.03
19	95	0.96	288	1,408	70	1,338	465.08	1,338	0.03
20	100	1.34	403	1,741	70	1,672	465.11	1,672	0.04
21	105	2.11	634	2,305	70	2,235	465.14	2,235	0.05
22	110	1.86	557	2,792	70	2,723	465.17	2,723	0.06
23	115	1.60	480	3,203	70	3,133	465.20	3,133	0.07
24	120	1.73	519	3,652	70	3,582	465.23	3,582	0.08
25	125	1.86	557	4,139	70	4,069	465.26	4,069	0.09
26	130	3.26	979	5,048	70	4,978	465.32	4,978	0.11
27	135	4.29	1,286	6,264	70	6,195	465.39	6,195	0.14
28	140	2.37	710	6,905	70	6,835	465.43	6,835	0.16
29	145	6.59	1,977	8,812	70	8,742	465.55	8,742	0.20
30	150	7.23	2,169	10,911	70	10,841	465.69	10,841	0.25
31	155	8.38	2,514	13,355	70	13,286	465.84	13,286	0.30
32	160	5.44	1,631	14,917	70	14,847	465.94	14,847	0.34
33	165	0.45	135	14,982	70	14,912	465.94	14,912	0.34
34	170	0.19	58	14,970	70	14,901	465.94	14,901	0.34
35	175	0.19	58	14,959	70	14,889	465.94	14,889	0.34
36	180	0.08	23	14,912	70	14,842	465.94	14,842	0.34

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	25	25	70	-	465.00	-	0.00
2	10	0.10	30	30	70	-	465.00	-	0.00
3	15	0.10	30	30	70	-	465.00	-	0.00
4	20	0.10	30	30	70	-	465.00	-	0.00
5	25	0.10	30	30	70	-	465.00	-	0.00
6	30	0.12	35	35	70	-	465.00	-	0.00
7	35	0.12	35	35	70	-	465.00	-	0.00
8	40	0.12	35	35	70	-	465.00	-	0.00
9	45	0.12	35	35	70	-	465.00	-	0.00
10	50	0.12	35	35	70	-	465.00	-	0.00
11	55	0.12	35	35	70	-	465.00	-	0.00
12	60	0.13	40	40	70	-	465.00	-	0.00
13	65	0.13	40	40	70	-	465.00	-	0.00
14	70	0.13	40	40	70	-	465.00	-	0.00
15	75	0.13	40	40	70	-	465.00	-	0.00
16	80	0.13	40	40	70	-	465.00	-	0.00
17	85	0.13	40	40	70	-	465.00	-	0.00
18	90	0.13	40	40	70	-	465.00	-	0.00
19	95	0.13	40	40	70	-	465.00	-	0.00
20	100	0.13	40	40	70	-	465.00	-	0.00
21	105	0.13	40	40	70	-	465.00	-	0.00
22	110	0.13	40	40	70	-	465.00	-	0.00
23	115	0.13	40	40	70	-	465.00	-	0.00
24	120	0.15	45	45	70	-	465.00	-	0.00
25	125	0.13	40	40	70	-	465.00	-	0.00
26	130	0.15	45	45	70	-	465.00	-	0.00
27	135	0.15	45	45	70	-	465.00	-	0.00
28	140	0.15	45	45	70	-	465.00	-	0.00
29	145	0.15	45	45	70	-	465.00	-	0.00
30	150	0.15	45	45	70	-	465.00	-	0.00
31	155	0.15	45	45	70	-	465.00	-	0.00
32	160	0.15	45	45	70	-	465.00	-	0.00
33	165	0.17	50	50	70	-	465.00	-	0.00
34	170	0.17	50	50	70	-	465.00	-	0.00
35	175	0.17	50	50	70	-	465.00	-	0.00
36	180	0.17	50	50	70	-	465.00	-	0.00
37	185	0.17	50	50	70	-	465.00	-	0.00
38	190	0.18	55	55	70	-	465.00	-	0.00
39	195	0.18	55	55	70	-	465.00	-	0.00
40	200	0.18	55	55	70	-	465.00	-	0.00
41	205	0.20	60	60	70	-	465.00	-	0.00
42	210	0.07	20	20	70	-	465.00	-	0.00
43	215	0.23	70	70	70	0	465.00	0	0.00
44	220	0.23	70	70	70	0	465.00	0	0.00
45	225	0.40	120	120	70	50	465.00	50	0.00
46	230	0.40	120	171	70	101	465.01	101	0.00
47	235	0.57	170	271	70	201	465.01	201	0.00
48	240	0.57	170	371	70	302	465.02	302	0.01
49	245	0.73	220	522	70	452	465.03	452	0.01
50	250	0.90	271	723	70	653	465.04	653	0.01
51	255	1.07	321	974	70	904	465.06	904	0.02
52	260	1.24	371	1,275	70	1,205	465.08	1,205	0.03
53	265	1.40	421	1,626	70	1,557	465.10	1,557	0.04
54	270	1.40	421	1,978	70	1,908	465.12	1,908	0.04
55	275	1.57	471	2,379	70	2,310	465.15	2,310	0.05

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.74	522	2,831	70	2,761	465.17	2,761	0.06
57	285	1.91	572	3,333	70	3,263	465.21	3,263	0.07
58	290	1.91	572	3,835	70	3,765	465.24	3,765	0.09
59	295	2.07	622	4,387	70	4,317	465.27	4,317	0.10
60	300	2.24	672	4,989	70	4,920	465.31	4,920	0.11
61	305	3.08	923	5,843	70	5,773	465.37	5,773	0.13
62	310	3.91	1,174	6,947	70	6,877	465.44	6,877	0.16
63	315	4.41	1,324	8,201	70	8,132	465.51	8,132	0.19
64	320	4.92	1,475	9,607	70	9,537	465.60	9,537	0.22
65	325	5.75	1,726	11,263	70	11,193	465.71	11,193	0.26
66	330	7.26	2,178	13,371	70	13,301	465.84	13,301	0.31
67	335	1.07	321	13,622	70	13,552	465.86	13,552	0.31
68	340	0.15	45	13,597	70	13,527	465.86	13,527	0.31
69	345	0.10	30	13,557	70	13,488	465.85	13,488	0.31
70	350	0.08	25	13,513	70	13,443	465.85	13,443	0.31
71	355	0.05	15	13,458	70	13,388	465.85	13,388	0.31
72	360	0.03	10	13,398	70	13,328	465.84	13,328	0.31

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	16	16	209	-	465.00	-	0.00
2	30	0.03	25	25	209	-	465.00	-	0.00
3	45	0.03	25	25	209	-	465.00	-	0.00
4	60	0.04	33	33	209	-	465.00	-	0.00
5	75	0.03	25	25	209	-	465.00	-	0.00
6	90	0.03	25	25	209	-	465.00	-	0.00
7	105	0.03	25	25	209	-	465.00	-	0.00
8	120	0.04	33	33	209	-	465.00	-	0.00
9	135	0.04	33	33	209	-	465.00	-	0.00
10	150	0.04	33	33	209	-	465.00	-	0.00
11	165	0.05	41	41	209	-	465.00	-	0.00
12	180	0.05	41	41	209	-	465.00	-	0.00
13	195	0.05	41	41	209	-	465.00	-	0.00
14	210	0.05	41	41	209	-	465.00	-	0.00
15	225	0.05	41	41	209	-	465.00	-	0.00
16	240	0.05	49	49	209	-	465.00	-	0.00
17	255	0.05	49	49	209	-	465.00	-	0.00
18	270	0.06	58	58	209	-	465.00	-	0.00
19	285	0.06	58	58	209	-	465.00	-	0.00
20	300	0.07	66	66	209	-	465.00	-	0.00
21	315	0.05	49	49	209	-	465.00	-	0.00
22	330	0.06	58	58	209	-	465.00	-	0.00
23	345	0.07	66	66	209	-	465.00	-	0.00
24	360	0.07	66	66	209	-	465.00	-	0.00
25	375	0.08	74	74	209	-	465.00	-	0.00
26	390	0.08	74	74	209	-	465.00	-	0.00
27	405	0.09	82	82	209	-	465.00	-	0.00
28	420	0.09	82	82	209	-	465.00	-	0.00
29	435	0.09	82	82	209	-	465.00	-	0.00
30	450	0.10	91	91	209	-	465.00	-	0.00
31	465	0.11	99	99	209	-	465.00	-	0.00
32	480	0.12	107	107	209	-	465.00	-	0.00
33	495	0.14	123	123	209	-	465.00	-	0.00
34	510	0.14	123	123	209	-	465.00	-	0.00
35	525	0.15	132	132	209	-	465.00	-	0.00
36	540	0.16	140	140	209	-	465.00	-	0.00
37	555	0.17	156	156	209	-	465.00	-	0.00
38	570	0.18	165	165	209	-	465.00	-	0.00
39	585	0.19	173	173	209	-	465.00	-	0.00
40	600	0.20	181	181	209	-	465.00	-	0.00
41	615	0.14	123	123	209	-	465.00	-	0.00
42	630	0.14	123	123	209	-	465.00	-	0.00
43	645	0.18	165	165	209	-	465.00	-	0.00
44	660	0.18	165	165	209	-	465.00	-	0.00
45	675	0.17	156	156	209	-	465.00	-	0.00
46	690	0.17	156	156	209	-	465.00	-	0.00
47	705	0.16	140	140	209	-	465.00	-	0.00
48	720	0.16	148	148	209	-	465.00	-	0.00
49	735	0.33	294	294	209	85	465.01	85	0.00
50	750	0.45	403	488	209	278	465.02	278	0.01
51	765	0.66	594	872	209	663	465.04	663	0.02
52	780	0.78	702	1,364	209	1,155	465.07	1,155	0.03
53	795	1.27	1,139	2,293	209	2,084	465.13	2,084	0.05
54	810	1.29	1,164	3,248	209	3,038	465.19	3,038	0.07
55	825	0.31	283	3,322	209	3,112	465.20	3,112	0.07
56	840	0.34	308	3,420	209	3,211	465.20	3,211	0.07
57	855	0.73	661	3,872	209	3,663	465.23	3,663	0.08
58	870	0.67	603	4,265	209	4,056	465.26	4,056	0.09

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.70	626	4,682	209	4,473	465.28	4,473	0.10
60	900	0.63	567	5,040	209	4,830	465.31	4,830	0.11
61	915	0.56	508	5,338	209	5,129	465.32	5,129	0.12
62	930	0.50	448	5,576	209	5,367	465.34	5,367	0.12
63	945	0.16	141	5,508	209	5,298	465.34	5,298	0.12
64	960	0.18	162	5,461	209	5,251	465.33	5,251	0.12
65	975	0.04	33	5,284	209	5,075	465.32	5,075	0.12
66	990	0.04	33	5,108	209	4,898	465.31	4,898	0.11
67	1005	0.03	25	4,923	209	4,714	465.30	4,714	0.11
68	1020	0.03	25	4,738	209	4,529	465.29	4,529	0.10
69	1035	0.05	41	4,570	209	4,361	465.28	4,361	0.10
70	1050	0.05	41	4,402	209	4,193	465.27	4,193	0.10
71	1065	0.05	41	4,234	209	4,024	465.25	4,024	0.09
72	1080	0.04	33	4,057	209	3,848	465.24	3,848	0.09
73	1095	0.04	33	3,881	209	3,671	465.23	3,671	0.08
74	1110	0.04	33	3,704	209	3,495	465.22	3,495	0.08
75	1125	0.03	25	3,520	209	3,310	465.21	3,310	0.08
76	1140	0.02	16	3,327	209	3,117	465.20	3,117	0.07
77	1155	0.03	25	3,142	209	2,933	465.19	2,933	0.07
78	1170	0.04	33	2,966	209	2,756	465.17	2,756	0.06
79	1185	0.03	25	2,781	209	2,572	465.16	2,572	0.06
80	1200	0.02	16	2,588	209	2,379	465.15	2,379	0.05
81	1215	0.03	25	2,403	209	2,194	465.14	2,194	0.05
82	1230	0.03	25	2,219	209	2,009	465.13	2,009	0.05
83	1245	0.03	25	2,034	209	1,825	465.12	1,825	0.04
84	1260	0.02	16	1,841	209	1,632	465.10	1,632	0.04
85	1275	0.03	25	1,656	209	1,447	465.09	1,447	0.03
86	1290	0.02	16	1,463	209	1,254	465.08	1,254	0.03
87	1305	0.03	25	1,279	209	1,069	465.07	1,069	0.02
88	1320	0.02	16	1,086	209	876	465.06	876	0.02
89	1335	0.03	25	901	209	692	465.04	692	0.02
90	1350	0.02	16	708	209	499	465.03	499	0.01
91	1365	0.02	16	515	209	306	465.02	306	0.01
92	1380	0.02	16	322	209	113	465.01	113	0.00
93	1395	0.02	16	129	209	-	465.00	-	0.00
94	1410	0.02	16	16	209	-	465.00	-	0.00
95	1425	0.02	16	16	209	-	465.00	-	0.00
96	1440	0.02	16	16	209	-	465.00	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 4		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.33		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.56		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.9		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	620		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	70		
30				
31	ELEVATION OF HEADWATER	470.5		
32	ELEVATION OF CONCENTRATION POINT	468		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		464.5	13730	
45		465.5	15200	
46		466.5	16700	
47		467.5	18270	
48		468	19075	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 4
[3] AREA - ACRES	9.790
[4] L-FEET	620
[5] L-MILES	0.117
[6] La-FEET	70.00
[7] La-MILES	0.013
[8] ELEVATION OF HEADWATER	470.5
[9] ELEVATION OF CONCENTRATION POINT	468
[10] H-FEET	2.5
[11] S-FEET/MILE	21.3
[12] S^0.5	4.61
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.4
[17] 100% OF LAG-MINUTES	1.4
[18] 200% OF LAG-MINUTES	2.8
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.21

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	9.790	1.00	1.04	1.36	9.790	1.00	1.36	2.23	9.790	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.79	SUM [7]	1.04	SUM [9]	9.79	SUM [11]	1.36	SUM [13]	9.79	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.47	0.47	0.37
FLOOD VOLUME	(cu-ft)	16,627	16,600	13,067
	(acre-ft)	0.38	0.38	0.30
REQUIRED STORAGE	(cu-ft)	14,362	13,085	5,344
	(acre-ft)	0.33	0.30	0.12
PEAK FLOW	(cfs)	8.01	6.94	1.24
MAXIMUM WSEL	(ft)	465.49	465.40	464.87

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.33	0.238	0.0124
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.56	0.670	0.1446
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.90	0.092	0.0478
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.79	SUM	0.2048

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102390603

C= 0.00190

Ft=C(24-(T/60))^1.55 = 0.00190 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.20
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.20	0.15	0.02	0.16	0.00
2	10	0.17	1.3	0.162	0.20	0.15	0.02	0.16	0.00
3	15	0.25	1.1	0.137	0.20	0.12	0.01	0.13	0.00
4	20	0.33	1.5	0.187	0.20	0.17	0.02	0.18	0.00
5	25	0.42	1.5	0.187	0.20	0.17	0.02	0.18	0.00
6	30	0.50	1.8	0.225	0.20	0.20	0.02	0.19	0.00
7	35	0.58	1.5	0.187	0.20	0.17	0.02	0.18	0.00
8	40	0.67	1.8	0.225	0.20	0.20	0.02	0.19	0.00
9	45	0.75	1.8	0.225	0.20	0.20	0.02	0.19	0.00
10	50	0.83	1.5	0.187	0.20	0.17	0.02	0.18	0.00
11	55	0.92	1.6	0.200	0.20	0.18	0.02	0.20	0.00
12	60	1.00	1.8	0.225	0.20	0.20	0.02	0.19	0.00
13	65	1.08	2.2	0.275	0.20	0.25	0.07	0.68	141.06
14	70	1.17	2.2	0.275	0.20	0.25	0.07	0.68	141.06
15	75	1.25	2.2	0.275	0.20	0.25	0.07	0.68	141.06
16	80	1.33	2.0	0.250	0.20	0.22	0.04	0.44	67.75
17	85	1.42	2.6	0.324	0.20	0.29	0.12	1.17	287.67
18	90	1.50	2.7	0.337	0.20	0.30	0.13	1.29	324.33
19	95	1.58	2.4	0.300	0.20	0.27	0.09	0.93	214.37
20	100	1.67	2.7	0.337	0.20	0.30	0.13	1.29	324.33
21	105	1.75	3.3	0.412	0.20	0.37	0.21	2.03	544.25
22	110	1.83	3.1	0.387	0.20	0.35	0.18	1.78	470.94
23	115	1.92	2.9	0.362	0.20	0.33	0.16	1.54	397.63
24	120	2.00	3.0	0.374	0.20	0.34	0.17	1.66	434.29
25	125	2.08	3.1	0.387	0.20	0.35	0.18	1.78	470.94
26	130	2.17	4.2	0.524	0.20	0.47	0.32	3.13	874.13
27	135	2.25	5.0	0.624	0.20	0.56	0.42	4.10	1167.36
28	140	2.33	3.5	0.437	0.20	0.39	0.23	2.27	617.56
29	145	2.42	6.8	0.849	0.20	0.76	0.64	6.30	1827.13
30	150	2.50	7.3	0.911	0.20	0.82	0.71	6.91	2010.40
31	155	2.58	8.2	1.023	0.20	0.92	0.82	8.01	2340.28
32	160	2.67	5.9	0.736	0.20	0.66	0.53	5.20	1497.25
33	165	2.75	2.0	0.250	0.20	0.22	0.04	0.44	67.75
34	170	2.83	1.8	0.225	0.20	0.20	0.02	0.19	0.00
35	175	2.92	1.8	0.225	0.20	0.20	0.02	0.19	0.00
36	180	3.00	0.6	0.075	0.20	0.07	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.38
FLOOD VOLUME (cuft)	16626.67
REQUIRED STORAGE (acft)	0.33
REQUIRED STORAGE (cuft)	14361.53
PEAK FLOW RATE (cfs)	8.01

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.38		
UNIT TIME-PERCENT OF LAG	362.1		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.205		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.21 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.082	0.20	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.20	0.09	0.01	0.10	0.00
3	15	0.25	0.6	0.098	0.20	0.09	0.01	0.10	0.00
4	20	0.33	0.6	0.098	0.20	0.09	0.01	0.10	0.00
5	25	0.42	0.6	0.098	0.20	0.09	0.01	0.10	0.00
6	30	0.50	0.7	0.114	0.20	0.10	0.01	0.11	0.00
7	35	0.58	0.7	0.114	0.20	0.10	0.01	0.11	0.00
8	40	0.67	0.7	0.114	0.20	0.10	0.01	0.11	0.00
9	45	0.75	0.7	0.114	0.20	0.10	0.01	0.11	0.00
10	50	0.83	0.7	0.114	0.20	0.10	0.01	0.11	0.00
11	55	0.92	0.7	0.114	0.20	0.10	0.01	0.11	0.00
12	60	1.00	0.8	0.131	0.20	0.12	0.01	0.13	0.00
13	65	1.08	0.8	0.131	0.20	0.12	0.01	0.13	0.00
14	70	1.17	0.8	0.131	0.20	0.12	0.01	0.13	0.00
15	75	1.25	0.8	0.131	0.20	0.12	0.01	0.13	0.00
16	80	1.33	0.8	0.131	0.20	0.12	0.01	0.13	0.00
17	85	1.42	0.8	0.131	0.20	0.12	0.01	0.13	0.00
18	90	1.50	0.8	0.131	0.20	0.12	0.01	0.13	0.00
19	95	1.58	0.8	0.131	0.20	0.12	0.01	0.13	0.00
20	100	1.67	0.8	0.131	0.20	0.12	0.01	0.13	0.00
21	105	1.75	0.8	0.131	0.20	0.12	0.01	0.13	0.00
22	110	1.83	0.8	0.131	0.20	0.12	0.01	0.13	0.00
23	115	1.92	0.8	0.131	0.20	0.12	0.01	0.13	0.00
24	120	2.00	0.9	0.147	0.20	0.13	0.01	0.14	0.00
25	125	2.08	0.8	0.131	0.20	0.12	0.01	0.13	0.00
26	130	2.17	0.9	0.147	0.20	0.13	0.01	0.14	0.00
27	135	2.25	0.9	0.147	0.20	0.13	0.01	0.14	0.00
28	140	2.33	0.9	0.147	0.20	0.13	0.01	0.14	0.00
29	145	2.42	0.9	0.147	0.20	0.13	0.01	0.14	0.00
30	150	2.50	0.9	0.147	0.20	0.13	0.01	0.14	0.00
31	155	2.58	0.9	0.147	0.20	0.13	0.01	0.14	0.00
32	160	2.67	0.9	0.147	0.20	0.13	0.01	0.14	0.00
33	165	2.75	1.0	0.163	0.20	0.15	0.02	0.16	0.00
34	170	2.83	1.0	0.163	0.20	0.15	0.02	0.16	0.00
35	175	2.92	1.0	0.163	0.20	0.15	0.02	0.16	0.00
36	180	3.00	1.0	0.163	0.20	0.15	0.02	0.16	0.00
37	185	3.08	1.0	0.163	0.20	0.15	0.02	0.16	0.00
38	190	3.17	1.1	0.180	0.20	0.16	0.02	0.18	0.00
39	195	3.25	1.1	0.180	0.20	0.16	0.02	0.18	0.00
40	200	3.33	1.1	0.180	0.20	0.16	0.02	0.18	0.00
41	205	3.42	1.2	0.196	0.20	0.18	0.02	0.19	0.00
42	210	3.50	1.3	0.212	0.20	0.19	0.01	0.07	0.00
43	215	3.58	1.4	0.228	0.20	0.21	0.02	0.23	5.72
44	220	3.67	1.4	0.228	0.20	0.21	0.02	0.23	5.72
45	225	3.75	1.5	0.245	0.20	0.22	0.04	0.39	53.65
46	230	3.83	1.5	0.245	0.20	0.22	0.04	0.39	53.65
47	235	3.92	1.6	0.261	0.20	0.24	0.06	0.55	101.58
48	240	4.00	1.6	0.261	0.20	0.24	0.06	0.55	101.58
49	245	4.08	1.7	0.277	0.20	0.25	0.07	0.71	149.52
50	250	4.17	1.8	0.294	0.20	0.26	0.09	0.87	197.45
51	255	4.25	1.9	0.310	0.20	0.28	0.11	1.03	245.38
52	260	4.33	2.0	0.326	0.20	0.29	0.12	1.19	293.31
53	265	4.42	2.1	0.343	0.20	0.31	0.14	1.35	341.24
54	270	4.50	2.1	0.343	0.20	0.31	0.14	1.35	341.24
55	275	4.58	2.2	0.359	0.20	0.32	0.15	1.51	389.18
56	280	4.67	2.3	0.375	0.20	0.34	0.17	1.67	437.11

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.38		
UNIT TIME-PERCENT OF LAG	362.1		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.205		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.21 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.392	0.20	0.35	0.19	1.83	485.04
58	290	4.83	2.4	0.392	0.20	0.35	0.19	1.83	485.04
59	295	4.92	2.5	0.408	0.20	0.37	0.20	1.99	532.97
60	300	5.00	2.6	0.424	0.20	0.38	0.22	2.15	580.90
61	305	5.08	3.1	0.506	0.20	0.46	0.30	2.95	820.56
62	310	5.17	3.6	0.588	0.20	0.53	0.38	3.75	1060.22
63	315	5.25	3.9	0.636	0.20	0.57	0.43	4.23	1204.02
64	320	5.33	4.2	0.685	0.20	0.62	0.48	4.71	1347.81
65	325	5.42	4.7	0.767	0.20	0.69	0.56	5.50	1587.47
66	330	5.50	5.6	0.914	0.20	0.82	0.71	6.94	2018.86
67	335	5.58	1.9	0.310	0.20	0.28	0.11	1.03	245.38
68	340	5.67	0.9	0.147	0.20	0.13	0.01	0.14	0.00
69	345	5.75	0.6	0.098	0.20	0.09	0.01	0.10	0.00
70	350	5.83	0.5	0.082	0.20	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.20	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.20	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.47
FLOOD VOLUME (acft)	0.38
FLOOD VOLUME (cuft)	16599.70
REQUIRED STORAGE (acft)	0.30
REQUIRED STORAGE (cuft)	13084.61
PEAK FLOW RATE (cfs)	6.94

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate		Effective Rain	Flood Hydrograph	Required Storage
	Minutes	Hours	Percent	in/hr	in/hr			Flow	
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.362	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.357	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.353	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.349	0.032	0.004	0.03	0.00
5	75	1.25	0.3	0.027	0.345	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.341	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.337	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.333	0.032	0.004	0.03	0.00
9	135	2.25	0.4	0.036	0.329	0.032	0.004	0.03	0.00
10	150	2.50	0.4	0.036	0.325	0.032	0.004	0.03	0.00
11	165	2.75	0.5	0.045	0.321	0.040	0.004	0.04	0.00
12	180	3.00	0.5	0.045	0.317	0.040	0.004	0.04	0.00
13	195	3.25	0.5	0.045	0.313	0.040	0.004	0.04	0.00
14	210	3.50	0.5	0.045	0.309	0.040	0.004	0.04	0.00
15	225	3.75	0.5	0.045	0.305	0.040	0.004	0.04	0.00
16	240	4.00	0.6	0.054	0.301	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.297	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.294	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.290	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.286	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.282	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.279	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.275	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.272	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.268	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.264	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.261	0.080	0.009	0.09	0.00
28	420	7.00	1.0	0.089	0.257	0.080	0.009	0.09	0.00
29	435	7.25	1.0	0.089	0.254	0.080	0.009	0.09	0.00
30	450	7.50	1.1	0.098	0.250	0.088	0.010	0.10	0.00
31	465	7.75	1.2	0.107	0.247	0.096	0.011	0.10	0.00
32	480	8.00	1.3	0.116	0.243	0.104	0.012	0.11	0.00
33	495	8.25	1.5	0.134	0.240	0.120	0.013	0.13	0.00
34	510	8.50	1.5	0.134	0.237	0.120	0.013	0.13	0.00
35	525	8.75	1.6	0.143	0.233	0.128	0.014	0.14	0.00
36	540	9.00	1.7	0.152	0.230	0.136	0.015	0.15	0.00
37	555	9.25	1.9	0.169	0.227	0.153	0.017	0.17	0.00
38	570	9.50	2.0	0.178	0.224	0.161	0.018	0.17	0.00
39	585	9.75	2.1	0.187	0.220	0.169	0.019	0.18	0.00
40	600	10.00	2.2	0.196	0.217	0.177	0.020	0.19	0.00
41	615	10.25	1.5	0.134	0.214	0.120	0.013	0.13	0.00
42	630	10.50	1.5	0.134	0.211	0.120	0.013	0.13	0.00
43	645	10.75	2.0	0.178	0.208	0.161	0.018	0.17	0.00
44	660	11.00	2.0	0.178	0.205	0.161	0.018	0.17	0.00
45	675	11.25	1.9	0.169	0.202	0.153	0.017	0.17	0.00
46	690	11.50	1.9	0.169	0.199	0.153	0.017	0.17	0.00
47	705	11.75	1.7	0.152	0.196	0.136	0.015	0.15	0.00
48	720	12.00	1.8	0.161	0.193	0.145	0.016	0.16	0.00
49	735	12.25	2.5	0.223	0.190	0.201	0.033	0.32	97.34
50	750	12.50	2.6	0.232	0.187	0.209	0.045	0.44	201.03
51	765	12.75	2.8	0.250	0.185	0.225	0.065	0.64	383.03
52	780	13.00	2.9	0.259	0.182	0.233	0.077	0.75	486.13
53	795	13.25	3.4	0.303	0.179	0.273	0.124	1.22	903.31
54	810	13.50	3.4	0.303	0.176	0.273	0.127	1.24	927.21
55	825	13.75	2.3	0.205	0.174	0.185	0.032	0.31	86.27
56	840	14.00	2.3	0.205	0.171	0.185	0.034	0.33	109.55
57	855	14.25	2.7	0.241	0.168	0.217	0.072	0.71	446.90
58	870	14.50	2.6	0.232	0.166	0.209	0.066	0.65	390.96
59	885	14.75	2.6	0.232	0.163	0.209	0.069	0.67	413.29
60	900	15.00	2.5	0.223	0.161	0.201	0.062	0.61	356.70
61	915	15.25	2.4	0.214	0.158	0.193	0.056	0.55	299.78

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.156	0.185	0.049	0.48	242.53
63	945	15.75	1.9	0.169	0.153	0.153	0.016	0.16	0.00
64	960	16.00	1.9	0.169	0.151	0.153	0.018	0.18	0.00
65	975	16.25	0.4	0.036	0.149	0.032	0.004	0.03	0.00
66	990	16.50	0.4	0.036	0.147	0.032	0.004	0.03	0.00
67	1005	16.75	0.3	0.027	0.144	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.142	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.140	0.040	0.004	0.04	0.00
70	1050	17.50	0.5	0.045	0.138	0.040	0.004	0.04	0.00
71	1065	17.75	0.5	0.045	0.136	0.040	0.004	0.04	0.00
72	1080	18.00	0.4	0.036	0.134	0.032	0.004	0.03	0.00
73	1095	18.25	0.4	0.036	0.132	0.032	0.004	0.03	0.00
74	1110	18.50	0.4	0.036	0.130	0.032	0.004	0.03	0.00
75	1125	18.75	0.3	0.027	0.128	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.126	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.124	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.123	0.032	0.004	0.03	0.00
79	1185	19.75	0.3	0.027	0.121	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.119	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.118	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.116	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.115	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.113	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.112	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.111	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.110	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.108	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.107	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.106	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.105	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.105	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.104	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.103	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.103	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.102	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.37
FLOOD VOLUME (acft)	0.30
FLOOD VOLUME (cuft)	13066.60
REQUIRED STORAGE (acft)	0.12
REQUIRED STORAGE (cuft)	5344.02
PEAK FLOW (cfs)	1.24

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
464.5	0	0		13730	0	0	0.00
465.5	1	1	1470	15200	14465	14465	0.33
466.5	1	2	1500	16700	15950	30415	0.70
467.5	1	3	1570	18270	17485	47900	1.10
468	0.5	3.5	805	19075	9336	57236	1.31

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.21 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.21 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	48	48	64	-	464.50	-	0.00
2	10	0.16	48	48	64	-	464.50	-	0.00
3	15	0.13	40	40	64	-	464.50	-	0.00
4	20	0.18	55	55	64	-	464.50	-	0.00
5	25	0.18	55	55	64	-	464.50	-	0.00
6	30	0.19	58	58	64	-	464.50	-	0.00
7	35	0.18	55	55	64	-	464.50	-	0.00
8	40	0.19	58	58	64	-	464.50	-	0.00
9	45	0.19	58	58	64	-	464.50	-	0.00
10	50	0.18	55	55	64	-	464.50	-	0.00
11	55	0.20	59	59	64	-	464.50	-	0.00
12	60	0.19	58	58	64	-	464.50	-	0.00
13	65	0.68	205	205	64	141	464.51	141	0.00
14	70	0.68	205	346	64	282	464.52	282	0.01
15	75	0.68	205	487	64	423	464.53	423	0.01
16	80	0.44	132	555	64	491	464.53	491	0.01
17	85	1.17	352	842	64	779	464.55	779	0.02
18	90	1.29	388	1,167	64	1,103	464.58	1,103	0.03
19	95	0.93	278	1,381	64	1,317	464.59	1,317	0.03
20	100	1.29	388	1,705	64	1,642	464.61	1,642	0.04
21	105	2.03	608	2,250	64	2,186	464.65	2,186	0.05
22	110	1.78	535	2,721	64	2,657	464.68	2,657	0.06
23	115	1.54	462	3,118	64	3,054	464.71	3,054	0.07
24	120	1.66	498	3,553	64	3,489	464.74	3,489	0.08
25	125	1.78	535	4,024	64	3,960	464.77	3,960	0.09
26	130	3.13	938	4,898	64	4,834	464.83	4,834	0.11
27	135	4.10	1,231	6,065	64	6,001	464.91	6,001	0.14
28	140	2.27	681	6,683	64	6,619	464.96	6,619	0.15
29	145	6.30	1,891	8,510	64	8,446	465.08	8,446	0.19
30	150	6.91	2,074	10,520	64	10,456	465.22	10,456	0.24
31	155	8.01	2,404	12,860	64	12,797	465.38	12,797	0.29
32	160	5.20	1,561	14,358	64	14,294	465.49	14,294	0.33
33	165	0.44	132	14,425	64	14,362	465.49	14,362	0.33
34	170	0.19	58	14,420	64	14,356	465.49	14,356	0.33
35	175	0.19	58	14,414	64	14,350	465.49	14,350	0.33
36	180	0.07	22	14,372	64	14,309	465.49	14,309	0.33

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JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	24	24	64	-	464.50	-	0.00
2	10	0.10	29	29	64	-	464.50	-	0.00
3	15	0.10	29	29	64	-	464.50	-	0.00
4	20	0.10	29	29	64	-	464.50	-	0.00
5	25	0.10	29	29	64	-	464.50	-	0.00
6	30	0.11	34	34	64	-	464.50	-	0.00
7	35	0.11	34	34	64	-	464.50	-	0.00
8	40	0.11	34	34	64	-	464.50	-	0.00
9	45	0.11	34	34	64	-	464.50	-	0.00
10	50	0.11	34	34	64	-	464.50	-	0.00
11	55	0.11	34	34	64	-	464.50	-	0.00
12	60	0.13	38	38	64	-	464.50	-	0.00
13	65	0.13	38	38	64	-	464.50	-	0.00
14	70	0.13	38	38	64	-	464.50	-	0.00
15	75	0.13	38	38	64	-	464.50	-	0.00
16	80	0.13	38	38	64	-	464.50	-	0.00
17	85	0.13	38	38	64	-	464.50	-	0.00
18	90	0.13	38	38	64	-	464.50	-	0.00
19	95	0.13	38	38	64	-	464.50	-	0.00
20	100	0.13	38	38	64	-	464.50	-	0.00
21	105	0.13	38	38	64	-	464.50	-	0.00
22	110	0.13	38	38	64	-	464.50	-	0.00
23	115	0.13	38	38	64	-	464.50	-	0.00
24	120	0.14	43	43	64	-	464.50	-	0.00
25	125	0.13	38	38	64	-	464.50	-	0.00
26	130	0.14	43	43	64	-	464.50	-	0.00
27	135	0.14	43	43	64	-	464.50	-	0.00
28	140	0.14	43	43	64	-	464.50	-	0.00
29	145	0.14	43	43	64	-	464.50	-	0.00
30	150	0.14	43	43	64	-	464.50	-	0.00
31	155	0.14	43	43	64	-	464.50	-	0.00
32	160	0.14	43	43	64	-	464.50	-	0.00
33	165	0.16	48	48	64	-	464.50	-	0.00
34	170	0.16	48	48	64	-	464.50	-	0.00
35	175	0.16	48	48	64	-	464.50	-	0.00
36	180	0.16	48	48	64	-	464.50	-	0.00
37	185	0.16	48	48	64	-	464.50	-	0.00
38	190	0.18	53	53	64	-	464.50	-	0.00
39	195	0.18	53	53	64	-	464.50	-	0.00
40	200	0.18	53	53	64	-	464.50	-	0.00
41	205	0.19	58	58	64	-	464.50	-	0.00
42	210	0.07	22	22	64	-	464.50	-	0.00
43	215	0.23	70	70	64	6	464.50	6	0.00
44	220	0.23	70	75	64	11	464.50	11	0.00
45	225	0.39	118	129	64	65	464.50	65	0.00
46	230	0.39	118	183	64	119	464.51	119	0.00
47	235	0.55	165	284	64	220	464.52	220	0.01
48	240	0.55	165	386	64	322	464.52	322	0.01
49	245	0.71	213	535	64	471	464.53	471	0.01
50	250	0.87	261	733	64	669	464.55	669	0.02
51	255	1.03	309	978	64	914	464.56	914	0.02
52	260	1.19	357	1,271	64	1,208	464.58	1,208	0.03
53	265	1.35	405	1,613	64	1,549	464.61	1,549	0.04
54	270	1.35	405	1,954	64	1,890	464.63	1,890	0.04
55	275	1.51	453	2,343	64	2,279	464.66	2,279	0.05

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.67	501	2,780	64	2,716	464.69	2,716	0.06
57	285	1.83	549	3,265	64	3,201	464.72	3,201	0.07
58	290	1.83	549	3,750	64	3,686	464.75	3,686	0.08
59	295	1.99	597	4,283	64	4,219	464.79	4,219	0.10
60	300	2.15	645	4,864	64	4,800	464.83	4,800	0.11
61	305	2.95	884	5,685	64	5,621	464.89	5,621	0.13
62	310	3.75	1,124	6,745	64	6,681	464.96	6,681	0.15
63	315	4.23	1,268	7,949	64	7,885	465.05	7,885	0.18
64	320	4.71	1,412	9,297	64	9,233	465.14	9,233	0.21
65	325	5.50	1,651	10,884	64	10,820	465.25	10,820	0.25
66	330	6.94	2,083	12,903	64	12,839	465.39	12,839	0.29
67	335	1.03	309	13,148	64	13,085	465.40	13,085	0.30
68	340	0.14	43	13,128	64	13,064	465.40	13,064	0.30
69	345	0.10	29	13,093	64	13,029	465.40	13,029	0.30
70	350	0.08	24	13,053	64	12,989	465.40	12,989	0.30
71	355	0.05	14	13,003	64	12,939	465.39	12,939	0.30
72	360	0.03	10	12,949	64	12,885	465.39	12,885	0.30

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JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	16	16	192	-	464.50	-	0.00
2	30	0.03	24	24	192	-	464.50	-	0.00
3	45	0.03	24	24	192	-	464.50	-	0.00
4	60	0.03	31	31	192	-	464.50	-	0.00
5	75	0.03	24	24	192	-	464.50	-	0.00
6	90	0.03	24	24	192	-	464.50	-	0.00
7	105	0.03	24	24	192	-	464.50	-	0.00
8	120	0.03	31	31	192	-	464.50	-	0.00
9	135	0.03	31	31	192	-	464.50	-	0.00
10	150	0.03	31	31	192	-	464.50	-	0.00
11	165	0.04	39	39	192	-	464.50	-	0.00
12	180	0.04	39	39	192	-	464.50	-	0.00
13	195	0.04	39	39	192	-	464.50	-	0.00
14	210	0.04	39	39	192	-	464.50	-	0.00
15	225	0.04	39	39	192	-	464.50	-	0.00
16	240	0.05	47	47	192	-	464.50	-	0.00
17	255	0.05	47	47	192	-	464.50	-	0.00
18	270	0.06	55	55	192	-	464.50	-	0.00
19	285	0.06	55	55	192	-	464.50	-	0.00
20	300	0.07	63	63	192	-	464.50	-	0.00
21	315	0.05	47	47	192	-	464.50	-	0.00
22	330	0.06	55	55	192	-	464.50	-	0.00
23	345	0.07	63	63	192	-	464.50	-	0.00
24	360	0.07	63	63	192	-	464.50	-	0.00
25	375	0.08	71	71	192	-	464.50	-	0.00
26	390	0.08	71	71	192	-	464.50	-	0.00
27	405	0.09	79	79	192	-	464.50	-	0.00
28	420	0.09	79	79	192	-	464.50	-	0.00
29	435	0.09	79	79	192	-	464.50	-	0.00
30	450	0.10	86	86	192	-	464.50	-	0.00
31	465	0.10	94	94	192	-	464.50	-	0.00
32	480	0.11	102	102	192	-	464.50	-	0.00
33	495	0.13	118	118	192	-	464.50	-	0.00
34	510	0.13	118	118	192	-	464.50	-	0.00
35	525	0.14	126	126	192	-	464.50	-	0.00
36	540	0.15	134	134	192	-	464.50	-	0.00
37	555	0.17	149	149	192	-	464.50	-	0.00
38	570	0.17	157	157	192	-	464.50	-	0.00
39	585	0.18	165	165	192	-	464.50	-	0.00
40	600	0.19	173	173	192	-	464.50	-	0.00
41	615	0.13	118	118	192	-	464.50	-	0.00
42	630	0.13	118	118	192	-	464.50	-	0.00
43	645	0.17	157	157	192	-	464.50	-	0.00
44	660	0.17	157	157	192	-	464.50	-	0.00
45	675	0.17	149	149	192	-	464.50	-	0.00
46	690	0.17	149	149	192	-	464.50	-	0.00
47	705	0.15	134	134	192	-	464.50	-	0.00
48	720	0.16	141	141	192	-	464.50	-	0.00
49	735	0.32	289	289	192	97	464.51	97	0.00
50	750	0.44	393	490	192	298	464.52	298	0.01
51	765	0.64	575	873	192	681	464.55	681	0.02
52	780	0.75	678	1,359	192	1,168	464.58	1,168	0.03
53	795	1.22	1,095	2,262	192	2,071	464.64	2,071	0.05
54	810	1.24	1,119	3,190	192	2,998	464.71	2,998	0.07
55	825	0.31	278	3,276	192	3,084	464.71	3,084	0.07
56	840	0.33	301	3,386	192	3,194	464.72	3,194	0.07
57	855	0.71	639	3,832	192	3,641	464.75	3,641	0.08
58	870	0.65	583	4,223	192	4,032	464.78	4,032	0.09

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.67	605	4,637	192	4,445	464.81	4,445	0.10
60	900	0.61	548	4,993	192	4,802	464.83	4,802	0.11
61	915	0.55	491	5,293	192	5,101	464.85	5,101	0.12
62	930	0.48	434	5,536	192	5,344	464.87	5,344	0.12
63	945	0.16	141	5,485	192	5,293	464.87	5,293	0.12
64	960	0.18	161	5,455	192	5,263	464.86	5,263	0.12
65	975	0.03	31	5,294	192	5,103	464.85	5,103	0.12
66	990	0.03	31	5,134	192	4,943	464.84	4,943	0.11
67	1005	0.03	24	4,966	192	4,775	464.83	4,775	0.11
68	1020	0.03	24	4,798	192	4,606	464.82	4,606	0.11
69	1035	0.04	39	4,646	192	4,454	464.81	4,454	0.10
70	1050	0.04	39	4,493	192	4,302	464.80	4,302	0.10
71	1065	0.04	39	4,341	192	4,149	464.79	4,149	0.10
72	1080	0.03	31	4,181	192	3,989	464.78	3,989	0.09
73	1095	0.03	31	4,021	192	3,829	464.76	3,829	0.09
74	1110	0.03	31	3,860	192	3,669	464.75	3,669	0.08
75	1125	0.03	24	3,692	192	3,501	464.74	3,501	0.08
76	1140	0.02	16	3,516	192	3,325	464.73	3,325	0.08
77	1155	0.03	24	3,348	192	3,157	464.72	3,157	0.07
78	1170	0.03	31	3,188	192	2,996	464.71	2,996	0.07
79	1185	0.03	24	3,020	192	2,828	464.70	2,828	0.06
80	1200	0.02	16	2,844	192	2,652	464.68	2,652	0.06
81	1215	0.03	24	2,676	192	2,484	464.67	2,484	0.06
82	1230	0.03	24	2,508	192	2,316	464.66	2,316	0.05
83	1245	0.03	24	2,340	192	2,148	464.65	2,148	0.05
84	1260	0.02	16	2,164	192	1,972	464.64	1,972	0.05
85	1275	0.03	24	1,996	192	1,804	464.62	1,804	0.04
86	1290	0.02	16	1,820	192	1,628	464.61	1,628	0.04
87	1305	0.03	24	1,652	192	1,460	464.60	1,460	0.03
88	1320	0.02	16	1,476	192	1,284	464.59	1,284	0.03
89	1335	0.03	24	1,308	192	1,116	464.58	1,116	0.03
90	1350	0.02	16	1,132	192	940	464.57	940	0.02
91	1365	0.02	16	956	192	764	464.55	764	0.02
92	1380	0.02	16	780	192	588	464.54	588	0.01
93	1395	0.02	16	604	192	413	464.53	413	0.01
94	1410	0.02	16	428	192	237	464.52	237	0.01
95	1425	0.02	16	252	192	61	464.50	61	0.00
96	1440	0.02	16	76	192	-	464.50	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 10 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 5		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.95		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	4.71		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	2.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	950		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	310		
30				
31	ELEVATION OF HEADWATER	471		
32	ELEVATION OF CONCENTRATION POINT	467		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	1.04		
40	6-HOUR	1.36		
41	24-HOUR	2.23		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		463.5	17610	
45		464.5	19400	
46		465.5	21240	
47		466.5	23140	
48		467	24110	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 5
[3] AREA - ACRES	9.490
[4] L-FEET	950
[5] L-MILES	0.180
[6] La-FEET	310.00
[7] La-MILES	0.059
[8] ELEVATION OF HEADWATER	471
[9] ELEVATION OF CONCENTRATION POINT	467
[10] H-FEET	4
[11] S-FEET/MILE	22.2
[12] S^0.5	4.72
[13] L*LCA/S^0.5	0.002
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.05
[16] LAG TIME-MINUTES	2.8
[17] 100% OF LAG-MINUTES	2.8
[18] 200% OF LAG-MINUTES	5.7
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.27

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
1.04	9.490	1.00	1.04	1.36	9.490	1.00	1.36	2.23	9.490	1.00	2.23
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.49	SUM [7]	1.04	SUM [9]	9.49	SUM [11]	1.36	SUM [13]	9.49	SUM [15]	2.23
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			1.04				1.36				2.23

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.36	0.35	0.22
FLOOD VOLUME	(cu-ft)	12,335	12,150	7,524
	(acre-ft)	0.28	0.28	0.17
REQUIRED STORAGE	(cu-ft)	9,965	8,400	646
	(acre-ft)	0.23	0.19	0.01
PEAK FLOW	(cfs)	7.12	6.08	0.65
MAXIMUM WSEL	(ft)	464.04	463.95	463.53

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 10 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.95	0.205	0.0107
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	4.71	0.496	0.1071
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	2.83	0.298	0.1551
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.49	SUM	0.2729

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.136428767

C= 0.00253

Ft=C(24-(T/60))^1.55 = 0.00253 (24-(T/60))^1.55 + 0.14 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	1.04
CONSTANT LOSS RATE-in/hr	0.27
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.162	0.27	0.15	0.02	0.15	0.00
2	10	0.17	1.3	0.162	0.27	0.15	0.02	0.15	0.00
3	15	0.25	1.1	0.137	0.27	0.12	0.01	0.13	0.00
4	20	0.33	1.5	0.187	0.27	0.17	0.02	0.18	0.00
5	25	0.42	1.5	0.187	0.27	0.17	0.02	0.18	0.00
6	30	0.50	1.8	0.225	0.27	0.20	0.02	0.21	0.00
7	35	0.58	1.5	0.187	0.27	0.17	0.02	0.18	0.00
8	40	0.67	1.8	0.225	0.27	0.20	0.02	0.21	0.00
9	45	0.75	1.8	0.225	0.27	0.20	0.02	0.21	0.00
10	50	0.83	1.5	0.187	0.27	0.17	0.02	0.18	0.00
11	55	0.92	1.6	0.200	0.27	0.18	0.02	0.19	0.00
12	60	1.00	1.8	0.225	0.27	0.20	0.02	0.21	0.00
13	65	1.08	2.2	0.275	0.27	0.25	0.00	0.02	0.00
14	70	1.17	2.2	0.275	0.27	0.25	0.00	0.02	0.00
15	75	1.25	2.2	0.275	0.27	0.25	0.00	0.02	0.00
16	80	1.33	2.0	0.250	0.27	0.22	0.02	0.24	0.00
17	85	1.42	2.6	0.324	0.27	0.29	0.05	0.49	65.03
18	90	1.50	2.7	0.337	0.27	0.30	0.06	0.61	100.56
19	95	1.58	2.4	0.300	0.27	0.27	0.03	0.25	0.00
20	100	1.67	2.7	0.337	0.27	0.30	0.06	0.61	100.56
21	105	1.75	3.3	0.412	0.27	0.37	0.14	1.32	313.75
22	110	1.83	3.1	0.387	0.27	0.35	0.11	1.08	242.69
23	115	1.92	2.9	0.362	0.27	0.33	0.09	0.85	171.63
24	120	2.00	3.0	0.374	0.27	0.34	0.10	0.96	207.16
25	125	2.08	3.1	0.387	0.27	0.35	0.11	1.08	242.69
26	130	2.17	4.2	0.524	0.27	0.47	0.25	2.38	633.52
27	135	2.25	5.0	0.624	0.27	0.56	0.35	3.33	917.77
28	140	2.33	3.5	0.437	0.27	0.39	0.16	1.56	384.81
29	145	2.42	6.8	0.849	0.27	0.76	0.58	5.46	1557.32
30	150	2.50	7.3	0.911	0.27	0.82	0.64	6.06	1734.97
31	155	2.58	8.2	1.023	0.27	0.92	0.75	7.12	2054.75
32	160	2.67	5.9	0.736	0.27	0.66	0.46	4.40	1237.54
33	165	2.75	2.0	0.250	0.27	0.22	0.02	0.24	0.00
34	170	2.83	1.8	0.225	0.27	0.20	0.02	0.21	0.00
35	175	2.92	1.8	0.225	0.27	0.20	0.02	0.21	0.00
36	180	3.00	0.6	0.075	0.27	0.07	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.36
FLOOD VOLUME (acft)	0.28
FLOOD VOLUME (cuft)	12334.87
REQUIRED STORAGE (acft)	0.23
REQUIRED STORAGE (cuft)	9964.74
PEAK FLOW RATE (cfs)	7.12

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	1.36
CONSTANT LOSS RATE-in/hr	0.273
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.082	0.27	0.07	0.01	0.08	0.00
2	10	0.17	0.6	0.098	0.27	0.09	0.01	0.09	0.00
3	15	0.25	0.6	0.098	0.27	0.09	0.01	0.09	0.00
4	20	0.33	0.6	0.098	0.27	0.09	0.01	0.09	0.00
5	25	0.42	0.6	0.098	0.27	0.09	0.01	0.09	0.00
6	30	0.50	0.7	0.114	0.27	0.10	0.01	0.11	0.00
7	35	0.58	0.7	0.114	0.27	0.10	0.01	0.11	0.00
8	40	0.67	0.7	0.114	0.27	0.10	0.01	0.11	0.00
9	45	0.75	0.7	0.114	0.27	0.10	0.01	0.11	0.00
10	50	0.83	0.7	0.114	0.27	0.10	0.01	0.11	0.00
11	55	0.92	0.7	0.114	0.27	0.10	0.01	0.11	0.00
12	60	1.00	0.8	0.131	0.27	0.12	0.01	0.12	0.00
13	65	1.08	0.8	0.131	0.27	0.12	0.01	0.12	0.00
14	70	1.17	0.8	0.131	0.27	0.12	0.01	0.12	0.00
15	75	1.25	0.8	0.131	0.27	0.12	0.01	0.12	0.00
16	80	1.33	0.8	0.131	0.27	0.12	0.01	0.12	0.00
17	85	1.42	0.8	0.131	0.27	0.12	0.01	0.12	0.00
18	90	1.50	0.8	0.131	0.27	0.12	0.01	0.12	0.00
19	95	1.58	0.8	0.131	0.27	0.12	0.01	0.12	0.00
20	100	1.67	0.8	0.131	0.27	0.12	0.01	0.12	0.00
21	105	1.75	0.8	0.131	0.27	0.12	0.01	0.12	0.00
22	110	1.83	0.8	0.131	0.27	0.12	0.01	0.12	0.00
23	115	1.92	0.8	0.131	0.27	0.12	0.01	0.12	0.00
24	120	2.00	0.9	0.147	0.27	0.13	0.01	0.14	0.00
25	125	2.08	0.8	0.131	0.27	0.12	0.01	0.12	0.00
26	130	2.17	0.9	0.147	0.27	0.13	0.01	0.14	0.00
27	135	2.25	0.9	0.147	0.27	0.13	0.01	0.14	0.00
28	140	2.33	0.9	0.147	0.27	0.13	0.01	0.14	0.00
29	145	2.42	0.9	0.147	0.27	0.13	0.01	0.14	0.00
30	150	2.50	0.9	0.147	0.27	0.13	0.01	0.14	0.00
31	155	2.58	0.9	0.147	0.27	0.13	0.01	0.14	0.00
32	160	2.67	0.9	0.147	0.27	0.13	0.01	0.14	0.00
33	165	2.75	1.0	0.163	0.27	0.15	0.02	0.15	0.00
34	170	2.83	1.0	0.163	0.27	0.15	0.02	0.15	0.00
35	175	2.92	1.0	0.163	0.27	0.15	0.02	0.15	0.00
36	180	3.00	1.0	0.163	0.27	0.15	0.02	0.15	0.00
37	185	3.08	1.0	0.163	0.27	0.15	0.02	0.15	0.00
38	190	3.17	1.1	0.180	0.27	0.16	0.02	0.17	0.00
39	195	3.25	1.1	0.180	0.27	0.16	0.02	0.17	0.00
40	200	3.33	1.1	0.180	0.27	0.16	0.02	0.17	0.00
41	205	3.42	1.2	0.196	0.27	0.18	0.02	0.19	0.00
42	210	3.50	1.3	0.212	0.27	0.19	0.02	0.20	0.00
43	215	3.58	1.4	0.228	0.27	0.21	0.02	0.22	0.00
44	220	3.67	1.4	0.228	0.27	0.21	0.02	0.22	0.00
45	225	3.75	1.5	0.245	0.27	0.22	0.02	0.23	0.00
46	230	3.83	1.5	0.245	0.27	0.22	0.02	0.23	0.00
47	235	3.92	1.6	0.261	0.27	0.24	0.03	0.25	0.00
48	240	4.00	1.6	0.261	0.27	0.24	0.03	0.25	0.00
49	245	4.08	1.7	0.277	0.27	0.25	0.00	0.04	0.00
50	250	4.17	1.8	0.294	0.27	0.26	0.02	0.20	0.00
51	255	4.25	1.9	0.310	0.27	0.28	0.04	0.35	24.04
52	260	4.33	2.0	0.326	0.27	0.29	0.05	0.51	70.50
53	265	4.42	2.1	0.343	0.27	0.31	0.07	0.66	116.96
54	270	4.50	2.1	0.343	0.27	0.31	0.07	0.66	116.96
55	275	4.58	2.2	0.359	0.27	0.32	0.09	0.82	163.43
56	280	4.67	2.3	0.375	0.27	0.34	0.10	0.97	209.89

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.83		
UNIT TIME-PERCENT OF LAG	176.4		
TOTAL ADJUSTED STORM RAIN-INCHES	1.36		
CONSTANT LOSS RATE-in/hr	0.273		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.27 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.392	0.27	0.35	0.12	1.13	256.35
58	290	4.83	2.4	0.392	0.27	0.35	0.12	1.13	256.35
59	295	4.92	2.5	0.408	0.27	0.37	0.14	1.28	302.82
60	300	5.00	2.6	0.424	0.27	0.38	0.15	1.44	349.28
61	305	5.08	3.1	0.506	0.27	0.46	0.23	2.21	581.59
62	310	5.17	3.6	0.588	0.27	0.53	0.31	2.99	813.91
63	315	5.25	3.9	0.636	0.27	0.57	0.36	3.45	953.30
64	320	5.33	4.2	0.685	0.27	0.62	0.41	3.92	1092.69
65	325	5.42	4.7	0.767	0.27	0.69	0.49	4.69	1325.00
66	330	5.50	5.6	0.914	0.27	0.82	0.64	6.08	1743.17
67	335	5.58	1.9	0.310	0.27	0.28	0.04	0.35	24.04
68	340	5.67	0.9	0.147	0.27	0.13	0.01	0.14	0.00
69	345	5.75	0.6	0.098	0.27	0.09	0.01	0.09	0.00
70	350	5.83	0.5	0.082	0.27	0.07	0.01	0.08	0.00
71	355	5.92	0.3	0.049	0.27	0.04	0.00	0.05	0.00
72	360	6.00	0.2	0.033	0.27	0.03	0.00	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	0.35
FLOOD VOLUME (acft)	0.28
FLOOD VOLUME (cuft)	12149.95
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8400.27
PEAK FLOW RATE (cfs)	6.08

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.018	0.482	0.016	0.002	0.02	0.00
2	30	0.50	0.3	0.027	0.476	0.024	0.003	0.03	0.00
3	45	0.75	0.3	0.027	0.471	0.024	0.003	0.03	0.00
4	60	1.00	0.4	0.036	0.465	0.032	0.004	0.03	0.00
5	75	1.25	0.3	0.027	0.460	0.024	0.003	0.03	0.00
6	90	1.50	0.3	0.027	0.454	0.024	0.003	0.03	0.00
7	105	1.75	0.3	0.027	0.449	0.024	0.003	0.03	0.00
8	120	2.00	0.4	0.036	0.443	0.032	0.004	0.03	0.00
9	135	2.25	0.4	0.036	0.438	0.032	0.004	0.03	0.00
10	150	2.50	0.4	0.036	0.433	0.032	0.004	0.03	0.00
11	165	2.75	0.5	0.045	0.427	0.040	0.004	0.04	0.00
12	180	3.00	0.5	0.045	0.422	0.040	0.004	0.04	0.00
13	195	3.25	0.5	0.045	0.417	0.040	0.004	0.04	0.00
14	210	3.50	0.5	0.045	0.412	0.040	0.004	0.04	0.00
15	225	3.75	0.5	0.045	0.407	0.040	0.004	0.04	0.00
16	240	4.00	0.6	0.054	0.401	0.048	0.005	0.05	0.00
17	255	4.25	0.6	0.054	0.396	0.048	0.005	0.05	0.00
18	270	4.50	0.7	0.062	0.391	0.056	0.006	0.06	0.00
19	285	4.75	0.7	0.062	0.386	0.056	0.006	0.06	0.00
20	300	5.00	0.8	0.071	0.381	0.064	0.007	0.07	0.00
21	315	5.25	0.6	0.054	0.376	0.048	0.005	0.05	0.00
22	330	5.50	0.7	0.062	0.371	0.056	0.006	0.06	0.00
23	345	5.75	0.8	0.071	0.367	0.064	0.007	0.07	0.00
24	360	6.00	0.8	0.071	0.362	0.064	0.007	0.07	0.00
25	375	6.25	0.9	0.080	0.357	0.072	0.008	0.08	0.00
26	390	6.50	0.9	0.080	0.352	0.072	0.008	0.08	0.00
27	405	6.75	1.0	0.089	0.347	0.080	0.009	0.08	0.00
28	420	7.00	1.0	0.089	0.343	0.080	0.009	0.08	0.00
29	435	7.25	1.0	0.089	0.338	0.080	0.009	0.08	0.00
30	450	7.50	1.1	0.098	0.334	0.088	0.010	0.09	0.00
31	465	7.75	1.2	0.107	0.329	0.096	0.011	0.10	0.00
32	480	8.00	1.3	0.116	0.324	0.104	0.012	0.11	0.00
33	495	8.25	1.5	0.134	0.320	0.120	0.013	0.13	0.00
34	510	8.50	1.5	0.134	0.315	0.120	0.013	0.13	0.00
35	525	8.75	1.6	0.143	0.311	0.128	0.014	0.14	0.00
36	540	9.00	1.7	0.152	0.307	0.136	0.015	0.14	0.00
37	555	9.25	1.9	0.169	0.302	0.153	0.017	0.16	0.00
38	570	9.50	2.0	0.178	0.298	0.161	0.018	0.17	0.00
39	585	9.75	2.1	0.187	0.294	0.169	0.019	0.18	0.00
40	600	10.00	2.2	0.196	0.290	0.177	0.020	0.19	0.00
41	615	10.25	1.5	0.134	0.285	0.120	0.013	0.13	0.00
42	630	10.50	1.5	0.134	0.281	0.120	0.013	0.13	0.00
43	645	10.75	2.0	0.178	0.277	0.161	0.018	0.17	0.00
44	660	11.00	2.0	0.178	0.273	0.161	0.018	0.17	0.00
45	675	11.25	1.9	0.169	0.269	0.153	0.017	0.16	0.00
46	690	11.50	1.9	0.169	0.265	0.153	0.017	0.16	0.00
47	705	11.75	1.7	0.152	0.261	0.136	0.015	0.14	0.00
48	720	12.00	1.8	0.161	0.257	0.145	0.016	0.15	0.00
49	735	12.25	2.5	0.223	0.253	0.201	0.022	0.21	0.00
50	750	12.50	2.6	0.232	0.250	0.209	0.023	0.22	0.00
51	765	12.75	2.8	0.250	0.246	0.225	0.004	0.04	0.00
52	780	13.00	2.9	0.259	0.242	0.233	0.017	0.16	0.00
53	795	13.25	3.4	0.303	0.239	0.273	0.065	0.61	307.33
54	810	13.50	3.4	0.303	0.235	0.273	0.068	0.65	338.20
55	825	13.75	2.3	0.205	0.231	0.185	0.021	0.19	0.00
56	840	14.00	2.3	0.205	0.228	0.185	0.021	0.19	0.00
57	855	14.25	2.7	0.241	0.224	0.217	0.016	0.16	0.00
58	870	14.50	2.6	0.232	0.221	0.209	0.011	0.10	0.00
59	885	14.75	2.6	0.232	0.218	0.209	0.014	0.14	0.00
60	900	15.00	2.5	0.223	0.214	0.201	0.009	0.08	0.00
61	915	15.25	2.4	0.214	0.211	0.193	0.003	0.03	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	2.23	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent	in/hr	in/hr				
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
62	930	15.50	2.3	0.205	0.208	0.185	0.021	0.19	0.00
63	945	15.75	1.9	0.169	0.205	0.153	0.017	0.16	0.00
64	960	16.00	1.9	0.169	0.201	0.153	0.017	0.16	0.00
65	975	16.25	0.4	0.036	0.198	0.032	0.004	0.03	0.00
66	990	16.50	0.4	0.036	0.195	0.032	0.004	0.03	0.00
67	1005	16.75	0.3	0.027	0.192	0.024	0.003	0.03	0.00
68	1020	17.00	0.3	0.027	0.189	0.024	0.003	0.03	0.00
69	1035	17.25	0.5	0.045	0.187	0.040	0.004	0.04	0.00
70	1050	17.50	0.5	0.045	0.184	0.040	0.004	0.04	0.00
71	1065	17.75	0.5	0.045	0.181	0.040	0.004	0.04	0.00
72	1080	18.00	0.4	0.036	0.178	0.032	0.004	0.03	0.00
73	1095	18.25	0.4	0.036	0.176	0.032	0.004	0.03	0.00
74	1110	18.50	0.4	0.036	0.173	0.032	0.004	0.03	0.00
75	1125	18.75	0.3	0.027	0.171	0.024	0.003	0.03	0.00
76	1140	19.00	0.2	0.018	0.168	0.016	0.002	0.02	0.00
77	1155	19.25	0.3	0.027	0.166	0.024	0.003	0.03	0.00
78	1170	19.50	0.4	0.036	0.164	0.032	0.004	0.03	0.00
79	1185	19.75	0.3	0.027	0.161	0.024	0.003	0.03	0.00
80	1200	20.00	0.2	0.018	0.159	0.016	0.002	0.02	0.00
81	1215	20.25	0.3	0.027	0.157	0.024	0.003	0.03	0.00
82	1230	20.50	0.3	0.027	0.155	0.024	0.003	0.03	0.00
83	1245	20.75	0.3	0.027	0.153	0.024	0.003	0.03	0.00
84	1260	21.00	0.2	0.018	0.151	0.016	0.002	0.02	0.00
85	1275	21.25	0.3	0.027	0.149	0.024	0.003	0.03	0.00
86	1290	21.50	0.2	0.018	0.148	0.016	0.002	0.02	0.00
87	1305	21.75	0.3	0.027	0.146	0.024	0.003	0.03	0.00
88	1320	22.00	0.2	0.018	0.145	0.016	0.002	0.02	0.00
89	1335	22.25	0.3	0.027	0.143	0.024	0.003	0.03	0.00
90	1350	22.50	0.2	0.018	0.142	0.016	0.002	0.02	0.00
91	1365	22.75	0.2	0.018	0.141	0.016	0.002	0.02	0.00
92	1380	23.00	0.2	0.018	0.139	0.016	0.002	0.02	0.00
93	1395	23.25	0.2	0.018	0.138	0.016	0.002	0.02	0.00
94	1410	23.50	0.2	0.018	0.138	0.016	0.002	0.02	0.00
95	1425	23.75	0.2	0.018	0.137	0.016	0.002	0.02	0.00
96	1440	24.00	0.2	0.018	0.137	0.016	0.002	0.02	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	0.22
FLOOD VOLUME (acft)	0.17
FLOOD VOLUME (cuft)	7524.21
REQUIRED STORAGE (acft)	0.01
REQUIRED STORAGE (cuft)	645.53
PEAK FLOW (cfs)	0.65

PROJECT: CALHOUN AT AVENUE 49 - 10 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
463.5	0	0		17610	0	0	0.00
464.5	1	1	1790	19400	18505	18505	0.42
465.5	1	2	1840	21240	20320	38825	0.89
466.5	1	3	1900	23140	22190	61015	1.40
467	0.5	3.5	970	24110	11813	72828	1.67

PERCOLATION CALCULATIONS

PERCOLATION RATE	0.67 in/hr	0.27 cfs

MAXWELL IV DRYWELLS

NUMBER USED	0	
RATE/DRYWELL	0 cfs	
TOTAL DISSIPATED		0 cfs

TOTAL PERCOLATION RATE 0.27 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.15	46	46	82	-	463.50	-	0.00
2	10	0.15	46	46	82	-	463.50	-	0.00
3	15	0.13	39	39	82	-	463.50	-	0.00
4	20	0.18	53	53	82	-	463.50	-	0.00
5	25	0.18	53	53	82	-	463.50	-	0.00
6	30	0.21	64	64	82	-	463.50	-	0.00
7	35	0.18	53	53	82	-	463.50	-	0.00
8	40	0.21	64	64	82	-	463.50	-	0.00
9	45	0.21	64	64	82	-	463.50	-	0.00
10	50	0.18	53	53	82	-	463.50	-	0.00
11	55	0.19	57	57	82	-	463.50	-	0.00
12	60	0.21	64	64	82	-	463.50	-	0.00
13	65	0.02	5	5	82	-	463.50	-	0.00
14	70	0.02	5	5	82	-	463.50	-	0.00
15	75	0.02	5	5	82	-	463.50	-	0.00
16	80	0.24	71	71	82	-	463.50	-	0.00
17	85	0.49	147	147	82	65	463.50	65	0.00
18	90	0.61	182	248	82	166	463.51	166	0.00
19	95	0.25	76	242	82	160	463.51	160	0.00
20	100	0.61	182	342	82	260	463.51	260	0.01
21	105	1.32	396	656	82	574	463.53	574	0.01
22	110	1.08	325	899	82	817	463.54	817	0.02
23	115	0.85	254	1,070	82	988	463.55	988	0.02
24	120	0.96	289	1,277	82	1,195	463.56	1,195	0.03
25	125	1.08	325	1,520	82	1,438	463.58	1,438	0.03
26	130	2.38	715	2,153	82	2,072	463.61	2,072	0.05
27	135	3.33	1,000	3,071	82	2,989	463.66	2,989	0.07
28	140	1.56	467	3,456	82	3,374	463.68	3,374	0.08
29	145	5.46	1,639	5,013	82	4,931	463.77	4,931	0.11
30	150	6.06	1,817	6,748	82	6,666	463.86	6,666	0.15
31	155	7.12	2,137	8,803	82	8,721	463.97	8,721	0.20
32	160	4.40	1,319	10,041	82	9,959	464.04	9,959	0.23
33	165	0.24	71	10,030	82	9,948	464.04	9,948	0.23
34	170	0.21	64	10,012	82	9,930	464.04	9,930	0.23
35	175	0.21	64	9,994	82	9,912	464.04	9,912	0.23
36	180	0.07	21	9,933	82	9,851	464.03	9,851	0.23

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.08	23	23	82	-	463.50	-	0.00
2	10	0.09	28	28	82	-	463.50	-	0.00
3	15	0.09	28	28	82	-	463.50	-	0.00
4	20	0.09	28	28	82	-	463.50	-	0.00
5	25	0.09	28	28	82	-	463.50	-	0.00
6	30	0.11	33	33	82	-	463.50	-	0.00
7	35	0.11	33	33	82	-	463.50	-	0.00
8	40	0.11	33	33	82	-	463.50	-	0.00
9	45	0.11	33	33	82	-	463.50	-	0.00
10	50	0.11	33	33	82	-	463.50	-	0.00
11	55	0.11	33	33	82	-	463.50	-	0.00
12	60	0.12	37	37	82	-	463.50	-	0.00
13	65	0.12	37	37	82	-	463.50	-	0.00
14	70	0.12	37	37	82	-	463.50	-	0.00
15	75	0.12	37	37	82	-	463.50	-	0.00
16	80	0.12	37	37	82	-	463.50	-	0.00
17	85	0.12	37	37	82	-	463.50	-	0.00
18	90	0.12	37	37	82	-	463.50	-	0.00
19	95	0.12	37	37	82	-	463.50	-	0.00
20	100	0.12	37	37	82	-	463.50	-	0.00
21	105	0.12	37	37	82	-	463.50	-	0.00
22	110	0.12	37	37	82	-	463.50	-	0.00
23	115	0.12	37	37	82	-	463.50	-	0.00
24	120	0.14	42	42	82	-	463.50	-	0.00
25	125	0.12	37	37	82	-	463.50	-	0.00
26	130	0.14	42	42	82	-	463.50	-	0.00
27	135	0.14	42	42	82	-	463.50	-	0.00
28	140	0.14	42	42	82	-	463.50	-	0.00
29	145	0.14	42	42	82	-	463.50	-	0.00
30	150	0.14	42	42	82	-	463.50	-	0.00
31	155	0.14	42	42	82	-	463.50	-	0.00
32	160	0.14	42	42	82	-	463.50	-	0.00
33	165	0.15	46	46	82	-	463.50	-	0.00
34	170	0.15	46	46	82	-	463.50	-	0.00
35	175	0.15	46	46	82	-	463.50	-	0.00
36	180	0.15	46	46	82	-	463.50	-	0.00
37	185	0.15	46	46	82	-	463.50	-	0.00
38	190	0.17	51	51	82	-	463.50	-	0.00
39	195	0.17	51	51	82	-	463.50	-	0.00
40	200	0.17	51	51	82	-	463.50	-	0.00
41	205	0.19	56	56	82	-	463.50	-	0.00
42	210	0.20	60	60	82	-	463.50	-	0.00
43	215	0.22	65	65	82	-	463.50	-	0.00
44	220	0.22	65	65	82	-	463.50	-	0.00
45	225	0.23	70	70	82	-	463.50	-	0.00
46	230	0.23	70	70	82	-	463.50	-	0.00
47	235	0.25	74	74	82	-	463.50	-	0.00
48	240	0.25	74	74	82	-	463.50	-	0.00
49	245	0.04	13	13	82	-	463.50	-	0.00
50	250	0.20	60	60	82	-	463.50	-	0.00
51	255	0.35	106	106	82	24	463.50	24	0.00
52	260	0.51	152	176	82	95	463.51	95	0.00
53	265	0.66	199	293	82	211	463.51	211	0.00
54	270	0.66	199	410	82	328	463.52	328	0.01
55	275	0.82	245	574	82	492	463.53	492	0.01

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.97	292	784	82	702	463.54	702	0.02
57	285	1.13	338	1,040	82	958	463.55	958	0.02
58	290	1.13	338	1,296	82	1,214	463.57	1,214	0.03
59	295	1.28	385	1,599	82	1,517	463.58	1,517	0.03
60	300	1.44	431	1,949	82	1,867	463.60	1,867	0.04
61	305	2.21	664	2,530	82	2,448	463.63	2,448	0.06
62	310	2.99	896	3,344	82	3,262	463.68	3,262	0.07
63	315	3.45	1,035	4,297	82	4,215	463.73	4,215	0.10
64	320	3.92	1,175	5,390	82	5,308	463.79	5,308	0.12
65	325	4.69	1,407	6,715	82	6,633	463.86	6,633	0.15
66	330	6.08	1,825	8,458	82	8,376	463.95	8,376	0.19
67	335	0.35	106	8,482	82	8,400	463.95	8,400	0.19
68	340	0.14	42	8,442	82	8,360	463.95	8,360	0.19
69	345	0.09	28	8,388	82	8,306	463.95	8,306	0.19
70	350	0.08	23	8,329	82	8,247	463.95	8,247	0.19
71	355	0.05	14	8,261	82	8,179	463.94	8,179	0.19
72	360	0.03	9	8,189	82	8,107	463.94	8,107	0.19

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.02	15	15	246	-	463.50	-	0.00
2	30	0.03	23	23	246	-	463.50	-	0.00
3	45	0.03	23	23	246	-	463.50	-	0.00
4	60	0.03	30	30	246	-	463.50	-	0.00
5	75	0.03	23	23	246	-	463.50	-	0.00
6	90	0.03	23	23	246	-	463.50	-	0.00
7	105	0.03	23	23	246	-	463.50	-	0.00
8	120	0.03	30	30	246	-	463.50	-	0.00
9	135	0.03	30	30	246	-	463.50	-	0.00
10	150	0.03	30	30	246	-	463.50	-	0.00
11	165	0.04	38	38	246	-	463.50	-	0.00
12	180	0.04	38	38	246	-	463.50	-	0.00
13	195	0.04	38	38	246	-	463.50	-	0.00
14	210	0.04	38	38	246	-	463.50	-	0.00
15	225	0.04	38	38	246	-	463.50	-	0.00
16	240	0.05	46	46	246	-	463.50	-	0.00
17	255	0.05	46	46	246	-	463.50	-	0.00
18	270	0.06	53	53	246	-	463.50	-	0.00
19	285	0.06	53	53	246	-	463.50	-	0.00
20	300	0.07	61	61	246	-	463.50	-	0.00
21	315	0.05	46	46	246	-	463.50	-	0.00
22	330	0.06	53	53	246	-	463.50	-	0.00
23	345	0.07	61	61	246	-	463.50	-	0.00
24	360	0.07	61	61	246	-	463.50	-	0.00
25	375	0.08	69	69	246	-	463.50	-	0.00
26	390	0.08	69	69	246	-	463.50	-	0.00
27	405	0.08	76	76	246	-	463.50	-	0.00
28	420	0.08	76	76	246	-	463.50	-	0.00
29	435	0.08	76	76	246	-	463.50	-	0.00
30	450	0.09	84	84	246	-	463.50	-	0.00
31	465	0.10	91	91	246	-	463.50	-	0.00
32	480	0.11	99	99	246	-	463.50	-	0.00
33	495	0.13	114	114	246	-	463.50	-	0.00
34	510	0.13	114	114	246	-	463.50	-	0.00
35	525	0.14	122	122	246	-	463.50	-	0.00
36	540	0.14	130	130	246	-	463.50	-	0.00
37	555	0.16	145	145	246	-	463.50	-	0.00
38	570	0.17	152	152	246	-	463.50	-	0.00
39	585	0.18	160	160	246	-	463.50	-	0.00
40	600	0.19	168	168	246	-	463.50	-	0.00
41	615	0.13	114	114	246	-	463.50	-	0.00
42	630	0.13	114	114	246	-	463.50	-	0.00
43	645	0.17	152	152	246	-	463.50	-	0.00
44	660	0.17	152	152	246	-	463.50	-	0.00
45	675	0.16	145	145	246	-	463.50	-	0.00
46	690	0.16	145	145	246	-	463.50	-	0.00
47	705	0.14	130	130	246	-	463.50	-	0.00
48	720	0.15	137	137	246	-	463.50	-	0.00
49	735	0.21	190	190	246	-	463.50	-	0.00
50	750	0.22	198	198	246	-	463.50	-	0.00
51	765	0.04	33	33	246	-	463.50	-	0.00
52	780	0.16	141	141	246	-	463.50	-	0.00
53	795	0.61	553	553	246	307	463.52	307	0.01
54	810	0.65	584	891	246	646	463.53	646	0.01
55	825	0.19	175	821	246	575	463.53	575	0.01
56	840	0.19	175	750	246	504	463.53	504	0.01
57	855	0.16	141	645	246	399	463.52	399	0.01
58	870	0.10	94	493	246	248	463.51	248	0.01

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.14	123	371	246	125	463.51	125	0.00
60	900	0.08	75	200	246	-	463.50	-	0.00
61	915	0.03	27	27	246	-	463.50	-	0.00
62	930	0.19	175	175	246	-	463.50	-	0.00
63	945	0.16	145	145	246	-	463.50	-	0.00
64	960	0.16	145	145	246	-	463.50	-	0.00
65	975	0.03	30	30	246	-	463.50	-	0.00
66	990	0.03	30	30	246	-	463.50	-	0.00
67	1005	0.03	23	23	246	-	463.50	-	0.00
68	1020	0.03	23	23	246	-	463.50	-	0.00
69	1035	0.04	38	38	246	-	463.50	-	0.00
70	1050	0.04	38	38	246	-	463.50	-	0.00
71	1065	0.04	38	38	246	-	463.50	-	0.00
72	1080	0.03	30	30	246	-	463.50	-	0.00
73	1095	0.03	30	30	246	-	463.50	-	0.00
74	1110	0.03	30	30	246	-	463.50	-	0.00
75	1125	0.03	23	23	246	-	463.50	-	0.00
76	1140	0.02	15	15	246	-	463.50	-	0.00
77	1155	0.03	23	23	246	-	463.50	-	0.00
78	1170	0.03	30	30	246	-	463.50	-	0.00
79	1185	0.03	23	23	246	-	463.50	-	0.00
80	1200	0.02	15	15	246	-	463.50	-	0.00
81	1215	0.03	23	23	246	-	463.50	-	0.00
82	1230	0.03	23	23	246	-	463.50	-	0.00
83	1245	0.03	23	23	246	-	463.50	-	0.00
84	1260	0.02	15	15	246	-	463.50	-	0.00
85	1275	0.03	23	23	246	-	463.50	-	0.00
86	1290	0.02	15	15	246	-	463.50	-	0.00
87	1305	0.03	23	23	246	-	463.50	-	0.00
88	1320	0.02	15	15	246	-	463.50	-	0.00
89	1335	0.03	23	23	246	-	463.50	-	0.00
90	1350	0.02	15	15	246	-	463.50	-	0.00
91	1365	0.02	15	15	246	-	463.50	-	0.00
92	1380	0.02	15	15	246	-	463.50	-	0.00
93	1395	0.02	15	15	246	-	463.50	-	0.00
94	1410	0.02	15	15	246	-	463.50	-	0.00
95	1425	0.02	15	15	246	-	463.50	-	0.00
96	1440	0.02	15	15	246	-	463.50	-	0.00

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 1		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.18		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	1000		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	15		
30				
31	ELEVATION OF HEADWATER	471.5		
32	ELEVATION OF CONCENTRATION POINT	468.8		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	3025	
45		466	3700	
46		467	4430	
47		468	5215	
48		468.5	5630	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 1
[3] AREA - ACRES	2.010
[4] L-FEET	1000
[5] L-MILES	0.189
[6] La-FEET	15.00
[7] La-MILES	0.003
[8] ELEVATION OF HEADWATER	471.5
[9] ELEVATION OF CONCENTRATION POINT	468.8
[10] H-FEET	2.7
[11] S-FEET/MILE	14.3
[12] S^0.5	3.78
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.0
[17] 100% OF LAG-MINUTES	1.0
[18] 200% OF LAG-MINUTES	2.0
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.05

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	2.010	1.00	2.12	2.78	2.010	1.00	2.78	4.47	2.010	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	2.01	SUM [7]	2.12	SUM [9]	2.01	SUM [11]	2.78	SUM [13]	2.01	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.39	1.40	1.43
FLOOD VOLUME	(cu-ft)	10,165	10,196	10,445
	(acre-ft)	0.23	0.23	0.24
REQUIRED STORAGE	(cu-ft)	9,580	9,148	8,100
	(acre-ft)	0.22	0.21	0.19
PEAK FLOW	(cfs)	3.70	3.26	0.80
MAXIMUM WSEL	(ft)	467.45	467.36	467.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.18	0.587	0.0305
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	0.00	0.000	0.0000
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.83	0.413	0.2147
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		2.01	SUM	0.2453

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.122626866

C= 0.00227

Ft=C(24-(T/60))^1.55 = 0.00227 (24-(T/60))^1.55 + 0.12 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.25
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.25	0.30	0.09	0.17	37.46
2	10	0.17	1.3	0.331	0.25	0.30	0.09	0.17	37.46
3	15	0.25	1.1	0.280	0.25	0.25	0.03	0.07	6.78
4	20	0.33	1.5	0.382	0.25	0.34	0.14	0.27	68.14
5	25	0.42	1.5	0.382	0.25	0.34	0.14	0.27	68.14
6	30	0.50	1.8	0.458	0.25	0.41	0.21	0.43	114.16
7	35	0.58	1.5	0.382	0.25	0.34	0.14	0.27	68.14
8	40	0.67	1.8	0.458	0.25	0.41	0.21	0.43	114.16
9	45	0.75	1.8	0.458	0.25	0.41	0.21	0.43	114.16
10	50	0.83	1.5	0.382	0.25	0.34	0.14	0.27	68.14
11	55	0.92	1.6	0.407	0.25	0.37	0.16	0.33	83.48
12	60	1.00	1.8	0.458	0.25	0.41	0.21	0.43	114.16
13	65	1.08	2.2	0.560	0.25	0.50	0.31	0.63	175.52
14	70	1.17	2.2	0.560	0.25	0.50	0.31	0.63	175.52
15	75	1.25	2.2	0.560	0.25	0.50	0.31	0.63	175.52
16	80	1.33	2.0	0.509	0.25	0.46	0.26	0.53	144.84
17	85	1.42	2.6	0.661	0.25	0.60	0.42	0.84	236.89
18	90	1.50	2.7	0.687	0.25	0.62	0.44	0.89	252.23
19	95	1.58	2.4	0.611	0.25	0.55	0.37	0.73	206.21
20	100	1.67	2.7	0.687	0.25	0.62	0.44	0.89	252.23
21	105	1.75	3.3	0.840	0.25	0.76	0.59	1.19	344.27
22	110	1.83	3.1	0.789	0.25	0.71	0.54	1.09	313.59
23	115	1.92	2.9	0.738	0.25	0.66	0.49	0.99	282.91
24	120	2.00	3.0	0.763	0.25	0.69	0.52	1.04	298.25
25	125	2.08	3.1	0.789	0.25	0.71	0.54	1.09	313.59
26	130	2.17	4.2	1.068	0.25	0.96	0.82	1.65	482.33
27	135	2.25	5.0	1.272	0.25	1.14	1.03	2.06	605.05
28	140	2.33	3.5	0.890	0.25	0.80	0.65	1.30	374.95
29	145	2.42	6.8	1.730	0.25	1.56	1.48	2.98	881.18
30	150	2.50	7.3	1.857	0.25	1.67	1.61	3.24	957.88
31	155	2.58	8.2	2.086	0.25	1.88	1.84	3.70	1095.94
32	160	2.67	5.9	1.501	0.25	1.35	1.26	2.52	743.12
33	165	2.75	2.0	0.509	0.25	0.46	0.26	0.53	144.84
34	170	2.83	1.8	0.458	0.25	0.41	0.21	0.43	114.16
35	175	2.92	1.8	0.458	0.25	0.41	0.21	0.43	114.16
36	180	3.00	0.6	0.153	0.25	0.14	0.02	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.39
FLOOD VOLUME (acft)	0.23
FLOOD VOLUME (cuft)	10165.45
REQUIRED STORAGE (acft)	0.22
REQUIRED STORAGE (cuft)	9579.59
PEAK FLOW RATE (cfs)	3.70

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.00
UNIT TIME-PERCENT OF LAG	502.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.245
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.05 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.167	0.25	0.15	0.02	0.03	0.00
2	10	0.17	0.6	0.200	0.25	0.18	0.02	0.04	0.00
3	15	0.25	0.6	0.200	0.25	0.18	0.02	0.04	0.00
4	20	0.33	0.6	0.200	0.25	0.18	0.02	0.04	0.00
5	25	0.42	0.6	0.200	0.25	0.18	0.02	0.04	0.00
6	30	0.50	0.7	0.234	0.25	0.21	0.02	0.05	0.01
7	35	0.58	0.7	0.234	0.25	0.21	0.02	0.05	0.01
8	40	0.67	0.7	0.234	0.25	0.21	0.02	0.05	0.01
9	45	0.75	0.7	0.234	0.25	0.21	0.02	0.05	0.01
10	50	0.83	0.7	0.234	0.25	0.21	0.02	0.05	0.01
11	55	0.92	0.7	0.234	0.25	0.21	0.02	0.05	0.01
12	60	1.00	0.8	0.267	0.25	0.24	0.02	0.04	0.00
13	65	1.08	0.8	0.267	0.25	0.24	0.02	0.04	0.00
14	70	1.17	0.8	0.267	0.25	0.24	0.02	0.04	0.00
15	75	1.25	0.8	0.267	0.25	0.24	0.02	0.04	0.00
16	80	1.33	0.8	0.267	0.25	0.24	0.02	0.04	0.00
17	85	1.42	0.8	0.267	0.25	0.24	0.02	0.04	0.00
18	90	1.50	0.8	0.267	0.25	0.24	0.02	0.04	0.00
19	95	1.58	0.8	0.267	0.25	0.24	0.02	0.04	0.00
20	100	1.67	0.8	0.267	0.25	0.24	0.02	0.04	0.00
21	105	1.75	0.8	0.267	0.25	0.24	0.02	0.04	0.00
22	110	1.83	0.8	0.267	0.25	0.24	0.02	0.04	0.00
23	115	1.92	0.8	0.267	0.25	0.24	0.02	0.04	0.00
24	120	2.00	0.9	0.300	0.25	0.27	0.05	0.11	19.08
25	125	2.08	0.8	0.267	0.25	0.24	0.02	0.04	0.00
26	130	2.17	0.9	0.300	0.25	0.27	0.05	0.11	19.08
27	135	2.25	0.9	0.300	0.25	0.27	0.05	0.11	19.08
28	140	2.33	0.9	0.300	0.25	0.27	0.05	0.11	19.08
29	145	2.42	0.9	0.300	0.25	0.27	0.05	0.11	19.08
30	150	2.50	0.9	0.300	0.25	0.27	0.05	0.11	19.08
31	155	2.58	0.9	0.300	0.25	0.27	0.05	0.11	19.08
32	160	2.67	0.9	0.300	0.25	0.27	0.05	0.11	19.08
33	165	2.75	1.0	0.334	0.25	0.30	0.09	0.18	39.20
34	170	2.83	1.0	0.334	0.25	0.30	0.09	0.18	39.20
35	175	2.92	1.0	0.334	0.25	0.30	0.09	0.18	39.20
36	180	3.00	1.0	0.334	0.25	0.30	0.09	0.18	39.20
37	185	3.08	1.0	0.334	0.25	0.30	0.09	0.18	39.20
38	190	3.17	1.1	0.367	0.25	0.33	0.12	0.24	59.31
39	195	3.25	1.1	0.367	0.25	0.33	0.12	0.24	59.31
40	200	3.33	1.1	0.367	0.25	0.33	0.12	0.24	59.31
41	205	3.42	1.2	0.400	0.25	0.36	0.16	0.31	79.43
42	210	3.50	1.3	0.434	0.25	0.39	0.19	0.38	99.55
43	215	3.58	1.4	0.467	0.25	0.42	0.22	0.45	119.66
44	220	3.67	1.4	0.467	0.25	0.42	0.22	0.45	119.66
45	225	3.75	1.5	0.500	0.25	0.45	0.26	0.51	139.78
46	230	3.83	1.5	0.500	0.25	0.45	0.26	0.51	139.78
47	235	3.92	1.6	0.534	0.25	0.48	0.29	0.58	159.89
48	240	4.00	1.6	0.534	0.25	0.48	0.29	0.58	159.89
49	245	4.08	1.7	0.567	0.25	0.51	0.32	0.65	180.01
50	250	4.17	1.8	0.600	0.25	0.54	0.36	0.71	200.13
51	255	4.25	1.9	0.634	0.25	0.57	0.39	0.78	220.24
52	260	4.33	2.0	0.667	0.25	0.60	0.42	0.85	240.36
53	265	4.42	2.1	0.701	0.25	0.63	0.46	0.92	260.48
54	270	4.50	2.1	0.701	0.25	0.63	0.46	0.92	260.48
55	275	4.58	2.2	0.734	0.25	0.66	0.49	0.98	280.59
56	280	4.67	2.3	0.767	0.25	0.69	0.52	1.05	300.71

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.01		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.00		
UNIT TIME-PERCENT OF LAG	502.5		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.245		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.05 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.801	0.25	0.72	0.56	1.12	320.82
58	290	4.83	2.4	0.801	0.25	0.72	0.56	1.12	320.82
59	295	4.92	2.5	0.834	0.25	0.75	0.59	1.18	340.94
60	300	5.00	2.6	0.867	0.25	0.78	0.62	1.25	361.06
61	305	5.08	3.1	1.034	0.25	0.93	0.79	1.59	461.64
62	310	5.17	3.6	1.201	0.25	1.08	0.96	1.92	562.22
63	315	5.25	3.9	1.301	0.25	1.17	1.06	2.12	622.56
64	320	5.33	4.2	1.401	0.25	1.26	1.16	2.32	682.91
65	325	5.42	4.7	1.568	0.25	1.41	1.32	2.66	783.49
66	330	5.50	5.6	1.868	0.25	1.68	1.62	3.26	964.54
67	335	5.58	1.9	0.634	0.25	0.57	0.39	0.78	220.24
68	340	5.67	0.9	0.300	0.25	0.27	0.05	0.11	19.08
69	345	5.75	0.6	0.200	0.25	0.18	0.02	0.04	0.00
70	350	5.83	0.5	0.167	0.25	0.15	0.02	0.03	0.00
71	355	5.92	0.3	0.100	0.25	0.09	0.01	0.02	0.00
72	360	6.00	0.2	0.067	0.25	0.06	0.01	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.40
FLOOD VOLUME (acft)	0.23
FLOOD VOLUME (cuft)	10195.68
REQUIRED STORAGE (acft)	0.21
REQUIRED STORAGE (cuft)	9147.59
PEAK FLOW RATE (cfs)	3.26

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.433	0.032	0.004	0.01	0.00
2	30	0.50	0.3	0.054	0.428	0.048	0.005	0.01	0.00
3	45	0.75	0.3	0.054	0.423	0.048	0.005	0.01	0.00
4	60	1.00	0.4	0.072	0.418	0.064	0.007	0.01	0.00
5	75	1.25	0.3	0.054	0.413	0.048	0.005	0.01	0.00
6	90	1.50	0.3	0.054	0.408	0.048	0.005	0.01	0.00
7	105	1.75	0.3	0.054	0.403	0.048	0.005	0.01	0.00
8	120	2.00	0.4	0.072	0.399	0.064	0.007	0.01	0.00
9	135	2.25	0.4	0.072	0.394	0.064	0.007	0.01	0.00
10	150	2.50	0.4	0.072	0.389	0.064	0.007	0.01	0.00
11	165	2.75	0.5	0.089	0.384	0.080	0.009	0.02	0.00
12	180	3.00	0.5	0.089	0.379	0.080	0.009	0.02	0.00
13	195	3.25	0.5	0.089	0.375	0.080	0.009	0.02	0.00
14	210	3.50	0.5	0.089	0.370	0.080	0.009	0.02	0.00
15	225	3.75	0.5	0.089	0.365	0.080	0.009	0.02	0.00
16	240	4.00	0.6	0.107	0.361	0.097	0.011	0.02	0.00
17	255	4.25	0.6	0.107	0.356	0.097	0.011	0.02	0.00
18	270	4.50	0.7	0.125	0.352	0.113	0.013	0.03	0.00
19	285	4.75	0.7	0.125	0.347	0.113	0.013	0.03	0.00
20	300	5.00	0.8	0.143	0.343	0.129	0.014	0.03	0.00
21	315	5.25	0.6	0.107	0.338	0.097	0.011	0.02	0.00
22	330	5.50	0.7	0.125	0.334	0.113	0.013	0.03	0.00
23	345	5.75	0.8	0.143	0.330	0.129	0.014	0.03	0.00
24	360	6.00	0.8	0.143	0.325	0.129	0.014	0.03	0.00
25	375	6.25	0.9	0.161	0.321	0.145	0.016	0.03	0.00
26	390	6.50	0.9	0.161	0.317	0.145	0.016	0.03	0.00
27	405	6.75	1.0	0.179	0.312	0.161	0.018	0.04	0.00
28	420	7.00	1.0	0.179	0.308	0.161	0.018	0.04	0.00
29	435	7.25	1.0	0.179	0.304	0.161	0.018	0.04	0.00
30	450	7.50	1.1	0.197	0.300	0.177	0.020	0.04	0.00
31	465	7.75	1.2	0.215	0.296	0.193	0.021	0.04	0.00
32	480	8.00	1.3	0.232	0.292	0.209	0.023	0.05	0.00
33	495	8.25	1.5	0.268	0.288	0.241	0.027	0.05	6.29
34	510	8.50	1.5	0.268	0.284	0.241	0.027	0.05	6.29
35	525	8.75	1.6	0.286	0.280	0.257	0.007	0.01	0.00
36	540	9.00	1.7	0.304	0.276	0.274	0.028	0.06	9.01
37	555	9.25	1.9	0.340	0.272	0.306	0.068	0.14	80.76
38	570	9.50	2.0	0.358	0.268	0.322	0.090	0.18	120.10
39	585	9.75	2.1	0.375	0.264	0.338	0.111	0.22	159.37
40	600	10.00	2.2	0.393	0.260	0.354	0.133	0.27	198.58
41	615	10.25	1.5	0.268	0.256	0.241	0.012	0.02	0.00
42	630	10.50	1.5	0.268	0.253	0.241	0.015	0.03	0.00
43	645	10.75	2.0	0.358	0.249	0.322	0.109	0.22	154.08
44	660	11.00	2.0	0.358	0.245	0.322	0.112	0.23	160.67
45	675	11.25	1.9	0.340	0.242	0.306	0.098	0.20	134.85
46	690	11.50	1.9	0.340	0.238	0.306	0.101	0.20	141.31
47	705	11.75	1.7	0.304	0.235	0.274	0.069	0.14	83.00
48	720	12.00	1.8	0.322	0.231	0.290	0.091	0.18	121.66
49	735	12.25	2.5	0.447	0.228	0.402	0.219	0.44	354.32
50	750	12.50	2.6	0.465	0.224	0.418	0.240	0.48	392.84
51	765	12.75	2.8	0.501	0.221	0.451	0.280	0.56	463.63
52	780	13.00	2.9	0.519	0.218	0.467	0.301	0.60	502.00
53	795	13.25	3.4	0.608	0.214	0.547	0.394	0.79	669.68
54	810	13.50	3.4	0.608	0.211	0.547	0.397	0.80	675.55
55	825	13.75	2.3	0.411	0.208	0.370	0.203	0.41	325.56
56	840	14.00	2.3	0.411	0.205	0.370	0.206	0.42	331.29
57	855	14.25	2.7	0.483	0.202	0.434	0.281	0.57	466.31
58	870	14.50	2.6	0.465	0.199	0.418	0.266	0.54	439.54
59	885	14.75	2.6	0.465	0.196	0.418	0.269	0.54	445.03
60	900	15.00	2.5	0.447	0.193	0.402	0.254	0.51	418.10
61	915	15.25	2.4	0.429	0.190	0.386	0.240	0.48	391.08
62	930	15.50	2.3	0.411	0.187	0.370	0.225	0.45	363.98
63	945	15.75	1.9	0.340	0.184	0.306	0.156	0.31	239.77
64	960	16.00	1.9	0.340	0.181	0.306	0.159	0.32	244.85
65	975	16.25	0.4	0.072	0.178	0.064	0.007	0.01	0.00
66	990	16.50	0.4	0.072	0.176	0.064	0.007	0.01	0.00
67	1005	16.75	0.3	0.054	0.173	0.048	0.005	0.01	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	2.010	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2453
LAG TIME - MINUTES	1.00	MINIMUM LOSS RATE (for var. loss) - in/hr	0.123
UNIT TIME-PERCENT OF LAG	1507.5	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00227
		PERCOLATION RATE (cfs)	0.05

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
	Minutes	Hours	(Plate E-5.9)		Max	Low			
68	1020	17.00	0.3	0.054	0.170	0.048	0.005	0.01	0.00
69	1035	17.25	0.5	0.089	0.168	0.080	0.009	0.02	0.00
70	1050	17.50	0.5	0.089	0.165	0.080	0.009	0.02	0.00
71	1065	17.75	0.5	0.089	0.163	0.080	0.009	0.02	0.00
72	1080	18.00	0.4	0.072	0.160	0.064	0.007	0.01	0.00
73	1095	18.25	0.4	0.072	0.158	0.064	0.007	0.01	0.00
74	1110	18.50	0.4	0.072	0.156	0.064	0.007	0.01	0.00
75	1125	18.75	0.3	0.054	0.153	0.048	0.005	0.01	0.00
76	1140	19.00	0.2	0.036	0.151	0.032	0.004	0.01	0.00
77	1155	19.25	0.3	0.054	0.149	0.048	0.005	0.01	0.00
78	1170	19.50	0.4	0.072	0.147	0.064	0.007	0.01	0.00
79	1185	19.75	0.3	0.054	0.145	0.048	0.005	0.01	0.00
80	1200	20.00	0.2	0.036	0.143	0.032	0.004	0.01	0.00
81	1215	20.25	0.3	0.054	0.141	0.048	0.005	0.01	0.00
82	1230	20.50	0.3	0.054	0.139	0.048	0.005	0.01	0.00
83	1245	20.75	0.3	0.054	0.138	0.048	0.005	0.01	0.00
84	1260	21.00	0.2	0.036	0.136	0.032	0.004	0.01	0.00
85	1275	21.25	0.3	0.054	0.134	0.048	0.005	0.01	0.00
86	1290	21.50	0.2	0.036	0.133	0.032	0.004	0.01	0.00
87	1305	21.75	0.3	0.054	0.131	0.048	0.005	0.01	0.00
88	1320	22.00	0.2	0.036	0.130	0.032	0.004	0.01	0.00
89	1335	22.25	0.3	0.054	0.129	0.048	0.005	0.01	0.00
90	1350	22.50	0.2	0.036	0.127	0.032	0.004	0.01	0.00
91	1365	22.75	0.2	0.036	0.126	0.032	0.004	0.01	0.00
92	1380	23.00	0.2	0.036	0.125	0.032	0.004	0.01	0.00
93	1395	23.25	0.2	0.036	0.124	0.032	0.004	0.01	0.00
94	1410	23.50	0.2	0.036	0.124	0.032	0.004	0.01	0.00
95	1425	23.75	0.2	0.036	0.123	0.032	0.004	0.01	0.00
96	1440	24.00	0.2	0.036	0.123	0.032	0.004	0.01	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	1.43
FLOOD VOLUME (acft)	0.24
FLOOD VOLUME (cuft)	10444.84
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8099.53
PEAK FLOW (cfs)	0.80

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		3025	0	0	0.00
466	1	1	675	3700	3363	3363	0.08
467	1	2	730	4430	4065	7428	0.17
468	1	3	785	5215	4823	12250	0.28
468.5	0.5	3.5	415	5630	2711	14961	0.34

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.05 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.05 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	52	52	14	37	465.01	37	0.00
2	10	0.17	52	89	14	75	465.02	75	0.00
3	15	0.07	21	96	14	82	465.02	82	0.00
4	20	0.27	82	164	14	150	465.04	150	0.00
5	25	0.27	82	232	14	218	465.06	218	0.01
6	30	0.43	128	346	14	332	465.10	332	0.01
7	35	0.27	82	414	14	400	465.12	400	0.01
8	40	0.43	128	529	14	514	465.15	514	0.01
9	45	0.43	128	643	14	629	465.19	629	0.01
10	50	0.27	82	711	14	697	465.21	697	0.02
11	55	0.33	98	794	14	780	465.23	780	0.02
12	60	0.43	128	908	14	894	465.27	894	0.02
13	65	0.63	190	1,084	14	1,070	465.32	1,070	0.02
14	70	0.63	190	1,260	14	1,245	465.37	1,245	0.03
15	75	0.63	190	1,435	14	1,421	465.42	1,421	0.03
16	80	0.53	159	1,580	14	1,566	465.47	1,566	0.04
17	85	0.84	251	1,817	14	1,803	465.54	1,803	0.04
18	90	0.89	266	2,069	14	2,055	465.61	2,055	0.05
19	95	0.73	220	2,275	14	2,261	465.67	2,261	0.05
20	100	0.89	266	2,527	14	2,513	465.75	2,513	0.06
21	105	1.19	358	2,872	14	2,858	465.85	2,858	0.07
22	110	1.09	328	3,185	14	3,171	465.94	3,171	0.07
23	115	0.99	297	3,468	14	3,454	466.02	3,454	0.08
24	120	1.04	312	3,766	14	3,752	466.10	3,752	0.09
25	125	1.09	328	4,080	14	4,066	466.17	4,066	0.09
26	130	1.65	496	4,562	14	4,548	466.29	4,548	0.10
27	135	2.06	619	5,167	14	5,153	466.44	5,153	0.12
28	140	1.30	389	5,542	14	5,528	466.53	5,528	0.13
29	145	2.98	895	6,424	14	6,409	466.75	6,409	0.15
30	150	3.24	972	7,381	14	7,367	466.99	7,367	0.17
31	155	3.70	1,110	8,477	14	8,463	467.21	8,463	0.19
32	160	2.52	757	9,220	14	9,206	467.37	9,206	0.21
33	165	0.53	159	9,365	14	9,351	467.40	9,351	0.21
34	170	0.43	128	9,479	14	9,465	467.42	9,465	0.22
35	175	0.43	128	9,594	14	9,580	467.45	9,580	0.22
36	180	0.03	9	9,589	14	9,575	467.45	9,575	0.22

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.03	10	10	14	-	465.00	-	0.00
2	10	0.04	12	12	14	-	465.00	-	0.00
3	15	0.04	12	12	14	-	465.00	-	0.00
4	20	0.04	12	12	14	-	465.00	-	0.00
5	25	0.04	12	12	14	-	465.00	-	0.00
6	30	0.05	14	14	14	0	465.00	0	0.00
7	35	0.05	14	14	14	0	465.00	0	0.00
8	40	0.05	14	14	14	0	465.00	0	0.00
9	45	0.05	14	14	14	0	465.00	0	0.00
10	50	0.05	14	14	14	0	465.00	0	0.00
11	55	0.05	14	14	14	0	465.00	0	0.00
12	60	0.04	13	13	14	-	465.00	-	0.00
13	65	0.04	13	13	14	-	465.00	-	0.00
14	70	0.04	13	13	14	-	465.00	-	0.00
15	75	0.04	13	13	14	-	465.00	-	0.00
16	80	0.04	13	13	14	-	465.00	-	0.00
17	85	0.04	13	13	14	-	465.00	-	0.00
18	90	0.04	13	13	14	-	465.00	-	0.00
19	95	0.04	13	13	14	-	465.00	-	0.00
20	100	0.04	13	13	14	-	465.00	-	0.00
21	105	0.04	13	13	14	-	465.00	-	0.00
22	110	0.04	13	13	14	-	465.00	-	0.00
23	115	0.04	13	13	14	-	465.00	-	0.00
24	120	0.11	33	33	14	19	465.01	19	0.00
25	125	0.04	13	32	14	18	465.01	18	0.00
26	130	0.11	33	51	14	37	465.01	37	0.00
27	135	0.11	33	70	14	56	465.02	56	0.00
28	140	0.11	33	89	14	75	465.02	75	0.00
29	145	0.11	33	108	14	94	465.03	94	0.00
30	150	0.11	33	128	14	113	465.03	113	0.00
31	155	0.11	33	147	14	133	465.04	133	0.00
32	160	0.11	33	166	14	152	465.05	152	0.00
33	165	0.18	53	205	14	191	465.06	191	0.00
34	170	0.18	53	244	14	230	465.07	230	0.01
35	175	0.18	53	283	14	269	465.08	269	0.01
36	180	0.18	53	322	14	308	465.09	308	0.01
37	185	0.18	53	362	14	348	465.10	348	0.01
38	190	0.24	73	421	14	407	465.12	407	0.01
39	195	0.24	73	480	14	466	465.14	466	0.01
40	200	0.24	73	540	14	526	465.16	526	0.01
41	205	0.31	94	619	14	605	465.18	605	0.01
42	210	0.38	114	719	14	705	465.21	705	0.02
43	215	0.45	134	838	14	824	465.25	824	0.02
44	220	0.45	134	958	14	944	465.28	944	0.02
45	225	0.51	154	1,098	14	1,084	465.32	1,084	0.02
46	230	0.51	154	1,237	14	1,223	465.36	1,223	0.03
47	235	0.58	174	1,397	14	1,383	465.41	1,383	0.03
48	240	0.58	174	1,557	14	1,543	465.46	1,543	0.04
49	245	0.65	194	1,737	14	1,723	465.51	1,723	0.04
50	250	0.71	214	1,937	14	1,923	465.57	1,923	0.04
51	255	0.78	234	2,158	14	2,144	465.64	2,144	0.05
52	260	0.85	254	2,398	14	2,384	465.71	2,384	0.05
53	265	0.92	275	2,658	14	2,644	465.79	2,644	0.06
54	270	0.92	275	2,919	14	2,905	465.86	2,905	0.07
55	275	0.98	295	3,200	14	3,185	465.95	3,185	0.07

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	1.05	315	3,500	14	3,486	466.03	3,486	0.08
57	285	1.12	335	3,821	14	3,807	466.11	3,807	0.09
58	290	1.12	335	4,142	14	4,128	466.19	4,128	0.09
59	295	1.18	355	4,483	14	4,469	466.27	4,469	0.10
60	300	1.25	375	4,844	14	4,830	466.36	4,830	0.11
61	305	1.59	476	5,306	14	5,291	466.47	5,291	0.12
62	310	1.92	576	5,868	14	5,854	466.61	5,854	0.13
63	315	2.12	637	6,490	14	6,476	466.77	6,476	0.15
64	320	2.32	697	7,173	14	7,159	466.93	7,159	0.16
65	325	2.66	798	7,957	14	7,943	467.11	7,943	0.18
66	330	3.26	979	8,921	14	8,907	467.31	8,907	0.20
67	335	0.78	234	9,142	14	9,127	467.35	9,127	0.21
68	340	0.11	33	9,161	14	9,147	467.36	9,147	0.21
69	345	0.04	12	9,159	14	9,145	467.36	9,145	0.21
70	350	0.03	10	9,155	14	9,140	467.36	9,140	0.21
71	355	0.02	6	9,147	14	9,132	467.35	9,132	0.21
72	360	0.01	4	9,136	14	9,122	467.35	9,122	0.21

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.01	6	6	42	-	465.00	-	0.00
2	30	0.01	10	10	42	-	465.00	-	0.00
3	45	0.01	10	10	42	-	465.00	-	0.00
4	60	0.01	13	13	42	-	465.00	-	0.00
5	75	0.01	10	10	42	-	465.00	-	0.00
6	90	0.01	10	10	42	-	465.00	-	0.00
7	105	0.01	10	10	42	-	465.00	-	0.00
8	120	0.01	13	13	42	-	465.00	-	0.00
9	135	0.01	13	13	42	-	465.00	-	0.00
10	150	0.01	13	13	42	-	465.00	-	0.00
11	165	0.02	16	16	42	-	465.00	-	0.00
12	180	0.02	16	16	42	-	465.00	-	0.00
13	195	0.02	16	16	42	-	465.00	-	0.00
14	210	0.02	16	16	42	-	465.00	-	0.00
15	225	0.02	16	16	42	-	465.00	-	0.00
16	240	0.02	19	19	42	-	465.00	-	0.00
17	255	0.02	19	19	42	-	465.00	-	0.00
18	270	0.03	23	23	42	-	465.00	-	0.00
19	285	0.03	23	23	42	-	465.00	-	0.00
20	300	0.03	26	26	42	-	465.00	-	0.00
21	315	0.02	19	19	42	-	465.00	-	0.00
22	330	0.03	23	23	42	-	465.00	-	0.00
23	345	0.03	26	26	42	-	465.00	-	0.00
24	360	0.03	26	26	42	-	465.00	-	0.00
25	375	0.03	29	29	42	-	465.00	-	0.00
26	390	0.03	29	29	42	-	465.00	-	0.00
27	405	0.04	32	32	42	-	465.00	-	0.00
28	420	0.04	32	32	42	-	465.00	-	0.00
29	435	0.04	32	32	42	-	465.00	-	0.00
30	450	0.04	36	36	42	-	465.00	-	0.00
31	465	0.04	39	39	42	-	465.00	-	0.00
32	480	0.05	42	42	42	-	465.00	-	0.00
33	495	0.05	49	49	42	6	465.00	6	0.00
34	510	0.05	49	55	42	13	465.00	13	0.00
35	525	0.01	12	24	42	-	465.00	-	0.00
36	540	0.06	51	51	42	9	465.00	9	0.00
37	555	0.14	123	132	42	90	465.03	90	0.00
38	570	0.18	162	252	42	210	465.06	210	0.00
39	585	0.22	202	411	42	369	465.11	369	0.01
40	600	0.27	241	610	42	568	465.17	568	0.01
41	615	0.02	21	589	42	547	465.16	547	0.01
42	630	0.03	28	575	42	532	465.16	532	0.01
43	645	0.22	196	729	42	687	465.20	687	0.02
44	660	0.23	203	889	42	847	465.25	847	0.02
45	675	0.20	177	1,024	42	982	465.29	982	0.02
46	690	0.20	184	1,166	42	1,123	465.33	1,123	0.03
47	705	0.14	125	1,249	42	1,206	465.36	1,206	0.03
48	720	0.18	164	1,370	42	1,328	465.39	1,328	0.03
49	735	0.44	397	1,725	42	1,682	465.50	1,682	0.04
50	750	0.48	435	2,117	42	2,075	465.62	2,075	0.05
51	765	0.56	506	2,581	42	2,539	465.76	2,539	0.06
52	780	0.60	544	3,083	42	3,041	465.90	3,041	0.07
53	795	0.79	712	3,753	42	3,711	466.09	3,711	0.09
54	810	0.80	718	4,428	42	4,386	466.25	4,386	0.10
55	825	0.41	368	4,754	42	4,712	466.33	4,712	0.11
56	840	0.42	374	5,085	42	5,043	466.41	5,043	0.12
57	855	0.57	509	5,551	42	5,509	466.53	5,509	0.13
58	870	0.54	482	5,991	42	5,949	466.64	5,949	0.14

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.54	487	6,436	42	6,394	466.75	6,394	0.15
60	900	0.51	460	6,854	42	6,812	466.85	6,812	0.16
61	915	0.48	433	7,245	42	7,203	466.94	7,203	0.17
62	930	0.45	406	7,609	42	7,567	467.03	7,567	0.17
63	945	0.31	282	7,849	42	7,807	467.08	7,807	0.18
64	960	0.32	287	8,094	42	8,052	467.13	8,052	0.18
65	975	0.01	13	8,065	42	8,022	467.12	8,022	0.18
66	990	0.01	13	8,035	42	7,993	467.12	7,993	0.18
67	1005	0.01	10	8,003	42	7,961	467.11	7,961	0.18
68	1020	0.01	10	7,970	42	7,928	467.10	7,928	0.18
69	1035	0.02	16	7,944	42	7,902	467.10	7,902	0.18
70	1050	0.02	16	7,918	42	7,876	467.09	7,876	0.18
71	1065	0.02	16	7,892	42	7,850	467.09	7,850	0.18
72	1080	0.01	13	7,863	42	7,821	467.08	7,821	0.18
73	1095	0.01	13	7,833	42	7,791	467.08	7,791	0.18
74	1110	0.01	13	7,804	42	7,762	467.07	7,762	0.18
75	1125	0.01	10	7,772	42	7,729	467.06	7,729	0.18
76	1140	0.01	6	7,736	42	7,694	467.06	7,694	0.18
77	1155	0.01	10	7,703	42	7,661	467.05	7,661	0.18
78	1170	0.01	13	7,674	42	7,632	467.04	7,632	0.18
79	1185	0.01	10	7,642	42	7,599	467.04	7,599	0.17
80	1200	0.01	6	7,606	42	7,564	467.03	7,564	0.17
81	1215	0.01	10	7,573	42	7,531	467.02	7,531	0.17
82	1230	0.01	10	7,541	42	7,499	467.01	7,499	0.17
83	1245	0.01	10	7,508	42	7,466	467.01	7,466	0.17
84	1260	0.01	6	7,473	42	7,430	467.00	7,430	0.17
85	1275	0.01	10	7,440	42	7,398	466.99	7,398	0.17
86	1290	0.01	6	7,404	42	7,362	466.98	7,362	0.17
87	1305	0.01	10	7,372	42	7,330	466.98	7,330	0.17
88	1320	0.01	6	7,336	42	7,294	466.97	7,294	0.17
89	1335	0.01	10	7,303	42	7,261	466.96	7,261	0.17
90	1350	0.01	6	7,268	42	7,225	466.95	7,225	0.17
91	1365	0.01	6	7,232	42	7,190	466.94	7,190	0.17
92	1380	0.01	6	7,196	42	7,154	466.93	7,154	0.16
93	1395	0.01	6	7,160	42	7,118	466.92	7,118	0.16
94	1410	0.01	6	7,125	42	7,082	466.92	7,082	0.16
95	1425	0.01	6	7,089	42	7,047	466.91	7,047	0.16
96	1440	0.01	6	7,053	42	7,011	466.90	7,011	0.16

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 2		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.51		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	7.46		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.6		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	724		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	100		
30				
31	ELEVATION OF HEADWATER	472		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15600	
45		466	17120	
46		467	18710	
47		468	20350	
48		468.5	21200	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD — PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
BASIC DATA CALCULATION FORM — JOB # 0
SHORTCUT METHOD — BY ES R. BAZUA, P.E. — DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 2
[3] AREA - ACRES	10.570
[4] L-FEET	724
[5] L-MILES	0.137
[6] La-FEET	100.00
[7] La-MILES	0.019
[8] ELEVATION OF HEADWATER	472
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.5
[11] S-FEET/MILE	25.5
[12] S^0.5	5.05
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	1.6
[17] 100% OF LAG-MINUTES	1.6
[18] 200% OF LAG-MINUTES	3.2
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.24

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	10.570	1.00	2.12	2.78	10.570	1.00	2.78	4.47	10.570	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.57	SUM [7]	2.12	SUM [9]	10.57	SUM [11]	2.78	SUM [13]	10.57	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.54	1.64	1.79
FLOOD VOLUME	(cu-ft)	59,174	63,009	68,653
	(acre-ft)	1.36	1.45	1.58
REQUIRED STORAGE	(cu-ft)	56,096	57,661	56,204
	(acre-ft)	1.29	1.32	1.29
PEAK FLOW	(cfs)	20.00	17.69	4.66
MAXIMUM WSEL	(ft)	468.11	468.19	468.12

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.51	0.237	0.0123
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	7.46	0.706	0.1523
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.60	0.057	0.0295
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	10.57	SUM	0.1942

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.097085525

C= 0.00180

Ft=C(24-(T/60))^1.55 = 0.00180 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.19
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.19	0.30	0.14	1.44	360.41
2	10	0.17	1.3	0.331	0.19	0.30	0.14	1.44	360.41
3	15	0.25	1.1	0.280	0.19	0.25	0.09	0.91	199.07
4	20	0.33	1.5	0.382	0.19	0.34	0.19	1.98	521.75
5	25	0.42	1.5	0.382	0.19	0.34	0.19	1.98	521.75
6	30	0.50	1.8	0.458	0.19	0.41	0.26	2.79	763.76
7	35	0.58	1.5	0.382	0.19	0.34	0.19	1.98	521.75
8	40	0.67	1.8	0.458	0.19	0.41	0.26	2.79	763.76
9	45	0.75	1.8	0.458	0.19	0.41	0.26	2.79	763.76
10	50	0.83	1.5	0.382	0.19	0.34	0.19	1.98	521.75
11	55	0.92	1.6	0.407	0.19	0.37	0.21	2.25	602.42
12	60	1.00	1.8	0.458	0.19	0.41	0.26	2.79	763.76
13	65	1.08	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
14	70	1.17	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
15	75	1.25	2.2	0.560	0.19	0.50	0.37	3.86	1086.45
16	80	1.33	2.0	0.509	0.19	0.46	0.31	3.33	925.11
17	85	1.42	2.6	0.661	0.19	0.60	0.47	4.94	1409.13
18	90	1.50	2.7	0.687	0.19	0.62	0.49	5.21	1489.80
19	95	1.58	2.4	0.611	0.19	0.55	0.42	4.40	1247.79
20	100	1.67	2.7	0.687	0.19	0.62	0.49	5.21	1489.80
21	105	1.75	3.3	0.840	0.19	0.76	0.65	6.82	1973.82
22	110	1.83	3.1	0.789	0.19	0.71	0.59	6.28	1812.48
23	115	1.92	2.9	0.738	0.19	0.66	0.54	5.75	1651.14
24	120	2.00	3.0	0.763	0.19	0.69	0.57	6.01	1731.81
25	125	2.08	3.1	0.789	0.19	0.71	0.59	6.28	1812.48
26	130	2.17	4.2	1.068	0.19	0.96	0.87	9.24	2699.85
27	135	2.25	5.0	1.272	0.19	1.14	1.08	11.39	3345.21
28	140	2.33	3.5	0.890	0.19	0.80	0.70	7.36	2135.16
29	145	2.42	6.8	1.730	0.19	1.56	1.54	16.23	4797.28
30	150	2.50	7.3	1.857	0.19	1.67	1.66	17.58	5200.63
31	155	2.58	8.2	2.086	0.19	1.88	1.89	20.00	5926.66
32	160	2.67	5.9	1.501	0.19	1.35	1.31	13.81	4071.24
33	165	2.75	2.0	0.509	0.19	0.46	0.31	3.33	925.11
34	170	2.83	1.8	0.458	0.19	0.41	0.26	2.79	763.76
35	175	2.92	1.8	0.458	0.19	0.41	0.26	2.79	763.76
36	180	3.00	0.6	0.153	0.19	0.14	0.02	0.16	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.54
FLOOD VOLUME (acft)	1.36
FLOOD VOLUME (cuft)	59173.82
REQUIRED STORAGE (acft)	1.29
REQUIRED STORAGE (cuft)	56095.73
PEAK FLOW RATE (cfs)	20.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.62
UNIT TIME-PERCENT OF LAG	308.6
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.194
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.24 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.167	0.19	0.15	0.02	0.18	0.00
2	10	0.17	0.6	0.200	0.19	0.18	0.01	0.06	0.00
3	15	0.25	0.6	0.200	0.19	0.18	0.01	0.06	0.00
4	20	0.33	0.6	0.200	0.19	0.18	0.01	0.06	0.00
5	25	0.42	0.6	0.200	0.19	0.18	0.01	0.06	0.00
6	30	0.50	0.7	0.234	0.19	0.21	0.04	0.42	52.19
7	35	0.58	0.7	0.234	0.19	0.21	0.04	0.42	52.19
8	40	0.67	0.7	0.234	0.19	0.21	0.04	0.42	52.19
9	45	0.75	0.7	0.234	0.19	0.21	0.04	0.42	52.19
10	50	0.83	0.7	0.234	0.19	0.21	0.04	0.42	52.19
11	55	0.92	0.7	0.234	0.19	0.21	0.04	0.42	52.19
12	60	1.00	0.8	0.267	0.19	0.24	0.07	0.77	157.98
13	65	1.08	0.8	0.267	0.19	0.24	0.07	0.77	157.98
14	70	1.17	0.8	0.267	0.19	0.24	0.07	0.77	157.98
15	75	1.25	0.8	0.267	0.19	0.24	0.07	0.77	157.98
16	80	1.33	0.8	0.267	0.19	0.24	0.07	0.77	157.98
17	85	1.42	0.8	0.267	0.19	0.24	0.07	0.77	157.98
18	90	1.50	0.8	0.267	0.19	0.24	0.07	0.77	157.98
19	95	1.58	0.8	0.267	0.19	0.24	0.07	0.77	157.98
20	100	1.67	0.8	0.267	0.19	0.24	0.07	0.77	157.98
21	105	1.75	0.8	0.267	0.19	0.24	0.07	0.77	157.98
22	110	1.83	0.8	0.267	0.19	0.24	0.07	0.77	157.98
23	115	1.92	0.8	0.267	0.19	0.24	0.07	0.77	157.98
24	120	2.00	0.9	0.300	0.19	0.27	0.11	1.12	263.76
25	125	2.08	0.8	0.267	0.19	0.24	0.07	0.77	157.98
26	130	2.17	0.9	0.300	0.19	0.27	0.11	1.12	263.76
27	135	2.25	0.9	0.300	0.19	0.27	0.11	1.12	263.76
28	140	2.33	0.9	0.300	0.19	0.27	0.11	1.12	263.76
29	145	2.42	0.9	0.300	0.19	0.27	0.11	1.12	263.76
30	150	2.50	0.9	0.300	0.19	0.27	0.11	1.12	263.76
31	155	2.58	0.9	0.300	0.19	0.27	0.11	1.12	263.76
32	160	2.67	0.9	0.300	0.19	0.27	0.11	1.12	263.76
33	165	2.75	1.0	0.334	0.19	0.30	0.14	1.47	369.55
34	170	2.83	1.0	0.334	0.19	0.30	0.14	1.47	369.55
35	175	2.92	1.0	0.334	0.19	0.30	0.14	1.47	369.55
36	180	3.00	1.0	0.334	0.19	0.30	0.14	1.47	369.55
37	185	3.08	1.0	0.334	0.19	0.30	0.14	1.47	369.55
38	190	3.17	1.1	0.367	0.19	0.33	0.17	1.83	475.33
39	195	3.25	1.1	0.367	0.19	0.33	0.17	1.83	475.33
40	200	3.33	1.1	0.367	0.19	0.33	0.17	1.83	475.33
41	205	3.42	1.2	0.400	0.19	0.36	0.21	2.18	581.11
42	210	3.50	1.3	0.434	0.19	0.39	0.24	2.53	686.90
43	215	3.58	1.4	0.467	0.19	0.42	0.27	2.88	792.68
44	220	3.67	1.4	0.467	0.19	0.42	0.27	2.88	792.68
45	225	3.75	1.5	0.500	0.19	0.45	0.31	3.24	898.47
46	230	3.83	1.5	0.500	0.19	0.45	0.31	3.24	898.47
47	235	3.92	1.6	0.534	0.19	0.48	0.34	3.59	1004.25
48	240	4.00	1.6	0.534	0.19	0.48	0.34	3.59	1004.25
49	245	4.08	1.7	0.567	0.19	0.51	0.37	3.94	1110.04
50	250	4.17	1.8	0.600	0.19	0.54	0.41	4.29	1215.82
51	255	4.25	1.9	0.634	0.19	0.57	0.44	4.65	1321.61
52	260	4.33	2.0	0.667	0.19	0.60	0.47	5.00	1427.39
53	265	4.42	2.1	0.701	0.19	0.63	0.51	5.35	1533.18
54	270	4.50	2.1	0.701	0.19	0.63	0.51	5.35	1533.18
55	275	4.58	2.2	0.734	0.19	0.66	0.54	5.71	1638.96
56	280	4.67	2.3	0.767	0.19	0.69	0.57	6.06	1744.75

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.57		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.62		
UNIT TIME-PERCENT OF LAG	308.6		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.194		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.24 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.801	0.19	0.72	0.61	6.41	1850.53
58	290	4.83	2.4	0.801	0.19	0.72	0.61	6.41	1850.53
59	295	4.92	2.5	0.834	0.19	0.75	0.64	6.76	1956.31
60	300	5.00	2.6	0.867	0.19	0.78	0.67	7.12	2062.10
61	305	5.08	3.1	1.034	0.19	0.93	0.84	8.88	2591.02
62	310	5.17	3.6	1.201	0.19	1.08	1.01	10.64	3119.94
63	315	5.25	3.9	1.301	0.19	1.17	1.11	11.70	3437.30
64	320	5.33	4.2	1.401	0.19	1.26	1.21	12.76	3754.65
65	325	5.42	4.7	1.568	0.19	1.41	1.37	14.52	4283.57
66	330	5.50	5.6	1.868	0.19	1.68	1.67	17.69	5235.64
67	335	5.58	1.9	0.634	0.19	0.57	0.44	4.65	1321.61
68	340	5.67	0.9	0.300	0.19	0.27	0.11	1.12	263.76
69	345	5.75	0.6	0.200	0.19	0.18	0.01	0.06	0.00
70	350	5.83	0.5	0.167	0.19	0.15	0.02	0.18	0.00
71	355	5.92	0.3	0.100	0.19	0.09	0.01	0.11	0.00
72	360	6.00	0.2	0.067	0.19	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.64
FLOOD VOLUME (acft)	1.45
FLOOD VOLUME (cuft)	63008.73
REQUIRED STORAGE (acft)	1.32
REQUIRED STORAGE (cuft)	57661.37
PEAK FLOW RATE (cfs)	17.69

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.343	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.339	0.048	0.005	0.06	0.00
3	45	0.75	0.3	0.054	0.335	0.048	0.005	0.06	0.00
4	60	1.00	0.4	0.072	0.331	0.064	0.007	0.08	0.00
5	75	1.25	0.3	0.054	0.327	0.048	0.005	0.06	0.00
6	90	1.50	0.3	0.054	0.323	0.048	0.005	0.06	0.00
7	105	1.75	0.3	0.054	0.319	0.048	0.005	0.06	0.00
8	120	2.00	0.4	0.072	0.316	0.064	0.007	0.08	0.00
9	135	2.25	0.4	0.072	0.312	0.064	0.007	0.08	0.00
10	150	2.50	0.4	0.072	0.308	0.064	0.007	0.08	0.00
11	165	2.75	0.5	0.089	0.304	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.300	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.297	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.293	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.289	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.286	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.282	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.278	0.113	0.013	0.13	0.00
19	285	4.75	0.7	0.125	0.275	0.113	0.013	0.13	0.00
20	300	5.00	0.8	0.143	0.271	0.129	0.014	0.15	0.00
21	315	5.25	0.6	0.107	0.268	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.264	0.113	0.013	0.13	0.00
23	345	5.75	0.8	0.143	0.261	0.129	0.014	0.15	0.00
24	360	6.00	0.8	0.143	0.257	0.129	0.014	0.15	0.00
25	375	6.25	0.9	0.161	0.254	0.145	0.016	0.17	0.00
26	390	6.50	0.9	0.161	0.251	0.145	0.016	0.17	0.00
27	405	6.75	1.0	0.179	0.247	0.161	0.018	0.19	0.00
28	420	7.00	1.0	0.179	0.244	0.161	0.018	0.19	0.00
29	435	7.25	1.0	0.179	0.241	0.161	0.018	0.19	0.00
30	450	7.50	1.1	0.197	0.237	0.177	0.020	0.21	0.00
31	465	7.75	1.2	0.215	0.234	0.193	0.021	0.23	0.00
32	480	8.00	1.3	0.232	0.231	0.209	0.002	0.02	0.00
33	495	8.25	1.5	0.268	0.228	0.241	0.041	0.43	167.88
34	510	8.50	1.5	0.268	0.224	0.241	0.044	0.46	198.07
35	525	8.75	1.6	0.286	0.221	0.257	0.065	0.68	398.09
36	540	9.00	1.7	0.304	0.218	0.274	0.086	0.91	597.84
37	555	9.25	1.9	0.340	0.215	0.306	0.125	1.32	967.41
38	570	9.50	2.0	0.358	0.212	0.322	0.146	1.54	1166.63
39	585	9.75	2.1	0.375	0.209	0.338	0.166	1.76	1365.57
40	600	10.00	2.2	0.393	0.206	0.354	0.187	1.98	1564.23
41	615	10.25	1.5	0.268	0.203	0.241	0.065	0.69	401.88
42	630	10.50	1.5	0.268	0.200	0.241	0.068	0.72	429.90
43	645	10.75	2.0	0.358	0.197	0.322	0.160	1.70	1308.09
44	660	11.00	2.0	0.358	0.194	0.322	0.163	1.73	1335.54
45	675	11.25	1.9	0.340	0.191	0.306	0.148	1.57	1192.62
46	690	11.50	1.9	0.340	0.189	0.306	0.151	1.60	1219.49
47	705	11.75	1.7	0.304	0.186	0.274	0.118	1.25	905.90
48	720	12.00	1.8	0.322	0.183	0.290	0.139	1.47	1102.28
49	735	12.25	2.5	0.447	0.180	0.402	0.267	2.82	2318.92
50	750	12.50	2.6	0.465	0.178	0.418	0.287	3.04	2514.71
51	765	12.75	2.8	0.501	0.175	0.451	0.326	3.44	2880.29
52	780	13.00	2.9	0.519	0.172	0.467	0.346	3.66	3075.47
53	795	13.25	3.4	0.608	0.170	0.547	0.438	4.63	3950.71
54	810	13.50	3.4	0.608	0.167	0.547	0.441	4.66	3975.18
55	825	13.75	2.3	0.411	0.165	0.370	0.247	2.61	2128.32
56	840	14.00	2.3	0.411	0.162	0.370	0.249	2.63	2152.16
57	855	14.25	2.7	0.483	0.160	0.434	0.323	3.42	2856.04
58	870	14.50	2.6	0.465	0.157	0.418	0.308	3.25	2709.14
59	885	14.75	2.6	0.465	0.155	0.418	0.310	3.28	2732.00
60	900	15.00	2.5	0.447	0.152	0.402	0.295	3.11	2584.44
61	915	15.25	2.4	0.429	0.150	0.386	0.279	2.95	2436.54
62	930	15.50	2.3	0.411	0.148	0.370	0.263	2.78	2288.29
63	945	15.75	1.9	0.340	0.146	0.306	0.194	2.05	1629.43
64	960	16.00	1.9	0.340	0.143	0.306	0.196	2.08	1650.58
65	975	16.25	0.4	0.072	0.141	0.064	0.007	0.08	0.00
66	990	16.50	0.4	0.072	0.139	0.064	0.007	0.08	0.00
67	1005	16.75	0.3	0.054	0.137	0.048	0.005	0.06	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.570	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1942
LAG TIME - MINUTES	1.62	MINIMUM LOSS RATE (for var. loss) - in/hr	0.097
UNIT TIME-PERCENT OF LAG	925.8	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00180
		PERCOLATION RATE (cfs)	0.24

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.135	0.048	0.005	0.06	0.00
69	1035	17.25	0.5	0.089	0.133	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.131	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.129	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.127	0.064	0.007	0.08	0.00
73	1095	18.25	0.4	0.072	0.125	0.064	0.007	0.08	0.00
74	1110	18.50	0.4	0.072	0.123	0.064	0.007	0.08	0.00
75	1125	18.75	0.3	0.054	0.121	0.048	0.005	0.06	0.00
76	1140	19.00	0.2	0.036	0.120	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.118	0.048	0.005	0.06	0.00
78	1170	19.50	0.4	0.072	0.116	0.064	0.007	0.08	0.00
79	1185	19.75	0.3	0.054	0.115	0.048	0.005	0.06	0.00
80	1200	20.00	0.2	0.036	0.113	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.112	0.048	0.005	0.06	0.00
82	1230	20.50	0.3	0.054	0.110	0.048	0.005	0.06	0.00
83	1245	20.75	0.3	0.054	0.109	0.048	0.005	0.06	0.00
84	1260	21.00	0.2	0.036	0.108	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.106	0.048	0.005	0.06	0.00
86	1290	21.50	0.2	0.036	0.105	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.104	0.048	0.005	0.06	0.00
88	1320	22.00	0.2	0.036	0.103	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.102	0.048	0.005	0.06	0.00
90	1350	22.50	0.2	0.036	0.101	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.100	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.099	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.099	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.098	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.097	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.097	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	1.79
FLOOD VOLUME (acft)	1.58
FLOOD VOLUME (cuft)	68652.95
REQUIRED STORAGE (acft)	1.29
REQUIRED STORAGE (cuft)	56203.65
PEAK FLOW (cfs)	4.66

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15600	0	0	0.00
466	1	1	1520	17120	16360	16360	0.38
467	1	2	1590	18710	17915	34275	0.79
468	1	3	1640	20350	19530	53805	1.24
468.5	0.5	3.5	850	21200	10388	64193	1.47

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.24 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.24 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.44	433	433	73	360	465.02	360	0.01
2	10	1.44	433	793	73	721	465.04	721	0.02
3	15	0.91	272	992	73	920	465.06	920	0.02
4	20	1.98	594	1,514	73	1,442	465.09	1,442	0.03
5	25	1.98	594	2,036	73	1,963	465.12	1,963	0.05
6	30	2.79	836	2,800	73	2,727	465.17	2,727	0.06
7	35	1.98	594	3,322	73	3,249	465.20	3,249	0.07
8	40	2.79	836	4,085	73	4,013	465.25	4,013	0.09
9	45	2.79	836	4,849	73	4,776	465.29	4,776	0.11
10	50	1.98	594	5,371	73	5,298	465.32	5,298	0.12
11	55	2.25	675	5,973	73	5,901	465.36	5,901	0.14
12	60	2.79	836	6,737	73	6,664	465.41	6,664	0.15
13	65	3.86	1,159	7,823	73	7,751	465.47	7,751	0.18
14	70	3.86	1,159	8,910	73	8,837	465.54	8,837	0.20
15	75	3.86	1,159	9,996	73	9,924	465.61	9,924	0.23
16	80	3.33	998	10,921	73	10,849	465.66	10,849	0.25
17	85	4.94	1,482	12,331	73	12,258	465.75	12,258	0.28
18	90	5.21	1,562	13,820	73	13,748	465.84	13,748	0.32
19	95	4.40	1,320	15,068	73	14,996	465.92	14,996	0.34
20	100	5.21	1,562	16,558	73	16,485	466.01	16,485	0.38
21	105	6.82	2,046	18,532	73	18,459	466.12	18,459	0.42
22	110	6.28	1,885	20,344	73	20,272	466.22	20,272	0.47
23	115	5.75	1,724	21,995	73	21,923	466.31	21,923	0.50
24	120	6.01	1,804	23,727	73	23,655	466.41	23,655	0.54
25	125	6.28	1,885	25,540	73	25,467	466.51	25,467	0.58
26	130	9.24	2,772	28,239	73	28,167	466.66	28,167	0.65
27	135	11.39	3,418	31,585	73	31,512	466.85	31,512	0.72
28	140	7.36	2,208	33,720	73	33,647	466.96	33,647	0.77
29	145	16.23	4,870	38,517	73	38,445	467.21	38,445	0.88
30	150	17.58	5,273	43,718	73	43,645	467.48	43,645	1.00
31	155	20.00	5,999	49,644	73	49,572	467.78	49,572	1.14
32	160	13.81	4,144	53,716	73	53,643	467.99	53,643	1.23
33	165	3.33	998	54,641	73	54,568	468.04	54,568	1.25
34	170	2.79	836	55,405	73	55,332	468.07	55,332	1.27
35	175	2.79	836	56,168	73	56,096	468.11	56,096	1.29
36	180	0.16	48	56,144	73	56,072	468.11	56,072	1.29

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.18	53	53	73	-	465.00	-	0.00
2	10	0.06	19	19	73	-	465.00	-	0.00
3	15	0.06	19	19	73	-	465.00	-	0.00
4	20	0.06	19	19	73	-	465.00	-	0.00
5	25	0.06	19	19	73	-	465.00	-	0.00
6	30	0.42	125	125	73	52	465.00	52	0.00
7	35	0.42	125	177	73	104	465.01	104	0.00
8	40	0.42	125	229	73	157	465.01	157	0.00
9	45	0.42	125	281	73	209	465.01	209	0.00
10	50	0.42	125	334	73	261	465.02	261	0.01
11	55	0.42	125	386	73	313	465.02	313	0.01
12	60	0.77	231	544	73	471	465.03	471	0.01
13	65	0.77	231	702	73	629	465.04	629	0.01
14	70	0.77	231	860	73	787	465.05	787	0.02
15	75	0.77	231	1,018	73	945	465.06	945	0.02
16	80	0.77	231	1,176	73	1,103	465.07	1,103	0.03
17	85	0.77	231	1,334	73	1,261	465.08	1,261	0.03
18	90	0.77	231	1,492	73	1,419	465.09	1,419	0.03
19	95	0.77	231	1,650	73	1,577	465.10	1,577	0.04
20	100	0.77	231	1,808	73	1,735	465.11	1,735	0.04
21	105	0.77	231	1,966	73	1,893	465.12	1,893	0.04
22	110	0.77	231	2,123	73	2,051	465.13	2,051	0.05
23	115	0.77	231	2,281	73	2,209	465.14	2,209	0.05
24	120	1.12	336	2,545	73	2,473	465.15	2,473	0.06
25	125	0.77	231	2,703	73	2,631	465.16	2,631	0.06
26	130	1.12	336	2,967	73	2,894	465.18	2,894	0.07
27	135	1.12	336	3,231	73	3,158	465.19	3,158	0.07
28	140	1.12	336	3,494	73	3,422	465.21	3,422	0.08
29	145	1.12	336	3,758	73	3,686	465.23	3,686	0.08
30	150	1.12	336	4,022	73	3,949	465.24	3,949	0.09
31	155	1.12	336	4,286	73	4,213	465.26	4,213	0.10
32	160	1.12	336	4,550	73	4,477	465.27	4,477	0.10
33	165	1.47	442	4,919	73	4,846	465.30	4,846	0.11
34	170	1.47	442	5,289	73	5,216	465.32	5,216	0.12
35	175	1.47	442	5,658	73	5,586	465.34	5,586	0.13
36	180	1.47	442	6,028	73	5,955	465.36	5,955	0.14
37	185	1.47	442	6,397	73	6,325	465.39	6,325	0.15
38	190	1.83	548	6,873	73	6,800	465.42	6,800	0.16
39	195	1.83	548	7,348	73	7,275	465.44	7,275	0.17
40	200	1.83	548	7,823	73	7,751	465.47	7,751	0.18
41	205	2.18	654	8,404	73	8,332	465.51	8,332	0.19
42	210	2.53	759	9,091	73	9,019	465.55	9,019	0.21
43	215	2.88	865	9,884	73	9,811	465.60	9,811	0.23
44	220	2.88	865	10,677	73	10,604	465.65	10,604	0.24
45	225	3.24	971	11,575	73	11,503	465.70	11,503	0.26
46	230	3.24	971	12,474	73	12,401	465.76	12,401	0.28
47	235	3.59	1,077	13,478	73	13,405	465.82	13,405	0.31
48	240	3.59	1,077	14,482	73	14,409	465.88	14,409	0.33
49	245	3.94	1,183	15,592	73	15,520	465.95	15,520	0.36
50	250	4.29	1,288	16,808	73	16,735	466.02	16,735	0.38
51	255	4.65	1,394	18,130	73	18,057	466.09	18,057	0.41
52	260	5.00	1,500	19,557	73	19,484	466.17	19,484	0.45
53	265	5.35	1,606	21,090	73	21,018	466.26	21,018	0.48
54	270	5.35	1,606	22,623	73	22,551	466.35	22,551	0.52
55	275	5.71	1,712	24,262	73	24,190	466.44	24,190	0.56

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	6.06	1,817	26,007	73	25,934	466.53	25,934	0.60
57	285	6.41	1,923	27,858	73	27,785	466.64	27,785	0.64
58	290	6.41	1,923	29,708	73	29,635	466.74	29,635	0.68
59	295	6.76	2,029	31,664	73	31,592	466.85	31,592	0.73
60	300	7.12	2,135	33,726	73	33,654	466.97	33,654	0.77
61	305	8.88	2,664	36,317	73	36,245	467.10	36,245	0.83
62	310	10.64	3,193	39,437	73	39,365	467.26	39,365	0.90
63	315	11.70	3,510	42,875	73	42,802	467.44	42,802	0.98
64	320	12.76	3,827	46,629	73	46,557	467.63	46,557	1.07
65	325	14.52	4,356	50,913	73	50,840	467.85	50,840	1.17
66	330	17.69	5,308	56,149	73	56,076	468.11	56,076	1.29
67	335	4.65	1,394	57,470	73	57,398	468.17	57,398	1.32
68	340	1.12	336	57,734	73	57,661	468.19	57,661	1.32
69	345	0.06	19	57,680	73	57,608	468.18	57,608	1.32
70	350	0.18	53	57,661	73	57,588	468.18	57,588	1.32
71	355	0.11	32	57,620	73	57,547	468.18	57,547	1.32
72	360	0.07	21	57,568	73	57,496	468.18	57,496	1.32

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	34	34	218	-	465.00	-	0.00
2	30	0.06	51	51	218	-	465.00	-	0.00
3	45	0.06	51	51	218	-	465.00	-	0.00
4	60	0.08	68	68	218	-	465.00	-	0.00
5	75	0.06	51	51	218	-	465.00	-	0.00
6	90	0.06	51	51	218	-	465.00	-	0.00
7	105	0.06	51	51	218	-	465.00	-	0.00
8	120	0.08	68	68	218	-	465.00	-	0.00
9	135	0.08	68	68	218	-	465.00	-	0.00
10	150	0.08	68	68	218	-	465.00	-	0.00
11	165	0.09	85	85	218	-	465.00	-	0.00
12	180	0.09	85	85	218	-	465.00	-	0.00
13	195	0.09	85	85	218	-	465.00	-	0.00
14	210	0.09	85	85	218	-	465.00	-	0.00
15	225	0.09	85	85	218	-	465.00	-	0.00
16	240	0.11	102	102	218	-	465.00	-	0.00
17	255	0.11	102	102	218	-	465.00	-	0.00
18	270	0.13	119	119	218	-	465.00	-	0.00
19	285	0.13	119	119	218	-	465.00	-	0.00
20	300	0.15	136	136	218	-	465.00	-	0.00
21	315	0.11	102	102	218	-	465.00	-	0.00
22	330	0.13	119	119	218	-	465.00	-	0.00
23	345	0.15	136	136	218	-	465.00	-	0.00
24	360	0.15	136	136	218	-	465.00	-	0.00
25	375	0.17	153	153	218	-	465.00	-	0.00
26	390	0.17	153	153	218	-	465.00	-	0.00
27	405	0.19	170	170	218	-	465.00	-	0.00
28	420	0.19	170	170	218	-	465.00	-	0.00
29	435	0.19	170	170	218	-	465.00	-	0.00
30	450	0.21	187	187	218	-	465.00	-	0.00
31	465	0.23	204	204	218	-	465.00	-	0.00
32	480	0.02	15	15	218	-	465.00	-	0.00
33	495	0.43	386	386	218	168	465.01	168	0.00
34	510	0.46	416	584	218	366	465.02	366	0.01
35	525	0.68	616	982	218	764	465.05	764	0.02
36	540	0.91	816	1,580	218	1,362	465.08	1,362	0.03
37	555	1.32	1,185	2,547	218	2,329	465.14	2,329	0.05
38	570	1.54	1,384	3,714	218	3,496	465.21	3,496	0.08
39	585	1.76	1,583	5,079	218	4,861	465.30	4,861	0.11
40	600	1.98	1,782	6,643	218	6,426	465.39	6,426	0.15
41	615	0.69	620	7,045	218	6,828	465.42	6,828	0.16
42	630	0.72	648	7,475	218	7,257	465.44	7,257	0.17
43	645	1.70	1,526	8,783	218	8,566	465.52	8,566	0.20
44	660	1.73	1,553	10,119	218	9,901	465.61	9,901	0.23
45	675	1.57	1,410	11,311	218	11,094	465.68	11,094	0.25
46	690	1.60	1,437	12,531	218	12,313	465.75	12,313	0.28
47	705	1.25	1,124	13,437	218	13,219	465.81	13,219	0.30
48	720	1.47	1,320	14,539	218	14,321	465.88	14,321	0.33
49	735	2.82	2,537	16,858	218	16,640	466.02	16,640	0.38
50	750	3.04	2,732	19,373	218	19,155	466.16	19,155	0.44
51	765	3.44	3,098	22,253	218	22,035	466.32	22,035	0.51
52	780	3.66	3,293	25,329	218	25,111	466.49	25,111	0.58
53	795	4.63	4,168	29,279	218	29,062	466.71	29,062	0.67
54	810	4.66	4,193	33,254	218	33,037	466.93	33,037	0.76
55	825	2.61	2,346	35,383	218	35,165	467.05	35,165	0.81
56	840	2.63	2,370	37,535	218	37,317	467.16	37,317	0.86
57	855	3.42	3,074	40,391	218	40,173	467.30	40,173	0.92
58	870	3.25	2,927	43,100	218	42,882	467.44	42,882	0.98

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	3.28	2,950	45,832	218	45,614	467.58	45,614	1.05
60	900	3.11	2,802	48,417	218	48,199	467.71	48,199	1.11
61	915	2.95	2,654	50,853	218	50,635	467.84	50,635	1.16
62	930	2.78	2,506	53,141	218	52,924	467.95	52,924	1.21
63	945	2.05	1,847	54,771	218	54,553	468.04	54,553	1.25
64	960	2.08	1,868	56,421	218	56,204	468.12	56,204	1.29
65	975	0.08	68	56,272	218	56,054	468.11	56,054	1.29
66	990	0.08	68	56,122	218	55,904	468.10	55,904	1.28
67	1005	0.06	51	55,955	218	55,738	468.09	55,738	1.28
68	1020	0.06	51	55,789	218	55,571	468.08	55,571	1.28
69	1035	0.09	85	55,656	218	55,438	468.08	55,438	1.27
70	1050	0.09	85	55,523	218	55,305	468.07	55,305	1.27
71	1065	0.09	85	55,390	218	55,173	468.07	55,173	1.27
72	1080	0.08	68	55,241	218	55,023	468.06	55,023	1.26
73	1095	0.08	68	55,091	218	54,873	468.05	54,873	1.26
74	1110	0.08	68	54,941	218	54,724	468.04	54,724	1.26
75	1125	0.06	51	54,775	218	54,557	468.04	54,557	1.25
76	1140	0.04	34	54,591	218	54,373	468.03	54,373	1.25
77	1155	0.06	51	54,424	218	54,206	468.02	54,206	1.24
78	1170	0.08	68	54,274	218	54,057	468.01	54,057	1.24
79	1185	0.06	51	54,108	218	53,890	468.00	53,890	1.24
80	1200	0.04	34	53,924	218	53,706	467.99	53,706	1.23
81	1215	0.06	51	53,757	218	53,539	467.99	53,539	1.23
82	1230	0.06	51	53,590	218	53,373	467.98	53,373	1.23
83	1245	0.06	51	53,424	218	53,206	467.97	53,206	1.22
84	1260	0.04	34	53,240	218	53,022	467.96	53,022	1.22
85	1275	0.06	51	53,073	218	52,856	467.95	52,856	1.21
86	1290	0.04	34	52,890	218	52,672	467.94	52,672	1.21
87	1305	0.06	51	52,723	218	52,505	467.93	52,505	1.21
88	1320	0.04	34	52,539	218	52,321	467.92	52,321	1.20
89	1335	0.06	51	52,372	218	52,155	467.92	52,155	1.20
90	1350	0.04	34	52,189	218	51,971	467.91	51,971	1.19
91	1365	0.04	34	52,005	218	51,787	467.90	51,787	1.19
92	1380	0.04	34	51,821	218	51,603	467.89	51,603	1.18
93	1395	0.04	34	51,637	218	51,420	467.88	51,420	1.18
94	1410	0.04	34	51,454	218	51,236	467.87	51,236	1.18
95	1425	0.04	34	51,270	218	51,052	467.86	51,052	1.17
96	1440	0.04	34	51,086	218	50,869	467.85	50,869	1.17

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 3		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.56		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.65		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	1.04		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	750		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	170		
30				
31	ELEVATION OF HEADWATER	471.8		
32	ELEVATION OF CONCENTRATION POINT	468.5		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		465	15000	
45		466	16600	
46		467	18250	
47		468	19960	
48		468.5	20831	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 3
[3] AREA - ACRES	10.250
[4] L-FEET	750
[5] L-MILES	0.142
[6] La-FEET	170.00
[7] La-MILES	0.032
[8] ELEVATION OF HEADWATER	471.8
[9] ELEVATION OF CONCENTRATION POINT	468.5
[10] H-FEET	3.3
[11] S-FEET/MILE	23.2
[12] S^0.5	4.82
[13] L*LCA/S^0.5	0.001
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.03
[16] LAG TIME-MINUTES	2.0
[17] 100% OF LAG-MINUTES	2.0
[18] 200% OF LAG-MINUTES	4.1
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.23

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	10.250	1.00	2.12	2.78	10.250	1.00	2.78	4.47	10.250	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	10.25	SUM [7]	2.12	SUM [9]	10.25	SUM [11]	2.78	SUM [13]	10.25	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.51	1.59	1.71
FLOOD VOLUME	(cu-ft)	56,125	59,056	63,525
	(acre-ft)	1.29	1.36	1.46
REQUIRED STORAGE	(cu-ft)	53,172	53,709	51,340
	(acre-ft)	1.22	1.23	1.18
PEAK FLOW	(cfs)	19.27	17.04	4.42
MAXIMUM WSEL	(ft)	468.04	468.07	467.95

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.56	0.250	0.0130
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.65	0.649	0.1400
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	1.04	0.101	0.0528
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
				SUM		10.25	SUM	0.2058

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102877561

C= 0.00191

Ft=C(24-(T/60))^1.55 = 0.00191 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.21
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.21	0.30	0.12	1.28	314.48
2	10	0.17	1.3	0.331	0.21	0.30	0.12	1.28	314.48
3	15	0.25	1.1	0.280	0.21	0.25	0.07	0.76	158.02
4	20	0.33	1.5	0.382	0.21	0.34	0.18	1.80	470.93
5	25	0.42	1.5	0.382	0.21	0.34	0.18	1.80	470.93
6	30	0.50	1.8	0.458	0.21	0.41	0.25	2.58	705.62
7	35	0.58	1.5	0.382	0.21	0.34	0.18	1.80	470.93
8	40	0.67	1.8	0.458	0.21	0.41	0.25	2.58	705.62
9	45	0.75	1.8	0.458	0.21	0.41	0.25	2.58	705.62
10	50	0.83	1.5	0.382	0.21	0.34	0.18	1.80	470.93
11	55	0.92	1.6	0.407	0.21	0.37	0.20	2.06	549.16
12	60	1.00	1.8	0.458	0.21	0.41	0.25	2.58	705.62
13	65	1.08	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
14	70	1.17	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
15	75	1.25	2.2	0.560	0.21	0.50	0.35	3.63	1018.53
16	80	1.33	2.0	0.509	0.21	0.46	0.30	3.11	862.07
17	85	1.42	2.6	0.661	0.21	0.60	0.46	4.67	1331.44
18	90	1.50	2.7	0.687	0.21	0.62	0.48	4.93	1409.67
19	95	1.58	2.4	0.611	0.21	0.55	0.40	4.15	1174.98
20	100	1.67	2.7	0.687	0.21	0.62	0.48	4.93	1409.67
21	105	1.75	3.3	0.840	0.21	0.76	0.63	6.50	1879.04
22	110	1.83	3.1	0.789	0.21	0.71	0.58	5.97	1722.58
23	115	1.92	2.9	0.738	0.21	0.66	0.53	5.45	1566.12
24	120	2.00	3.0	0.763	0.21	0.69	0.56	5.71	1644.35
25	125	2.08	3.1	0.789	0.21	0.71	0.58	5.97	1722.58
26	130	2.17	4.2	1.068	0.21	0.96	0.86	8.84	2583.09
27	135	2.25	5.0	1.272	0.21	1.14	1.07	10.93	3208.91
28	140	2.33	3.5	0.890	0.21	0.80	0.68	7.02	2035.49
29	145	2.42	6.8	1.730	0.21	1.56	1.52	15.62	4617.02
30	150	2.50	7.3	1.857	0.21	1.67	1.65	16.93	5008.16
31	155	2.58	8.2	2.086	0.21	1.88	1.88	19.27	5712.21
32	160	2.67	5.9	1.501	0.21	1.35	1.30	13.28	3912.96
33	165	2.75	2.0	0.509	0.21	0.46	0.30	3.11	862.07
34	170	2.83	1.8	0.458	0.21	0.41	0.25	2.58	705.62
35	175	2.92	1.8	0.458	0.21	0.41	0.25	2.58	705.62
36	180	3.00	0.6	0.153	0.21	0.14	0.02	0.16	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.51
FLOOD VOLUME (acft)	1.29
FLOOD VOLUME (cuft)	56125.24
REQUIRED STORAGE (acft)	1.22
REQUIRED STORAGE (cuft)	53171.53
PEAK FLOW RATE (cfs)	19.27

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.05
UNIT TIME-PERCENT OF LAG	244.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.206
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.23 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.167	0.21	0.15	0.02	0.17	0.00
2	10	0.17	0.6	0.200	0.21	0.18	0.02	0.21	0.00
3	15	0.25	0.6	0.200	0.21	0.18	0.02	0.21	0.00
4	20	0.33	0.6	0.200	0.21	0.18	0.02	0.21	0.00
5	25	0.42	0.6	0.200	0.21	0.18	0.02	0.21	0.00
6	30	0.50	0.7	0.234	0.21	0.21	0.03	0.28	15.59
7	35	0.58	0.7	0.234	0.21	0.21	0.03	0.28	15.59
8	40	0.67	0.7	0.234	0.21	0.21	0.03	0.28	15.59
9	45	0.75	0.7	0.234	0.21	0.21	0.03	0.28	15.59
10	50	0.83	0.7	0.234	0.21	0.21	0.03	0.28	15.59
11	55	0.92	0.7	0.234	0.21	0.21	0.03	0.28	15.59
12	60	1.00	0.8	0.267	0.21	0.24	0.06	0.63	118.17
13	65	1.08	0.8	0.267	0.21	0.24	0.06	0.63	118.17
14	70	1.17	0.8	0.267	0.21	0.24	0.06	0.63	118.17
15	75	1.25	0.8	0.267	0.21	0.24	0.06	0.63	118.17
16	80	1.33	0.8	0.267	0.21	0.24	0.06	0.63	118.17
17	85	1.42	0.8	0.267	0.21	0.24	0.06	0.63	118.17
18	90	1.50	0.8	0.267	0.21	0.24	0.06	0.63	118.17
19	95	1.58	0.8	0.267	0.21	0.24	0.06	0.63	118.17
20	100	1.67	0.8	0.267	0.21	0.24	0.06	0.63	118.17
21	105	1.75	0.8	0.267	0.21	0.24	0.06	0.63	118.17
22	110	1.83	0.8	0.267	0.21	0.24	0.06	0.63	118.17
23	115	1.92	0.8	0.267	0.21	0.24	0.06	0.63	118.17
24	120	2.00	0.9	0.300	0.21	0.27	0.09	0.97	220.75
25	125	2.08	0.8	0.267	0.21	0.24	0.06	0.63	118.17
26	130	2.17	0.9	0.300	0.21	0.27	0.09	0.97	220.75
27	135	2.25	0.9	0.300	0.21	0.27	0.09	0.97	220.75
28	140	2.33	0.9	0.300	0.21	0.27	0.09	0.97	220.75
29	145	2.42	0.9	0.300	0.21	0.27	0.09	0.97	220.75
30	150	2.50	0.9	0.300	0.21	0.27	0.09	0.97	220.75
31	155	2.58	0.9	0.300	0.21	0.27	0.09	0.97	220.75
32	160	2.67	0.9	0.300	0.21	0.27	0.09	0.97	220.75
33	165	2.75	1.0	0.334	0.21	0.30	0.13	1.31	323.33
34	170	2.83	1.0	0.334	0.21	0.30	0.13	1.31	323.33
35	175	2.92	1.0	0.334	0.21	0.30	0.13	1.31	323.33
36	180	3.00	1.0	0.334	0.21	0.30	0.13	1.31	323.33
37	185	3.08	1.0	0.334	0.21	0.30	0.13	1.31	323.33
38	190	3.17	1.1	0.367	0.21	0.33	0.16	1.65	425.91
39	195	3.25	1.1	0.367	0.21	0.33	0.16	1.65	425.91
40	200	3.33	1.1	0.367	0.21	0.33	0.16	1.65	425.91
41	205	3.42	1.2	0.400	0.21	0.36	0.19	1.99	528.50
42	210	3.50	1.3	0.434	0.21	0.39	0.23	2.34	631.08
43	215	3.58	1.4	0.467	0.21	0.42	0.26	2.68	733.66
44	220	3.67	1.4	0.467	0.21	0.42	0.26	2.68	733.66
45	225	3.75	1.5	0.500	0.21	0.45	0.29	3.02	836.24
46	230	3.83	1.5	0.500	0.21	0.45	0.29	3.02	836.24
47	235	3.92	1.6	0.534	0.21	0.48	0.33	3.36	938.82
48	240	4.00	1.6	0.534	0.21	0.48	0.33	3.36	938.82
49	245	4.08	1.7	0.567	0.21	0.51	0.36	3.70	1041.41
50	250	4.17	1.8	0.600	0.21	0.54	0.39	4.05	1143.99
51	255	4.25	1.9	0.634	0.21	0.57	0.43	4.39	1246.57
52	260	4.33	2.0	0.667	0.21	0.60	0.46	4.73	1349.15
53	265	4.42	2.1	0.701	0.21	0.63	0.49	5.07	1451.73
54	270	4.50	2.1	0.701	0.21	0.63	0.49	5.07	1451.73
55	275	4.58	2.2	0.734	0.21	0.66	0.53	5.41	1554.32
56	280	4.67	2.3	0.767	0.21	0.69	0.56	5.76	1656.90

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.25		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.05		
UNIT TIME-PERCENT OF LAG	244.5		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.206		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.23 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.801	0.21	0.72	0.59	6.10	1759.48
58	290	4.83	2.4	0.801	0.21	0.72	0.59	6.10	1759.48
59	295	4.92	2.5	0.834	0.21	0.75	0.63	6.44	1862.06
60	300	5.00	2.6	0.867	0.21	0.78	0.66	6.78	1964.64
61	305	5.08	3.1	1.034	0.21	0.93	0.83	8.49	2477.55
62	310	5.17	3.6	1.201	0.21	1.08	1.00	10.20	2990.46
63	315	5.25	3.9	1.301	0.21	1.17	1.10	11.23	3298.21
64	320	5.33	4.2	1.401	0.21	1.26	1.20	12.25	3605.96
65	325	5.42	4.7	1.568	0.21	1.41	1.36	13.96	4118.87
66	330	5.50	5.6	1.868	0.21	1.68	1.66	17.04	5042.10
67	335	5.58	1.9	0.634	0.21	0.57	0.43	4.39	1246.57
68	340	5.67	0.9	0.300	0.21	0.27	0.09	0.97	220.75
69	345	5.75	0.6	0.200	0.21	0.18	0.02	0.21	0.00
70	350	5.83	0.5	0.167	0.21	0.15	0.02	0.17	0.00
71	355	5.92	0.3	0.100	0.21	0.09	0.01	0.10	0.00
72	360	6.00	0.2	0.067	0.21	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.59
FLOOD VOLUME (acft)	1.36
FLOOD VOLUME (cuft)	59055.81
REQUIRED STORAGE (acft)	1.23
REQUIRED STORAGE (cuft)	53709.02
PEAK FLOW RATE (cfs)	17.04

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
	Minutes	Hours	(Plate E-5.9)		Max	Low			
1	15	0.25	0.2	0.036	0.363	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.359	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.355	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.351	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.347	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.343	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.338	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.334	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.330	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.326	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.322	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.318	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.314	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.310	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.307	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.303	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.299	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.295	0.113	0.013	0.13	0.00
19	285	4.75	0.7	0.125	0.291	0.113	0.013	0.13	0.00
20	300	5.00	0.8	0.143	0.288	0.129	0.014	0.15	0.00
21	315	5.25	0.6	0.107	0.284	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.280	0.113	0.013	0.13	0.00
23	345	5.75	0.8	0.143	0.276	0.129	0.014	0.15	0.00
24	360	6.00	0.8	0.143	0.273	0.129	0.014	0.15	0.00
25	375	6.25	0.9	0.161	0.269	0.145	0.016	0.16	0.00
26	390	6.50	0.9	0.161	0.266	0.145	0.016	0.16	0.00
27	405	6.75	1.0	0.179	0.262	0.161	0.018	0.18	0.00
28	420	7.00	1.0	0.179	0.258	0.161	0.018	0.18	0.00
29	435	7.25	1.0	0.179	0.255	0.161	0.018	0.18	0.00
30	450	7.50	1.1	0.197	0.252	0.177	0.020	0.20	0.00
31	465	7.75	1.2	0.215	0.248	0.193	0.021	0.22	0.00
32	480	8.00	1.3	0.232	0.245	0.209	0.023	0.24	5.05
33	495	8.25	1.5	0.268	0.241	0.241	0.027	0.28	39.29
34	510	8.50	1.5	0.268	0.238	0.241	0.030	0.31	70.31
35	525	8.75	1.6	0.286	0.235	0.257	0.052	0.53	266.00
36	540	9.00	1.7	0.304	0.231	0.274	0.073	0.75	461.42
37	555	9.25	1.9	0.340	0.228	0.306	0.112	1.15	821.51
38	570	9.50	2.0	0.358	0.225	0.322	0.133	1.36	1016.37
39	585	9.75	2.1	0.375	0.222	0.338	0.154	1.58	1210.96
40	600	10.00	2.2	0.393	0.218	0.354	0.175	1.79	1405.26
41	615	10.25	1.5	0.268	0.215	0.241	0.053	0.54	279.74
42	630	10.50	1.5	0.268	0.212	0.241	0.056	0.58	308.53
43	645	10.75	2.0	0.358	0.209	0.322	0.149	1.52	1161.74
44	660	11.00	2.0	0.358	0.206	0.322	0.152	1.55	1189.95
45	675	11.25	1.9	0.340	0.203	0.306	0.137	1.40	1052.92
46	690	11.50	1.9	0.340	0.200	0.306	0.140	1.43	1080.54
47	705	11.75	1.7	0.304	0.197	0.274	0.107	1.10	777.97
48	720	12.00	1.8	0.322	0.194	0.290	0.128	1.31	969.93
49	735	12.25	2.5	0.447	0.191	0.402	0.256	2.62	2151.25
50	750	12.50	2.6	0.465	0.188	0.418	0.277	2.84	2342.59
51	765	12.75	2.8	0.501	0.185	0.451	0.315	3.23	2698.57
52	780	13.00	2.9	0.519	0.183	0.467	0.336	3.44	2889.30
53	795	13.25	3.4	0.608	0.180	0.547	0.428	4.39	3739.48
54	810	13.50	3.4	0.608	0.177	0.547	0.431	4.42	3764.62
55	825	13.75	2.3	0.411	0.174	0.370	0.237	2.43	1975.07
56	840	14.00	2.3	0.411	0.172	0.370	0.239	2.45	1999.56
57	855	14.25	2.7	0.483	0.169	0.434	0.314	3.21	2683.50
58	870	14.50	2.6	0.465	0.167	0.418	0.298	3.06	2542.39
59	885	14.75	2.6	0.465	0.164	0.418	0.301	3.08	2565.88
60	900	15.00	2.5	0.447	0.162	0.402	0.285	2.93	2424.08
61	915	15.25	2.4	0.429	0.159	0.386	0.270	2.77	2281.94
62	930	15.50	2.3	0.411	0.157	0.370	0.255	2.61	2139.45
63	945	15.75	1.9	0.340	0.154	0.306	0.185	1.90	1501.78
64	960	16.00	1.9	0.340	0.152	0.306	0.188	1.93	1523.52
65	975	16.25	0.4	0.072	0.150	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.147	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.145	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	10.250	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2058
LAG TIME - MINUTES	2.05	MINIMUM LOSS RATE (for var. loss) - in/hr	0.103
UNIT TIME-PERCENT OF LAG	733.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00191
		PERCOLATION RATE (cfs)	0.23

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
68	1020	17.00	0.3	0.054	0.143	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.141	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.139	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.137	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.134	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.133	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.131	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.129	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.127	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.125	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.123	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.122	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.120	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.118	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.117	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.115	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.114	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.113	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.111	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.110	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.109	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.108	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.107	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.106	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.105	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.104	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.104	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.103	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.103	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	1.71
FLOOD VOLUME (acft)	1.46
FLOOD VOLUME (cuft)	63525.46
REQUIRED STORAGE (acft)	1.18
REQUIRED STORAGE (cuft)	51340.48
PEAK FLOW (cfs)	4.42

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
465	0	0		15000	0	0	0.00
466	1	1	1600	16600	15800	15800	0.36
467	1	2	1650	18250	17425	33225	0.76
468	1	3	1710	19960	19105	52330	1.20
468.5	0.5	3.5	871	20831	10198	62528	1.44

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.23 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.23 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.28	384	384	70	314	465.02	314	0.01
2	10	1.28	384	699	70	629	465.04	629	0.01
3	15	0.76	228	857	70	787	465.05	787	0.02
4	20	1.80	541	1,328	70	1,258	465.08	1,258	0.03
5	25	1.80	541	1,799	70	1,729	465.11	1,729	0.04
6	30	2.58	775	2,504	70	2,434	465.15	2,434	0.06
7	35	1.80	541	2,975	70	2,905	465.18	2,905	0.07
8	40	2.58	775	3,681	70	3,611	465.23	3,611	0.08
9	45	2.58	775	4,386	70	4,317	465.27	4,317	0.10
10	50	1.80	541	4,857	70	4,788	465.30	4,788	0.11
11	55	2.06	619	5,406	70	5,337	465.34	5,337	0.12
12	60	2.58	775	6,112	70	6,042	465.38	6,042	0.14
13	65	3.63	1,088	7,131	70	7,061	465.45	7,061	0.16
14	70	3.63	1,088	8,149	70	8,079	465.51	8,079	0.19
15	75	3.63	1,088	9,168	70	9,098	465.58	9,098	0.21
16	80	3.11	932	10,030	70	9,960	465.63	9,960	0.23
17	85	4.67	1,401	11,361	70	11,291	465.71	11,291	0.26
18	90	4.93	1,479	12,771	70	12,701	465.80	12,701	0.29
19	95	4.15	1,245	13,946	70	13,876	465.88	13,876	0.32
20	100	4.93	1,479	15,356	70	15,286	465.97	15,286	0.35
21	105	6.50	1,949	17,235	70	17,165	466.08	17,165	0.39
22	110	5.97	1,792	18,957	70	18,887	466.18	18,887	0.43
23	115	5.45	1,636	20,523	70	20,453	466.27	20,453	0.47
24	120	5.71	1,714	22,168	70	22,098	466.36	22,098	0.51
25	125	5.97	1,792	23,890	70	23,820	466.46	23,820	0.55
26	130	8.84	2,653	26,473	70	26,403	466.61	26,403	0.61
27	135	10.93	3,279	29,682	70	29,612	466.79	29,612	0.68
28	140	7.02	2,105	31,718	70	31,648	466.91	31,648	0.73
29	145	15.62	4,687	36,335	70	36,265	467.16	36,265	0.83
30	150	16.93	5,078	41,343	70	41,273	467.42	41,273	0.95
31	155	19.27	5,782	47,055	70	46,985	467.72	46,985	1.08
32	160	13.28	3,983	50,968	70	50,898	467.93	50,898	1.17
33	165	3.11	932	51,830	70	51,760	467.97	51,760	1.19
34	170	2.58	775	52,536	70	52,466	468.01	52,466	1.20
35	175	2.58	775	53,241	70	53,172	468.04	53,172	1.22
36	180	0.16	47	53,218	70	53,149	468.04	53,149	1.22

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	70	-	465.00	-	0.00
2	10	0.21	62	62	70	-	465.00	-	0.00
3	15	0.21	62	62	70	-	465.00	-	0.00
4	20	0.21	62	62	70	-	465.00	-	0.00
5	25	0.21	62	62	70	-	465.00	-	0.00
6	30	0.28	85	85	70	16	465.00	16	0.00
7	35	0.28	85	101	70	31	465.00	31	0.00
8	40	0.28	85	117	70	47	465.00	47	0.00
9	45	0.28	85	132	70	62	465.00	62	0.00
10	50	0.28	85	148	70	78	465.00	78	0.00
11	55	0.28	85	163	70	94	465.01	94	0.00
12	60	0.63	188	281	70	212	465.01	212	0.00
13	65	0.63	188	400	70	330	465.02	330	0.01
14	70	0.63	188	518	70	448	465.03	448	0.01
15	75	0.63	188	636	70	566	465.04	566	0.01
16	80	0.63	188	754	70	684	465.04	684	0.02
17	85	0.63	188	872	70	803	465.05	803	0.02
18	90	0.63	188	990	70	921	465.06	921	0.02
19	95	0.63	188	1,109	70	1,039	465.07	1,039	0.02
20	100	0.63	188	1,227	70	1,157	465.07	1,157	0.03
21	105	0.63	188	1,345	70	1,275	465.08	1,275	0.03
22	110	0.63	188	1,463	70	1,393	465.09	1,393	0.03
23	115	0.63	188	1,581	70	1,512	465.10	1,512	0.03
24	120	0.97	291	1,802	70	1,732	465.11	1,732	0.04
25	125	0.63	188	1,920	70	1,850	465.12	1,850	0.04
26	130	0.97	291	2,141	70	2,071	465.13	2,071	0.05
27	135	0.97	291	2,362	70	2,292	465.15	2,292	0.05
28	140	0.97	291	2,582	70	2,513	465.16	2,513	0.06
29	145	0.97	291	2,803	70	2,733	465.17	2,733	0.06
30	150	0.97	291	3,024	70	2,954	465.19	2,954	0.07
31	155	0.97	291	3,245	70	3,175	465.20	3,175	0.07
32	160	0.97	291	3,465	70	3,396	465.21	3,396	0.08
33	165	1.31	393	3,789	70	3,719	465.24	3,719	0.09
34	170	1.31	393	4,112	70	4,042	465.26	4,042	0.09
35	175	1.31	393	4,435	70	4,366	465.28	4,366	0.10
36	180	1.31	393	4,759	70	4,689	465.30	4,689	0.11
37	185	1.31	393	5,082	70	5,012	465.32	5,012	0.12
38	190	1.65	496	5,508	70	5,438	465.34	5,438	0.12
39	195	1.65	496	5,934	70	5,864	465.37	5,864	0.13
40	200	1.65	496	6,360	70	6,290	465.40	6,290	0.14
41	205	1.99	598	6,888	70	6,819	465.43	6,819	0.16
42	210	2.34	701	7,519	70	7,450	465.47	7,450	0.17
43	215	2.68	803	8,253	70	8,183	465.52	8,183	0.19
44	220	2.68	803	8,987	70	8,917	465.56	8,917	0.20
45	225	3.02	906	9,823	70	9,753	465.62	9,753	0.22
46	230	3.02	906	10,659	70	10,589	465.67	10,589	0.24
47	235	3.36	1,009	11,598	70	11,528	465.73	11,528	0.26
48	240	3.36	1,009	12,537	70	12,467	465.79	12,467	0.29
49	245	3.70	1,111	13,578	70	13,509	465.85	13,509	0.31
50	250	4.05	1,214	14,722	70	14,652	465.93	14,652	0.34
51	255	4.39	1,316	15,969	70	15,899	466.01	15,899	0.36
52	260	4.73	1,419	17,318	70	17,248	466.08	17,248	0.40
53	265	5.07	1,522	18,770	70	18,700	466.17	18,700	0.43
54	270	5.07	1,522	20,221	70	20,152	466.25	20,152	0.46
55	275	5.41	1,624	21,776	70	21,706	466.34	21,706	0.50

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	5.76	1,727	23,433	70	23,363	466.43	23,363	0.54
57	285	6.10	1,829	25,192	70	25,122	466.53	25,122	0.58
58	290	6.10	1,829	26,952	70	26,882	466.64	26,882	0.62
59	295	6.44	1,932	28,814	70	28,744	466.74	28,744	0.66
60	300	6.78	2,034	30,778	70	30,709	466.86	30,709	0.70
61	305	8.49	2,547	33,256	70	33,186	467.00	33,186	0.76
62	310	10.20	3,060	36,246	70	36,177	467.15	36,177	0.83
63	315	11.23	3,368	39,545	70	39,475	467.33	39,475	0.91
64	320	12.25	3,676	43,151	70	43,081	467.52	43,081	0.99
65	325	13.96	4,189	47,269	70	47,200	467.73	47,200	1.08
66	330	17.04	5,112	52,311	70	52,242	468.00	52,242	1.20
67	335	4.39	1,316	53,558	70	53,488	468.06	53,488	1.23
68	340	0.97	291	53,779	70	53,709	468.07	53,709	1.23
69	345	0.21	62	53,771	70	53,701	468.07	53,701	1.23
70	350	0.17	51	53,752	70	53,682	468.07	53,682	1.23
71	355	0.10	31	53,713	70	53,643	468.06	53,643	1.23
72	360	0.07	21	53,664	70	53,594	468.06	53,594	1.23

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	33	33	209	-	465.00	-	0.00
2	30	0.05	49	49	209	-	465.00	-	0.00
3	45	0.05	49	49	209	-	465.00	-	0.00
4	60	0.07	66	66	209	-	465.00	-	0.00
5	75	0.05	49	49	209	-	465.00	-	0.00
6	90	0.05	49	49	209	-	465.00	-	0.00
7	105	0.05	49	49	209	-	465.00	-	0.00
8	120	0.07	66	66	209	-	465.00	-	0.00
9	135	0.07	66	66	209	-	465.00	-	0.00
10	150	0.07	66	66	209	-	465.00	-	0.00
11	165	0.09	82	82	209	-	465.00	-	0.00
12	180	0.09	82	82	209	-	465.00	-	0.00
13	195	0.09	82	82	209	-	465.00	-	0.00
14	210	0.09	82	82	209	-	465.00	-	0.00
15	225	0.09	82	82	209	-	465.00	-	0.00
16	240	0.11	99	99	209	-	465.00	-	0.00
17	255	0.11	99	99	209	-	465.00	-	0.00
18	270	0.13	115	115	209	-	465.00	-	0.00
19	285	0.13	115	115	209	-	465.00	-	0.00
20	300	0.15	132	132	209	-	465.00	-	0.00
21	315	0.11	99	99	209	-	465.00	-	0.00
22	330	0.13	115	115	209	-	465.00	-	0.00
23	345	0.15	132	132	209	-	465.00	-	0.00
24	360	0.15	132	132	209	-	465.00	-	0.00
25	375	0.16	148	148	209	-	465.00	-	0.00
26	390	0.16	148	148	209	-	465.00	-	0.00
27	405	0.18	165	165	209	-	465.00	-	0.00
28	420	0.18	165	165	209	-	465.00	-	0.00
29	435	0.18	165	165	209	-	465.00	-	0.00
30	450	0.20	181	181	209	-	465.00	-	0.00
31	465	0.22	198	198	209	-	465.00	-	0.00
32	480	0.24	214	214	209	5	465.00	5	0.00
33	495	0.28	249	254	209	44	465.00	44	0.00
34	510	0.31	280	324	209	115	465.01	115	0.00
35	525	0.53	475	590	209	381	465.02	381	0.01
36	540	0.75	671	1,051	209	842	465.05	842	0.02
37	555	1.15	1,031	1,873	209	1,664	465.11	1,664	0.04
38	570	1.36	1,226	2,889	209	2,680	465.17	2,680	0.06
39	585	1.58	1,420	4,100	209	3,891	465.25	3,891	0.09
40	600	1.79	1,615	5,506	209	5,296	465.34	5,296	0.12
41	615	0.54	489	5,785	209	5,576	465.35	5,576	0.13
42	630	0.58	518	6,094	209	5,884	465.37	5,884	0.14
43	645	1.52	1,371	7,256	209	7,046	465.45	7,046	0.16
44	660	1.55	1,399	8,446	209	8,236	465.52	8,236	0.19
45	675	1.40	1,262	9,498	209	9,289	465.59	9,289	0.21
46	690	1.43	1,290	10,579	209	10,370	465.66	10,370	0.24
47	705	1.10	987	11,357	209	11,148	465.71	11,148	0.26
48	720	1.31	1,179	12,327	209	12,117	465.77	12,117	0.28
49	735	2.62	2,361	14,478	209	14,269	465.90	14,269	0.33
50	750	2.84	2,552	16,821	209	16,611	466.05	16,611	0.38
51	765	3.23	2,908	19,519	209	19,310	466.20	19,310	0.44
52	780	3.44	3,099	22,409	209	22,199	466.37	22,199	0.51
53	795	4.39	3,949	26,148	209	25,939	466.58	25,939	0.60
54	810	4.42	3,974	29,913	209	29,703	466.80	29,703	0.68
55	825	2.43	2,184	31,888	209	31,678	466.91	31,678	0.73
56	840	2.45	2,209	33,887	209	33,678	467.02	33,678	0.77
57	855	3.21	2,893	36,571	209	36,361	467.16	36,361	0.83
58	870	3.06	2,752	39,113	209	38,904	467.30	38,904	0.89

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	3.08	2,775	41,679	209	41,470	467.43	41,470	0.95
60	900	2.93	2,633	44,103	209	43,894	467.56	43,894	1.01
61	915	2.77	2,491	46,385	209	46,176	467.68	46,176	1.06
62	930	2.61	2,349	48,525	209	48,315	467.79	48,315	1.11
63	945	1.90	1,711	50,026	209	49,817	467.87	49,817	1.14
64	960	1.93	1,733	51,550	209	51,340	467.95	51,340	1.18
65	975	0.07	66	51,406	209	51,197	467.94	51,197	1.18
66	990	0.07	66	51,263	209	51,054	467.93	51,054	1.17
67	1005	0.05	49	51,103	209	50,894	467.92	50,894	1.17
68	1020	0.05	49	50,943	209	50,734	467.92	50,734	1.16
69	1035	0.09	82	50,816	209	50,607	467.91	50,607	1.16
70	1050	0.09	82	50,689	209	50,480	467.90	50,480	1.16
71	1065	0.09	82	50,563	209	50,353	467.90	50,353	1.16
72	1080	0.07	66	50,419	209	50,210	467.89	50,210	1.15
73	1095	0.07	66	50,276	209	50,066	467.88	50,066	1.15
74	1110	0.07	66	50,132	209	49,923	467.87	49,923	1.15
75	1125	0.05	49	49,972	209	49,763	467.87	49,763	1.14
76	1140	0.04	33	49,796	209	49,587	467.86	49,587	1.14
77	1155	0.05	49	49,636	209	49,427	467.85	49,427	1.13
78	1170	0.07	66	49,493	209	49,283	467.84	49,283	1.13
79	1185	0.05	49	49,333	209	49,124	467.83	49,124	1.13
80	1200	0.04	33	49,157	209	48,947	467.82	48,947	1.12
81	1215	0.05	49	48,997	209	48,787	467.81	48,787	1.12
82	1230	0.05	49	48,837	209	48,627	467.81	48,627	1.12
83	1245	0.05	49	48,677	209	48,467	467.80	48,467	1.11
84	1260	0.04	33	48,500	209	48,291	467.79	48,291	1.11
85	1275	0.05	49	48,341	209	48,131	467.78	48,131	1.10
86	1290	0.04	33	48,164	209	47,955	467.77	47,955	1.10
87	1305	0.05	49	48,004	209	47,795	467.76	47,795	1.10
88	1320	0.04	33	47,828	209	47,619	467.75	47,619	1.09
89	1335	0.05	49	47,668	209	47,459	467.75	47,459	1.09
90	1350	0.04	33	47,492	209	47,282	467.74	47,282	1.09
91	1365	0.04	33	47,315	209	47,106	467.73	47,106	1.08
92	1380	0.04	33	47,139	209	46,929	467.72	46,929	1.08
93	1395	0.04	33	46,962	209	46,753	467.71	46,753	1.07
94	1410	0.04	33	46,786	209	46,577	467.70	46,577	1.07
95	1425	0.04	33	46,610	209	46,400	467.69	46,400	1.07
96	1440	0.04	33	46,433	209	46,224	467.68	46,224	1.06

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 4		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	2.33		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	6.56		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	0.9		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	620		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	70		
30				
31	ELEVATION OF HEADWATER	470.5		
32	ELEVATION OF CONCENTRATION POINT	468		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		464.5	13730	
45		465.5	15200	
46		466.5	16700	
47		467.5	18270	
48		468	19075	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 4
[3] AREA - ACRES	9.790
[4] L-FEET	620
[5] L-MILES	0.117
[6] La-FEET	70.00
[7] La-MILES	0.013
[8] ELEVATION OF HEADWATER	470.5
[9] ELEVATION OF CONCENTRATION POINT	468
[10] H-FEET	2.5
[11] S-FEET/MILE	21.3
[12] S^0.5	4.61
[13] L*LCA/S^0.5	0.000
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.02
[16] LAG TIME-MINUTES	1.4
[17] 100% OF LAG-MINUTES	1.4
[18] 200% OF LAG-MINUTES	2.8
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.21

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	9.790	1.00	2.12	2.78	9.790	1.00	2.78	4.47	9.790	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.79	SUM [7]	2.12	SUM [9]	9.79	SUM [11]	2.78	SUM [13]	9.79	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.51	1.59	1.71
FLOOD VOLUME	(cu-ft)	53,707	56,587	60,936
	(acre-ft)	1.23	1.30	1.40
REQUIRED STORAGE	(cu-ft)	50,983	51,654	49,570
	(acre-ft)	1.17	1.19	1.14
PEAK FLOW	(cfs)	18.42	16.28	4.23
MAXIMUM WSEL	(ft)	467.67	467.70	467.59

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	2.33	0.238	0.0124
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	6.56	0.670	0.1446
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	0.90	0.092	0.0478
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.79	SUM	0.2048

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.102390603

C= 0.00190

Ft=C(24-(T/60))^1.55 = 0.00190 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.20
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.20	0.30	0.13	1.23	306.00
2	10	0.17	1.3	0.331	0.20	0.30	0.13	1.23	306.00
3	15	0.25	1.1	0.280	0.20	0.25	0.08	0.73	156.57
4	20	0.33	1.5	0.382	0.20	0.34	0.18	1.73	455.43
5	25	0.42	1.5	0.382	0.20	0.34	0.18	1.73	455.43
6	30	0.50	1.8	0.458	0.20	0.41	0.25	2.48	679.59
7	35	0.58	1.5	0.382	0.20	0.34	0.18	1.73	455.43
8	40	0.67	1.8	0.458	0.20	0.41	0.25	2.48	679.59
9	45	0.75	1.8	0.458	0.20	0.41	0.25	2.48	679.59
10	50	0.83	1.5	0.382	0.20	0.34	0.18	1.73	455.43
11	55	0.92	1.6	0.407	0.20	0.37	0.20	1.98	530.15
12	60	1.00	1.8	0.458	0.20	0.41	0.25	2.48	679.59
13	65	1.08	2.2	0.560	0.20	0.50	0.35	3.47	978.46
14	70	1.17	2.2	0.560	0.20	0.50	0.35	3.47	978.46
15	75	1.25	2.2	0.560	0.20	0.50	0.35	3.47	978.46
16	80	1.33	2.0	0.509	0.20	0.46	0.30	2.98	829.02
17	85	1.42	2.6	0.661	0.20	0.60	0.46	4.47	1277.32
18	90	1.50	2.7	0.687	0.20	0.62	0.48	4.72	1352.04
19	95	1.58	2.4	0.611	0.20	0.55	0.41	3.97	1127.89
20	100	1.67	2.7	0.687	0.20	0.62	0.48	4.72	1352.04
21	105	1.75	3.3	0.840	0.20	0.76	0.63	6.21	1800.35
22	110	1.83	3.1	0.789	0.20	0.71	0.58	5.72	1650.91
23	115	1.92	2.9	0.738	0.20	0.66	0.53	5.22	1501.48
24	120	2.00	3.0	0.763	0.20	0.69	0.56	5.47	1576.19
25	125	2.08	3.1	0.789	0.20	0.71	0.58	5.72	1650.91
26	130	2.17	4.2	1.068	0.20	0.96	0.86	8.46	2472.80
27	135	2.25	5.0	1.272	0.20	1.14	1.07	10.45	3070.54
28	140	2.33	3.5	0.890	0.20	0.80	0.69	6.71	1949.78
29	145	2.42	6.8	1.730	0.20	1.56	1.53	14.93	4415.45
30	150	2.50	7.3	1.857	0.20	1.67	1.65	16.18	4789.04
31	155	2.58	8.2	2.086	0.20	1.88	1.88	18.42	5461.49
32	160	2.67	5.9	1.501	0.20	1.35	1.30	12.69	3742.99
33	165	2.75	2.0	0.509	0.20	0.46	0.30	2.98	829.02
34	170	2.83	1.8	0.458	0.20	0.41	0.25	2.48	679.59
35	175	2.92	1.8	0.458	0.20	0.41	0.25	2.48	679.59
36	180	3.00	0.6	0.153	0.20	0.14	0.02	0.15	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.51
FLOOD VOLUME (acft)	1.23
FLOOD VOLUME (cuft)	53707.39
REQUIRED STORAGE (acft)	1.17
REQUIRED STORAGE (cuft)	50982.60
PEAK FLOW RATE (cfs)	18.42

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.38
UNIT TIME-PERCENT OF LAG	362.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.205
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.21 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.167	0.20	0.15	0.02	0.16	0.00
2	10	0.17	0.6	0.200	0.20	0.18	0.02	0.20	0.00
3	15	0.25	0.6	0.200	0.20	0.18	0.02	0.20	0.00
4	20	0.33	0.6	0.200	0.20	0.18	0.02	0.20	0.00
5	25	0.42	0.6	0.200	0.20	0.18	0.02	0.20	0.00
6	30	0.50	0.7	0.234	0.20	0.21	0.03	0.28	20.52
7	35	0.58	0.7	0.234	0.20	0.21	0.03	0.28	20.52
8	40	0.67	0.7	0.234	0.20	0.21	0.03	0.28	20.52
9	45	0.75	0.7	0.234	0.20	0.21	0.03	0.28	20.52
10	50	0.83	0.7	0.234	0.20	0.21	0.03	0.28	20.52
11	55	0.92	0.7	0.234	0.20	0.21	0.03	0.28	20.52
12	60	1.00	0.8	0.267	0.20	0.24	0.06	0.61	118.50
13	65	1.08	0.8	0.267	0.20	0.24	0.06	0.61	118.50
14	70	1.17	0.8	0.267	0.20	0.24	0.06	0.61	118.50
15	75	1.25	0.8	0.267	0.20	0.24	0.06	0.61	118.50
16	80	1.33	0.8	0.267	0.20	0.24	0.06	0.61	118.50
17	85	1.42	0.8	0.267	0.20	0.24	0.06	0.61	118.50
18	90	1.50	0.8	0.267	0.20	0.24	0.06	0.61	118.50
19	95	1.58	0.8	0.267	0.20	0.24	0.06	0.61	118.50
20	100	1.67	0.8	0.267	0.20	0.24	0.06	0.61	118.50
21	105	1.75	0.8	0.267	0.20	0.24	0.06	0.61	118.50
22	110	1.83	0.8	0.267	0.20	0.24	0.06	0.61	118.50
23	115	1.92	0.8	0.267	0.20	0.24	0.06	0.61	118.50
24	120	2.00	0.9	0.300	0.20	0.27	0.10	0.93	216.48
25	125	2.08	0.8	0.267	0.20	0.24	0.06	0.61	118.50
26	130	2.17	0.9	0.300	0.20	0.27	0.10	0.93	216.48
27	135	2.25	0.9	0.300	0.20	0.27	0.10	0.93	216.48
28	140	2.33	0.9	0.300	0.20	0.27	0.10	0.93	216.48
29	145	2.42	0.9	0.300	0.20	0.27	0.10	0.93	216.48
30	150	2.50	0.9	0.300	0.20	0.27	0.10	0.93	216.48
31	155	2.58	0.9	0.300	0.20	0.27	0.10	0.93	216.48
32	160	2.67	0.9	0.300	0.20	0.27	0.10	0.93	216.48
33	165	2.75	1.0	0.334	0.20	0.30	0.13	1.26	314.46
34	170	2.83	1.0	0.334	0.20	0.30	0.13	1.26	314.46
35	175	2.92	1.0	0.334	0.20	0.30	0.13	1.26	314.46
36	180	3.00	1.0	0.334	0.20	0.30	0.13	1.26	314.46
37	185	3.08	1.0	0.334	0.20	0.30	0.13	1.26	314.46
38	190	3.17	1.1	0.367	0.20	0.33	0.16	1.59	412.44
39	195	3.25	1.1	0.367	0.20	0.33	0.16	1.59	412.44
40	200	3.33	1.1	0.367	0.20	0.33	0.16	1.59	412.44
41	205	3.42	1.2	0.400	0.20	0.36	0.20	1.91	510.41
42	210	3.50	1.3	0.434	0.20	0.39	0.23	2.24	608.39
43	215	3.58	1.4	0.467	0.20	0.42	0.26	2.57	706.37
44	220	3.67	1.4	0.467	0.20	0.42	0.26	2.57	706.37
45	225	3.75	1.5	0.500	0.20	0.45	0.30	2.89	804.35
46	230	3.83	1.5	0.500	0.20	0.45	0.30	2.89	804.35
47	235	3.92	1.6	0.534	0.20	0.48	0.33	3.22	902.33
48	240	4.00	1.6	0.534	0.20	0.48	0.33	3.22	902.33
49	245	4.08	1.7	0.567	0.20	0.51	0.36	3.55	1000.31
50	250	4.17	1.8	0.600	0.20	0.54	0.40	3.87	1098.28
51	255	4.25	1.9	0.634	0.20	0.57	0.43	4.20	1196.26
52	260	4.33	2.0	0.667	0.20	0.60	0.46	4.53	1294.24
53	265	4.42	2.1	0.701	0.20	0.63	0.50	4.85	1392.22
54	270	4.50	2.1	0.701	0.20	0.63	0.50	4.85	1392.22
55	275	4.58	2.2	0.734	0.20	0.66	0.53	5.18	1490.20
56	280	4.67	2.3	0.767	0.20	0.69	0.56	5.51	1588.18

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.79		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.38		
UNIT TIME-PERCENT OF LAG	362.1		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.205		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.21 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.801	0.20	0.72	0.60	5.83	1686.15
58	290	4.83	2.4	0.801	0.20	0.72	0.60	5.83	1686.15
59	295	4.92	2.5	0.834	0.20	0.75	0.63	6.16	1784.13
60	300	5.00	2.6	0.867	0.20	0.78	0.66	6.49	1882.11
61	305	5.08	3.1	1.034	0.20	0.93	0.83	8.12	2372.00
62	310	5.17	3.6	1.201	0.20	1.08	1.00	9.75	2861.89
63	315	5.25	3.9	1.301	0.20	1.17	1.10	10.73	3155.83
64	320	5.33	4.2	1.401	0.20	1.26	1.20	11.71	3449.76
65	325	5.42	4.7	1.568	0.20	1.41	1.36	13.35	3939.66
66	330	5.50	5.6	1.868	0.20	1.68	1.66	16.28	4821.46
67	335	5.58	1.9	0.634	0.20	0.57	0.43	4.20	1196.26
68	340	5.67	0.9	0.300	0.20	0.27	0.10	0.93	216.48
69	345	5.75	0.6	0.200	0.20	0.18	0.02	0.20	0.00
70	350	5.83	0.5	0.167	0.20	0.15	0.02	0.16	0.00
71	355	5.92	0.3	0.100	0.20	0.09	0.01	0.10	0.00
72	360	6.00	0.2	0.067	0.20	0.06	0.01	0.07	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.59
FLOOD VOLUME (acft)	1.30
FLOOD VOLUME (cuft)	56587.21
REQUIRED STORAGE (acft)	1.19
REQUIRED STORAGE (cuft)	51653.82
PEAK FLOW RATE (cfs)	16.28

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.362	0.032	0.004	0.04	0.00
2	30	0.50	0.3	0.054	0.357	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.353	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.349	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.345	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.341	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.337	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.333	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.329	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.325	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.321	0.080	0.009	0.09	0.00
12	180	3.00	0.5	0.089	0.317	0.080	0.009	0.09	0.00
13	195	3.25	0.5	0.089	0.313	0.080	0.009	0.09	0.00
14	210	3.50	0.5	0.089	0.309	0.080	0.009	0.09	0.00
15	225	3.75	0.5	0.089	0.305	0.080	0.009	0.09	0.00
16	240	4.00	0.6	0.107	0.301	0.097	0.011	0.11	0.00
17	255	4.25	0.6	0.107	0.297	0.097	0.011	0.11	0.00
18	270	4.50	0.7	0.125	0.294	0.113	0.013	0.12	0.00
19	285	4.75	0.7	0.125	0.290	0.113	0.013	0.12	0.00
20	300	5.00	0.8	0.143	0.286	0.129	0.014	0.14	0.00
21	315	5.25	0.6	0.107	0.282	0.097	0.011	0.11	0.00
22	330	5.50	0.7	0.125	0.279	0.113	0.013	0.12	0.00
23	345	5.75	0.8	0.143	0.275	0.129	0.014	0.14	0.00
24	360	6.00	0.8	0.143	0.272	0.129	0.014	0.14	0.00
25	375	6.25	0.9	0.161	0.268	0.145	0.016	0.16	0.00
26	390	6.50	0.9	0.161	0.264	0.145	0.016	0.16	0.00
27	405	6.75	1.0	0.179	0.261	0.161	0.018	0.18	0.00
28	420	7.00	1.0	0.179	0.257	0.161	0.018	0.18	0.00
29	435	7.25	1.0	0.179	0.254	0.161	0.018	0.18	0.00
30	450	7.50	1.1	0.197	0.250	0.177	0.020	0.19	0.00
31	465	7.75	1.2	0.215	0.247	0.193	0.021	0.21	0.00
32	480	8.00	1.3	0.232	0.243	0.209	0.023	0.23	13.15
33	495	8.25	1.5	0.268	0.240	0.241	0.028	0.28	55.92
34	510	8.50	1.5	0.268	0.237	0.241	0.031	0.31	85.41
35	525	8.75	1.6	0.286	0.233	0.257	0.053	0.52	272.18
36	540	9.00	1.7	0.304	0.230	0.274	0.074	0.72	458.69
37	555	9.25	1.9	0.340	0.227	0.306	0.113	1.10	802.48
38	570	9.50	2.0	0.358	0.224	0.322	0.134	1.31	988.46
39	585	9.75	2.1	0.375	0.220	0.338	0.155	1.52	1174.18
40	600	10.00	2.2	0.393	0.217	0.354	0.176	1.72	1359.63
41	615	10.25	1.5	0.268	0.214	0.241	0.054	0.53	284.49
42	630	10.50	1.5	0.268	0.211	0.241	0.057	0.56	311.86
43	645	10.75	2.0	0.358	0.208	0.322	0.150	1.46	1126.65
44	660	11.00	2.0	0.358	0.205	0.322	0.153	1.49	1153.47
45	675	11.25	1.9	0.340	0.202	0.306	0.138	1.35	1022.46
46	690	11.50	1.9	0.340	0.199	0.306	0.141	1.38	1048.71
47	705	11.75	1.7	0.304	0.196	0.274	0.108	1.06	759.60
48	720	12.00	1.8	0.322	0.193	0.290	0.129	1.26	942.83
49	735	12.25	2.5	0.447	0.190	0.402	0.257	2.51	2071.00
50	750	12.50	2.6	0.465	0.187	0.418	0.278	2.72	2253.64
51	765	12.75	2.8	0.501	0.185	0.451	0.316	3.09	2593.53
52	780	13.00	2.9	0.519	0.182	0.467	0.337	3.30	2775.58
53	795	13.25	3.4	0.608	0.179	0.547	0.429	4.20	3587.49
54	810	13.50	3.4	0.608	0.176	0.547	0.432	4.23	3611.39
55	825	13.75	2.3	0.411	0.174	0.370	0.238	2.33	1902.04
56	840	14.00	2.3	0.411	0.171	0.370	0.240	2.35	1925.32
57	855	14.25	2.7	0.483	0.168	0.434	0.314	3.08	2578.46
58	870	14.50	2.6	0.465	0.166	0.418	0.299	2.93	2443.57
59	885	14.75	2.6	0.465	0.163	0.418	0.302	2.95	2465.90
60	900	15.00	2.5	0.447	0.161	0.402	0.286	2.80	2330.36
61	915	15.25	2.4	0.429	0.158	0.386	0.271	2.65	2194.50
62	930	15.50	2.3	0.411	0.156	0.370	0.255	2.50	2058.30
63	945	15.75	1.9	0.340	0.153	0.306	0.186	1.82	1449.14
64	960	16.00	1.9	0.340	0.151	0.306	0.189	1.85	1469.81
65	975	16.25	0.4	0.072	0.149	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.147	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.144	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.790	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2048
LAG TIME - MINUTES	1.38	MINIMUM LOSS RATE (for var. loss) - in/hr	0.102
UNIT TIME-PERCENT OF LAG	1086.4	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00190
		PERCOLATION RATE (cfs)	0.21

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
	Minutes	Hours	(Plate E-5.9)		Max	Low			
68	1020	17.00	0.3	0.054	0.142	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.140	0.080	0.009	0.09	0.00
70	1050	17.50	0.5	0.089	0.138	0.080	0.009	0.09	0.00
71	1065	17.75	0.5	0.089	0.136	0.080	0.009	0.09	0.00
72	1080	18.00	0.4	0.072	0.134	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.132	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.130	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.128	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.126	0.032	0.004	0.04	0.00
77	1155	19.25	0.3	0.054	0.124	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.123	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.121	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.119	0.032	0.004	0.04	0.00
81	1215	20.25	0.3	0.054	0.118	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.116	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.115	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.113	0.032	0.004	0.04	0.00
85	1275	21.25	0.3	0.054	0.112	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.111	0.032	0.004	0.04	0.00
87	1305	21.75	0.3	0.054	0.110	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.108	0.032	0.004	0.04	0.00
89	1335	22.25	0.3	0.054	0.107	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.106	0.032	0.004	0.04	0.00
91	1365	22.75	0.2	0.036	0.105	0.032	0.004	0.04	0.00
92	1380	23.00	0.2	0.036	0.105	0.032	0.004	0.04	0.00
93	1395	23.25	0.2	0.036	0.104	0.032	0.004	0.04	0.00
94	1410	23.50	0.2	0.036	0.103	0.032	0.004	0.04	0.00
95	1425	23.75	0.2	0.036	0.103	0.032	0.004	0.04	0.00
96	1440	24.00	0.2	0.036	0.102	0.032	0.004	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	1.71
FLOOD VOLUME (acft)	1.40
FLOOD VOLUME (cuft)	60935.59
REQUIRED STORAGE (acft)	1.14
REQUIRED STORAGE (cuft)	49570.20
PEAK FLOW (cfs)	4.23

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
464.5	0	0		13730	0	0	0.00
465.5	1	1	1470	15200	14465	14465	0.33
466.5	1	2	1500	16700	15950	30415	0.70
467.5	1	3	1570	18270	17485	47900	1.10
468	0.5	3.5	805	19075	9336	57236	1.31

PERCOLATION CALCULATIONS
PERCOLATION RATE 0.67 in/hr 0.21 cfs

MAXWELL IV DRYWELLS
NUMBER USED 0
RATE/DRYWELL 0 cfs
TOTAL DISSIPATED 0 cfs

TOTAL PERCOLATION RATE 0.21 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	1.23	370	370	64	306	464.52	306	0.01
2	10	1.23	370	676	64	612	464.54	612	0.01
3	15	0.73	220	832	64	769	464.55	769	0.02
4	20	1.73	519	1,288	64	1,224	464.58	1,224	0.03
5	25	1.73	519	1,743	64	1,679	464.62	1,679	0.04
6	30	2.48	743	2,423	64	2,359	464.66	2,359	0.05
7	35	1.73	519	2,878	64	2,814	464.69	2,814	0.06
8	40	2.48	743	3,558	64	3,494	464.74	3,494	0.08
9	45	2.48	743	4,238	64	4,174	464.79	4,174	0.10
10	50	1.73	519	4,693	64	4,629	464.82	4,629	0.11
11	55	1.98	594	5,223	64	5,159	464.86	5,159	0.12
12	60	2.48	743	5,903	64	5,839	464.90	5,839	0.13
13	65	3.47	1,042	6,881	64	6,817	464.97	6,817	0.16
14	70	3.47	1,042	7,860	64	7,796	465.04	7,796	0.18
15	75	3.47	1,042	8,838	64	8,774	465.11	8,774	0.20
16	80	2.98	893	9,667	64	9,603	465.16	9,603	0.22
17	85	4.47	1,341	10,944	64	10,881	465.25	10,881	0.25
18	90	4.72	1,416	12,296	64	12,233	465.35	12,233	0.28
19	95	3.97	1,192	13,424	64	13,360	465.42	13,360	0.31
20	100	4.72	1,416	14,776	64	14,712	465.52	14,712	0.34
21	105	6.21	1,864	16,577	64	16,513	465.63	16,513	0.38
22	110	5.72	1,715	18,228	64	18,164	465.73	18,164	0.42
23	115	5.22	1,565	19,729	64	19,665	465.83	19,665	0.45
24	120	5.47	1,640	21,305	64	21,241	465.92	21,241	0.49
25	125	5.72	1,715	22,956	64	22,892	466.03	22,892	0.53
26	130	8.46	2,537	25,429	64	25,365	466.18	25,365	0.58
27	135	10.45	3,134	28,500	64	28,436	466.38	28,436	0.65
28	140	6.71	2,014	30,449	64	30,385	466.50	30,385	0.70
29	145	14.93	4,479	34,865	64	34,801	466.75	34,801	0.80
30	150	16.18	4,853	39,654	64	39,590	467.02	39,590	0.91
31	155	18.42	5,525	45,115	64	45,051	467.34	45,051	1.03
32	160	12.69	3,807	48,858	64	48,794	467.55	48,794	1.12
33	165	2.98	893	49,687	64	49,623	467.59	49,623	1.14
34	170	2.48	743	50,367	64	50,303	467.63	50,303	1.15
35	175	2.48	743	51,046	64	50,983	467.67	50,983	1.17
36	180	0.15	45	51,027	64	50,964	467.66	50,964	1.17

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	49	49	64	-	464.50	-	0.00
2	10	0.20	59	59	64	-	464.50	-	0.00
3	15	0.20	59	59	64	-	464.50	-	0.00
4	20	0.20	59	59	64	-	464.50	-	0.00
5	25	0.20	59	59	64	-	464.50	-	0.00
6	30	0.28	84	84	64	21	464.50	21	0.00
7	35	0.28	84	105	64	41	464.50	41	0.00
8	40	0.28	84	125	64	62	464.50	62	0.00
9	45	0.28	84	146	64	82	464.51	82	0.00
10	50	0.28	84	166	64	103	464.51	103	0.00
11	55	0.28	84	187	64	123	464.51	123	0.00
12	60	0.61	182	306	64	242	464.52	242	0.01
13	65	0.61	182	424	64	360	464.52	360	0.01
14	70	0.61	182	543	64	479	464.53	479	0.01
15	75	0.61	182	661	64	597	464.54	597	0.01
16	80	0.61	182	780	64	716	464.55	716	0.02
17	85	0.61	182	898	64	834	464.56	834	0.02
18	90	0.61	182	1,017	64	953	464.57	953	0.02
19	95	0.61	182	1,135	64	1,071	464.57	1,071	0.02
20	100	0.61	182	1,254	64	1,190	464.58	1,190	0.03
21	105	0.61	182	1,372	64	1,308	464.59	1,308	0.03
22	110	0.61	182	1,491	64	1,427	464.60	1,427	0.03
23	115	0.61	182	1,609	64	1,545	464.61	1,545	0.04
24	120	0.93	280	1,826	64	1,762	464.62	1,762	0.04
25	125	0.61	182	1,944	64	1,880	464.63	1,880	0.04
26	130	0.93	280	2,161	64	2,097	464.64	2,097	0.05
27	135	0.93	280	2,377	64	2,313	464.66	2,313	0.05
28	140	0.93	280	2,593	64	2,530	464.67	2,530	0.06
29	145	0.93	280	2,810	64	2,746	464.69	2,746	0.06
30	150	0.93	280	3,026	64	2,963	464.70	2,963	0.07
31	155	0.93	280	3,243	64	3,179	464.72	3,179	0.07
32	160	0.93	280	3,459	64	3,395	464.73	3,395	0.08
33	165	1.26	378	3,774	64	3,710	464.76	3,710	0.09
34	170	1.26	378	4,088	64	4,024	464.78	4,024	0.09
35	175	1.26	378	4,403	64	4,339	464.80	4,339	0.10
36	180	1.26	378	4,717	64	4,653	464.82	4,653	0.11
37	185	1.26	378	5,032	64	4,968	464.84	4,968	0.11
38	190	1.59	476	5,444	64	5,380	464.87	5,380	0.12
39	195	1.59	476	5,857	64	5,793	464.90	5,793	0.13
40	200	1.59	476	6,269	64	6,205	464.93	6,205	0.14
41	205	1.91	574	6,779	64	6,716	464.96	6,716	0.15
42	210	2.24	672	7,388	64	7,324	465.01	7,324	0.17
43	215	2.57	770	8,094	64	8,030	465.06	8,030	0.18
44	220	2.57	770	8,801	64	8,737	465.10	8,737	0.20
45	225	2.89	868	9,605	64	9,541	465.16	9,541	0.22
46	230	2.89	868	10,409	64	10,345	465.22	10,345	0.24
47	235	3.22	966	11,312	64	11,248	465.28	11,248	0.26
48	240	3.22	966	12,214	64	12,150	465.34	12,150	0.28
49	245	3.55	1,064	13,214	64	13,150	465.41	13,150	0.30
50	250	3.87	1,162	14,312	64	14,249	465.49	14,249	0.33
51	255	4.20	1,260	15,509	64	15,445	465.56	15,445	0.35
52	260	4.53	1,358	16,803	64	16,739	465.64	16,739	0.38
53	265	4.85	1,456	18,195	64	18,131	465.73	18,131	0.42
54	270	4.85	1,456	19,587	64	19,524	465.82	19,524	0.45
55	275	5.18	1,554	21,078	64	21,014	465.91	21,014	0.48

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	5.51	1,652	22,666	64	22,602	466.01	22,602	0.52
57	285	5.83	1,750	24,352	64	24,288	466.12	24,288	0.56
58	290	5.83	1,750	26,038	64	25,974	466.22	25,974	0.60
59	295	6.16	1,848	27,822	64	27,758	466.33	27,758	0.64
60	300	6.49	1,946	29,704	64	29,640	466.45	29,640	0.68
61	305	8.12	2,436	32,076	64	32,012	466.59	32,012	0.73
62	310	9.75	2,926	34,938	64	34,874	466.76	34,874	0.80
63	315	10.73	3,220	38,094	64	38,030	466.94	38,030	0.87
64	320	11.71	3,514	41,544	64	41,480	467.13	41,480	0.95
65	325	13.35	4,004	45,483	64	45,420	467.36	45,420	1.04
66	330	16.28	4,885	50,305	64	50,241	467.63	50,241	1.15
67	335	4.20	1,260	51,501	64	51,437	467.69	51,437	1.18
68	340	0.93	280	51,718	64	51,654	467.70	51,654	1.19
69	345	0.20	59	51,713	64	51,649	467.70	51,649	1.19
70	350	0.16	49	51,698	64	51,634	467.70	51,634	1.19
71	355	0.10	29	51,663	64	51,599	467.70	51,599	1.18
72	360	0.07	20	51,619	64	51,555	467.70	51,555	1.18

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	32	32	192	-	464.50	-	0.00
2	30	0.05	47	47	192	-	464.50	-	0.00
3	45	0.05	47	47	192	-	464.50	-	0.00
4	60	0.07	63	63	192	-	464.50	-	0.00
5	75	0.05	47	47	192	-	464.50	-	0.00
6	90	0.05	47	47	192	-	464.50	-	0.00
7	105	0.05	47	47	192	-	464.50	-	0.00
8	120	0.07	63	63	192	-	464.50	-	0.00
9	135	0.07	63	63	192	-	464.50	-	0.00
10	150	0.07	63	63	192	-	464.50	-	0.00
11	165	0.09	79	79	192	-	464.50	-	0.00
12	180	0.09	79	79	192	-	464.50	-	0.00
13	195	0.09	79	79	192	-	464.50	-	0.00
14	210	0.09	79	79	192	-	464.50	-	0.00
15	225	0.09	79	79	192	-	464.50	-	0.00
16	240	0.11	95	95	192	-	464.50	-	0.00
17	255	0.11	95	95	192	-	464.50	-	0.00
18	270	0.12	110	110	192	-	464.50	-	0.00
19	285	0.12	110	110	192	-	464.50	-	0.00
20	300	0.14	126	126	192	-	464.50	-	0.00
21	315	0.11	95	95	192	-	464.50	-	0.00
22	330	0.12	110	110	192	-	464.50	-	0.00
23	345	0.14	126	126	192	-	464.50	-	0.00
24	360	0.14	126	126	192	-	464.50	-	0.00
25	375	0.16	142	142	192	-	464.50	-	0.00
26	390	0.16	142	142	192	-	464.50	-	0.00
27	405	0.18	158	158	192	-	464.50	-	0.00
28	420	0.18	158	158	192	-	464.50	-	0.00
29	435	0.18	158	158	192	-	464.50	-	0.00
30	450	0.19	173	173	192	-	464.50	-	0.00
31	465	0.21	189	189	192	-	464.50	-	0.00
32	480	0.23	205	205	192	13	464.50	13	0.00
33	495	0.28	248	261	192	69	464.50	69	0.00
34	510	0.31	277	346	192	154	464.51	154	0.00
35	525	0.52	464	618	192	427	464.53	427	0.01
36	540	0.72	650	1,077	192	885	464.56	885	0.02
37	555	1.10	994	1,879	192	1,688	464.62	1,688	0.04
38	570	1.31	1,180	2,868	192	2,676	464.69	2,676	0.06
39	585	1.52	1,366	4,042	192	3,850	464.77	3,850	0.09
40	600	1.72	1,551	5,402	192	5,210	464.86	5,210	0.12
41	615	0.53	476	5,686	192	5,495	464.88	5,495	0.13
42	630	0.56	504	5,998	192	5,806	464.90	5,806	0.13
43	645	1.46	1,318	7,125	192	6,933	464.98	6,933	0.16
44	660	1.49	1,345	8,278	192	8,087	465.06	8,087	0.19
45	675	1.35	1,214	9,301	192	9,109	465.13	9,109	0.21
46	690	1.38	1,240	10,349	192	10,158	465.20	10,158	0.23
47	705	1.06	951	11,109	192	10,917	465.25	10,917	0.25
48	720	1.26	1,134	12,052	192	11,860	465.32	11,860	0.27
49	735	2.51	2,263	14,123	192	13,931	465.46	13,931	0.32
50	750	2.72	2,445	16,376	192	16,185	465.61	16,185	0.37
51	765	3.09	2,785	18,970	192	18,778	465.77	18,778	0.43
52	780	3.30	2,967	21,746	192	21,554	465.94	21,554	0.49
53	795	4.20	3,779	25,333	192	25,141	466.17	25,141	0.58
54	810	4.23	3,803	28,944	192	28,753	466.40	28,753	0.66
55	825	2.33	2,094	30,846	192	30,655	466.51	30,655	0.70
56	840	2.35	2,117	32,772	192	32,580	466.62	32,580	0.75
57	855	3.08	2,770	35,350	192	35,159	466.77	35,159	0.81
58	870	2.93	2,635	37,794	192	37,602	466.91	37,602	0.86

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	2.95	2,658	40,260	192	40,068	467.05	40,068	0.92
60	900	2.80	2,522	42,590	192	42,398	467.19	42,398	0.97
61	915	2.65	2,386	44,785	192	44,593	467.31	44,593	1.02
62	930	2.50	2,250	46,843	192	46,651	467.43	46,651	1.07
63	945	1.82	1,641	48,292	192	48,100	467.51	48,100	1.10
64	960	1.85	1,661	49,762	192	49,570	467.59	49,570	1.14
65	975	0.07	63	49,633	192	49,442	467.58	49,442	1.14
66	990	0.07	63	49,505	192	49,313	467.58	49,313	1.13
67	1005	0.05	47	49,360	192	49,169	467.57	49,169	1.13
68	1020	0.05	47	49,216	192	49,024	467.56	49,024	1.13
69	1035	0.09	79	49,103	192	48,911	467.55	48,911	1.12
70	1050	0.09	79	48,990	192	48,798	467.55	48,798	1.12
71	1065	0.09	79	48,877	192	48,686	467.54	48,686	1.12
72	1080	0.07	63	48,749	192	48,557	467.54	48,557	1.11
73	1095	0.07	63	48,620	192	48,428	467.53	48,428	1.11
74	1110	0.07	63	48,491	192	48,300	467.52	48,300	1.11
75	1125	0.05	47	48,347	192	48,155	467.51	48,155	1.11
76	1140	0.04	32	48,187	192	47,995	467.51	47,995	1.10
77	1155	0.05	47	48,042	192	47,851	467.50	47,851	1.10
78	1170	0.07	63	47,914	192	47,722	467.49	47,722	1.10
79	1185	0.05	47	47,769	192	47,578	467.48	47,578	1.09
80	1200	0.04	32	47,609	192	47,418	467.47	47,418	1.09
81	1215	0.05	47	47,465	192	47,273	467.46	47,273	1.09
82	1230	0.05	47	47,320	192	47,129	467.46	47,129	1.08
83	1245	0.05	47	47,176	192	46,984	467.45	46,984	1.08
84	1260	0.04	32	47,016	192	46,824	467.44	46,824	1.07
85	1275	0.05	47	46,872	192	46,680	467.43	46,680	1.07
86	1290	0.04	32	46,711	192	46,520	467.42	46,520	1.07
87	1305	0.05	47	46,567	192	46,375	467.41	46,375	1.06
88	1320	0.04	32	46,407	192	46,215	467.40	46,215	1.06
89	1335	0.05	47	46,262	192	46,071	467.40	46,071	1.06
90	1350	0.04	32	46,102	192	45,911	467.39	45,911	1.05
91	1365	0.04	32	45,942	192	45,751	467.38	45,751	1.05
92	1380	0.04	32	45,782	192	45,590	467.37	45,590	1.05
93	1395	0.04	32	45,622	192	45,430	467.36	45,430	1.04
94	1410	0.04	32	45,462	192	45,270	467.35	45,270	1.04
95	1425	0.04	32	45,302	192	45,110	467.34	45,110	1.04
96	1440	0.04	32	45,142	192	44,950	467.33	44,950	1.03

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.		
5				
6	PROJECT NAME	CALHOUN AT AVENUE 49 - 100 YEAR EVENT		
7	JOB #			
8				
9	CONCENTRATION POINT DESIGNATION	1		
10	AREA DESIGNATION	SUBAREA 5		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE	1.95		
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS	4.71		
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING	2.83		
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	90%		
27				
28	LENGTH OF WATERCOURSE (L)	950		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	310		
30				
31	ELEVATION OF HEADWATER	471		
32	ELEVATION OF CONCENTRATION POINT	467		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.02		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.12		
40	6-HOUR	2.78		
41	24-HOUR	4.47		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		463.5	17610	
45		464.5	19400	
46		465.5	21240	
47		466.5	23140	
48		467	24110	
49				
50				
51				
52	PERCOLATION RATE (in/hr)	0.67		
53				
54	DRYWELL DATA			
55	NUMBER USED			
56	PERCOLATION RATE (cfs)			

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
BY ES R. BAZUA, P.E. DATE 1/17/2025

PHYSICAL DATA

[1] CONCENTRATION POINT	1
[2] AREA DESIGNATION	SUBAREA 5
[3] AREA - ACRES	9.490
[4] L-FEET	950
[5] L-MILES	0.180
[6] La-FEET	310.00
[7] La-MILES	0.059
[8] ELEVATION OF HEADWATER	471
[9] ELEVATION OF CONCENTRATION POINT	467
[10] H-FEET	4
[11] S-FEET/MILE	22.2
[12] S^0.5	4.72
[13] L*LCA/S^0.5	0.002
[14] AVERAGE MANNINGS 'N'	0.02
[15] LAG TIME-HOURS	0.05
[16] LAG TIME-MINUTES	2.8
[17] 100% OF LAG-MINUTES	2.8
[18] 200% OF LAG-MINUTES	5.7
[19] UNIT TIME-MINUTES (100%-200% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.27

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.12	9.490	1.00	2.12	2.78	9.490	1.00	2.78	4.47	9.490	1.00	4.47
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	9.49	SUM [7]	2.12	SUM [9]	9.49	SUM [11]	2.78	SUM [13]	9.49	SUM [15]	4.47
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.12				2.78				4.47

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.31	1.30	1.28
FLOOD VOLUME	(cu-ft)	45,222	44,840	44,164
	(acre-ft)	1.04	1.03	1.01
REQUIRED STORAGE	(cu-ft)	41,999	39,086	31,405
	(acre-ft)	0.96	0.90	0.72
PEAK FLOW	(cfs)	17.21	15.14	3.54
MAXIMUM WSEL	(ft)	465.64	465.51	465.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD	PROJECT CALHOUN AT AVENUE 49 - 100 YEAR EVENT
	CONCENTRATION POINT: 1
	BY MES R. BAZUA, P.E. DATE 1/17/2025

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS [Plate E-6.3]	ADJUSTED INFILTRATION RATE (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
B	COMMERCIAL	56	0.52	90%	0.10	0.00	0.000	0.0000
B	PAVING/HARDSCAPE	56	0.52	100%	0.05	1.95	0.205	0.0107
B	SF - 1 ACRE	56	0.52	20%	0.43	0.00	0.000	0.0000
B	SF - 1/2 ACRE	56	0.52	40%	0.33	0.00	0.000	0.0000
B	SF - 1/4 ACRE	56	0.52	50%	0.29	0.00	0.000	0.0000
B	MF - COND0MINIUMS	56	0.52	65%	0.22	4.71	0.496	0.1071
B	MF - APARTMENTS	56	0.52	80%	0.15	0.00	0.000	0.0000
B	MOBILE HOME PARKS	56	0.52	75%	0.17	0.00	0.000	0.0000
B	LANDSCAPING	56	0.52	0%	0.52	2.83	0.298	0.1551
B	RETENTION BASINS	56	0.52	0%	0.52	0.00	0.000	0.0000
B	GOLF COURSE	56	0.52	0%	0.52	0.00	0.000	0.0000
D	MOUNTAINOUS	93	0.95	90%	0.18	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	9.49	SUM	0.2729

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.136428767

C= 0.00253

Ft=C(24-(T/60))^1.55 = 0.00253 (24-(T/60))^1.55 + 0.14 in/hr

LOW LOSS RATE (80-90 PERCENT) = 90%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: IES R. BAZUA, DATE 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	2.12
CONSTANT LOSS RATE-in/hr	0.27
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.331	0.27	0.30	0.06	0.55	82.80
2	10	0.17	1.3	0.331	0.27	0.30	0.06	0.55	82.80
3	15	0.25	1.1	0.280	0.27	0.25	0.01	0.07	0.00
4	20	0.33	1.5	0.382	0.27	0.34	0.11	1.03	227.65
5	25	0.42	1.5	0.382	0.27	0.34	0.11	1.03	227.65
6	30	0.50	1.8	0.458	0.27	0.41	0.19	1.76	444.94
7	35	0.58	1.5	0.382	0.27	0.34	0.11	1.03	227.65
8	40	0.67	1.8	0.458	0.27	0.41	0.19	1.76	444.94
9	45	0.75	1.8	0.458	0.27	0.41	0.19	1.76	444.94
10	50	0.83	1.5	0.382	0.27	0.34	0.11	1.03	227.65
11	55	0.92	1.6	0.407	0.27	0.37	0.13	1.27	300.08
12	60	1.00	1.8	0.458	0.27	0.41	0.19	1.76	444.94
13	65	1.08	2.2	0.560	0.27	0.50	0.29	2.72	734.65
14	70	1.17	2.2	0.560	0.27	0.50	0.29	2.72	734.65
15	75	1.25	2.2	0.560	0.27	0.50	0.29	2.72	734.65
16	80	1.33	2.0	0.509	0.27	0.46	0.24	2.24	589.79
17	85	1.42	2.6	0.661	0.27	0.60	0.39	3.69	1024.36
18	90	1.50	2.7	0.687	0.27	0.62	0.41	3.93	1096.79
19	95	1.58	2.4	0.611	0.27	0.55	0.34	3.20	879.50
20	100	1.67	2.7	0.687	0.27	0.62	0.41	3.93	1096.79
21	105	1.75	3.3	0.840	0.27	0.76	0.57	5.38	1531.35
22	110	1.83	3.1	0.789	0.27	0.71	0.52	4.89	1386.50
23	115	1.92	2.9	0.738	0.27	0.66	0.46	4.41	1241.64
24	120	2.00	3.0	0.763	0.27	0.69	0.49	4.65	1314.07
25	125	2.08	3.1	0.789	0.27	0.71	0.52	4.89	1386.50
26	130	2.17	4.2	1.068	0.27	0.96	0.80	7.55	2183.20
27	135	2.25	5.0	1.272	0.27	1.14	1.00	9.48	2762.62
28	140	2.33	3.5	0.890	0.27	0.80	0.62	5.86	1676.21
29	145	2.42	6.8	1.730	0.27	1.56	1.46	13.83	4066.32
30	150	2.50	7.3	1.857	0.27	1.67	1.58	15.03	4428.46
31	155	2.58	8.2	2.086	0.27	1.88	1.81	17.21	5080.31
32	160	2.67	5.9	1.501	0.27	1.35	1.23	11.65	3414.47
33	165	2.75	2.0	0.509	0.27	0.46	0.24	2.24	589.79
34	170	2.83	1.8	0.458	0.27	0.41	0.19	1.76	444.94
35	175	2.92	1.8	0.458	0.27	0.41	0.19	1.76	444.94
36	180	3.00	0.6	0.153	0.27	0.14	0.02	0.14	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.31
FLOOD VOLUME (acft)	1.04
FLOOD VOLUME (cuft)	45221.59
REQUIRED STORAGE (acft)	0.96
REQUIRED STORAGE (cuft)	41998.54
PEAK FLOW RATE (cfs)	17.21

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	2.83
UNIT TIME-PERCENT OF LAG	176.4
TOTAL ADJUSTED STORM RAIN-INCHES	2.78
CONSTANT LOSS RATE-in/hr	0.273
LOW LOSS RATE - PERCENT	90%

TOTAL PERCOLATION RATE (cfs) 0.27 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.167	0.27	0.15	0.02	0.16	0.00
2	10	0.17	0.6	0.200	0.27	0.18	0.02	0.19	0.00
3	15	0.25	0.6	0.200	0.27	0.18	0.02	0.19	0.00
4	20	0.33	0.6	0.200	0.27	0.18	0.02	0.19	0.00
5	25	0.42	0.6	0.200	0.27	0.18	0.02	0.19	0.00
6	30	0.50	0.7	0.234	0.27	0.21	0.02	0.22	0.00
7	35	0.58	0.7	0.234	0.27	0.21	0.02	0.22	0.00
8	40	0.67	0.7	0.234	0.27	0.21	0.02	0.22	0.00
9	45	0.75	0.7	0.234	0.27	0.21	0.02	0.22	0.00
10	50	0.83	0.7	0.234	0.27	0.21	0.02	0.22	0.00
11	55	0.92	0.7	0.234	0.27	0.21	0.02	0.22	0.00
12	60	1.00	0.8	0.267	0.27	0.24	0.03	0.25	0.00
13	65	1.08	0.8	0.267	0.27	0.24	0.03	0.25	0.00
14	70	1.17	0.8	0.267	0.27	0.24	0.03	0.25	0.00
15	75	1.25	0.8	0.267	0.27	0.24	0.03	0.25	0.00
16	80	1.33	0.8	0.267	0.27	0.24	0.03	0.25	0.00
17	85	1.42	0.8	0.267	0.27	0.24	0.03	0.25	0.00
18	90	1.50	0.8	0.267	0.27	0.24	0.03	0.25	0.00
19	95	1.58	0.8	0.267	0.27	0.24	0.03	0.25	0.00
20	100	1.67	0.8	0.267	0.27	0.24	0.03	0.25	0.00
21	105	1.75	0.8	0.267	0.27	0.24	0.03	0.25	0.00
22	110	1.83	0.8	0.267	0.27	0.24	0.03	0.25	0.00
23	115	1.92	0.8	0.267	0.27	0.24	0.03	0.25	0.00
24	120	2.00	0.9	0.300	0.27	0.27	0.03	0.26	0.00
25	125	2.08	0.8	0.267	0.27	0.24	0.03	0.25	0.00
26	130	2.17	0.9	0.300	0.27	0.27	0.03	0.26	0.00
27	135	2.25	0.9	0.300	0.27	0.27	0.03	0.26	0.00
28	140	2.33	0.9	0.300	0.27	0.27	0.03	0.26	0.00
29	145	2.42	0.9	0.300	0.27	0.27	0.03	0.26	0.00
30	150	2.50	0.9	0.300	0.27	0.27	0.03	0.26	0.00
31	155	2.58	0.9	0.300	0.27	0.27	0.03	0.26	0.00
32	160	2.67	0.9	0.300	0.27	0.27	0.03	0.26	0.00
33	165	2.75	1.0	0.334	0.27	0.30	0.06	0.58	91.00
34	170	2.83	1.0	0.334	0.27	0.30	0.06	0.58	91.00
35	175	2.92	1.0	0.334	0.27	0.30	0.06	0.58	91.00
36	180	3.00	1.0	0.334	0.27	0.30	0.06	0.58	91.00
37	185	3.08	1.0	0.334	0.27	0.30	0.06	0.58	91.00
38	190	3.17	1.1	0.367	0.27	0.33	0.09	0.89	185.97
39	195	3.25	1.1	0.367	0.27	0.33	0.09	0.89	185.97
40	200	3.33	1.1	0.367	0.27	0.33	0.09	0.89	185.97
41	205	3.42	1.2	0.400	0.27	0.36	0.13	1.21	280.95
42	210	3.50	1.3	0.434	0.27	0.39	0.16	1.53	375.93
43	215	3.58	1.4	0.467	0.27	0.42	0.19	1.84	470.90
44	220	3.67	1.4	0.467	0.27	0.42	0.19	1.84	470.90
45	225	3.75	1.5	0.500	0.27	0.45	0.23	2.16	565.88
46	230	3.83	1.5	0.500	0.27	0.45	0.23	2.16	565.88
47	235	3.92	1.6	0.534	0.27	0.48	0.26	2.48	660.85
48	240	4.00	1.6	0.534	0.27	0.48	0.26	2.48	660.85
49	245	4.08	1.7	0.567	0.27	0.51	0.29	2.79	755.83
50	250	4.17	1.8	0.600	0.27	0.54	0.33	3.11	850.81
51	255	4.25	1.9	0.634	0.27	0.57	0.36	3.43	945.78
52	260	4.33	2.0	0.667	0.27	0.60	0.39	3.74	1040.76
53	265	4.42	2.1	0.701	0.27	0.63	0.43	4.06	1135.73
54	270	4.50	2.1	0.701	0.27	0.63	0.43	4.06	1135.73
55	275	4.58	2.2	0.734	0.27	0.66	0.46	4.38	1230.71
56	280	4.67	2.3	0.767	0.27	0.69	0.49	4.69	1325.69

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.49		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	2.83		
UNIT TIME-PERCENT OF LAG	176.4		
TOTAL ADJUSTED STORM RAIN-INCHES	2.78		
CONSTANT LOSS RATE-in/hr	0.273		
LOW LOSS RATE - PERCENT	90%	TOTAL PERCOLATION RATE (cfs)	0.27 cfs

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.801	0.27	0.72	0.53	5.01	1420.66
58	290	4.83	2.4	0.801	0.27	0.72	0.53	5.01	1420.66
59	295	4.92	2.5	0.834	0.27	0.75	0.56	5.33	1515.64
60	300	5.00	2.6	0.867	0.27	0.78	0.59	5.64	1610.61
61	305	5.08	3.1	1.034	0.27	0.93	0.76	7.22	2085.49
62	310	5.17	3.6	1.201	0.27	1.08	0.93	8.81	2560.37
63	315	5.25	3.9	1.301	0.27	1.17	1.03	9.76	2845.30
64	320	5.33	4.2	1.401	0.27	1.26	1.13	10.71	3130.23
65	325	5.42	4.7	1.568	0.27	1.41	1.30	12.29	3605.11
66	330	5.50	5.6	1.868	0.27	1.68	1.60	15.14	4459.89
67	335	5.58	1.9	0.634	0.27	0.57	0.36	3.43	945.78
68	340	5.67	0.9	0.300	0.27	0.27	0.03	0.26	0.00
69	345	5.75	0.6	0.200	0.27	0.18	0.02	0.19	0.00
70	350	5.83	0.5	0.167	0.27	0.15	0.02	0.16	0.00
71	355	5.92	0.3	0.100	0.27	0.09	0.01	0.09	0.00
72	360	6.00	0.2	0.067	0.27	0.06	0.01	0.06	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.30
FLOOD VOLUME (acft)	1.03
FLOOD VOLUME (cuft)	44839.99
REQUIRED STORAGE (acft)	0.90
REQUIRED STORAGE (cuft)	39085.84
PEAK FLOW RATE (cfs)	15.14

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
CONCENTRATION POINT: 1

BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.036	0.482	0.032	0.004	0.03	0.00
2	30	0.50	0.3	0.054	0.476	0.048	0.005	0.05	0.00
3	45	0.75	0.3	0.054	0.471	0.048	0.005	0.05	0.00
4	60	1.00	0.4	0.072	0.465	0.064	0.007	0.07	0.00
5	75	1.25	0.3	0.054	0.460	0.048	0.005	0.05	0.00
6	90	1.50	0.3	0.054	0.454	0.048	0.005	0.05	0.00
7	105	1.75	0.3	0.054	0.449	0.048	0.005	0.05	0.00
8	120	2.00	0.4	0.072	0.443	0.064	0.007	0.07	0.00
9	135	2.25	0.4	0.072	0.438	0.064	0.007	0.07	0.00
10	150	2.50	0.4	0.072	0.433	0.064	0.007	0.07	0.00
11	165	2.75	0.5	0.089	0.427	0.080	0.009	0.08	0.00
12	180	3.00	0.5	0.089	0.422	0.080	0.009	0.08	0.00
13	195	3.25	0.5	0.089	0.417	0.080	0.009	0.08	0.00
14	210	3.50	0.5	0.089	0.412	0.080	0.009	0.08	0.00
15	225	3.75	0.5	0.089	0.407	0.080	0.009	0.08	0.00
16	240	4.00	0.6	0.107	0.401	0.097	0.011	0.10	0.00
17	255	4.25	0.6	0.107	0.396	0.097	0.011	0.10	0.00
18	270	4.50	0.7	0.125	0.391	0.113	0.013	0.12	0.00
19	285	4.75	0.7	0.125	0.386	0.113	0.013	0.12	0.00
20	300	5.00	0.8	0.143	0.381	0.129	0.014	0.14	0.00
21	315	5.25	0.6	0.107	0.376	0.097	0.011	0.10	0.00
22	330	5.50	0.7	0.125	0.371	0.113	0.013	0.12	0.00
23	345	5.75	0.8	0.143	0.367	0.129	0.014	0.14	0.00
24	360	6.00	0.8	0.143	0.362	0.129	0.014	0.14	0.00
25	375	6.25	0.9	0.161	0.357	0.145	0.016	0.15	0.00
26	390	6.50	0.9	0.161	0.352	0.145	0.016	0.15	0.00
27	405	6.75	1.0	0.179	0.347	0.161	0.018	0.17	0.00
28	420	7.00	1.0	0.179	0.343	0.161	0.018	0.17	0.00
29	435	7.25	1.0	0.179	0.338	0.161	0.018	0.17	0.00
30	450	7.50	1.1	0.197	0.334	0.177	0.020	0.19	0.00
31	465	7.75	1.2	0.215	0.329	0.193	0.021	0.20	0.00
32	480	8.00	1.3	0.232	0.324	0.209	0.023	0.22	0.00
33	495	8.25	1.5	0.268	0.320	0.241	0.027	0.25	0.00
34	510	8.50	1.5	0.268	0.315	0.241	0.027	0.25	0.00
35	525	8.75	1.6	0.286	0.311	0.257	0.029	0.27	0.00
36	540	9.00	1.7	0.304	0.307	0.274	0.030	0.29	13.81
37	555	9.25	1.9	0.340	0.302	0.306	0.037	0.35	73.64
38	570	9.50	2.0	0.358	0.298	0.322	0.060	0.57	263.09
39	585	9.75	2.1	0.375	0.294	0.338	0.082	0.78	452.20
40	600	10.00	2.2	0.393	0.290	0.354	0.104	0.99	640.96
41	615	10.25	1.5	0.268	0.285	0.241	0.027	0.25	0.00
42	630	10.50	1.5	0.268	0.281	0.241	0.027	0.25	0.00
43	645	10.75	2.0	0.358	0.277	0.322	0.080	0.76	441.57
44	660	11.00	2.0	0.358	0.273	0.322	0.085	0.80	476.21
45	675	11.25	1.9	0.340	0.269	0.306	0.071	0.67	357.77
46	690	11.50	1.9	0.340	0.265	0.306	0.075	0.71	391.68
47	705	11.75	1.7	0.304	0.261	0.274	0.043	0.41	119.79
48	720	12.00	1.8	0.322	0.257	0.290	0.065	0.61	305.68
49	735	12.25	2.5	0.447	0.253	0.402	0.194	1.84	1407.47
50	750	12.50	2.6	0.465	0.250	0.418	0.215	2.04	1592.60
51	765	12.75	2.8	0.501	0.246	0.451	0.255	2.42	1930.06
52	780	13.00	2.9	0.519	0.242	0.467	0.276	2.62	2114.43
53	795	13.25	3.4	0.608	0.239	0.547	0.369	3.51	2909.26
54	810	13.50	3.4	0.608	0.235	0.547	0.373	3.54	2940.13
55	825	13.75	2.3	0.411	0.231	0.370	0.180	1.71	1290.76
56	840	14.00	2.3	0.411	0.228	0.370	0.183	1.74	1320.84
57	855	14.25	2.7	0.483	0.224	0.434	0.258	2.45	1961.36
58	870	14.50	2.6	0.465	0.221	0.418	0.244	2.32	1837.90
59	885	14.75	2.6	0.465	0.218	0.418	0.247	2.35	1866.75
60	900	15.00	2.5	0.447	0.214	0.402	0.233	2.21	1742.46
61	915	15.25	2.4	0.429	0.211	0.386	0.218	2.07	1617.74
62	930	15.50	2.3	0.411	0.208	0.370	0.204	1.93	1492.59
63	945	15.75	1.9	0.340	0.205	0.306	0.135	1.28	908.87
64	960	16.00	1.9	0.340	0.201	0.306	0.138	1.31	935.56
65	975	16.25	0.4	0.072	0.198	0.064	0.007	0.07	0.00
66	990	16.50	0.4	0.072	0.195	0.064	0.007	0.07	0.00
67	1005	16.75	0.3	0.054	0.192	0.048	0.005	0.05	0.00

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT CONCENTRATION POINT: 1 BY: JAMES R. BAZ DATE: 1/17/2025

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	9.490	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2729
LAG TIME - MINUTES	2.83	MINIMUM LOSS RATE (for var. loss) - in/hr	0.136
UNIT TIME-PERCENT OF LAG	529.1	LOW LOSS RATE - DECIMAL	0.90
TOTAL ADJUSTED STORM RAIN-INCHES	4.47	C	0.00253
		PERCOLATION RATE (cfs)	0.27

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
	Minutes	Hours	(Plate E-5.9)		Max	Low			
68	1020	17.00	0.3	0.054	0.189	0.048	0.005	0.05	0.00
69	1035	17.25	0.5	0.089	0.187	0.080	0.009	0.08	0.00
70	1050	17.50	0.5	0.089	0.184	0.080	0.009	0.08	0.00
71	1065	17.75	0.5	0.089	0.181	0.080	0.009	0.08	0.00
72	1080	18.00	0.4	0.072	0.178	0.064	0.007	0.07	0.00
73	1095	18.25	0.4	0.072	0.176	0.064	0.007	0.07	0.00
74	1110	18.50	0.4	0.072	0.173	0.064	0.007	0.07	0.00
75	1125	18.75	0.3	0.054	0.171	0.048	0.005	0.05	0.00
76	1140	19.00	0.2	0.036	0.168	0.032	0.004	0.03	0.00
77	1155	19.25	0.3	0.054	0.166	0.048	0.005	0.05	0.00
78	1170	19.50	0.4	0.072	0.164	0.064	0.007	0.07	0.00
79	1185	19.75	0.3	0.054	0.161	0.048	0.005	0.05	0.00
80	1200	20.00	0.2	0.036	0.159	0.032	0.004	0.03	0.00
81	1215	20.25	0.3	0.054	0.157	0.048	0.005	0.05	0.00
82	1230	20.50	0.3	0.054	0.155	0.048	0.005	0.05	0.00
83	1245	20.75	0.3	0.054	0.153	0.048	0.005	0.05	0.00
84	1260	21.00	0.2	0.036	0.151	0.032	0.004	0.03	0.00
85	1275	21.25	0.3	0.054	0.149	0.048	0.005	0.05	0.00
86	1290	21.50	0.2	0.036	0.148	0.032	0.004	0.03	0.00
87	1305	21.75	0.3	0.054	0.146	0.048	0.005	0.05	0.00
88	1320	22.00	0.2	0.036	0.145	0.032	0.004	0.03	0.00
89	1335	22.25	0.3	0.054	0.143	0.048	0.005	0.05	0.00
90	1350	22.50	0.2	0.036	0.142	0.032	0.004	0.03	0.00
91	1365	22.75	0.2	0.036	0.141	0.032	0.004	0.03	0.00
92	1380	23.00	0.2	0.036	0.139	0.032	0.004	0.03	0.00
93	1395	23.25	0.2	0.036	0.138	0.032	0.004	0.03	0.00
94	1410	23.50	0.2	0.036	0.138	0.032	0.004	0.03	0.00
95	1425	23.75	0.2	0.036	0.137	0.032	0.004	0.03	0.00
96	1440	24.00	0.2	0.036	0.137	0.032	0.004	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	1.28
FLOOD VOLUME (acft)	1.01
FLOOD VOLUME (cuft)	44164.39
REQUIRED STORAGE (acft)	0.72
REQUIRED STORAGE (cuft)	31405.17
PEAK FLOW (cfs)	3.54

PROJECT: CALHOUN AT AVENUE 49 - 100 YEAR EVENT
JOB # 0
1

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
463.5	0	0		17610	0	0	0.00
464.5	1	1	1790	19400	18505	18505	0.42
465.5	1	2	1840	21240	20320	38825	0.89
466.5	1	3	1900	23140	22190	61015	1.40
467	0.5	3.5	970	24110	11813	72828	1.67

PERCOLATION CALCULATIONS

PERCOLATION RATE	0.67 in/hr	0.27 cfs

MAXWELL IV DRYWELLS

NUMBER USED	0	
RATE/DRYWELL	0 cfs	
TOTAL DISSIPATED		0 cfs

TOTAL PERCOLATION RATE 0.27 cfs

1

JOB # 0

100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.55	165	165	82	83	463.50	83	0.00
2	10	0.55	165	248	82	166	463.51	166	0.00
3	15	0.07	20	185	82	104	463.51	104	0.00
4	20	1.03	310	413	82	331	463.52	331	0.01
5	25	1.03	310	641	82	559	463.53	559	0.01
6	30	1.76	527	1,086	82	1,004	463.55	1,004	0.02
7	35	1.03	310	1,313	82	1,231	463.57	1,231	0.03
8	40	1.76	527	1,758	82	1,676	463.59	1,676	0.04
9	45	1.76	527	2,203	82	2,121	463.61	2,121	0.05
10	50	1.03	310	2,431	82	2,349	463.63	2,349	0.05
11	55	1.27	382	2,731	82	2,649	463.64	2,649	0.06
12	60	1.76	527	3,176	82	3,094	463.67	3,094	0.07
13	65	2.72	817	3,911	82	3,829	463.71	3,829	0.09
14	70	2.72	817	4,645	82	4,563	463.75	4,563	0.10
15	75	2.72	817	5,380	82	5,298	463.79	5,298	0.12
16	80	2.24	672	5,970	82	5,888	463.82	5,888	0.14
17	85	3.69	1,106	6,994	82	6,912	463.87	6,912	0.16
18	90	3.93	1,179	8,091	82	8,009	463.93	8,009	0.18
19	95	3.20	961	8,970	82	8,888	463.98	8,888	0.20
20	100	3.93	1,179	10,067	82	9,985	464.04	9,985	0.23
21	105	5.38	1,613	11,598	82	11,517	464.12	11,517	0.26
22	110	4.89	1,468	12,985	82	12,903	464.20	12,903	0.30
23	115	4.41	1,324	14,227	82	14,145	464.26	14,145	0.32
24	120	4.65	1,396	15,541	82	15,459	464.34	15,459	0.35
25	125	4.89	1,468	16,927	82	16,845	464.41	16,845	0.39
26	130	7.55	2,265	19,110	82	19,028	464.53	19,028	0.44
27	135	9.48	2,845	21,873	82	21,791	464.66	21,791	0.50
28	140	5.86	1,758	23,549	82	23,467	464.74	23,467	0.54
29	145	13.83	4,148	27,616	82	27,534	464.94	27,534	0.63
30	150	15.03	4,510	32,044	82	31,962	465.16	31,962	0.73
31	155	17.21	5,162	37,124	82	37,042	465.41	37,042	0.85
32	160	11.65	3,496	40,539	82	40,457	465.57	40,457	0.93
33	165	2.24	672	41,129	82	41,047	465.60	41,047	0.94
34	170	1.76	527	41,573	82	41,492	465.62	41,492	0.95
35	175	1.76	527	42,018	82	41,936	465.64	41,936	0.96
36	180	0.14	43	41,980	82	41,898	465.64	41,898	0.96

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.16	47	47	82	-	463.50	-	0.00
2	10	0.19	57	57	82	-	463.50	-	0.00
3	15	0.19	57	57	82	-	463.50	-	0.00
4	20	0.19	57	57	82	-	463.50	-	0.00
5	25	0.19	57	57	82	-	463.50	-	0.00
6	30	0.22	66	66	82	-	463.50	-	0.00
7	35	0.22	66	66	82	-	463.50	-	0.00
8	40	0.22	66	66	82	-	463.50	-	0.00
9	45	0.22	66	66	82	-	463.50	-	0.00
10	50	0.22	66	66	82	-	463.50	-	0.00
11	55	0.22	66	66	82	-	463.50	-	0.00
12	60	0.25	76	76	82	-	463.50	-	0.00
13	65	0.25	76	76	82	-	463.50	-	0.00
14	70	0.25	76	76	82	-	463.50	-	0.00
15	75	0.25	76	76	82	-	463.50	-	0.00
16	80	0.25	76	76	82	-	463.50	-	0.00
17	85	0.25	76	76	82	-	463.50	-	0.00
18	90	0.25	76	76	82	-	463.50	-	0.00
19	95	0.25	76	76	82	-	463.50	-	0.00
20	100	0.25	76	76	82	-	463.50	-	0.00
21	105	0.25	76	76	82	-	463.50	-	0.00
22	110	0.25	76	76	82	-	463.50	-	0.00
23	115	0.25	76	76	82	-	463.50	-	0.00
24	120	0.26	78	78	82	-	463.50	-	0.00
25	125	0.25	76	76	82	-	463.50	-	0.00
26	130	0.26	78	78	82	-	463.50	-	0.00
27	135	0.26	78	78	82	-	463.50	-	0.00
28	140	0.26	78	78	82	-	463.50	-	0.00
29	145	0.26	78	78	82	-	463.50	-	0.00
30	150	0.26	78	78	82	-	463.50	-	0.00
31	155	0.26	78	78	82	-	463.50	-	0.00
32	160	0.26	78	78	82	-	463.50	-	0.00
33	165	0.58	173	173	82	91	463.50	91	0.00
34	170	0.58	173	264	82	182	463.51	182	0.00
35	175	0.58	173	355	82	273	463.51	273	0.01
36	180	0.58	173	446	82	364	463.52	364	0.01
37	185	0.58	173	537	82	455	463.52	455	0.01
38	190	0.89	268	723	82	641	463.53	641	0.01
39	195	0.89	268	909	82	827	463.54	827	0.02
40	200	0.89	268	1,095	82	1,013	463.55	1,013	0.02
41	205	1.21	363	1,376	82	1,294	463.57	1,294	0.03
42	210	1.53	458	1,752	82	1,670	463.59	1,670	0.04
43	215	1.84	553	2,223	82	2,141	463.62	2,141	0.05
44	220	1.84	553	2,694	82	2,612	463.64	2,612	0.06
45	225	2.16	648	3,259	82	3,177	463.67	3,177	0.07
46	230	2.16	648	3,825	82	3,743	463.70	3,743	0.09
47	235	2.48	743	4,486	82	4,404	463.74	4,404	0.10
48	240	2.48	743	5,147	82	5,065	463.77	5,065	0.12
49	245	2.79	838	5,903	82	5,821	463.81	5,821	0.13
50	250	3.11	933	6,754	82	6,672	463.86	6,672	0.15
51	255	3.43	1,028	7,699	82	7,617	463.91	7,617	0.17
52	260	3.74	1,123	8,740	82	8,658	463.97	8,658	0.20
53	265	4.06	1,218	9,876	82	9,794	464.03	9,794	0.22
54	270	4.06	1,218	11,012	82	10,930	464.09	10,930	0.25
55	275	4.38	1,313	12,242	82	12,160	464.16	12,160	0.28

1

JOB # 0

100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	4.69	1,408	13,568	82	13,486	464.23	13,486	0.31
57	285	5.01	1,503	14,989	82	14,907	464.31	14,907	0.34
58	290	5.01	1,503	16,409	82	16,327	464.38	16,327	0.37
59	295	5.33	1,598	17,925	82	17,843	464.46	17,843	0.41
60	300	5.64	1,693	19,536	82	19,454	464.55	19,454	0.45
61	305	7.22	2,167	21,621	82	21,539	464.65	21,539	0.49
62	310	8.81	2,642	24,181	82	24,100	464.78	24,100	0.55
63	315	9.76	2,927	27,027	82	26,945	464.92	26,945	0.62
64	320	10.71	3,212	30,157	82	30,075	465.07	30,075	0.69
65	325	12.29	3,687	33,762	82	33,680	465.25	33,680	0.77
66	330	15.14	4,542	38,222	82	38,140	465.47	38,140	0.88
67	335	3.43	1,028	39,168	82	39,086	465.51	39,086	0.90
68	340	0.26	78	39,164	82	39,082	465.51	39,082	0.90
69	345	0.19	57	39,139	82	39,057	465.51	39,057	0.90
70	350	0.16	47	39,104	82	39,022	465.51	39,022	0.90
71	355	0.09	28	39,051	82	38,969	465.51	38,969	0.89
72	360	0.06	19	38,988	82	38,906	465.50	38,906	0.89

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.03	31	31	246	-	463.50	-	0.00
2	30	0.05	46	46	246	-	463.50	-	0.00
3	45	0.05	46	46	246	-	463.50	-	0.00
4	60	0.07	61	61	246	-	463.50	-	0.00
5	75	0.05	46	46	246	-	463.50	-	0.00
6	90	0.05	46	46	246	-	463.50	-	0.00
7	105	0.05	46	46	246	-	463.50	-	0.00
8	120	0.07	61	61	246	-	463.50	-	0.00
9	135	0.07	61	61	246	-	463.50	-	0.00
10	150	0.07	61	61	246	-	463.50	-	0.00
11	165	0.08	76	76	246	-	463.50	-	0.00
12	180	0.08	76	76	246	-	463.50	-	0.00
13	195	0.08	76	76	246	-	463.50	-	0.00
14	210	0.08	76	76	246	-	463.50	-	0.00
15	225	0.08	76	76	246	-	463.50	-	0.00
16	240	0.10	92	92	246	-	463.50	-	0.00
17	255	0.10	92	92	246	-	463.50	-	0.00
18	270	0.12	107	107	246	-	463.50	-	0.00
19	285	0.12	107	107	246	-	463.50	-	0.00
20	300	0.14	122	122	246	-	463.50	-	0.00
21	315	0.10	92	92	246	-	463.50	-	0.00
22	330	0.12	107	107	246	-	463.50	-	0.00
23	345	0.14	122	122	246	-	463.50	-	0.00
24	360	0.14	122	122	246	-	463.50	-	0.00
25	375	0.15	137	137	246	-	463.50	-	0.00
26	390	0.15	137	137	246	-	463.50	-	0.00
27	405	0.17	153	153	246	-	463.50	-	0.00
28	420	0.17	153	153	246	-	463.50	-	0.00
29	435	0.17	153	153	246	-	463.50	-	0.00
30	450	0.19	168	168	246	-	463.50	-	0.00
31	465	0.20	183	183	246	-	463.50	-	0.00
32	480	0.22	199	199	246	-	463.50	-	0.00
33	495	0.25	229	229	246	-	463.50	-	0.00
34	510	0.25	229	229	246	-	463.50	-	0.00
35	525	0.27	244	244	246	-	463.50	-	0.00
36	540	0.29	260	260	246	14	463.50	14	0.00
37	555	0.35	319	333	246	87	463.50	87	0.00
38	570	0.57	509	596	246	351	463.52	351	0.01
39	585	0.78	698	1,049	246	803	463.54	803	0.02
40	600	0.99	887	1,689	246	1,444	463.58	1,444	0.03
41	615	0.25	229	1,673	246	1,427	463.58	1,427	0.03
42	630	0.25	229	1,656	246	1,410	463.58	1,410	0.03
43	645	0.76	687	2,098	246	1,852	463.60	1,852	0.04
44	660	0.80	722	2,574	246	2,328	463.63	2,328	0.05
45	675	0.67	604	2,932	246	2,686	463.65	2,686	0.06
46	690	0.71	637	3,323	246	3,077	463.67	3,077	0.07
47	705	0.41	366	3,443	246	3,197	463.67	3,197	0.07
48	720	0.61	551	3,749	246	3,503	463.69	3,503	0.08
49	735	1.84	1,653	5,156	246	4,910	463.77	4,910	0.11
50	750	2.04	1,838	6,749	246	6,503	463.85	6,503	0.15
51	765	2.42	2,176	8,679	246	8,433	463.96	8,433	0.19
52	780	2.62	2,360	10,793	246	10,547	464.07	10,547	0.24
53	795	3.51	3,155	13,703	246	13,457	464.23	13,457	0.31
54	810	3.54	3,186	16,643	246	16,397	464.39	16,397	0.38
55	825	1.71	1,537	17,933	246	17,688	464.46	17,688	0.41
56	840	1.74	1,567	19,254	246	19,008	464.52	19,008	0.44
57	855	2.45	2,207	21,216	246	20,970	464.62	20,970	0.48
58	870	2.32	2,084	23,054	246	22,808	464.71	22,808	0.52

1

JOB # 0

100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	2.35	2,113	24,920	246	24,674	464.80	24,674	0.57
60	900	2.21	1,988	26,663	246	26,417	464.89	26,417	0.61
61	915	2.07	1,864	28,280	246	28,035	464.97	28,035	0.64
62	930	1.93	1,738	29,773	246	29,527	465.04	29,527	0.68
63	945	1.28	1,155	30,682	246	30,436	465.09	30,436	0.70
64	960	1.31	1,181	31,618	246	31,372	465.13	31,372	0.72
65	975	0.07	61	31,433	246	31,187	465.12	31,187	0.72
66	990	0.07	61	31,248	246	31,002	465.12	31,002	0.71
67	1005	0.05	46	31,048	246	30,802	465.11	30,802	0.71
68	1020	0.05	46	30,848	246	30,602	465.10	30,602	0.70
69	1035	0.08	76	30,679	246	30,433	465.09	30,433	0.70
70	1050	0.08	76	30,509	246	30,263	465.08	30,263	0.69
71	1065	0.08	76	30,340	246	30,094	465.07	30,094	0.69
72	1080	0.07	61	30,155	246	29,909	465.06	29,909	0.69
73	1095	0.07	61	29,970	246	29,724	465.05	29,724	0.68
74	1110	0.07	61	29,786	246	29,540	465.04	29,540	0.68
75	1125	0.05	46	29,586	246	29,340	465.03	29,340	0.67
76	1140	0.03	31	29,370	246	29,125	465.02	29,125	0.67
77	1155	0.05	46	29,170	246	28,925	465.01	28,925	0.66
78	1170	0.07	61	28,986	246	28,740	465.00	28,740	0.66
79	1185	0.05	46	28,786	246	28,540	464.99	28,540	0.66
80	1200	0.03	31	28,570	246	28,325	464.98	28,325	0.65
81	1215	0.05	46	28,370	246	28,125	464.97	28,125	0.65
82	1230	0.05	46	28,170	246	27,925	464.96	27,925	0.64
83	1245	0.05	46	27,970	246	27,725	464.95	27,725	0.64
84	1260	0.03	31	27,755	246	27,509	464.94	27,509	0.63
85	1275	0.05	46	27,555	246	27,309	464.93	27,309	0.63
86	1290	0.03	31	27,340	246	27,094	464.92	27,094	0.62
87	1305	0.05	46	27,140	246	26,894	464.91	26,894	0.62
88	1320	0.03	31	26,925	246	26,679	464.90	26,679	0.61
89	1335	0.05	46	26,725	246	26,479	464.89	26,479	0.61
90	1350	0.03	31	26,509	246	26,264	464.88	26,264	0.60
91	1365	0.03	31	26,294	246	26,048	464.87	26,048	0.60
92	1380	0.03	31	26,079	246	25,833	464.86	25,833	0.59
93	1395	0.03	31	25,864	246	25,618	464.85	25,618	0.59
94	1410	0.03	31	25,648	246	25,402	464.84	25,402	0.58
95	1425	0.03	31	25,433	246	25,187	464.83	25,187	0.58
96	1440	0.03	31	25,218	246	24,972	464.82	24,972	0.57

IV STREET FLOWRATE CAPACITY

On-site street curb and gutter systems will be designed to convey runoff to the on-site retention basin systems via surface flow. The project site will be designed to ensure that surface runoff generated during the 100 year storm event can be contained within the street right of way per City of Coachella drainage standards

In terms of on-site drainage, the site is divided into 4 separate quadrants, each draining to a separate surface retention basin. Within each quadrant, the maximum tributary area contributing runoff to any single street is 5 acres. Rational method calculations based on the 100 year design storm for 5 acres drainage area are provided in this section to quantify the maximum flowrate (Q) that must be conveyed by any on-site interior street. Manning's equation for open channel flow has then been used to show that the 100 year maximum flowrate (Q) can be contained within the street section right of way.

Q(100) MAX. = 10.92 CFS

MAX. STREET CAPACITY = 13.86 CFS

```
                Riverside County Rational Hydrology Program

     CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version
7.1
           Rational Hydrology Study        Date: 09/25/24
File:CALHOUN100STREET.out
     ---------------------------------------------------------------
------
     CALHOUN 100 YEAR - 5 ACRE STUDY


     ---------------------------------------------------------------
------
      *********   Hydrology Study Control Information **********

      English (in-lb) Units used in input data file

     ---------------------------------------------------------------
------


     Program License Serial Number 6253

     ---------------------------------------------------------------
------
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual

     Storm event (year) =  100.00 Antecedent Moisture Condition = 2

     2 year, 1 hour precipitation =  0.350(In.)
     100 year, 1 hour precipitation =  1.330(In.)

     Storm event year = 100.0
     Calculated rainfall intensity data:
     1 hour intensity =  1.330(In/Hr)
     Slope of intensity duration curve = 0.5900




     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++
     Process from Point/Station      100.000 to Point/Station
200.000
     **** INITIAL AREA EVALUATION ****
     ________________________________________________________________
____
     Initial area flow distance =  1000.000(Ft.)
     Top (of initial area) elevation =   450.000(Ft.)
     Bottom (of initial area) elevation =   446.500(Ft.)
     Difference in elevation =     3.500(Ft.)
     Slope =    0.00350  s(percent)=       0.35
     TC = k(0.370)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration =   18.171 min.
     Rainfall intensity =      2.691(In/Hr) for a   100.0 year storm
```

```
CONDOMINIUM subarea type
Runoff Coefficient = 0.812
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.350; Impervious fraction =  0.650
Initial subarea runoff =     10.922(CFS)
Total initial stream area =        5.000(Ac.)
Pervious area fraction = 0.350
End of computations, total study area =            5.00 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.350
Area averaged RI index number =  56.0
```

100 YEAR STREET CAPACITY

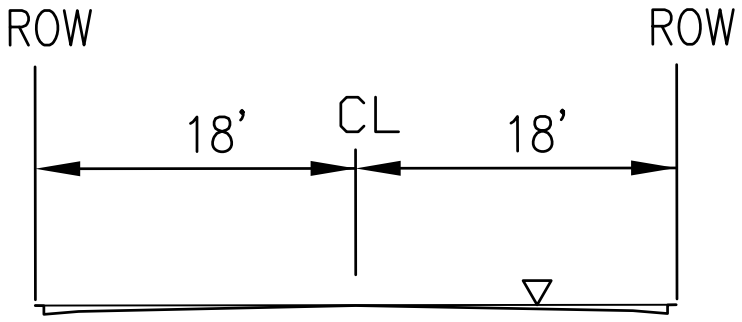
WITHIN PROJECT HALF STREET
(NO CURB GUTTER AND SIDEWALK IMPROVEMENTS ON NON-PROJECT SIDE)

$n=0.016$

$S=0.0035$

$R=A/P= 0.196$

$Q=(1.49/n)AR^{2/3}S^{1/2} = 13.86cfs$



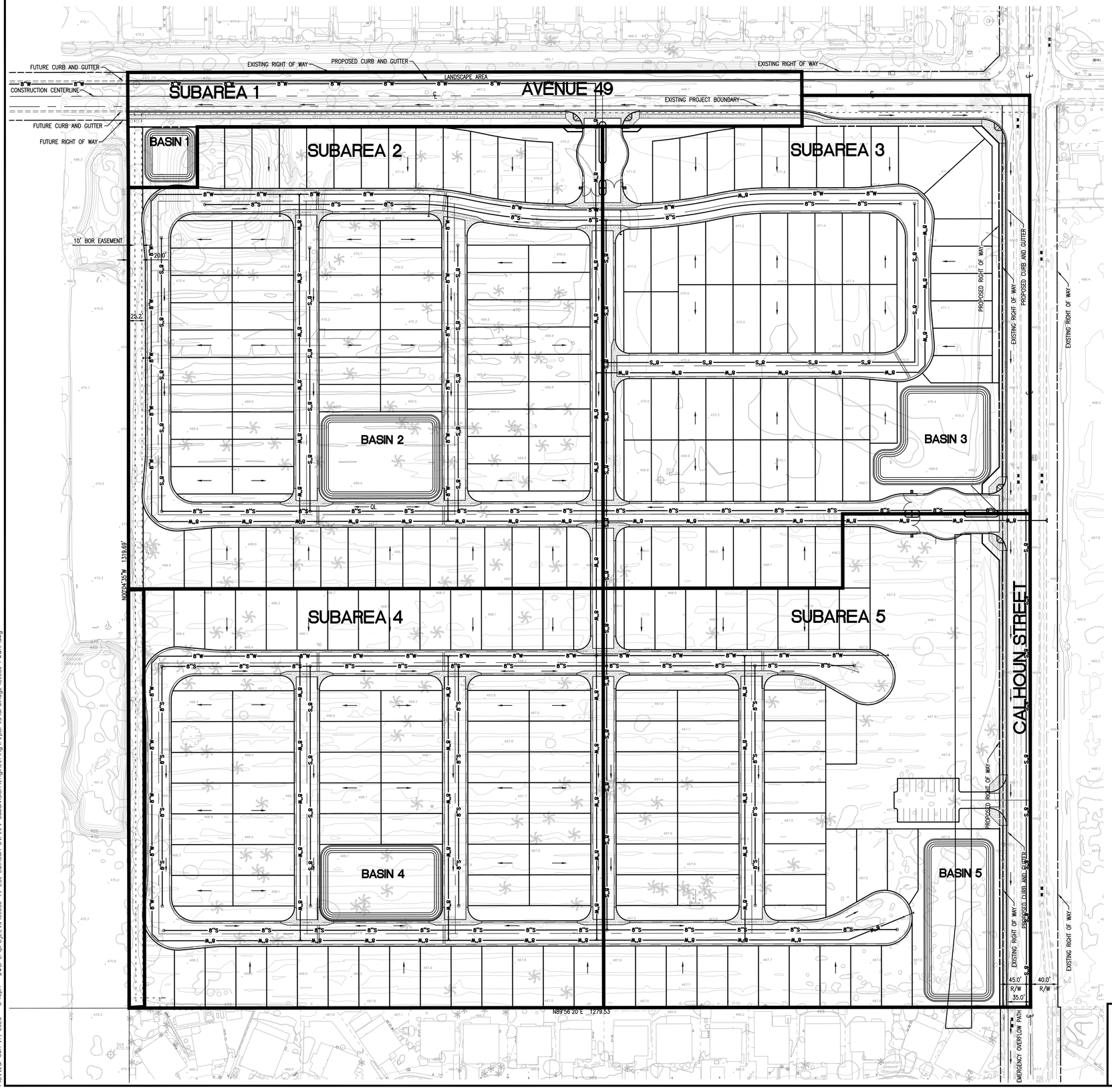
WETTED PERIMETER (P)=38.02

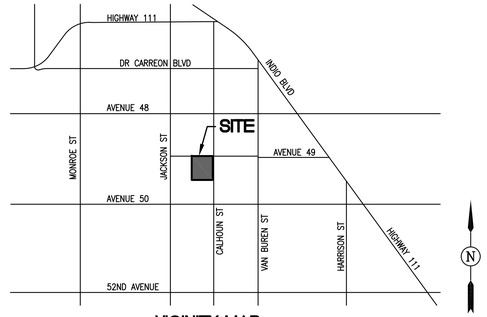
CROSS SECTION AREA (A)=7.46

V APPENDIX

PRELIMINARY HYDROLOGY/WATER QUALITY MANAGEMENT MAP

IN THE CITY OF COACHELLA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA





VICINITY MAP

NOT TO SCALE

LEGEND

SUBAREA BOUNDARY

DIRECTIONAL DRAINAGE ARROWS

NOAA POINT RAINFALL DATA

2 YEAR – 1 HR = 0.35 IN.
10 YEAR – 1 HR = 0.70 IN. 100 YEAR – 1 HR = 1.37 IN.
10 YEAR – 3 HR = 1.04 IN. 100 YEAR – 3 HR = 2.12 IN.
10 YEAR – 6 HR = 1.36 IN. 100 YEAR – 6 HR = 2.78 IN.
10 YEAR – 24 HR = 2.23 IN. 100 YEAR – 24 HR = 4.47 IN.

INFILTRATION RATE

DESIGN INFILTRATION RATE = 0.67 IN/HR

HYDROLOGIC SOIL GROUP

HYDROLOGIC SOIL GROUP "B"

SITE DATA

PROJECT SITE AREA: 38.8 AC.
PROJECT SITE & OFFSITE IMPROVEMENT AREA: 42.50 AC.

SUBAREA 1

AREA: 2.01 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 2.01 AC. = 100%

PROPOSED IMPERVIOUS AREA: 1.18 AC. = 59%
PROPOSED PERVIOUS AREA: 0.83 AC. = 41%

RETENTION VOLUME REQUIRED = 9,580 C.F.
RETENTION VOLUME PROVIDED = 12,250 C.F.

100 YR STORED W.S. DEPTH = 2.45'
10 YR STORED W.S. DEPTH = 0.72'

SUBAREA 2

AREA: 10.57 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.36 AC. = 100%

PROPOSED IMPERVIOUS AREA: 7.36 AC. = 70%
PROPOSED PERVIOUS AREA: 3.21 AC. = 30%

RETENTION VOLUME REQUIRED = 57,661 C.F.
RETENTION VOLUME PROVIDED = 64,193 C.F.

100 YR STORED W.S. DEPTH = 3.19'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 3

AREA: 9.36 AC.

EXISTING IMPERVIOUS AREA: 0.34 AC. = 4%
EXISTING PERVIOUS AREA: 9.02 AC. = 96%

PROPOSED IMPERVIOUS AREA: 6.88 AC. = 74%
PROPOSED PERVIOUS AREA: 2.48 AC. = 26%

RETENTION VOLUME REQUIRED = 53,709 C.F.
RETENTION VOLUME PROVIDED = 62,528 C.F.

100 YR STORED W.S. DEPTH = 3.07'
10 YR STORED W.S. DEPTH = 0.94'

SUBAREA 4

AREA: 9.79 AC.

EXISTING IMPERVIOUS AREA: 0.0 AC. = 0.0%
EXISTING PERVIOUS AREA: 9.79 AC. = 100%

PROPOSED IMPERVIOUS AREA: 6.59 AC. = 67%
PROPOSED PERVIOUS AREA: 3.20 AC. = 33%

RETENTION VOLUME REQUIRED = 51,654 C.F.
RETENTION VOLUME PROVIDED = 57,236 C.F.

100 YR STORED W.S. DEPTH = 3.20'
10 YR STORED W.S. DEPTH = 0.99'

SUBAREA 5

AREA: 9.49 AC.

EXISTING IMPERVIOUS AREA: 0.53 AC. = 6%
EXISTING PERVIOUS AREA: 8.96 AC. = 94%

PROPOSED IMPERVIOUS AREA: 5.01 AC. = 53%
PROPOSED PERVIOUS AREA: 4.48 AC. = 47%

RETENTION VOLUME REQUIRED = 41,999 C.F.
RETENTION VOLUME PROVIDED = 72,828 C.F.

100 YR STORED W.S. DEPTH = 2.14'
10 YR STORED W.S. DEPTH = 0.54'

N

GRAPHIC SCALE
SCALE 1"=60'
0 30 60 120 180 240

PREPARED BY:
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ENGINEERING | PLANNING | SURVEY | ENVIRONMENTAL

CITY OF COACHELLA, CALIFORNIA

PRELIMINARY HYDROLOGY/
WATER QUALITY MANAGEMENT PLAN

FOR: CALHOUN STREET SUBDIVISION

SHEET NO.

Plotted: Jan 17, 2025 - 3:43pm DWG: L:\projects\C1530 49-251 Calhoun Street Subdivision\engineering\reports\drainage\C1530 PWQMP.dwg

NOAA Atlas 14, Volume 6, Version 2
Location name: Coachella, California, USA*
Latitude: 33.6909°, Longitude: -116.2099°
Elevation: -31 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.064** (0.053-0.077)	**0.100** (0.083-0.121)	**0.152** (0.126-0.184)	**0.198** (0.163-0.242)	**0.266** (0.212-0.338)	**0.325** (0.253-0.421)	**0.390** (0.297-0.518)	**0.464** (0.343-0.634)	**0.576** (0.408-0.821)	**0.674** (0.461-0.997)
10-min	**0.092** (0.076-0.111)	**0.143** (0.119-0.173)	**0.217** (0.181-0.264)	**0.283** (0.233-0.347)	**0.382** (0.304-0.484)	**0.466** (0.363-0.604)	**0.559** (0.425-0.743)	**0.665** (0.491-0.909)	**0.825** (0.584-1.18)	**0.967** (0.661-1.43)
15-min	**0.111** (0.092-0.134)	**0.173** (0.144-0.210)	**0.263** (0.218-0.319)	**0.343** (0.282-0.420)	**0.462** (0.368-0.586)	**0.564** (0.439-0.730)	**0.676** (0.514-0.899)	**0.804** (0.594-1.10)	**0.998** (0.706-1.42)	**1.17** (0.799-1.73)
30-min	**0.160** (0.134-0.194)	**0.251** (0.209-0.304)	**0.381** (0.316-0.463)	**0.496** (0.409-0.608)	**0.669** (0.533-0.848)	**0.816** (0.636-1.06)	**0.979** (0.745-1.30)	**1.16** (0.860-1.59)	**1.44** (1.02-2.06)	**1.69** (1.16-2.50)
60-min	**0.225** (0.188-0.272)	**0.352** (0.293-0.426)	**0.534** (0.444-0.649)	**0.696** (0.573-0.853)	**0.938** (0.747-1.19)	**1.14** (0.892-1.48)	**1.37** (1.04-1.83)	**1.63** (1.21-2.23)	**2.03** (1.44-2.89)	**2.38** (1.62-3.51)
2-hr	**0.311** (0.260-0.377)	**0.462** (0.385-0.560)	**0.687** (0.571-0.835)	**0.891** (0.734-1.09)	**1.21** (0.961-1.53)	**1.48** (1.15-1.92)	**1.79** (1.36-2.38)	**2.14** (1.58-2.93)	**2.69** (1.90-3.83)	**3.17** (2.17-4.68)
3-hr	**0.375** (0.313-0.454)	**0.547** (0.456-0.663)	**0.806** (0.669-0.979)	**1.04** (0.861-1.28)	**1.42** (1.13-1.80)	**1.74** (1.36-2.26)	**2.12** (1.61-2.82)	**2.55** (1.88-3.49)	**3.22** (2.28-4.60)	**3.82** (2.61-5.65)
6-hr	**0.495** (0.413-0.599)	**0.715** (0.596-0.866)	**1.05** (0.871-1.27)	**1.36** (1.12-1.66)	**1.84** (1.47-2.34)	**2.28** (1.78-2.95)	**2.78** (2.11-3.69)	**3.36** (2.48-4.59)	**4.27** (3.02-6.08)	**5.08** (3.47-7.51)
12-hr	**0.598** (0.499-0.724)	**0.883** (0.736-1.07)	**1.31** (1.09-1.59)	**1.70** (1.40-2.09)	**2.31** (1.84-2.93)	**2.85** (2.22-3.69)	**3.46** (2.63-4.60)	**4.17** (3.08-5.70)	**5.27** (3.73-7.52)	**6.25** (4.27-9.23)
24-hr	**0.751** (0.665-0.866)	**1.14** (1.01-1.32)	**1.72** (1.51-1.98)	**2.23** (1.95-2.60)	**3.02** (2.56-3.64)	**3.71** (3.08-4.56)	**4.47** (3.63-5.63)	**5.34** (4.22-6.91)	**6.67** (5.06-8.97)	**7.83** (5.75-10.9)
2-day	**0.871** (0.770-1.00)	**1.34** (1.18-1.55)	**2.02** (1.78-2.34)	**2.63** (2.30-3.06)	**3.53** (2.99-4.26)	**4.30** (3.57-5.29)	**5.15** (4.18-6.48)	**6.10** (4.82-7.89)	**7.53** (5.71-10.1)	**8.74** (6.42-12.2)
3-day	**0.933** (0.825-1.08)	**1.44** (1.28-1.67)	**2.18** (1.92-2.52)	**2.82** (2.47-3.30)	**3.79** (3.21-4.56)	**4.60** (3.82-5.65)	**5.49** (4.46-6.91)	**6.49** (5.12-8.38)	**7.96** (6.04-10.7)	**9.21** (6.76-12.8)
4-day	**0.983** (0.870-1.13)	**1.52** (1.34-1.76)	**2.29** (2.02-2.65)	**2.97** (2.60-3.47)	**3.98** (3.37-4.79)	**4.82** (4.01-5.93)	**5.75** (4.66-7.23)	**6.78** (5.35-8.75)	**8.29** (6.29-11.2)	**9.58** (7.03-13.3)
7-day	**1.04** (0.923-1.20)	**1.61** (1.42-1.86)	**2.41** (2.12-2.79)	**3.12** (2.73-3.64)	**4.16** (3.52-5.01)	**5.03** (4.18-6.18)	**5.98** (4.85-7.52)	**7.03** (5.55-9.08)	**8.57** (6.50-11.5)	**9.88** (7.25-13.7)
10-day	**1.08** (0.955-1.24)	**1.66** (1.47-1.92)	**2.48** (2.19-2.87)	**3.21** (2.80-3.74)	**4.27** (3.62-5.14)	**5.16** (4.29-6.34)	**6.13** (4.97-7.71)	**7.19** (5.68-9.30)	**8.76** (6.65-11.8)	**10.1** (7.40-14.0)
20-day	**1.15** (1.02-1.33)	**1.78** (1.58-2.06)	**2.68** (2.36-3.10)	**3.46** (3.03-4.04)	**4.61** (3.91-5.55)	**5.56** (4.62-6.84)	**6.60** (5.35-8.30)	**7.73** (6.10-9.99)	**9.38** (7.12-12.6)	**10.8** (7.90-15.0)
30-day	**1.20** (1.06-1.38)	**1.88** (1.66-2.17)	**2.86** (2.52-3.31)	**3.71** (3.25-4.33)	**4.97** (4.21-5.98)	**6.00** (4.98-7.38)	**7.12** (5.77-8.95)	**8.33** (6.58-10.8)	**10.1** (7.66-13.6)	**11.5** (8.47-16.0)
45-day	**1.30** (1.15-1.49)	**2.07** (1.83-2.39)	**3.18** (2.80-3.68)	**4.14** (3.62-4.83)	**5.56** (4.72-6.70)	**6.74** (5.60-8.28)	**8.00** (6.49-10.1)	**9.36** (7.39-12.1)	**11.3** (8.59-15.2)	**12.9** (9.50-18.0)
60-day	**1.36** (1.21-1.57)	**2.21** (1.95-2.55)	**3.42** (3.01-3.96)	**4.48** (3.92-5.22)	**6.03** (5.11-7.26)	**7.31** (6.07-8.98)	**8.68** (7.04-10.9)	**10.2** (8.03-13.1)	**12.3** (9.33-16.5)	**14.0** (10.3-19.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

Appendix G

AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS, BMP MAINTENANCE AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS PROJECT-SPECIFIC WQMP

N/A

Appendix H

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS

The Altum Group
44-600 Village Court, Suite 100
Palm Desert, California 92260

Proposal for
Geotechnical Engineering Feasibility Report and
Phase I Environmental Site Assessment
Vandenburg
APN: 612-260-010-6
Coachella, Riverside County, California

August 1, 2023

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Proposal No.: BER-23-8-001

EARTH SYSTEMS
79-811B Country Club Drive | Bermuda Dunes, CA 92203-1244 | (760) 345-1588 | www.earthsystems.com

August 1, 2023 Proposal No.: BER-23-8-001

The Altum Group
44-600 Village Court, Suite 100
Palm Desert, California 92260

Attention: Rich Malacoff, AICP, Principal Planner

Subject: **Geotechnical Engineering Feasibility Report and Phase I Environmental Site Assessment**

Project: **Vandenburg**
APN: 612-260-010-6
Coachella, Riverside County, California

Earth Systems Pacific [Earth Systems] is pleased to submit this proposal to provide geotechnical services and a Phase I Environmental Site Assessment for the above referenced project. Since 1969, the Earth Systems group of companies has provided expert geo-professional services to assist our clients through all aspects of geotechnical and geologic engineering, environmental engineering, and construction related materials testing and inspection services. Our dedicated staff understands the diverse geotechnical, geologic, and construction-related issues that may affect the proposed project and will work to develop practical and economical geotechnical engineering solutions through innovative approaches. We have prepared this proposal based on our understanding of preliminary project information provided by the client. We have estimated the total number of borings and our fees based on preliminary information provided by the client. We also understand that the proposed structure/s will be developed under the regulation of the current California Building Code [CBC] (2022). Based upon the anticipated conditions, the following sections describe our understanding of the project and our anticipated scope of services in order to meet the above requirements.

This project will be managed by Mr. Kevin Paul, GE 2930, who will also oversee the engineering evaluation and report preparation, and be the Principal on the project. Mr. Mark Spykerman, EG 1174, will also oversee the interpretation of the site geologic conditions.

Environmental work on this project will be performed under the direct supervision of an Environmental Professional [EP], in accordance with the US EPA AAI and ASTM E-1527-13 requirements.

SITE AREA AND PROJECT UNDERSTANDING

We understand the proposed project is contained within one accessor parcel number located southwest corner of Avenue 49 and Calhoun Street, Riverside County, California. The legal address is APNs: 612-260-010-6. The project is bounded by future extension of Avenue 49 to the north, Calhoun Street to the east, abandoned date palm farmland to the south and west. The APN report states the area is approximately 38.8 acres and has a high potential for liquefaction. The site appears to have been used as a former date tree farm.

The client provided site plan shows multiple improvements on the project site. The following improvements are noted:

- Three subareas containing apartment buildings, total 15.2 acres.
- Residential Lots.
- Park site totaling 1.5 acres.
- Two retention basins along Calhoun Street

Note, plans showing actual building locations and other improvements have not been provided to Earth Systems at the time of drafting this proposal; hence, the reason for "feasibility level" geotechnical report. Earth Systems shall review the 100 percent concept plans to determine if the report can become a "full level" geotechnical report. The client should understand that Earth Systems could require additional exploration, lab testing, and report addendums based on the comparison of the now and future Concept Plans and other project plans.

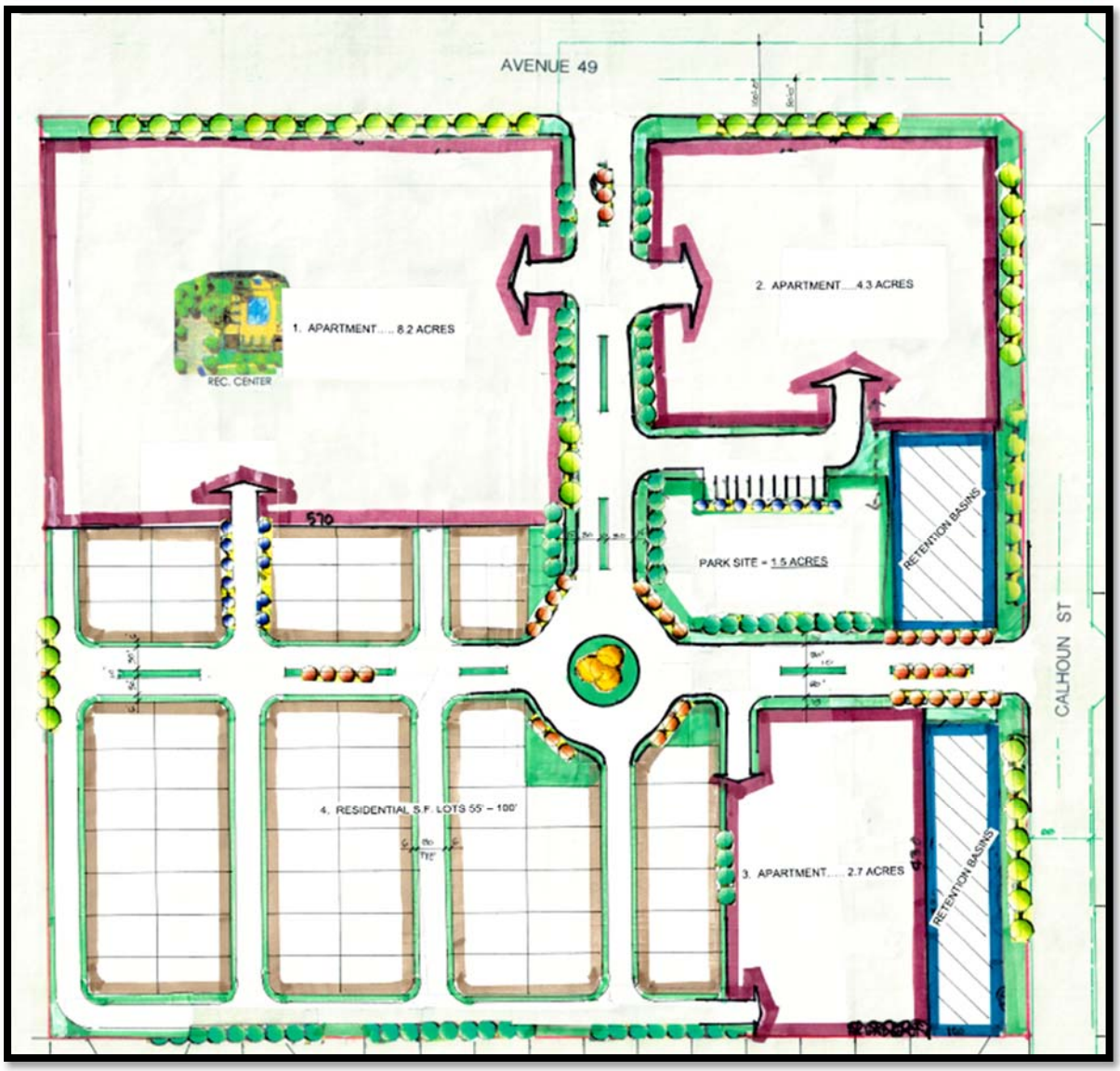

Figure 1 Conceptual Site Plan

Earth Systems assumes any new structure will be one to two-story with slab on grade construction. Earth Systems also assumes the structure will be made of wood or metal frame construction with shallow conventional foundation. Below grade basement levels are not anticipated. We assume column loads are anticipated not to exceed approximately 50 kips for spread footings and 3 kip/LF for wall loads. Based on the type of development, appurtenant site work is anticipated to include perimeter walls, trash enclosure, asphaltic pavement, driveway approaches, PCC sidewalk, underground utilities and landscaping. If all weather roads consisting of gravel is desired, please contact Earth Systems for these design recommendations.

Preliminary grading elevations were not available at this time. We assumed that proposed grades will be approximately (+/-3 feet) those of existing site grades. Site soils are expected to be coarse grained soils. Bedrock is not expected to be within the limits of the borings (maximum depth of 50 feet). However, groundwater may be near the 50-foot depth of search required by the California Building Code.

The purpose of our study will be to explore the subsurface conditions and provide geotechnical recommendations for project design. Two locations will be selected prior to field explorations to perform shallow boring percolation tests for proposed storm basin infiltration. This proposal contains a brief project description, our proposed approach to the project based upon our initial assessment of site conditions and readily available information, our proposed scope of services, schedule, and proposed fee. Since detailed services may involve greater expense, we ask that our clients participate in determining the level of service, which provides adequate information for their purposes. Please review this information and our proposed scope. If you should have any questions or suggested revisions to our scope, please do not hesitate to contact the signatory of this proposal. Our proposal is based upon the assumption that we will be provided full access to the site during normal business hours (M-F, 7 am to 6 pm) to complete field activities and that drilling with a gasoline powered drill rig equipped with a 140-pound hammer to drive the soil samplers can be used at the site.

PROPOSED SCOPE OF GEOTECHNICAL SERVICES

Our scope will include performing subsurface exploration, laboratory testing, and preparing one report of our findings and recommendations regarding geotechnical and geologic aspects of the project. Specific tasks are as follows:

Task 1 - Literature Review

We propose to begin our services by reviewing select geologic and geotechnical literature pertaining to the project. This will include a review of various hazard, fault and geologic maps prepared by the U.S. Geological Survey, Riverside County, and other governmental agencies as they relate to the site.

Task 2 - Utility Coordination, USA Layout

Each of our proposed field exploration locations will be located and marked in the field and cleared with known utility lines as identified by Underground Service Alert [USA]. Our proposed exploration locations will be located in the field by hand measuring devices such as tape or a

wheel, based on the control provided, and a consumer grade hand-held GPS (accuracy +- 15 feet). The accuracy of location will be governed by the method used.

Task 3 – Field Exploration

We propose to evaluate the general subsurface conditions at the site by utilizing a rubber track rig-mounted drill utilizing hollow-stem auger type techniques. Borings will be performed to collect field data and soil samples to evaluate the general nature of the anticipated site soils. Our proposed exploration locations will be selected based on client provided information of the proposed improvements. Additionally, backhoe test pits on the order of 5 to 10 feet deep will be excavated to observe the depth of date palm roots.

Our planned boring exploration will include approximately five (5) exploration borings. Boring depths vary between 10 and 50 feet (50-foot depth) in depth below the ground surface or practical refusal. Boring and pit depths are measured below the existing ground surface and will be excavated to the approximate stated depth or to practical refusal, whichever occurs first. Boring and pit depths may be adjusted depending on conditions encountered.

A representative from Earth Systems will maintain a log of the subsurface conditions encountered and will obtain samples for visual observation, classification and laboratory testing. Soils will be logged in general accordance with the Unified Soil Classification System. Our typical sampling interval within the borings will be approximately every 2½ to 5 feet to the full depth explored; however, sampling intervals may be adjusted depending on the materials encountered. Bulk samples of the soil materials will be obtained. The number of blows necessary to drive either a Standard Penetration Test [SPT] sampler or a modified California-type sampler within the borings will be recorded. The depth to groundwater will be measured, if encountered. Borings will be backfilled with the soils from the cuttings and tamped upon completion. Controlled compaction of the backfill is not proposed. Our field exploration will be provided under the direction of a Registered Engineer from our firm.

In the event that unusual site conditions not presently anticipated are encountered during the exploration, we will bring it to your attention and will discuss with you the effect of these conditions on both the estimated cost and timing of the report.

Task 4 - Laboratory Testing

Laboratory tests will be performed on selected samples to evaluate the physical characteristics of the materials encountered during our field exploration. We anticipate laboratory testing may include moisture content, dry unit weight, maximum density/optimum moisture content, sieve analysis, Expansion Index, R-value, and consolidation/collapse potential. Testing will be performed in general accordance with American Society for Testing and Materials [ASTM] or appropriate test procedure. Selected samples will also be tested for a screening level of corrosion potential (pH, electrical resistivity, water-soluble sulfates, and water-soluble chlorides). Earth Systems does not practice corrosion engineering; however, these test results may be used by a qualified engineer in designing an appropriate corrosion control plan for the project. The tests selected and the frequency of testing may be modified and will be based on the subsurface conditions encountered.

Task 5 – Analysis and Report

Earth Systems will analyze the field data obtained, perform preliminary engineering analyses, and provide recommended design parameters for earthwork and foundations for the proposed structure/s. The results of our field exploration and engineering analysis will be summarized in a report prepared under the supervision of a Registered Engineer. Four copies of this report will be provided to the client. We anticipate that our report will include:

- A description of the proposed project including a site plan showing the approximate boring locations.
- A description of the surface and subsurface site conditions including groundwater conditions, as encountered in our field exploration.
- A description of the site geologic setting and possible associated geology-related hazards, including liquefaction, subsidence, and seismic settlement analysis.
- A discussion of regional geology and site seismicity.
- A description of local and regional active faults.
- A discussion of other geologic hazards such as ground shaking, landslides, flooding, and tsunamis.
- A discussion of site conditions, including the geotechnical suitability of the site for the general type of construction proposed.
- A "General Procedure" seismic analysis including geotechnical seismic design coefficients in accordance with the 2022 CBC.
- Recommendations for imported fill (if required) for use in compacted fills.
- Recommendations for foundation design including parameters for shallow foundations and building pad and subgrade preparation.
- Anticipated total and differential settlements for the recommended foundation system.
- Preliminary recommendations for the mitigation of seismic induced settlement.
- Recommendations for lateral earth pressures (active, at-rest, and passive) for retaining walls, including drainage requirements, coefficients of friction and seismic earth pressures.
- Recommendations for site preparation, earthwork, and fill compaction specifications.
- Discussion of anticipated excavation conditions, including shrinkage and/or bulking.
- Recommendations for underground utility trench backfill and import soils.
- Recommendations for stability of temporary trench excavations.
- Recommendations for slabs-on-grade (building slabs and walkways), including recommendations for reducing the potential for moisture transmission through interior slabs.

- Asphalt concrete pavement and Portland cement driveway recommendations for auto, driveways, and fire lanes (Traffic Index values of 5.0 for parking areas and 7.0 for driveways, and 5.0 for fire lanes).
- Recommendations for collapsible or expansive soils (if applicable).
- Recommendations for location specific storm water infiltration rates. Note, infiltration rates will be provided in the geotechnical report.
- A discussion of the corrosion potential of the near-surface soils encountered during our field exploration.
- An appendix, which will include a summary of the field exploration and laboratory testing program.

Task 6 – Percolation Testing for Basin Infiltration

In addition to the geotechnical explorations, two (2) borings will be drilled and used for percolation testing and soil classification. The percolation testing borings will extend no deeper than 5 feet below the ground surface. Drilling must be performed in conjunction with the geotechnical engineering exploration during our field exploration and these will be used for percolation testing in proposed infiltration systems (location to be determined by the hydraulic engineer prior to drilling operations). The percolation test values will be converted to infiltration values based on Porchet Method defined in Riverside County (accepted by San Bernardino County) Low Impact Development BMP Design Handbook: Shallow Percolation Test. Test holes will extend vertically to maximum depth of 5 feet below the existing ground surface representing the assumed bottom of the drainage facility. Perforated PVC pipe and gravel and sock will be placed into the test hole to hold it open during the test, and the test holes will be pre-soaked and allowed to sit overnight if required.

Percolation testing will consist of adding up to 3 feet of clean water to the test holes. Adding the water will allow measuring the rate at which the water percolates into the subsurface by periodically measuring the drop in water surface over time. The tests will take about one hour if a sandy protocol is used, and will last about six hours if a clayey protocol is used (in general conformance with the standards of the Riverside County Low Impact Development BMP Design Handbook: Shallow Percolation Test. For the clayey protocol, the testing will be performed the day after the hole has been presoaked; for the sandy protocol, the testing can be performed two hours after the hole has been presoaked. Based on knowledge of the surface soils designated as sandy, we anticipate that the sandy testing protocol may apply. The tests can be performed concurrently in the various test holes.

Optional Task 7 – Private Utility Locating

As USA does not locate utilities on private property. We offer, as an optional task item, to perform private utility locating at the proposed boring locations if utility plans are not available from the owner and they would like greater assurance of not encountering a buried utility during the drilling.

GEOTECHNICAL FEES

We propose to complete the proposed scope of work presented above assuming typical site conditions on a fixed-fee basis as detailed below:

Geotechnical Engineering Report and Seismic Hazards Evaluation and Percolation Testing (Tasks 1-6)	$19,900.00
Private Utility Locating (Optional Task 7)	$ 1,500.00

Typical site conditions assume reasonable accessibility for a truck mounted drill rig, permits are not required, monitoring by third parties are not required, and minimal delays for utility clearances. In the event that unusual site conditions not presently anticipated are encountered during the exploration, we will bring it to your attention and will discuss with you the effect of these conditions on both the estimated cost and timing of the reports.

Other services not included are private utility locating (unless option selected), percolation testing for leach private sewage, temporary traffic control plans & permit & devices & device setup, plan reviews, response to reviews, meetings, testing or observation during construction, or any other service not expressly detailed. If required, services in addition to the scope of work described above will be billed on a time-and-expense basis, based upon the Fee Schedule in effect at the time the services are provided.

Our proposal is based on the understanding that our services, as outlined in this proposal, are not subject to Prevailing Wage Law for non-professional field staff (i.e. drillers and helpers). In the event that the Department of Industrial Relations determines that additional Prevailing Wage Law applies to the project, (client) agrees to pay to Consultant any additional compensation necessary to adjust Consultant's employees' wages to conform to the Prevailing Wage Law on this project.

GEOTECHNICAL SCHEDULE

Based on the requested information, we feel confident that we can provide the geotechnical engineering report as outlined in this proposal in an expeditious manner. Typically, once authorization to enter the property and a signed contract and retainer are received, we will mark respective boring locations in the field. Subsequent to field marking, we will contact Underground Service Alert which requires 48 hours notification prior to any underground excavation or drilling. Depending on subcontractor availability, we anticipate excavating our field borings within one to two weeks after the minimum 48 hour wait required by Underground Service Alert. Drilling operations will take approximately one day to complete.

Laboratory testing is anticipated to take three weeks to complete after drilling is completed. This time frame is governed by the type of testing performed as certain tests anticipated for this project require at least two weeks to run. Normal time frames from receipt of authorization to report submittal is typically about six to eight weeks. If requested, we can provide preliminary design data in the interim period before the report is finalized.

PROPOSED SCOPE OF ENVIRONMENTAL SERVICES

Our environmental scope will include performing a standard Phase I Environmental Site Assessment. No additional environmental services are proposed. The purpose of an ESA is to evaluate the potential for soil or groundwater contamination at a site due to the possible past use, storage, or handling of hazardous materials or petroleum products on or near the site, based on a visit to the site and a review of readily obtainable information concerning site activities and conditions. The scope of work is based on United States Environmental Protection Agency Final All Appropriate Inquiry Rule (2006) [US EPA AAI] and ASTM Standard E-1527-13, *Standard Practice for Environmental Site Assessments*. Our cost estimate is based on performing the following scope of services:

Site Reconnaissance: This will include a visual reconnaissance of the site, noting physical evidence of potential contamination or possible sources of contamination. The client/owner, tenants, and/or site personnel will be interviewed (if possible) regarding current and past site usage. The site will be photographed to document current conditions. Adjacent site uses will also be observed to evaluate their possible impact on the subject property.

Site History Investigation: The history of the site will be researched to identify past land use at and near the site related to the storage, production, or use of hazardous materials. If possible, persons with knowledge of past site uses will be interviewed. Documents to be reviewed may include the following:

- Historical aerial photographs
- Topographic maps
- Munger Oil maps
- Fire insurance maps
- Land title information
- Local street directories
- Zoning/land use records
- Interviews with current and/or former owners, occupants, and operators
- Engineering and institutional controls, such as deed restrictions and restrictive zoning to a radius of ½-mile, if contained in publicly available lists/registries
- Tribal records of subject property and adjoining properties (if tribal land)
- Local government records such as building department files
- Environmental cleanup liens
- Prior investigative reports (non-Earth Systems reports must be provided by the client)

Regulatory Agency Record Review: Many regulatory agencies compile information concerning sites that generate, store, use, and/or have released hazardous materials. This information will be accessed by obtaining a report from a firm that specializes in maintaining a database of this type of information. The search radii for this review will be in accordance with the US EPA AAI and ASTM standard E-1527-13 (plus an additional distance to accommodate large sites, as appropriate). In addition, personnel at select government agencies will be contacted for information they may have regarding

environmental conditions at the site or in the site vicinity. If the site or an adjacent property is known to have had a release of hazardous materials, the agency files for that site will be reviewed (if readily obtainable). We have assumed that this review will take no more than 2 hours.

Report Preparation: A report summarizing the results of the assessment will be prepared and sent to the client. The report will present our findings regarding past land use on and around the site, our opinion regarding the potential for soil or groundwater contamination at the site, and our recommendations for additional assessment of the site (if deemed appropriate). The US EPA AAI and ASTM standard E1527-13 require the identification of gaps in the data used in evaluating the site. Data gaps encountered in the project, and their significance to the project, will be summarized. The report is normally provided in digital form (as a pdf). Up to three paper copies of the report can be provided upon request at no additional cost.

Note that the collection or analysis of samples of building materials, soil, groundwater, or air is not typically included in the scope of an ESA and is not proposed here. Assessment for the presence of molds is also not included. We do not propose to determine the degree or extent of any contamination that may be identified during this phase of work. If needed, these evaluations would normally be performed as part of a subsequent "Phase II" investigation, at an additional fee.

ENVIRONMENTAL FEES

We propose to conduct this Phase I with a normal turnaround time of 4 weeks and on a fixed-fee basis.

Phase I Environmental Site Assessment – site has past use	$4,900.00

In lieu of requesting a credit application and performing a credit check, we will invoice you for this amount when we receive authorization to proceed. That invoice must be paid before the report will be issued.

ENVIRONMENTAL SCHEDULE

Phase I ESA's typically require about four weeks to complete. Please note that some of the information required to complete the ESA may not be available within the project time-frame. Significant information that does not arrive by the time of publication will be reported as a data gap.

TERMS FOR SERVICE

The following terms and conditions shall be incorporated into the agreement for services and form the basis for the fees developed within. Contract terms more onerous than presented within or insurance greater than $1,000,000 typical limit could incur greater fee.

1. STUDY, MONITORING & INSPECTION: If the services include monitoring or inspection of soil, construction and/or materials, Client shall authorize and pay for Consultant to provide sufficient observation and professional inspection to permit Consultant to form opinions according to accepted statistical sampling methods as to whether the work has been performed

in accordance with recommendations. Such opinions, while statistically valid, do not guaranty uniformity of conditions or materials. Similarly, soils and geology investigations do not guaranty uniformity of subsurface conditions. Client hereby represents and warrants that it has provided and shall provide to Consultant all information and sufficient advance notice necessary in order for Consultant to perform the appropriate level of services. No statement or action of Consultant can relieve Client's contractors of their obligation to perform their work properly. Consultant has no authority to supervise or stop the work of others.

2. SITE ACCESS & UTILITIES: Client has sole responsibility for securing site access, locating utilities, and any repair.

3. BILLING AND PAYMENT: Client will pay Consultant the proposal amount or, if none is stated, according to the fee schedule in effect at the time our services are provided. Prior to initiation of fieldwork, a retainer may be required. This retainer shall be maintained throughout the project and shall be applied to the final invoice. Payment is due on presentation of invoices, and is delinquent if Consultant has not received payment within 30-days from date of an invoice. Client will pay an additional charge of 1-1/2 (1.5) percent per month (or the maximum percentage allowed by law, whichever is lower) on any delinquent amount. Each payment will first be applied to accrued interest, costs and fees and then to the principal unpaid amount. All time spent and expenses incurred (including any in-house or outside attorney's fees) in connection with collection of any delinquent amount will be paid by the Client to Consultant per Consultant's current fee schedule. Payment by Credit Card is subject to a 3% additional fee.

4. OWNERSHIP OF DOCUMENTS: Consultant owns all documents it creates and grants Client limited license to use the documents for the purposes stated in the documents. Consultant reserves the right to withhold delivery of documents to Client until payment in full of current invoices has been received.

5. TERMINATION: This agreement may be terminated by either party effective seven (7) days from the date of written notice, or if the client suspends the work for three (3) months. In the event of termination, Consultant will be paid for services performed prior to the date of termination plus reasonable termination expenses. If Consultant has not received payment for any invoice within 30 days from the date of the invoice, or in the event of anticipatory breach by Client, Consultant may suspend performance of its services immediately and may terminate this contract.

6. RISK ALLOCATION: In order for Client to obtain the benefit of a fee which includes a lesser allowance for compensating Consultant for its litigation risk, Client agrees to indemnify, hold harmless and defend Consultant, its agents, employees, or officers, from and against any and all loss, claim, expenses, including attorney's fees, injury, damages, liability or costs arising out of non-design services (i.e., services other than as defined by Civil Code Section 2784) performed by Consultant on this project, except where such loss injury, damage, liability, cost, expenses or claims are the result of the sole negligence or willful misconduct of Consultant. Client further agrees to limit the total aggregate liability of Consultant, its agents, employees, and officers to Client on the entire project, to the greater of $25,000.00 or total fees charged by Consultant, except that Consultant's liability for willful misconduct shall not be limited. These terms may be negotiable depending on the particular facts of your project. You should consult with an attorney experienced in construction contracts and litigation regarding this provision.

7. HAZARDOUS MATERIALS: Consultant is responsible only for hazardous materials brought by Consultant onto the site. Client retains ownership and responsibility in all respects for other hazardous materials and associated damage.

8. ASSIGNS AND THIRD PARTIES: This Contract is intended only to benefit the parties hereto. No person who is not a signatory to this Contract shall have any rights hereunder to rely on this Contract or on any of Consultant's services or reports without the express written authorization of Consultant. This Contract shall not be assigned by Client without the Consultant's written consent. This Contract is binding on any successor companies to Client or Consultant, and on the surviving corporation in the event of a merger or acquisition.

9. STANDARD OF CARE: Consultant agrees to strive to perform its services that are intended solely for the use of the Client, in a proper and professional manner in accordance with current standards of environmental practice in this community at this time. The Client agrees to pay for and look to Consultant only for such performances. No warranty or guarantee is expressed or implied. Consultant and the Client agree that there are risks of earth movement and property damage inherent in land development and repair and that Consultant has not been authorized to perform the exhaustive and economically unfeasible investigation necessary to eliminate such risks.

10. EFFECTS OF SITE EXPLORATION: It is understood that in the normal course of providing these services, Consultant may be required to access the site to perform field exploration. All boreholes will be backfilled at completion; however, some settlement should be anticipated. Consultant will attempt to minimize the effects of the exploration operations on the site. However, it must be understood that some damage to existing roadways, vegetation, or other improvements may occur. Consultant does not propose to restore the site to the same condition as was present prior to the exploration operations.

11. GOVERNING LAW, SURVIVAL AND FORUM SELECTION: The contract shall be governed by laws of the State of California. If any of the provisions contained in this agreement are held invalid, the enforceability of the remaining provisions will not be impaired. Limitations of liability, indemnities, representations and warranties by Client will survive termination of this agreement. The signatories represent and warrant that they are authorized by the entities on whose behalf they sign to enter into this contract and that their principals have filed fictitious business name statements, if required. All disputes between Consultant and client related to this agreement will be submitted to the court of the county where Consultant's principal place of business is located and client waives the right to remove the action to any other county or judicial jurisdiction.

CLOSURE

If the proposed Scope of Services, Terms for Service and Fee are satisfactory, **please sign in the space provided. Please return one copy to our office with the Owner Information Form.** This will constitute authorization for us to proceed with work on the project. Our fee will be billed subsequent to the submission of our final report to the client. Based on the passing of Assembly Bill No. 2629, services may not commence until the execution of a written contract. This agreement can be terminated by either party by notification in writing. Earth Systems responsibility for the project will end upon completion of the services described herein or termination of the agreement, unless authorization to perform additional work and agreement for payment thereof is provided by the client. This proposal is valid for a period of 90 days. If authorized after 90 days, Earth Systems reserves the right to reconsider the fees presented herein. We look forward to assisting you on this project and we thank you for the opportunity to submit this proposal.

If you have any questions or require additional information, please do not hesitate to contact the undersigned at (760) 345-1588.

Respectfully submitted,
EARTH SYSTEMS PACIFIC

Kevin L. Paul
Vice President

PLEASE RETURN A SIGNED COPY TO EARTH SYSTEMS PACIFIC

Proposal/ac/cgj/klp/mh

AGREED TO AND ACCEPTED

_____
CLIENT NAME (IN PRINT)

_____
SIGNATURE AND TITLE

_____
TIN/SSN (Tax ID No. /Social Security No.)
(This information and signature above authorizes us to review Client credit history.)

_____
DATE

Check Below to Authorize Services:

☐ Geotechnical Engineering Feasibility Report

☐ Optional Task 7 – Private Utility Locating

☐ Phase I Environmental Site Assessment

Attachments: Owner Information Form

Distribution: 1/Rich Malacoff: rich.malacoff@thealtumgroup.com
1/BER File

Earth Systems

Request for Owner Information for California Preliminary Notice

Project Name: _____ **Project No:** _____

Scope of Work: _____ **Estimated Value: $**_____

Address: _____

Tract and/or Lot # and APN #: _____
(Legal Description)

Party Retaining Services (i.e. Client): _____
(Legal Entity)

Attention: _____

Address: _____

Phone: _____ **Fax:** _____ **Cell Phone:** _____

Property Owner: _____
(Owner or Reputed Owner)

Address: _____

Phone: _____ **Fax:** _____ **Cell Phone:** _____

General Contractor (if applicable): _____
(General Contractor or Reputed Contractor)

Address: _____

Phone: _____ **Fax:** _____ **Cell Phone:** _____

Lender: (if applicable): _____
(Construction Lender, or Reputed Construction Lender, if any)

Address: _____

Phone: _____ **Fax:** _____ **Cell Phone:** _____

Pursuant to California Civil Code Section 8208, we request that you provide us with the above information to be used in a Preliminary Notice of work performed to the job site identified above. The statute requires that this information be furnished uponyour receipt of this request.

Return completed form to: _____

Appendix I

PROJECT-SPECIFIC WQMP SUMMARY DATA FORM

Project-Specific WQMP Summary Data Form

Applicant Information	
Name and Title	Rod Vandenburg
Company	Pacific Coast Properties
Phone	(760) 779 - 8227
Email	

Project Information	
Project Name (as shown on project application/project-specific WQMP)	Calhoun Street Subdivision
Street Address	49-251 Calhoun Street, Coachella, CA
Nearest Cross Streets	Avenue 49 and Calhoun Street
Municipality (City or Unincorporated County)	City of Coachella
Zip Code	92236
Tract Number(s) and/or Assessor Parcel Number(s)	612-260-010
Other (other information to help identify location of project)	
Watershed	Whitewater River

Indicate type of project.	**Priority Development Projects (Use an "X" in cell preceding project type):**
	SF hillside residence; impervious area ≥ 10,000 sq. ft.; Slope ≥ 25%
	SF hillside residence; impervious area ≥ 10,000 sq. ft.; Slope ≥ 10% & erosive soils
	Commercial or Industrial ≥ 100,000 sq. ft.
	Automotive repair shop
	Retail Gasoline Outlet disturbing > 5,000 sq. ft.
	Restaurant disturbing > 5,000 sq. ft.
X	Home subdivision ≥ 10 housing units
	Parking lot ≥ 5,000 sq. ft. or ≥ 25 parking spaces

Date Project-Specific PWQMP Submitted	
Size of Project Area (nearest 0.1 acre)	39.98 acres
Project Area managed with Site Design or Low Impact Development (LID) BMPs (nearest 0.1 acre)	100%
Is the project subject to onsite retention by ordinance or policy?	Yes
Are Treatment Control BMPs required?	No
Name of the entity that will implement, operate, and maintain the post-construction BMPs	Pacific Coast Properties
Contact Name	Ron Vandenburg
Street or Mailing Address	43-584 Via Magellan Drive, Palm Desert, CA 92201
City	Palm Desert
Zip Code	92201
Phone	(760) 779 - 8227

Space Below for Use by City/County Staff Only	
Preceding Information Verified by (consistent with information in project-specific WQMP)	**Name:** **Date:**
Date Project-Specific WQMP Approved:	
Data Entered by	**Name:** **Date:**
Other Comments	

Appendix F
Calhoun Street Housing Development Traffic Impact Analysis

URBAN | CROSSROADS

CALHOUN STREET SUBDIVISION

TRAFFIC ANALYSIS

PREPARED BY: Janette Cachola | jcachola@urbanxroads.com
Marlie Whiteman, P.E. | mwhiteman@urbanxroads.com
John Kain, AICP | jkain@urbanxroads.com

Reference Number	Agency	Date
15830-04 TA Report.docx	City of Coachella	September 6, 2024

TABLE OF CONTENTS

Table of Contents ii

Appendices iv

List of Exhibits v

List of Tables vi

List of Abbreviated Terms vii

1 Introduction 1

1.1 Project Overview 1
1.2 Analysis Scenarios 1
1.3 Study Area 3
1.4 Analysis Findings 3

2 Methodologies 7

2.1 Level of Service 7
2.2 Intersection Capacity Analysis 7
2.3 Traffic Signal Warrant Analysis Methodology 9
2.4 Minimum Acceptable Levels of Service (LOS) 10

3 Area Conditions 11

3.1 Existing Circulation Network 11
3.2 City of Coachella General Plan Circulation Element 11
3.3 Transit Service 11
3.4 Pedestrian and Bicycle Facilities 11
3.5 Existing (2024) Traffic Counts 16
3.6 Intersection Operations Analysis 16
3.7 Traffic Signal Warrants Analysis 19

4 Projected Future Traffic 21

4.1 Project Trip Generation 21
4.2 Project Trip Distribution 22
4.3 Modal Split 22
4.4 Project Trip Assignment 22
4.5 Background Traffic 22

5 EAP (2026) Traffic Conditions 29

5.1 EAP Traffic Volume Forecasts 29
5.2 Intersection Operations Analysis 29
5.3 Traffic Signal Warrants Analysis 29

6 EAPC (2026) Traffic Conditions 33

6.1 EAPC (2026) Traffic Volume Forecasts 33
6.2 Intersection Operations Analysis 33
6.3 Traffic Signal Warrants Analysis 33
6.4 Cumulative Improvements 36

7 Cumulative and Site Access Improvements 37

7.1 Recommended Cumulative Improvement 37
7.2 ON-Site and Site-Adjacent Improvements 37

8 References 41

APPENDICES

Appendix 1.1: Traffic Study Scope

Appendix 1.2: VMT Screening

Appendix 3.1: Traffic Counts –2024

Appendix 3.2: Existing (2024) Conditions Intersection Operations Analysis Worksheets

Appendix 3.3: Traffic Signal Warrant Analysis Worksheets

Appendix 5.1: EAP (2026) Conditions Intersection Operations Analysis Worksheets

Appendix 6.1: EAPC (2026) Conditions Intersection Operations Analysis Worksheets

LIST OF EXHIBITS

Exhibit 1-1: Preliminary Site Plan 2
Exhibit 1-2: Study Area 4
Exhibit 3-1: Existing Number of Through Lanes and Intersection Controls 12
Exhibit 3-2: City of Coachella General Plan Circulation Element 13
Exhibit 3-3: City of Coachella General Plan Roadway Cross-Sections 14
Exhibit 3-4: Existing Pedestrian and Bike Facilities 15
Exhibit 3-5: Existing (2024) Traffic Volumes 17
Exhibit 4-1: Project Trip Distribution 24
Exhibit 4-2: Project Only Traffic volumes 25
Exhibit 4-3: Cumulative Development Location Map 26
Exhibit 5-1: EAP (2026) Traffic Volumes 31
Exhibit 6-1: EAPC (2026) Traffic Volumes 34
Exhibit 7-1: Site Access Recommendations 39
Exhibit 7-2: Recommended Intersection Improvements for EAP (2026) and EAPC (2026) Conditions 40

LIST OF TABLES

Table 1-1: Intersection Analysis Locations 3
Table 1-2: Level of Service Summary 5
Table 2-1: Signalized Intersection LOS Thresholds 8
Table 2-2: Unsignalized Intersection LOS Thresholds 9
Table 2-3: Traffic Signal Warrant Analysis Locations 10
Table 3-1: Intersection Analysis for Existing (2024) Conditions 18
Table 4-1: Project Trip Generation Summary 21
Table 4-2: Cumulative Development Land Use Summary 27
Table 5-1: Intersection Analysis for EAP (2026) Conditions 32
Table 6-1: Intersection Analysis for EAPC (2026) Conditions 35
Table 7-1: Existing Plus Ambient Plus Project Plus Cumulative (EAPC) Fair Share Calculations 37

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CAMUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
EAP	Existing Plus Ambient Plus Project
EAPC	Existing Plus Ambient Plus Project Plus Cumulative
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
PHF	Peak Hour Factor
Project	Calhoun Street Subdivision
sf	Square Feet
TA	Traffic Analysis

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1 INTRODUCTION

This report presents the results of the traffic analysis (TA) for Calhoun Street Subdivision ("Project"), located at the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella, as shown on Exhibit 1-1.

The purpose of this TA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and recommend improvements to achieve acceptable circulation system operational conditions. This TA has been prepared based in accordance with the County of Riverside's Transportation Analysis Guidelines for Level of Service & Vehicle Miles Traveled (December 2020), as the City of Coachella utilizes the County guidelines. (1) Urban Crossroads, Inc. prepared a traffic study scoping package (included in Appendix 1.1) which was reviewed by City's consultant prior to the preparation of this report.

1.1 PROJECT OVERVIEW

The Project is proposed to consist of 259 single family residential units and a 1.5-acre park on approximately 40 acres. It is anticipated that the Project would be developed by year 2026. A preliminary site plan of the proposed Project is shown in Exhibit 1-1. Access to the Project will be provided via Access 1 at Calhoun Street (full access) and Access 2 at Avenue 49 (full access).

In order to develop the traffic characteristics of the proposed Project, trip-generation rates provided in the *Institute of Transportation Engineers (ITE) Trip Generation* (11th Edition, 2021) are utilized.

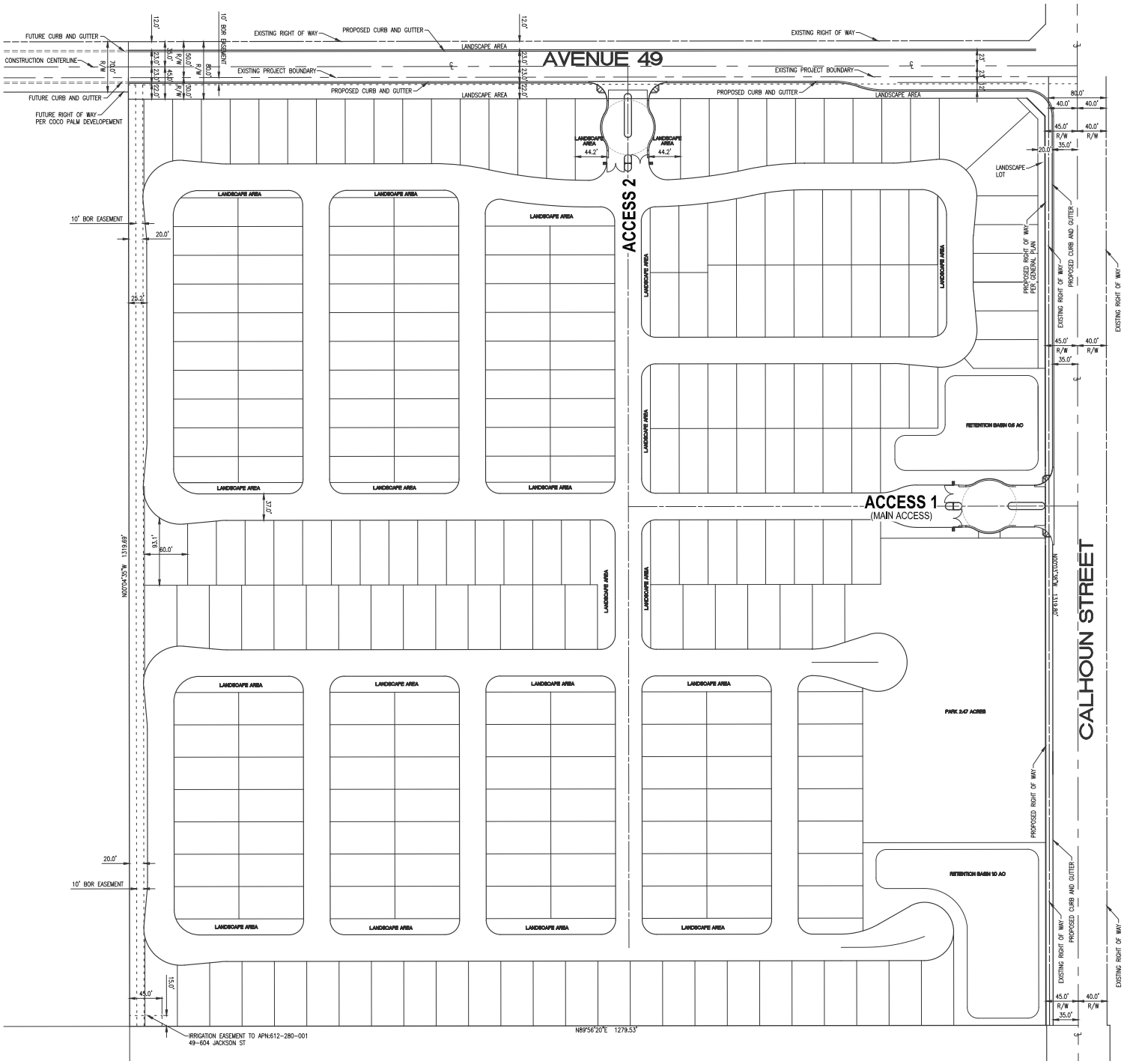
The Project is anticipated to generate a total of 2,517 trip-ends per day with 192 AM peak hour trips and 250 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

1.2 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2024) Conditions
- Existing plus Ambient plus Project (EAP) (2026) Conditions
- Existing plus Ambient plus Project plus Cumulative (EAPC) (2026) Conditions

EXHIBIT 1-1: PRELIMINARY SITE PLAN



N

For the existing study area intersections, traffic count data has been collected in January and June, 2024 during the AM peak period of 7:00 AM to 9:00 AM and PM peak period of 4:00 PM to 6:00 PM.

The Existing plus Ambient plus Project (EAP) conditions analysis determines the potential near-term cumulative circulation system deficiencies with the Project but without known cumulative projects. To account for background traffic growth, an ambient growth factor from Existing conditions of 4.04% (2% per year, compounded annually over 2 years) is included for EAP (2026) traffic conditions. The ambient growth is consistent with the growth used by other projects within the City of Coachella.

The Existing plus Ambient plus Project plus Cumulative (EAPC) (2026) traffic conditions analysis determines the potential cumulative circulation system deficiencies, including the Project and other known cumulative projects. The cumulative project list was compiled from information provided in the City of Coachella website.

1.3 STUDY AREA

The Project study area was defined in coordination with the City of Coachella. Exhibit 1-2 presents the study area and intersection analysis locations. The intersections listed in Table 1-1 were selected for this TA with City of Coachella technical staff concurrence.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

#	Intersection	#	Intersection
1	Calhoun St. / Dr. Carreon Bl.	5	Jackson St. / Avenue 49 - Odlum Dr.
2	Calhoun St. / Avenue 48	6	Calhoun St. / Access 1
3	Calhoun St. / Avenue 49	7	Access 2 / Avenue 49
4	Calhoun St. / Avenue 50		

1.4 ANALYSIS FINDINGS

This section provides a summary of the analysis results for Existing (2024), EAP (2026), and EAPC (2026) conditions. Table 1-2 presents a summary of study area LOS conditions for each analysis scenario.

1.4.1 EXISTING (2024) CONDITIONS

For Existing (2024) traffic conditions the unsignalized study area intersections of Calhoun Street / Dr. Carreon Boulevard (#1), Calhoun Street / Avenue 49 (#3), and Jackson Street / Avenue 49 – Odlum Drive (#5) are operating at unacceptable level of service (LOS "E" or worse). Each of these three locations meet the traffic volume warrants for installation of a traffic signal based upon existing traffic counts.

EXHIBIT 1-2: TRAFFIC ANALYSIS STUDY AREA

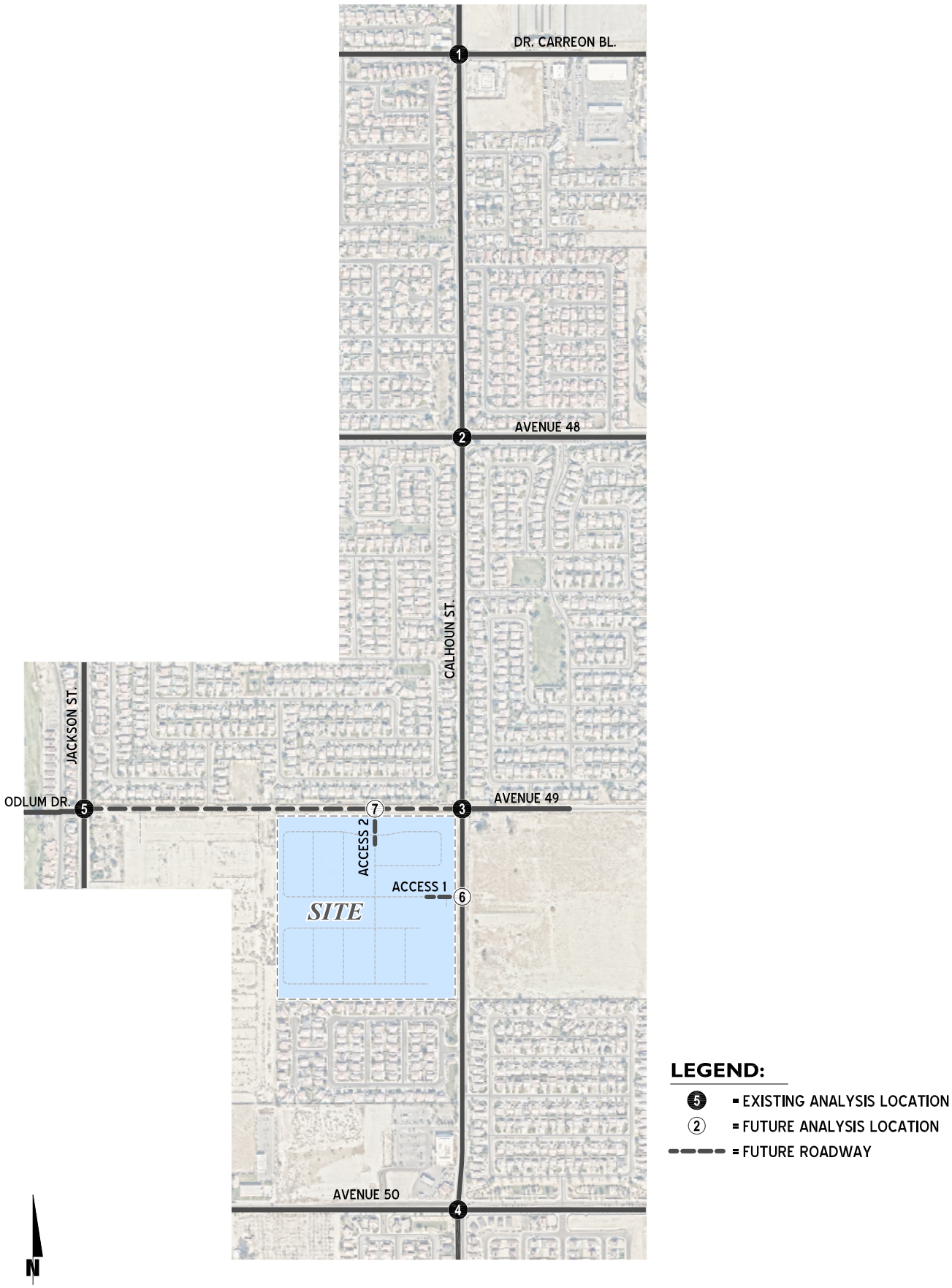


TABLE 1-2: LEVEL OF SERVICE (LOS) SUMMARY

#	Intersection	Existing (2024) AM	Existing (2024) PM	EAP (2026) AM	EAP (2026) PM	EAPC (2026) AM	EAPC (2026) PM
1	Calhoun St. / Dr. Carreon Bl.						
	- Without Improvements	F	A - D	F	E	F	F
	- With Improvements	N/A	N/A	A - D	A - D	A - D	A - D
2	Calhoun St. / Avenue 48	A - D	A - D	A - D	A - D	A - D	A - D
3	Calhoun St. / Avenue 49						
	- Without Improvements	F	A - D	F	E	F	F
	- With Improvements	N/A	N/A	A - D	A - D	A - D	A - D
4	Calhoun St. / Avenue 50	A - D	A - D	A - D	A - D	A - D	A - D
5	Jackson St. / Avenue 49 - Odlum Dr.						
	- Without Improvements	F	A - D	F	A - D	F	E
	- With Improvements	N/A	N/A	A - D	A - D	A - D	A - D
6	Calhoun St. / Access 1	N/A	N/A	A - D	A - D	A - D	A - D
7	Access 2 / Avenue 49	N/A	N/A	A - D	A - D	A - D	A - D

Legend:

= A - D = E = F

F:\UXRjobs_15600_16000_15800\15830\02_LOS\Excel\[15830 - Report.xlsx]1-2_LOS Summary

1.4.2 EXISTING PLUS AMBIENT PLUS PROJECT (EAP) (2026) CONDITIONS

For EAP (2026) traffic conditions, there are no additional intersections anticipated to operate at unacceptable LOS during peak hours beyond the three locations which have existing deficiencies. Installation of a traffic signal at each of the deficient intersections of Calhoun Street / Dr. Carreon Boulevard (#1), Calhoun Street / Avenue 49 (#3), and Jackson Street / Avenue 49 – Odlum Drive (#5) are anticipated to address intersection operational deficiencies.

Although the intersection of Calhoun Street / Access 1 (#6) operates at an acceptable LOS for EAP conditions, this location meets the volume warrants for installation of a traffic signal.

1.4.3 EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE (EAPC) (2026) CONDITIONS

For EAPC (2026) traffic conditions, there are no additional intersections anticipated to operate at unacceptable LOS during peak hours. Similar to EAP conditions, installation of traffic signal at the three deficient unsignalized intersections are anticipated to address intersection operational deficiencies.

Detailed Project fair share calculations, for each peak hour, are provided in Table 7-1 for the three locations where traffic signals are warranted for all analysis scenarios (existing, EAP, and EAPC).

Site-adjacent improvements are listed in Section 7.2 and include the following:

- Project to construct Avenue 49 as a 2-lane roadway (40 feet curb-to-curb width) from Jackson Street to the Project's westerly site boundary.
- Project to construct Avenue 49 at its ultimate southerly half section width as a Primary Arterial with bicycle facility from the Project's westerly site boundary to the Project's easterly site boundary (Calhoun Street).
- Project to widen Calhoun Street at its ultimate westerly half-section width as a Collector Roadway with Bicycle facility from Project's northerly site boundary (Avenue 49) to the Project's southerly boundary.
- Project to implement a new traffic signal at the Calhoun Street / Avenue 49 (#3) intersection, with potential future reimbursement contingent upon cumulative development activity.
- Access to the adjacent public park to be provided from Calhoun Street, subject to park development access and parking plans (to be determined).

1.4.4 VEHICLE MILES TRAVELED (VMT)

Appendix 1.2 contains the approved VMT screening analysis which was performed in a separate document (Calhoun Street Subdivision Vehicle Miles Traveled (VMT) Screening, Urban Crossroads, June 18, 2024) and no further VMT is required.

2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with the County of Riverside TIA Guidelines. (1)

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors, such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near Capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The 7th Edition Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (2)The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The City of Coachella requires signalized intersection operations analysis based on the methodology described in the HCM. (2) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is related to the average control delay per vehicle and is correlated to a LOS designation as described on Table 2-1.

The traffic modeling and signal timing optimization software package Synchro (Version 12) has been utilized to analyze signalized intersections. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and Capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes are adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour.

The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (2)

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Serice, V/C ≤ 1.0[1]
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and indvidual cycle failures are noticeable.	35.01 to 55.00	D
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F

Source: HCM, 7th Edition

[1] if V/C is greater than 1.0 then LOS is F per HCM

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Coachella requires the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (2) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2). At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. Delay for the intersection is reported for the worst individual movement at a two-way stop-controlled intersection.

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Serice, V/C ≤ 1.0[1]
Little or no delays.	0 to 10.00	A
Short traffic delays.	10.01 to 15.00	B
Average traffic delays.	15.01 to 25.00	C
Long traffic delays.	25.01 to 35.00	D
Very long traffic delays.	35.01 to 50.00	E
Extreme traffic delays with intersections capacity exceeded.	>50.00	F

Source: HCM, 7th Edition

[1] if V/C is greater than 1.0 then LOS is F per HCM

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or determine the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD). (3)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (3) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions and for all future analysis scenarios for existing unsignalized intersections. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics. For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection. Urban warrants have been used as posted speed limits on the major roadways with unsignalized intersections are 40 miles per hour or below and rural warrants have been used on roadways with speeds greater than 40 miles per hour.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. Similarly, the speed limit has been used as the basis for determining the use of Urban and Rural warrants.

Traffic signal warrant analyses were performed for the following unsignalized study area intersections shown in Table 2-3:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

#	Intersection	#	Intersection
1	Calhoun St. / Dr. Carreon Bl.	6	Calhoun St. / Access 1
3	Calhoun St. / Avenue 49	7	Access 2 / Avenue 49
5	Jackson St. / Avenue 49 - Odlum Dr.		

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 EAP *(2026) Traffic Conditions* and Section 6 *EAPC (2026) Traffic Conditions* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

For the purposes of this analysis, the following thresholds of significance have been applied to study area intersections located within the City of Coachella to identify significant impacts through a comparison of Existing and EAP traffic conditions:

- If an intersection is projected to operate at an acceptable level of service (i.e., LOS D or better) under Existing traffic conditions and the addition of project traffic is expected to cause the intersection to operate at an unacceptable level of service (LOS E or F), the impact is considered significant;
- If an intersection is projected to operate at LOS E or LOS F under Existing, and the addition of project traffic, the impact is considered significant.

Cumulative traffic impacts are deficiencies that are not directly caused by the Project, but occur as a result of regional growth combined with that or other nearby cumulative development projects. The Project's contribution to a particular cumulative transportation deficiency is deemed cumulatively considerable if the Project adds significant traffic to the forecasted deficiency. A Project's contribution to a cumulatively considerable impact can be reduced to less than significant if the Project is required to implement or fund its fair share of improvements designed to alleviate the potential cumulative impact. If full funding of future cumulative improvements is not reasonably assured, a temporary unmitigated cumulative impact may occur until the needed improvement is fully funded and constructed.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Coachella General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the Project scope (Appendix 1.1), the study area includes 5 existing intersections as shown previously on Exhibit 1-2, which have been agreed upon with City staff. Exhibit 3-1 illustrates the number of through traffic lanes for existing roadways and traffic controls for study area intersections.

3.2 CITY OF COACHELLA GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located at the southwest corner of Tyler Street and Avenue 53 in the City of Coachella. Exhibit 3-2 shows the City of Coachella General Plan Circulation Element, with planned roadway classifications. Exhibit 3-3 illustrates the City of Coachella General Plan roadway cross-sections.

Calhoun Street is classified as a Collector with Bicycle Facility in the study area.

Dr. Carreon Boulevard and Avenue 49 are classified as a Primary Arterial with Bicycle Facility in the study area.

Avenue 48 and Avenue 50 are classified as a Major Arterial with Bicycle Facility in the study area.

3.3 TRANSIT SERVICE

The City of Coachella is currently served by the SunLine Transit Agency; currently, Route 8 is located along Calhoun Street (between Avenue 48 and Avenue 50), Dr. Carreon Boulevard (between Jackson Street & Van Buren Street), Avenue 48 (between Calhoun Street & Van Buren Street), Avenue 50 (east of Calhoun Street) in the study area. Transit service is reviewed and updated by Sunline periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

3.4 PEDESTRIAN AND BICYCLE FACILITIES

The existing pedestrian facilities within the study area are shown on Exhibit 3-4. As shown on Exhibit 3-4, existing on-street bike lanes are located along the Calhoun Street, Avenue 48, and Avenue 50. Sidewalks generally exist on Avenue 48 and Avenue 50. Some portions of the sidewalk exist on Calhoun Street, Jackson Street, Dr. Carreon Boulevard, Odlum Drive, and Avenue 49.

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

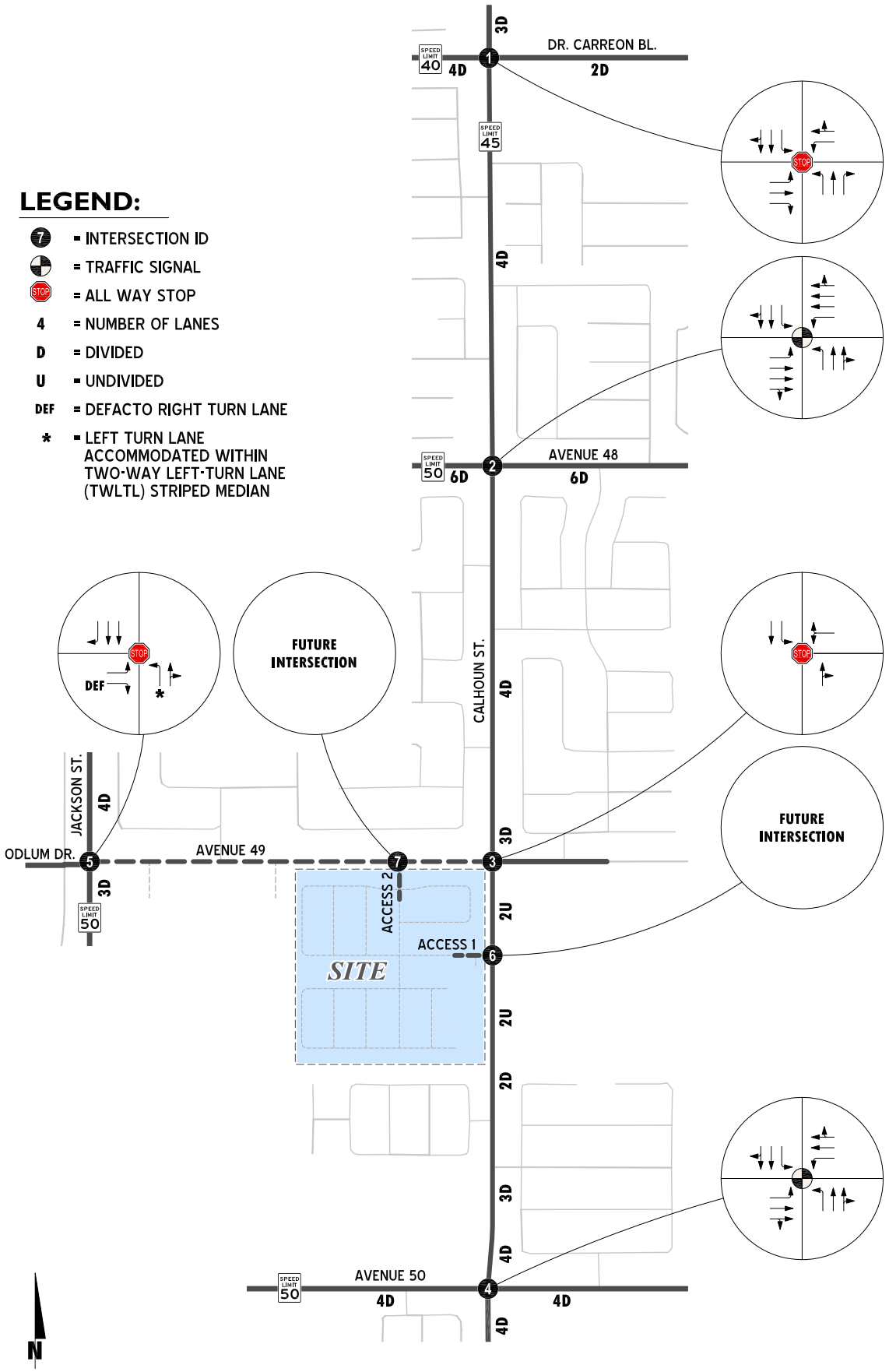
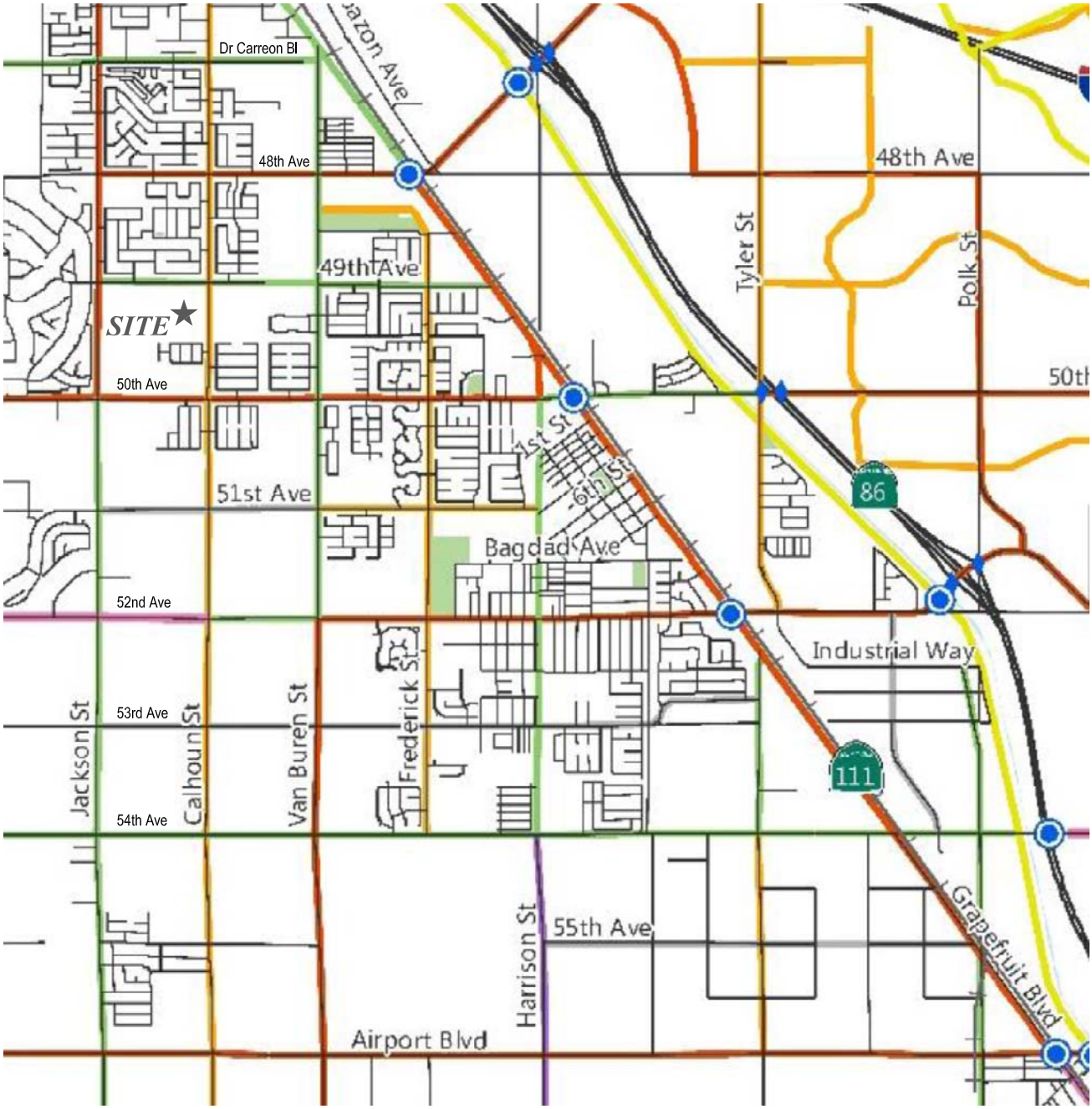


EXHIBIT 3-2: CITY OF COACHELLA GENERAL PLAN CIRCULATION ELEMENT



SOURCE: CITY OF COACHELLA

LEGEND:

③ = EXISTING ANALYSIS LOCATION

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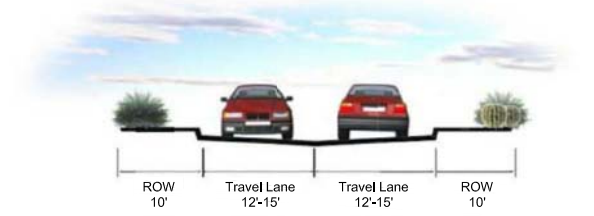
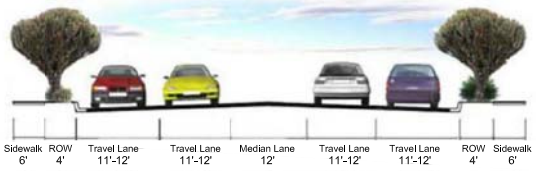
EXHIBIT 3-3: CITY OF COACHELLA GENERAL PLAN ROADWAY CROSS-SECTIONS



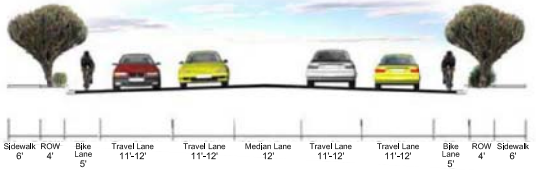
COUNTRY ROAD



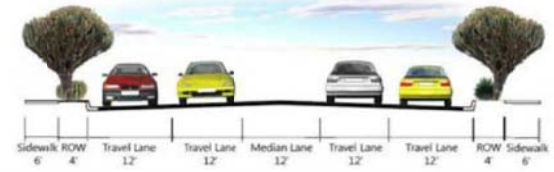
COLLECTOR

LOCAL INDUSTRIAL STREET

MAJOR ARTERIAL

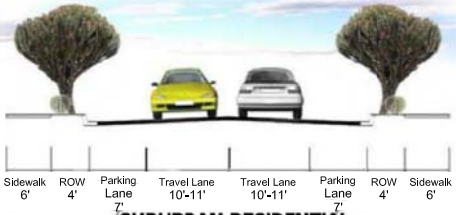


COLLECTOR WITH ENHANCED BICYCLE FACILITIES

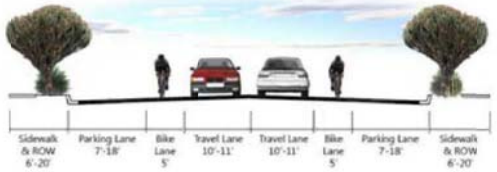


INDUSTRIAL COLLECTOR

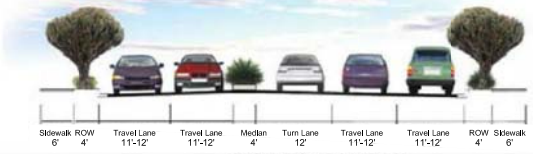
MAJOR ARTERIAL WITH ENHANCED BICYCLE FACILITIES



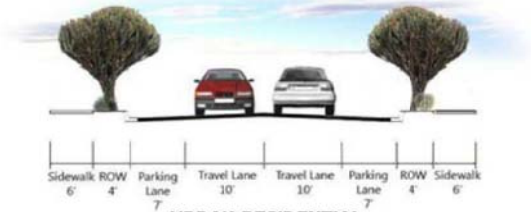
SURURBAN RESIDENTIAL WITH PARKING



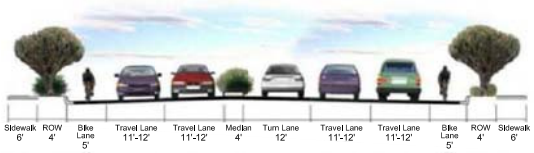
URBAN STREET 2-LANE



PRIMARY ARTERIAL



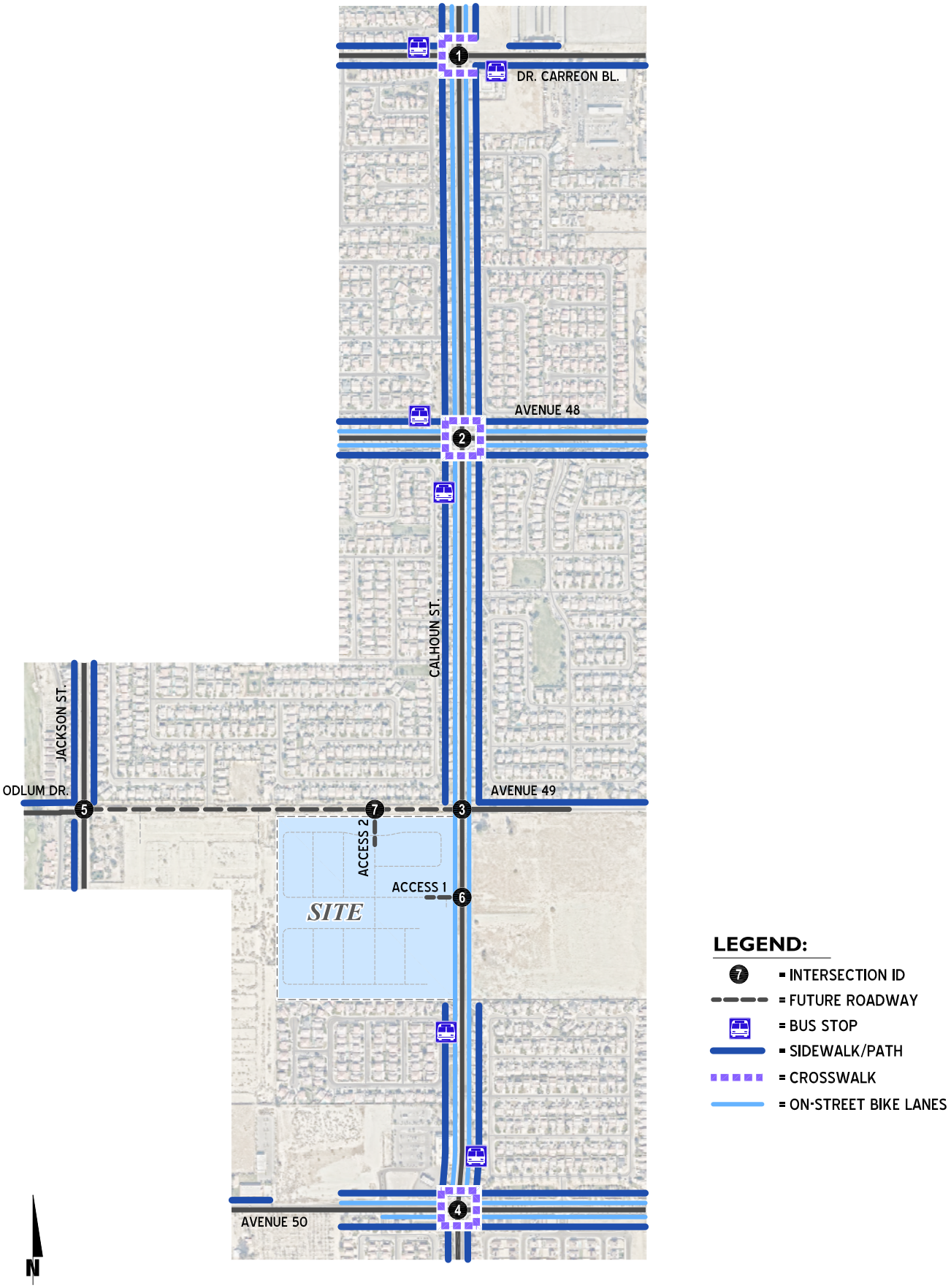
URBAN RESIDENTIAL WITH PARKING



PRIMARY ARTERIAL WITH ENHANCED BICYCLE FACILITIES

URBAN STREET 4-LANE

EXHIBIT 3-4: EXISTING PEDESTRIAN AND BIKE FACILITIES



3.5 EXISTING (2024) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in August 2024. The City of Coachella experiences seasonal population variations over the course of the year, with relatively higher populations during the winter months from January to the end of March. To compensate for the discrepancy, counts not taken during this peak winter period (January 2 to March 31) require seasonal adjustments. A 20% increase is applied to counts taken in August to estimate peak season. This factor is consistent with other nearby jurisdictions within the Coachella Valley area.

The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

The weekday AM and PM peak hour count data are representative of typical peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity that would prevent or limit roadway access and detour routes. These raw turning volumes have been flow conserved between intersections with limited access, no access and where there are currently no uses generating traffic. Existing weekday peak hour intersection volumes are shown on Exhibit 3-5.

Existing weekday ADT volumes are also shown on Exhibit 3-5. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 12.658 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 7.90 percent. As such, the above equation utilizing a factor of 12.658 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 7.90 percent (i.e., 1/0.070 = 12.658) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses.

3.6 INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized on Table 3-1, which indicates that no study area intersections operate at unacceptable LOS (LOS "E" or worse). The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

EXHIBIT 3-5: EXISTING (2024) TRAFFIC VOLUMES

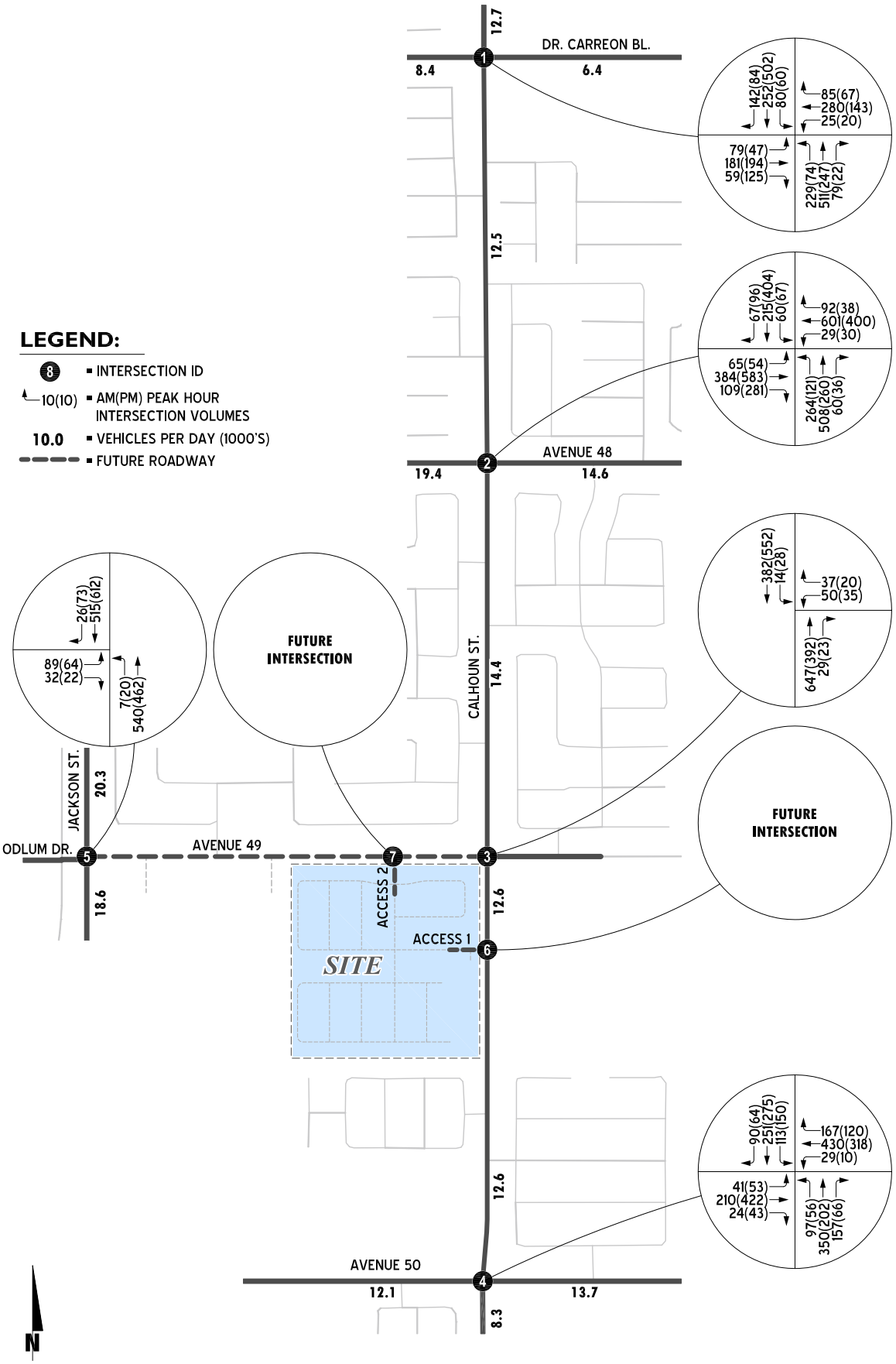


TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2023) CONDITIONS

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2]												Delay[3] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Calhoun St. / Dr. Carreon Bl.	AWS	1	1	1	1	2	0	1	1	1	1	1	0	>80	28.7	F	D
2	Calhoun St. / Avenue 48	TS	1	2	0	1	2	0	1	3	0	1	3	0	32.5	28.6	C	C
3	Calhoun St. / Avenue 49	AWS	0	1	0	1	1	1	0	0	0	0	1!	0	51.2	20.3	F	C
4	Calhoun St. / Avenue 50	TS	1	2	0	1	2	0	1	2	0	1	2	0	33.1	28.5	C	C
5	Jackson St. / Avenue 49 - Odlum Dr.	AWS	1*	1	0	0	2	1	1	0	d	0	0	0	51.9	23.0	F	C
6	Calhoun St. / Access 1		Future Intersection												-	-		
7	Access 2 / Avenue 49		Future Intersection												-	-		

[1] TS = Traffic Signal; AWS = All Way Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; d = Defacto Right Turn Lane; 0.5 = Shared Lane; 1! = Shared Left/Through/Right lane;
* = Left-Turn accommodated within two-way left turn lane (TWLTL) striped median

[3] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

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3.7 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on 2024 peak hour intersection turning volumes (see Appendix 3.3). For Existing (2024) traffic conditions, the following three unsignalized study area intersections currently meets traffic volume warrants for installation of a traffic signal.

- Calhoun Street / Dr. Carreon Boulevard (#1)
- Calhoun Street / Avenue 49 (#3)
- Jackson Street / Avenue 49 – Odlum Drive (#5)

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4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network.

The Project is proposed to consist of 259 single family residential units and a 1.5-acre park with dog run on approximately 40 acres.

It is anticipated that the Project will be operational by year 2026. Access to the Project will be provided via Access 1 at Calhoun Street (full access) and Access 2 at Avenue 49 (full access)

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

In order to develop the traffic characteristics of the proposed project, the trip generation rates provided in the *Institute of Transportation Engineers (ITE) Trip Generation* (11th Edition, 2021) have been utilized (4).

Table 4-1 shows the vehicle trip generation rates for the Project, as well as the vehicle trip generation summary with daily and peak hour trip generation estimates. As shown on Table 4-1, the Project is anticipated to generate a total of 2,517 trip-ends per day with 192 AM peak hour trips and 250 PM peak hour trips.

TABLE 4-1: PROJECT TRIP GENERATION SUMMARY

Trip Generation Rates[1]

Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Single Family Detached	210	259	DU	0.18	0.52	0.70	0.59	0.35	0.94	9.43
Park with Dog Run[3]	--	1.5	AC	3.25	3.25	6.50	2.25	2.25	4.50	50.00

Trip Generation Results

Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Single Family Detached	210	259	DU	47	135	182	153	91	244	2,442
Park with Dog Run	--	1.5	AC	5	5	10	3	3	6	75
TOTAL				**52**	**140**	**192**	**156**	**94**	**250**	**2,517**

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

[2] DU = Dwelling Unit; AC = Acre

[3] Since ITE does not have trip rates for a park with dog run, similar use based on SANDAG's City park is utilized to account for higher park activity related to the dog run use.

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4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and proximity to the surrounding highway network. Trip distribution patterns proposed for the Project are illustrated on Exhibit 4-1.

4.3 MODAL SPLIT

The potential for Project trips to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes.

4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project weekday ADT and weekday peak hour intersection turning movement volumes are shown on Exhibit 4-2.

4.5 BACKGROUND TRAFFIC

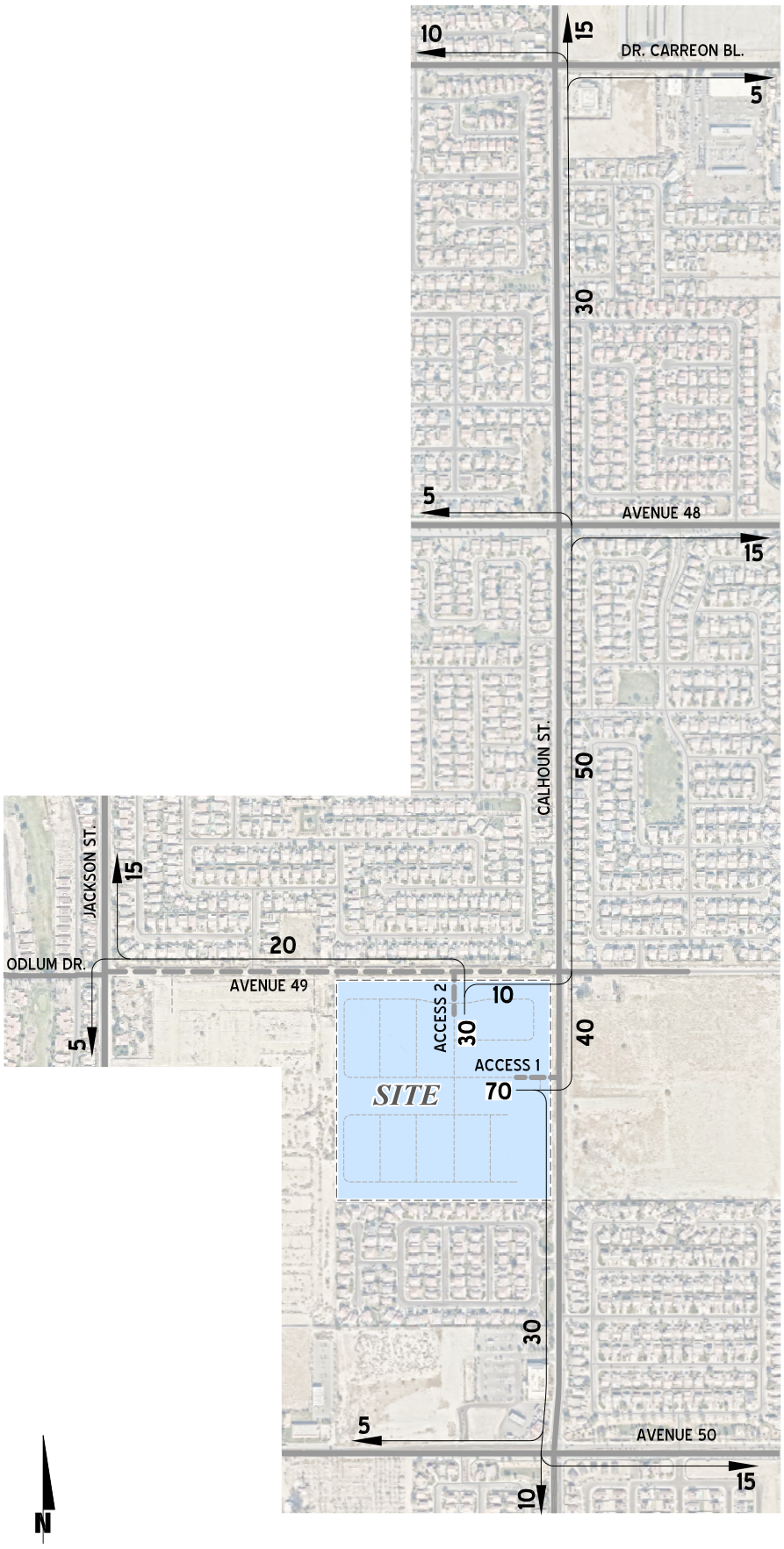
Future year traffic forecasts have been based upon background (ambient) growth at 2% per year for 2026 traffic conditions. The total ambient growth is 4.04% for 2026 traffic conditions. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in conjunction with traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

Exhibit 4-3 illustrates the cumulative development location map. The cumulative projects listed are those that would generate traffic and would contribute traffic to study area intersections. A summary of cumulative development projects and their proposed land uses are shown on Table 4-2. If applicable, the traffic generated by individual cumulative projects was manually added to the EAP forecasts to ensure that traffic generated by the listed cumulative development projects on Table 4-2 are reflected as part of the background traffic.

The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- EAP (2026)
  - Existing (2024) volumes
  - Ambient growth traffic (4.04% over 2 years)
  - Project traffic
- EAPC (2026)
  - Existing (2024) volumes
  - Ambient growth traffic (4.04% over 2 years)
  - Project traffic
  - Cumulative development traffic

EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION



LEGEND:

10 = PERCENT FROM PROJECT

EXHIBIT 4-2: PROJECT ONLY TRAFFIC VOLUMES

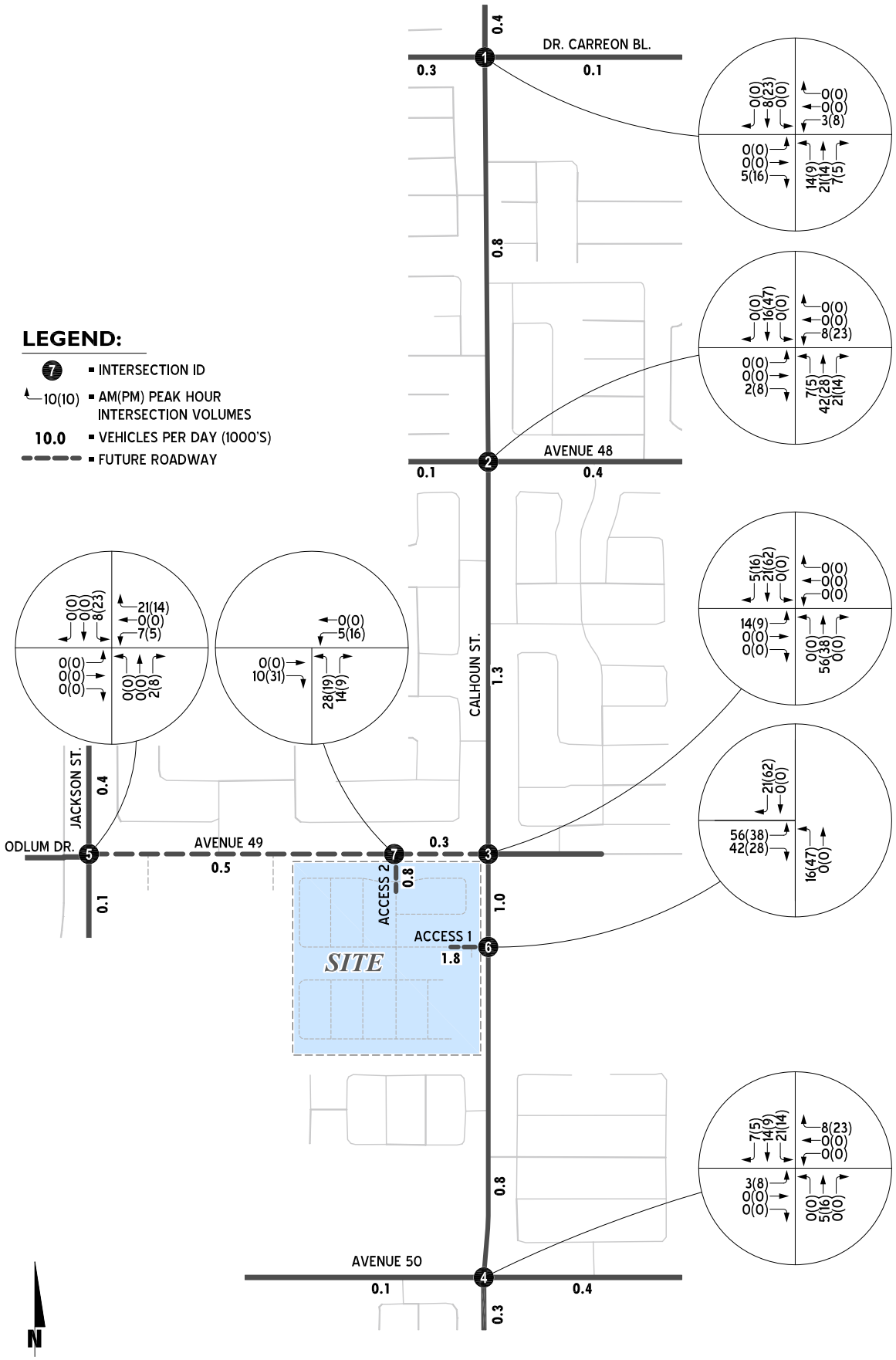


EXHIBIT 4-3: CUMULATIVE DEVELOPMENT MAP

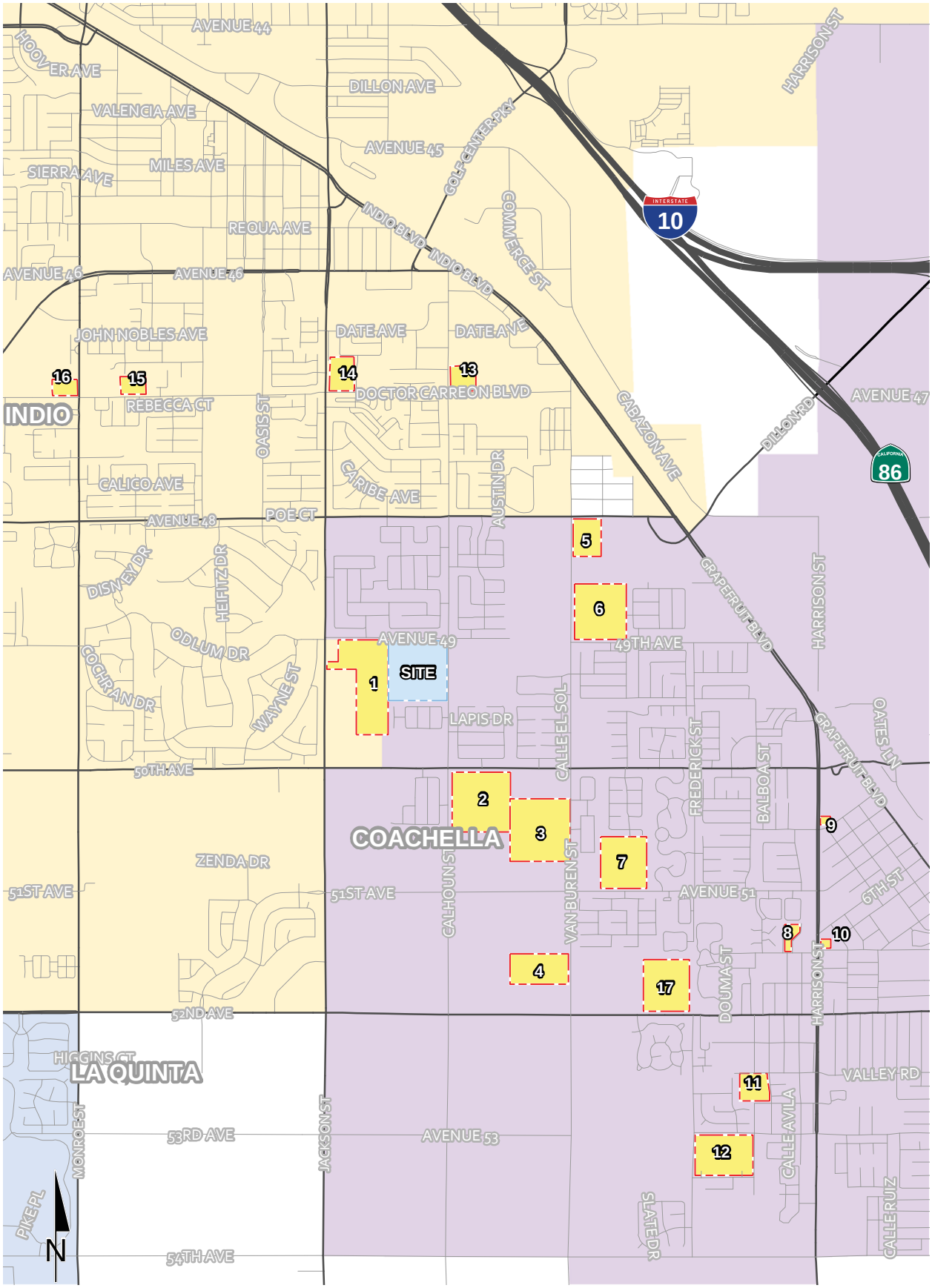


TABLE 4-2: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

TAZ	Project	Land Use	Quantity	Units[1]
1	TT 38072	Single Family Residential	173	DU
2	Mariposa Pointe	Single Family Residential	155	DU
3	Sevilla II	Single Family Residential	204	DU
4	Encanto	Single Family Residential	112	DU
5	Glenroy Hotel Project	Resort casitas/bungalows	620	RM
		Hotel	130	RM
		Restaurant	3.6	TSF
		Retail Cannabis	3.12	TSF
		General Store	2.5	TSF
		Coffee shop with drive thru	2.5	TSF
6	Rancho Flores 2	Single Family Residential	124	DU
7	Sevilla by Pulte	Single Family Residential	232	DU
8	Placita Dolores Huerta	Multifamily Residential	110	DU
9	Fountainhead Plaza (NEC 1st St. & Cesar Chavez St.)	Supermarket	20.422	TSF
		Fast-Food Restaurant	2.6	TSF
		Coffee Shop w/ Restaurant	2.1	TSF
10	Tripoli Mixed-Use	Multifamily Residential	108	DU
11	Villa Verde Apartments	Multifamily Residential	152	DU
12	Bellissima (Tract 31978)	Single Family Residential	111	DU
13	West Coast Self Storage	Self-Storage Facility	62	TSF
14	Indio Public Safety Campus (NEC Jackson St. & Dr. Carreon Bl.)	Fire Station Expansion	4.1	TSF
		Police Headquarters Expansion	44	EMP
		Government Office Complex	30.1	TSF
15	Coachella Medical Center (North of Dr. Carreon Bl., b/w Monroe & Arabia)	Skilled Nursing Facility	288	Beds
16	Tower Market	Convenience Mkt. w/ Pumps	12	VFP
17	Frederick St. Residential (NWC Frederick/Ave. 52)	Single Family Residential	256	DU

[1] DU = Dwelling Units; TSF = Thousand Square Feet; RM = Rooms; EMP = Employees; VFP = Vehicle Fueling Positions

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5 EAP (2026) TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Ambient plus Project (EAP) conditions and the resulting intersection operations and traffic signal warrant analyses.

The lane configurations and traffic controls assumed to be in place for EAP (2026) conditions are consistent with those shown previously on Exhibit 3-1, with the exception driveways and those facilities assumed to be constructed by the project to provide site access are assumed to be in place for EAP (2026) conditions (e.g., intersection and roadway improvements at the projects' frontage and driveways).

5.1 EAP TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 4.04% and the addition of project traffic. The weekday ADT and weekday peak hour intersection turning movement volumes which can be expected for EAP (2026) traffic conditions are shown on Exhibit 5-1.

5.2 INTERSECTION OPERATIONS ANALYSIS

EAP peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 Methodologies of this TA.

The intersection analysis results summarized in Table 5-1, indicate that the following intersections are anticipated to continue to operate at an unacceptable LOS during peak hours under EAP conditions, without installation of the traffic signal that is currently warranted for existing conditions.

- Calhoun Street / Dr. Carreon Boulevard (#1)
- Calhoun Street / Avenue 49 (#3)
- Jackson Street / Avenue 49 – Odlum Drive (#5)

The intersection operations analysis worksheets for EAP traffic conditions are included in Appendix 5.1 of this TA.

5.3 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for EAP (2026) traffic conditions provided in Appendix 3.3. For EAP conditions, the intersection of Calhoun Street / Access 1 (#6) meets the volume warrants for installation of a traffic signal (see Appendix 3.3).

As mentioned previously, it is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS.

An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

Installation of a traffic signal is currently not recommended at Calhoun Street / Access 1 (#6) intersection for the following reasons:

- This intersection is anticipated to operate at an acceptable LOS for EAP (2026) conditions with cross-street stop control.
- Access to the Project site is also provided at the Access 2 / Avenue 49 (#7) intersection, which is anticipated to operate at LOS "A" during peak hours for both EAP and EAPC conditions.
- This intersection is also anticipated to operate at an acceptable LOS for EAPC (2026) conditions with cross-street stop control.

EXHIBIT 5-1: EXISTING PLUS AMBIENT PLUS PROJECT (2026) TRAFFIC VOLUMES

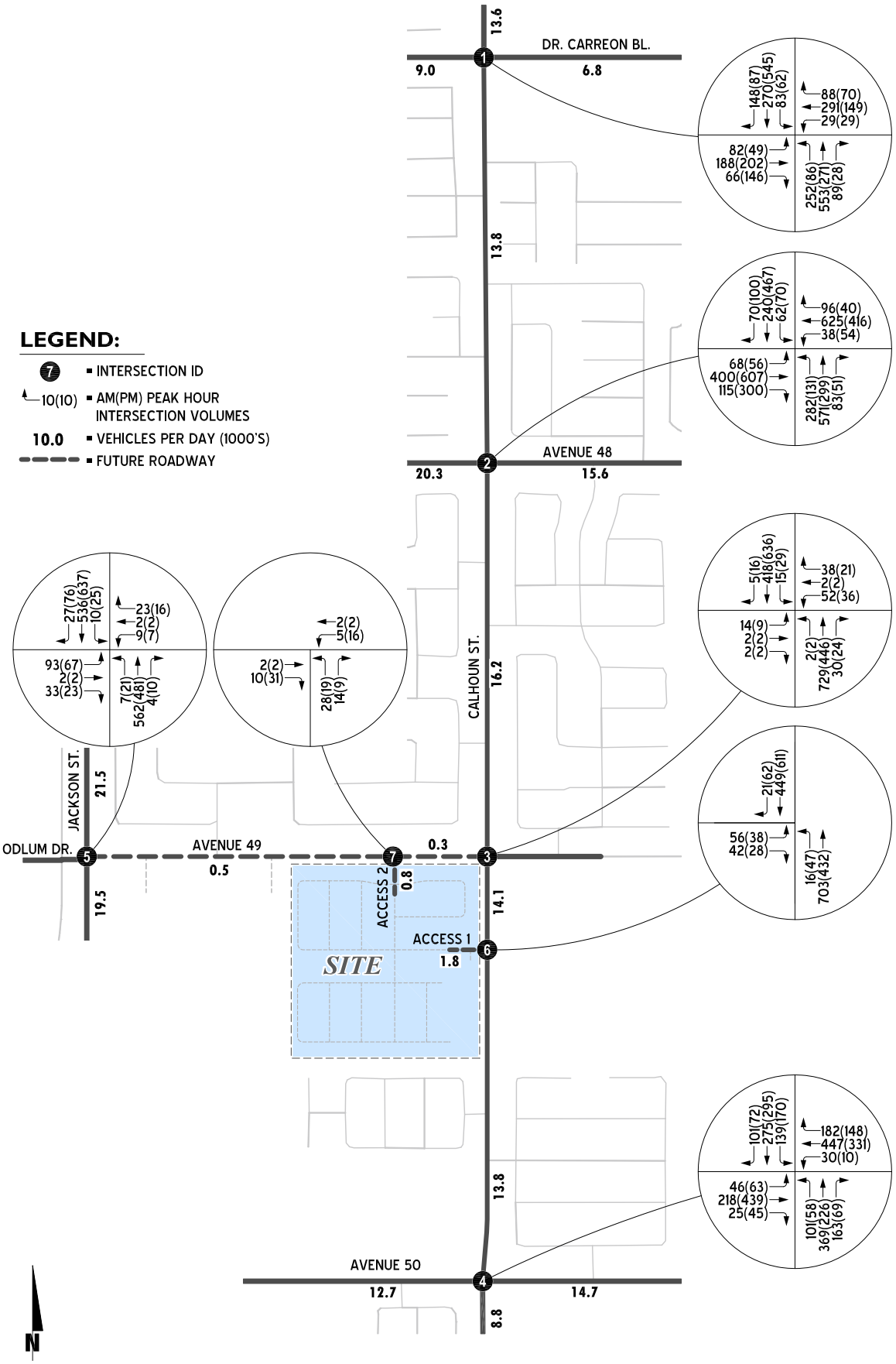

TABLE 5-1: INTERSECTION ANALYSIS FOR EAP (2026) CONDITIONS

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service AM	PM
1	Calhoun St. / Dr. Carreon Bl.																	
	- With Existing All-Way Stop	AWS	1	1	1	1	2	0	1	1	1	1	1	0	>80	41.7	F	E
	- With Traffic Signal Improvement	**TS**	1	1	1	1	2	0	1	1	1	1	1	0	39.0	31.9	D	C
2	Calhoun St. / Avenue 48	TS	1	2	0	1	2	0	1	3	0	1	3	0	33.7	30.3	C	C
3	Calhoun St. / Avenue 49																	
	- With Existing All-Way Stop	AWS	**1**	1	0	1	1	**1**	0	**1!**	0	0	1!	0	>80	46.2	F	E
	- With Traffic Signal Improvement	**TS**	**1**	1	0	1	1	**1**	0	**1!**	0	0	1!	0	10.4	7.9	B	A
4	Calhoun St. / Avenue 50	TS	1	2	0	1	2	0	1	**2**	0	1	2	0	34.3	29.3	C	C
5	Jackson St. / Avenue 49 - Odlum Dr.																	
	- With Existing All-Way Stop	AWS	1*	1	0	1*	2	1	1	0	d	0	**1!**	0	74.2	35.0	F	D
	- With Traffic Signal Improvement	**TS**	**1**	1	0	**1**	2	1	0.5	0.5	d	0	**1!**	0	12.4	9.2	B	A
6	Calhoun St. / Access 1	**CSS**	**1**	1	0	0	1	0	0	**1!**	0	0	0	0	27.3	25.1	D	D
7	Access 2 / Avenue 49	**CSS**	0	**1!**	0	0	0	0	0	**1**	0	**0.5**	**0.5**	0	8.7	8.8	A	A

[1] TS = Traffic Signal; CSS = Cross-Street Stop; AWS = All Way Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; d = Defacto Right Turn Lane; 0.5 = Shared Lane; 1! = Shared Left/Through/Right lane;
* = Left-Turn accommodated within two-way left turn lane (TWLTL) striped median; **1** = Improvement

[3] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

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6 EAPC (2026) TRAFFIC CONDITIONS

This section discusses the methods used to develop Existing plus Ambient plus Project plus Cumulative (EAPC) (2026) traffic forecasts, and the resulting intersection operations and traffic signal warrant analyses.

The lane configurations and traffic controls assumed to be in place for EAPC (2026) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for EAPC conditions (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- If applicable, driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for EAPC conditions (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).

6.1 EAPC (2026) TRAFFIC VOLUME FORECASTS

This scenario consists of existing traffic volumes plus an ambient growth factor of 4.04% plus traffic from pending and approved but not yet constructed known development projects in the area plus the Project.

The weekday ADT and weekday peak hour volumes which can be expected for EAPC (2026) traffic conditions are shown on Exhibit 6-1.

6.2 INTERSECTION OPERATIONS ANALYSIS

The intersection analysis results summarized in Table 6-1, indicate that the following intersections are anticipated to continue to operate at an unacceptable LOS during peak hours under EAPC conditions, without installation of the traffic signal that are currently warranted for existing conditions.

- Calhoun Street / Dr. Carreon Boulevard (#1)
- Calhoun Street / Avenue 49 (#3)
- Jackson Street / Avenue 49 – Odlum Drive (#5)

The intersection operations analysis worksheets for EAPC traffic conditions are included in Appendix 6.1 of this TA.

EXHIBIT 6-1: EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE (2026) TRAFFIC VOLUMES

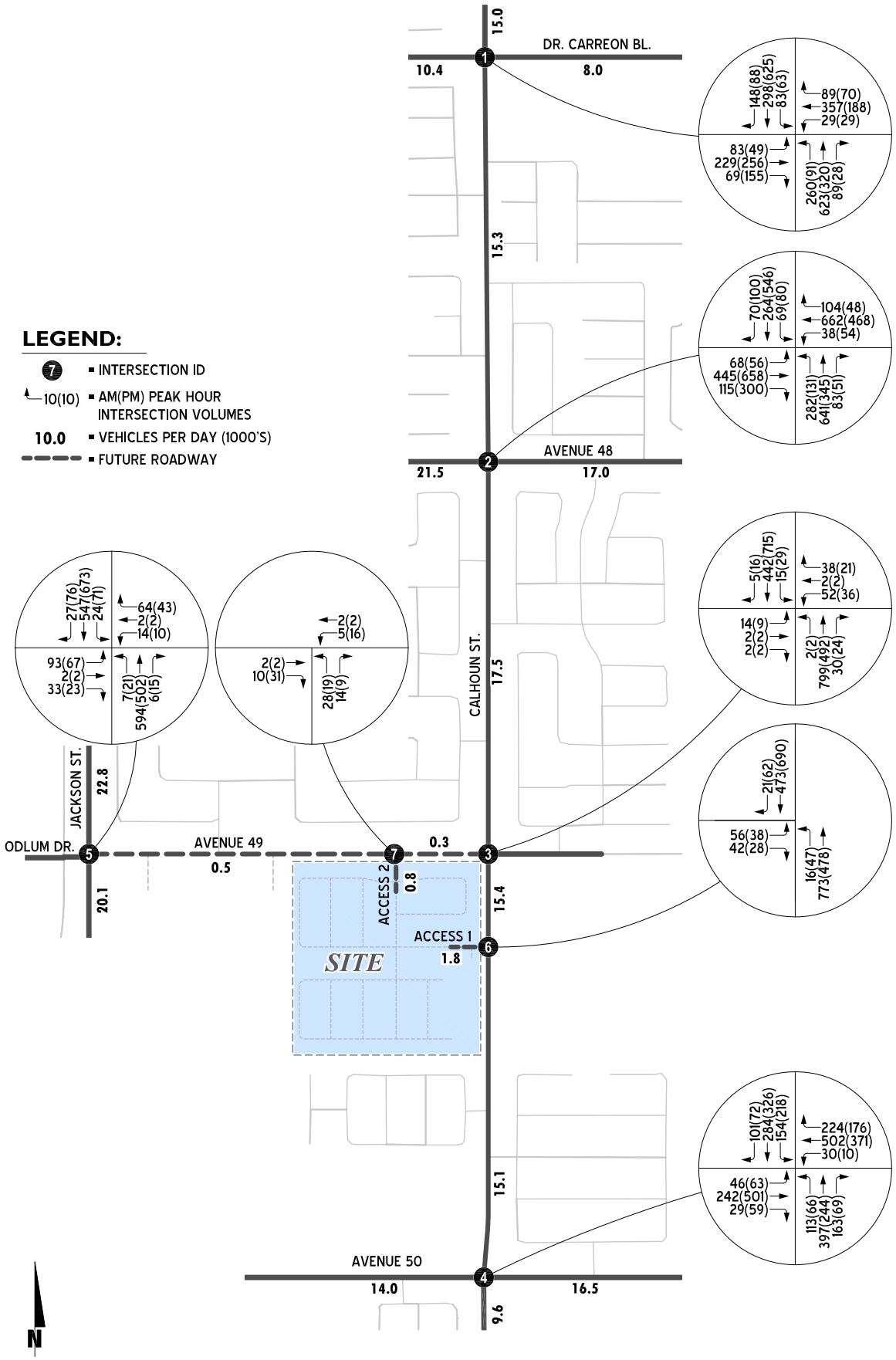

TABLE 6-1: INTERSECTION ANALYSIS FOR EAPC (2026) CONDITIONS

#	Intersection	Traffic Control[1]	Intersection Approach Lanes[2] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[3] (secs.) AM	PM	Level of Service AM	PM
1	Calhoun St. / Dr. Carreon Bl.																	
	- With Existing All-Way Stop	AWS	1	1	1	1	2	0	1	1	1	1	1	0	>80	>80	F	F
	- With Traffic Signal Improvement	**TS**	1	1	1	1	2	0	1	1	1	1	1	0	43.6	32.6	D	C
2	Calhoun St. / Avenue 48	TS	1	2	0	1	2	0	1	3	0	1	3	0	34.7	31.0	C	C
3	Calhoun St. / Avenue 49																	
	- With Existing All-Way Stop	AWS	**1**	1	0	1	1	**1**	0	**1!**	0	0	1!	0	>80	75.4	F	F
	- With Traffic Signal Improvement	**TS**	**1**	1	0	1	1	**1**	0	**1!**	0	0	1!	0	10.9	7.8	B	A
4	Calhoun St. / Avenue 50	TS	1	2	0	1	2	0	1	**2**	0	1	2	0	37.8	30.5	D	C
5	Jackson St. / Avenue 49 - Odlum Dr.																	
	- With Existing All-Way Stop	AWS	1*	1	0	1*	2	1	1	0	d	0	**1!**	0	>80	47.9	F	E
	- With Traffic Signal Improvement	**TS**	**1**	1	0	**1**	2	1	0.5	0.5	d	0	**1!**	0	15.7	11.9	B	B
6	Calhoun St. / Access 1	**CSS**	**1**	1	0	0	1	0	0	**1!**	0	0	0	0	32.2	30.6	D	D
7	Access 2 / Avenue 49	**CSS**	0	**1!**	0	0	0	0	0	**1**	0	**0.5**	**0.5**	0	8.7	8.8	A	A

[1] TS = Traffic Signal; CSS = Cross-Street Stop; AWS = All Way Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; d = Defacto Right Turn Lane; 0.5 = Shared Lane; 1! = Shared Left/Through/Right lane;
* = Left-Turn accommodated within two-way left turn lane (TWLTL) striped median; **1** = Improvement

[3] Per the Highway Capacity Manual (7th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

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6.3 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis worksheets for EAPC (2026) traffic conditions are provided in Appendix 3.3. For EAPC conditions, no additional study area intersections meet the volume warrants for installation of a traffic signal (see Appendix 3.3).

As mentioned previously, a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

Installation of a traffic signal at the intersection of Calhoun Street / Access 1 (which was previously warranted under EAP 2026 conditions) is not currently recommended since this intersection is anticipated to continue to operate at an acceptable LOS under EAPC (2026) conditions as a cross-street stop controlled intersection.

6.4 CUMULATIVE IMPROVEMENTS

The provision of traffic signal control addresses the off-site intersection operational deficiency for EAPC (2026) conditions at the intersections of Calhoun Street / Dr. Carreon Boulevard (#1), Calhoun Street / Avenue 49 (#3), and Jackson Street / Avenue 49 – Odlum Drive (#5). The effectiveness of this recommended signal improvement at the abovementioned intersections are presented in Table 6-1 for EAPC (2026) traffic conditions.

The intersection operations analysis worksheets for EAPC (2026) traffic conditions, with this traffic signal improvement, are included in Appendix 6.1 of this TA.

7 CUMULATIVE AND SITE ACCESS IMPROVEMENTS

7.1 RECOMMENDED CUMULATIVE IMPROVEMENTS

The provision of traffic signal control addresses the off-site intersection operational deficiency for EAPC (2026) conditions at the intersections of Calhoun Street / Dr. Carreon Boulevard (#1), Calhoun Street / Avenue 49 (#3), and Jackson Street / Avenue 49 – Odlum Drive (#5).

Detailed fair share calculations, for each peak hour, are provided below (see Table 7-1).

TABLE 7-1: EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE (EAPC) FAIR SHARE CALCULATIONS

#	Intersection	Existing (2024) Traffic	EAPC (2026) Traffic[3]	Project Only Traffic	Total New Traffic[1]	Project Fair Share (%)[2]
1	Calhoun St. / Dr. Carreon Bl.					
	• AM Peak Hour	2,002	2,357	58	355	16.3%
	• PM Peak Hour	1,585	1,962	75	377	**19.9%**
3	Calhoun St. / Avenue 49					
	• AM Peak Hour	1,159	1,403	96	244	39.3%
	• PM Peak Hour	1,050	1,350	125	300	**41.7%**
5	Jackson St. / Avenue 49 - Odlum Dr.					
	• AM Peak Hour	1,209	1,413	38	204	18.6%
	• PM Peak Hour	1,253	1,505	50	252	**19.8%**

[1] Total New Traffic = (EAPC 2026 - Existing Traffic)

[2] Project Fair Share % = (Project Only Traffic / Total New Traffic)

[3] Existing Plus Ambient Plus Project Plus Cumulative (2026) Conditions

F:\UXRjobs_15600_16000_15800\15830\02_LOS\Excel\[15830 - Report.xlsx]7-1 FairShare

7.2 ON-SITE AND SITE-ADJACENT IMPROVEMENTS

The following recommendations are based on the minimum improvements needed to accommodate site access and maintain acceptable peak hour operations for the proposed Project. On-site and site adjacent recommendations are shown on Exhibit 7-1.

- Project to construct Avenue 49 as a 2-lane roadway (40 feet curb-to-curb width) from Jackson Street to the Project's westerly site boundary.
- Project to construct Avenue 49 at its ultimate southerly half section width as a Primary Arterial with bicycle facility from the Project's westerly site boundary to the Project's easterly site boundary (Calhoun Street).

- Project to widen Calhoun Street at its ultimate westerly half-section width as a Collector Roadway with Bicycle facility from Project's northerly site boundary (Avenue 49) to the Project's southerly boundary.
- Project to implement a new traffic signal at the Calhoun Street / Avenue 49 (#3) intersection, with potential future reimbursement contingent upon cumulative development activity.
- Access to the adjacent public park to be provided from Calhoun Street, subject to park development access and parking plans (to be determined).

Exhibit 7-2 shows the following site access and site adjacent intersection improvements:

#3 – Calhoun Street / Avenue 49

- Provide a separate northbound left turn lane.
- Modify southbound approach striping to provide a separate southbound right turn lane.
- Provide a shared eastbound left/thru/right lane.

#6 – Calhoun Street / Access 1

- Provide a separate northbound left turn lane.
- Provide a shared eastbound left/right turn lane.

#7 – Access 1 / Avenue 49

- Provide a shared northbound left/right turn lane.
- Provide a shared eastbound thru/right turn lane.
- Provide a shared westbound left/thru lane.

EXHIBIT 7-1: SITE ACCESS RECOMMENDATIONS

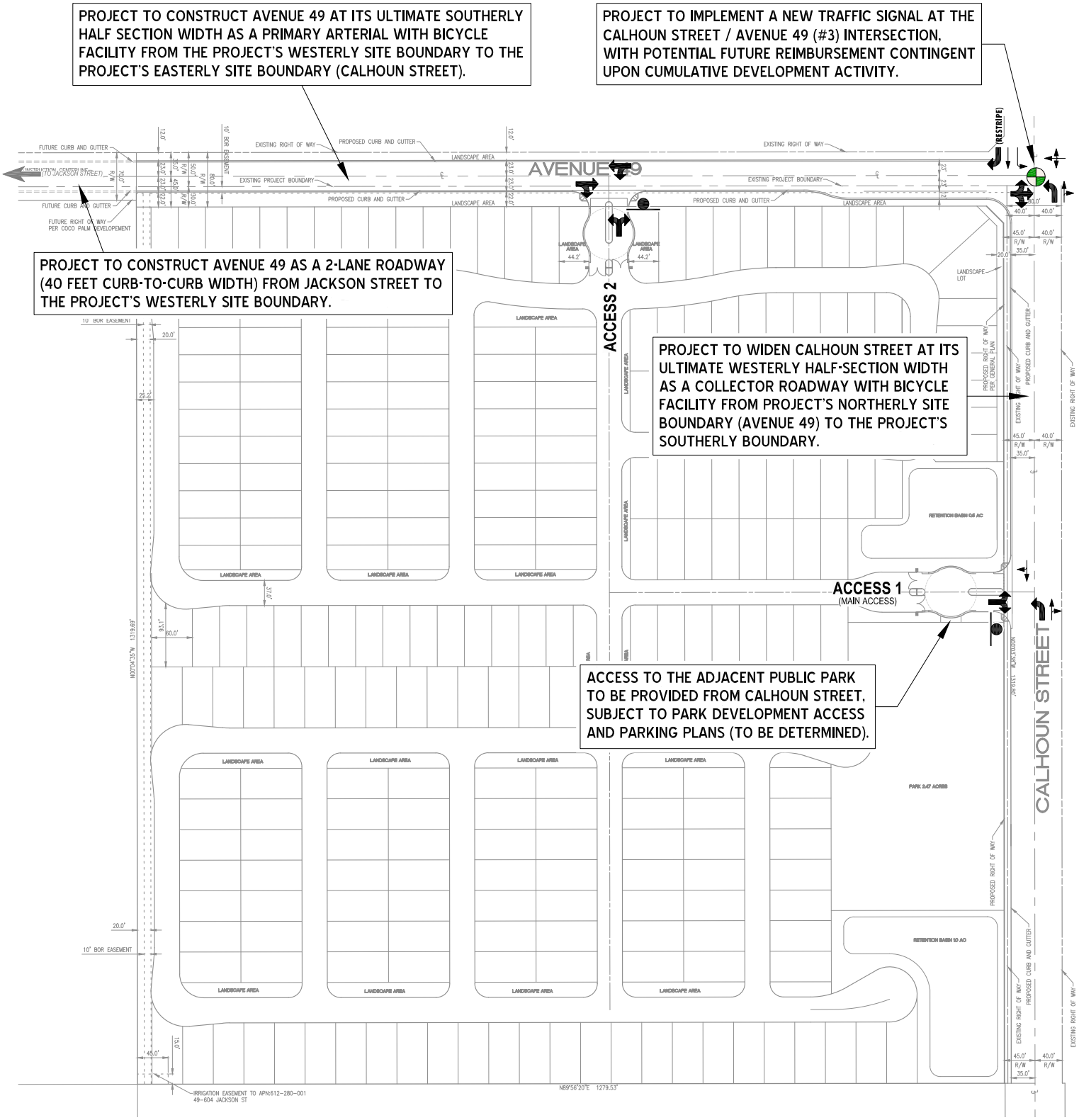
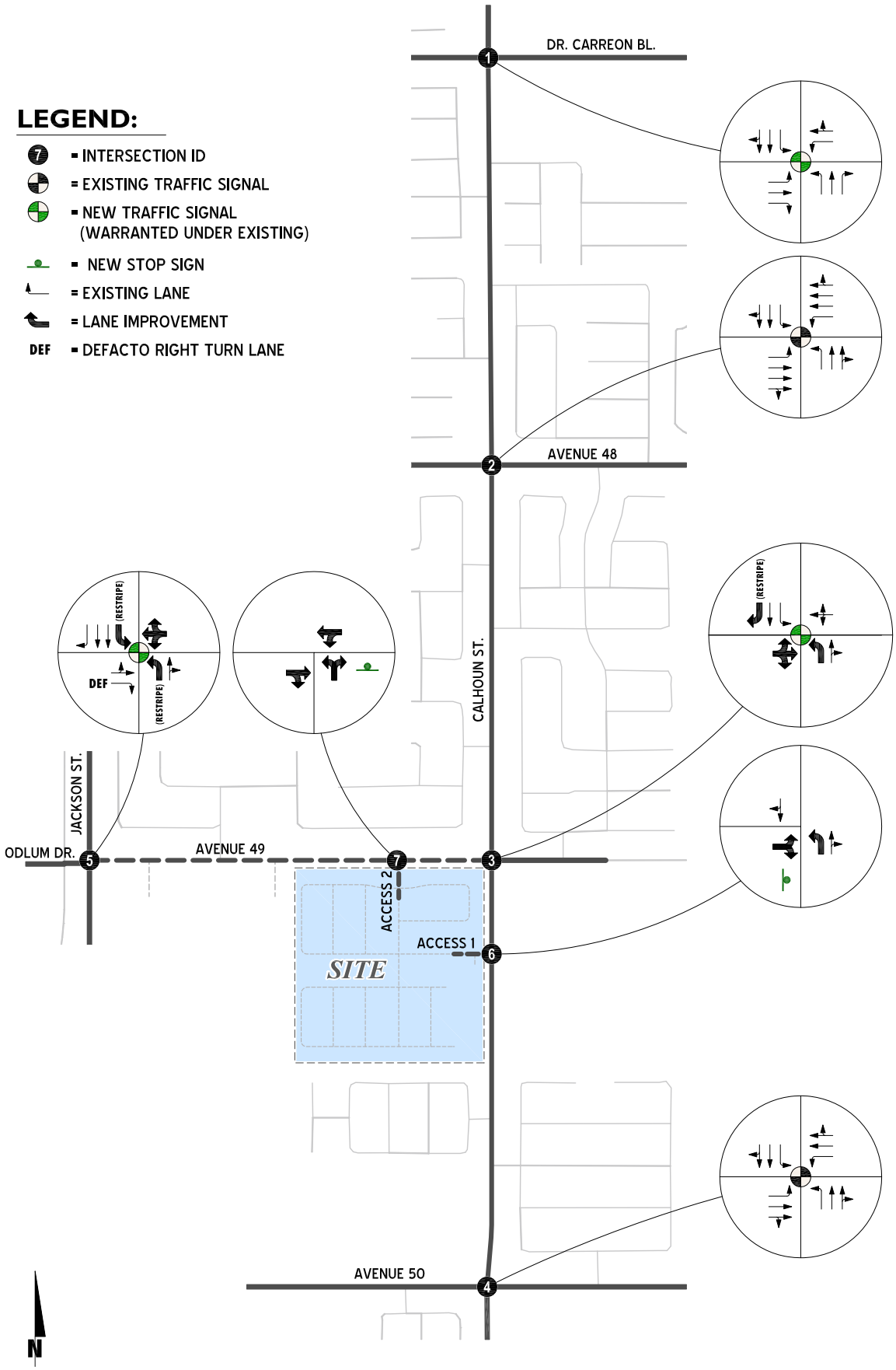


EXHIBIT 7-2: RECOMMENDED INTERSECTION IMPROVEMENTS FOR EAP (2026) AND EAPC (2026) CONDITIONS



8 REFERENCES

1. **Riverside County.** *Transportation Analysis Guidelines for Level of Service & Vehicle Miles Traveled.* Riverside County : s.n., December 2020.
2. **Transportation Research Board.** *Highway Capacity Manual (HCM), 7th Edition.* s.l. : National Academy of Sciences, 2022.
3. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014, Updated March 30, 2021 (Revision 6).
4. **Institute of Transportation Engineers.** Trip Generation Manual. 11th Edition, 2021.

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APPENDIX 1.1: TRAFFIC STUDY SCOPE

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SCOPING AGREEMENT FOR TRANSPORTATION LOS ANALYSIS

This letter acknowledges the Riverside County Transportation Department requirements for transportation level of service analysis of the following project. The analysis must follow the Riverside County Transportation Department Transportation Analysis Guidelines, December 2020.

Case No.	
Related Cases	
Project Name:	Calhoun Street Subdivision
Project Address:	Southwest corner of Calhoun Street and Avenue 49
Project Description:	258 single family detached residential units and 1.5 acre park with dog run

	Traffic Consultant	Applicant/Developer
Name:	Marlie Whiteman, P.E., Urban Crossroads, Inc.	Terra Nova Planning & Research, Inc. - Nicole Criste
Address:	1133 Camelback St. #8329	42635 Melanie Place, Ste 101
	Newport Beach, CA 92658	Palm Desert, CA. 92211
Telephone:	714.585.0574	(760) 341-4800
E-mail:	mwhiteman@urbanxroads.com	ncriste@terranovaplanning.com

Current GP Land Use	Suburban Neighborhood	Proposed Land Use	Suburban Neighborhood
Current Zoning	Suburban Neighborhood (S-N)	Proposed Zoning	Suburban Neighborhood (S-N)

A. Trip Generation Source: ITE Trip Generation 11th Edition (see Table 1)

	Current Trip Generation			Proposed Trip Generation		
	In	Out	Total	In	Out	
AM Trips/Saturday Morning				51	139	190
PM Trips/Sunday Afternoon				155	93	248

Internal Trip Allowance ☐ Yes ☑ No (____ % Trip Discount)

Pass-By Trip Allowance ☐ Yes ☑ No (____ % Trip Discount)

A pass-by trip discount of 25% is allowed for appropriate land uses. The pass-by trips at adjacent study area intersections and project driveways shall be indicated on a report figure.

B. Trip Geographic Distribution: (attach exhibit for detailed assignment)

N %	S %	E %	W %
See Exhibit 3			

C. Background Traffic

Project Build-out Year:	2026	Annual Ambient Growth Rate:	2 %
Phase Year(s)	Not Applicable		
Other projects to be analyzed:	To be provided by the City. Initial list provided in Exhibit 8 and Table 2.		
Model/Forecast methodology	Not Applicable		

D. Study intersections: *(NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)*

1. Calhoun St. / Dr. Carreon Bl.
2. Calhoun St. / Avenue 48
3. Calhoun St. / Avenue 49
4. Calhoun St. / Avenue 50
5. Jackson St. / Odlum Dr.
6. Access 2 / Avenue 49 (Future)
7. Calhoun St. / Access 1 (Future)
8. Calhoun St. / Access 3 (Future)
9.
10.

E. Study Roadway Segments: *(NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)*

1. Calhoun Street, south of Avenue 49
2.
3.
4.
5.
6.
7.
8.
9.
10.

F. Other Jurisdictional

Is this project within a City's Sphere of Influence or one-mile radius of City boundaries? ☑ Yes ☐ No

If yes, name of jurisdiction(s): Coachella

G. Site Plan (please attach reduced copy) See Exhibit 1

H. Specific issues to be addressed in the Study (in addition to the standard analysis described in the Guideline) (To be filled out by Transportation Department)

(NOTE: If the traffic study states that "a traffic signal is warranted" (or "a traffic signal appears to be warranted," or similar statement) at an existing unsignalized intersection under existing conditions, 8-hour approach traffic volume information must be submitted in addition to the peak hourly turning movement counts for that intersection.)

I. Existing Conditions

Traffic count data must be new or recent. Provide traffic count dates if using other than new counts.
Date of counts August 27, 2024

***NOTE* Traffic Study Submittal Form and appropriate fee must be submitted with this form.**

Recommended by:

Marlie Whiteman 08/14/2024
Traffic Consultant Date

Approved Scoping Agreement

Date

Scoping Agreement Submitted on 06/17/2024
Revised on 08/14/2024

MEMORANDUM

URBAN | CROSSROADS

DATE: August 14, 2024
TO: Mr. Andrew Simmons, P.E., City of Coachella
FROM: John Kain and Marlie Whiteman, Urban Crossroads, Inc.
JOB NO: 15830-02 LOS Scope.docx

CALHOUN STREET SUBDIVISION – LEVEL OF SERVICE (LOS) ANALYSIS SCOPE

Urban Crossroads, Inc. is pleased to submit the following LOS traffic study scope for the proposed Calhoun Street Subdivision development (**Project**). The Project is located at the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella. The following evaluation is based on the County of Riverside's Transportation Analysis Guidelines for Level of Service & Vehicle Miles Traveled (December 2020), as the City of Coachella utilizes the County guidelines.

PROJECT DESCRIPTION

It is our understanding that the Project is to consist of 258 dwelling units and a 1.5-acre park with dog run on approximately 40 acres. A preliminary site plan for the proposed Project is shown on Exhibit 1.

Access to the Project is provided via Access 1 at Calhoun Street (full access), Access 2 at Avenue 49 (full access), and Access 3 at Calhoun Street (right-in/right-out only access for the park).

STUDY AREA

Exhibit 2 presents the study area intersection analysis locations. Study area intersections will be evaluated using the HCM 7 methodology. Count data will be collected during the AM and PM peak hours on a typical weekday.

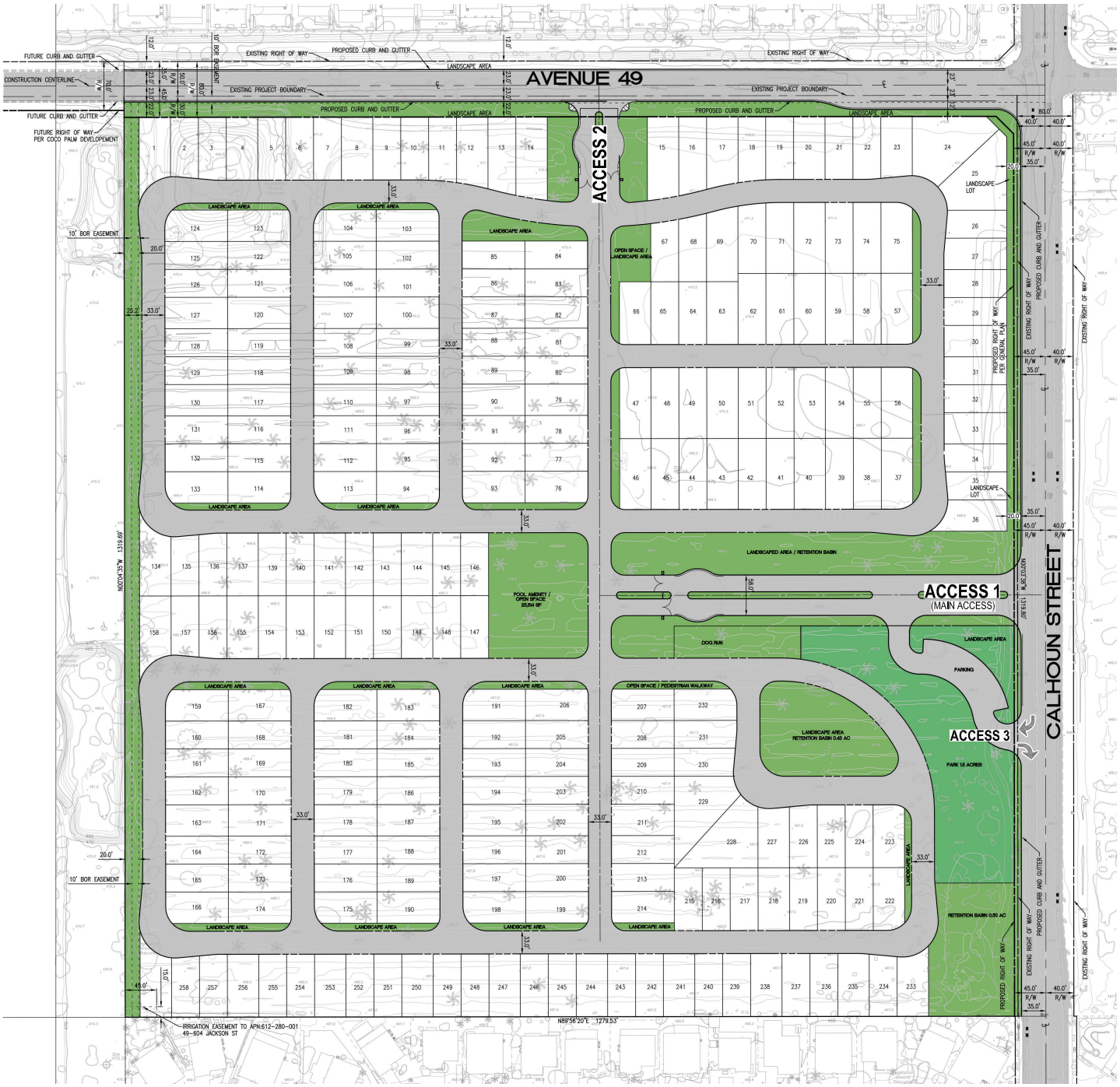
ANALYSIS SCENARIOS

The analysis of peak hour operations at study area intersections will be provided for the following analysis scenarios:

- Existing (2024)
- Existing Plus Ambient Growth Plus Project (2026) Conditions (EAP)
  - EAP with Improvements *(if needed)*
- Existing Plus Ambient Growth Plus Cumulative (2026) Conditions (EAC)
  - EAC with Improvements *(if needed)*
- Existing Plus Ambient Growth Plus Project Plus Cumulative (2026) Conditions (EAPC)
  - EAPC with Improvements *(if needed)*

EAP traffic conditions will be utilized to determine direct Project traffic impacts, while the EAPC (2026) analysis will be utilized to determine the Project's cumulatively considerable/direct impacts (subject to payment of fees/fair share).

EXHIBIT 1: PRELIMINARY SITE PLAN



LEGEND:

▪ RIGHT-IN/RIGHT-OUT ONLY

N

Based on the traffic analysis results, the TA will indicate new improvement requirements and fair share contribution for the proposed Project.

STUDY AREA

Per the County's traffic study guidelines, the study area has been developed by including locations where the Project is anticipated to contribute 50 or more peak hour trips within a 5-mile radius of the Project. Exhibit 2 presents the study area intersection analysis locations. The study area intersections will be evaluated using the HCM 7 methodology.

AMBIENT GROWTH ASSUMPTIONS

An ambient growth rate of 2.0 percent per year is proposed for the study area intersections which will be compounded for each year to the Project's Opening Year of 2026 (in addition to cumulative development traffic overlays). The growth rate is consistent with the growth rate utilized by the County of Riverside.

TRIP GENERATION

Trip generation represents the amount of traffic that is attracted and produced by a development, and is based upon the specific land uses planned for a given project. Table 1 presents the trip generation rates and the resulting trip generation summary for the proposed Project. The trip generation rates used for this analysis are based upon information collected by the Institute of Transportation Engineers (ITE) as provided in their Trip Generation manual, 11th Edition, 2021. As shown in Table 1, the Project is anticipated to generate a total of 2,508 trip-ends per day with 190 AM peak hour trips and 248 PM peak hour trips.

TRIP DISTRIBUTION

Trip distribution is the process of identifying the probable destinations, directions, or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land use and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. The trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. Exhibits 3 and 4 illustrate the outbound and inbound trip distribution patterns for the Project, respectively.

PROJECT TRAFFIC VOLUMES

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project Only Average Daily Traffic (ADT) volumes and AM and PM peak hour intersection turning movement volumes are shown on Exhibit 5.

EXHIBIT 2: TRAFFIC ANALYSIS STUDY AREA

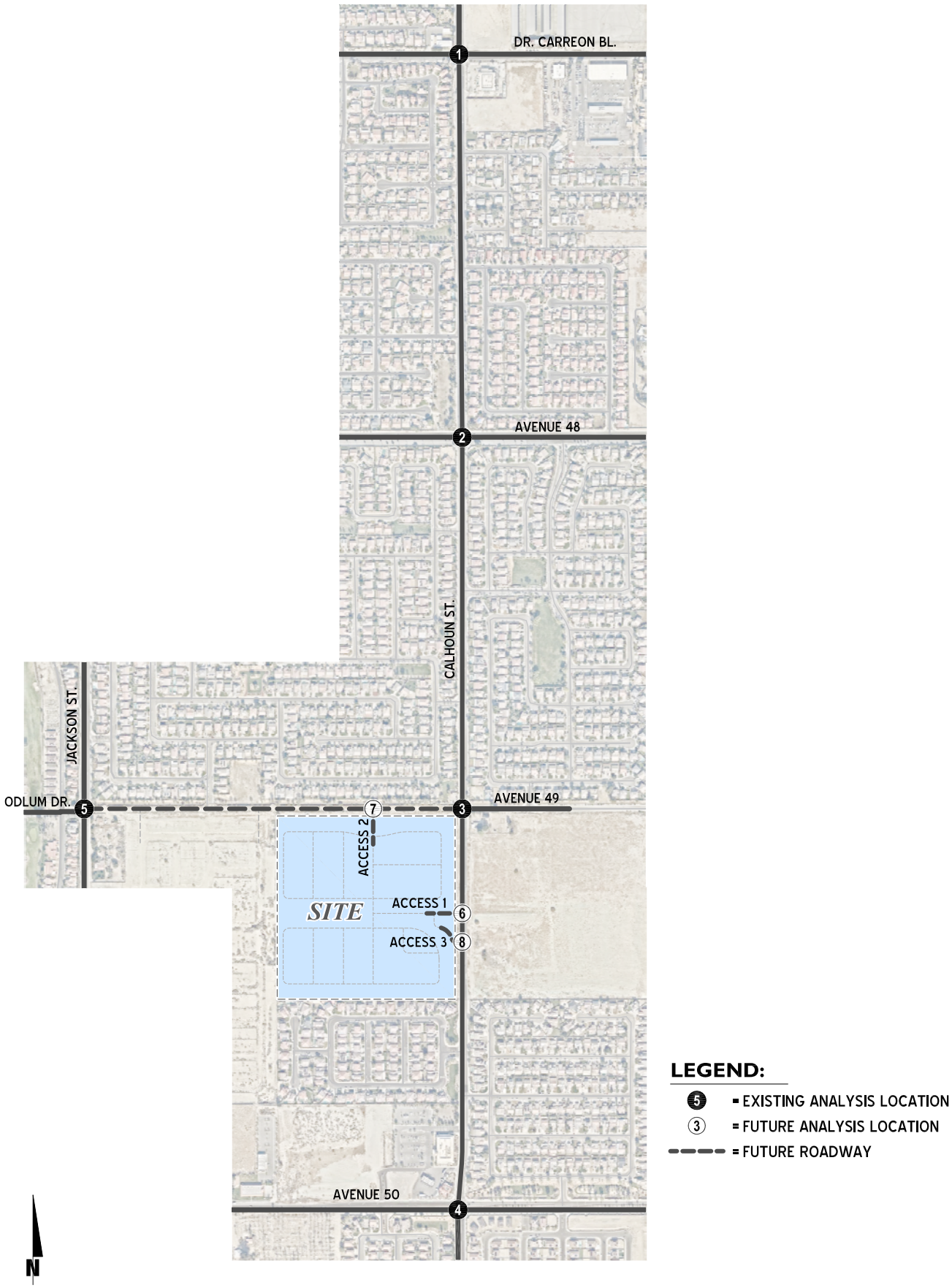


TABLE 1: PROJECT TRIP GENERATION SUMMARY

Trip Generation Rates[1]

Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Single Family Detached	210	258	DU	0.18	0.52	0.70	0.59	0.35	0.94	9.43
Park with Dog Run[3]	--	1.5	AC	3.25	3.25	6.50	2.25	2.25	4.50	50.00

Trip Generation Results

Land Use	ITE LU Code	Quantity[2]		AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Single Family Detached	210	258	DU	46	134	180	152	90	242	2,433
Park with Dog Run	--	1.5	AC	5	5	10	3	3	6	75
TOTAL				**51**	**139**	**190**	**155**	**93**	**248**	**2,508**

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

[2] DU = Dwelling Unit; AC = Acre

[3] Since ITE does not have trip rates for a park with dog run, similar use based on SANDAG's City park is utilized to account for higher park activity related to the dog run use.

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EXHIBIT 3: PROJECT OUTBOUND TRIP DISTRIBUTION

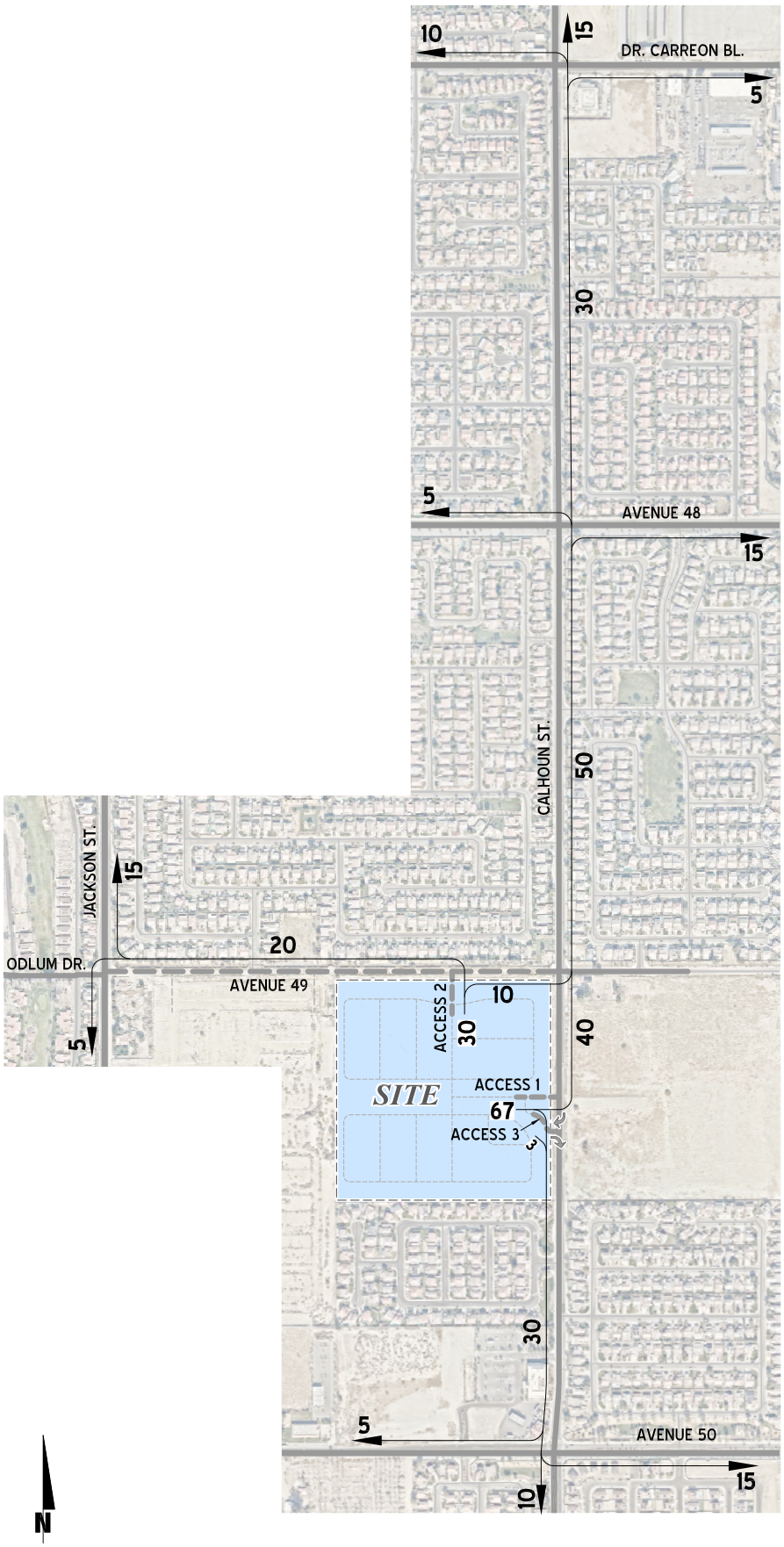


EXHIBIT 4: PROJECT INBOUND TRIP DISTRIBUTION

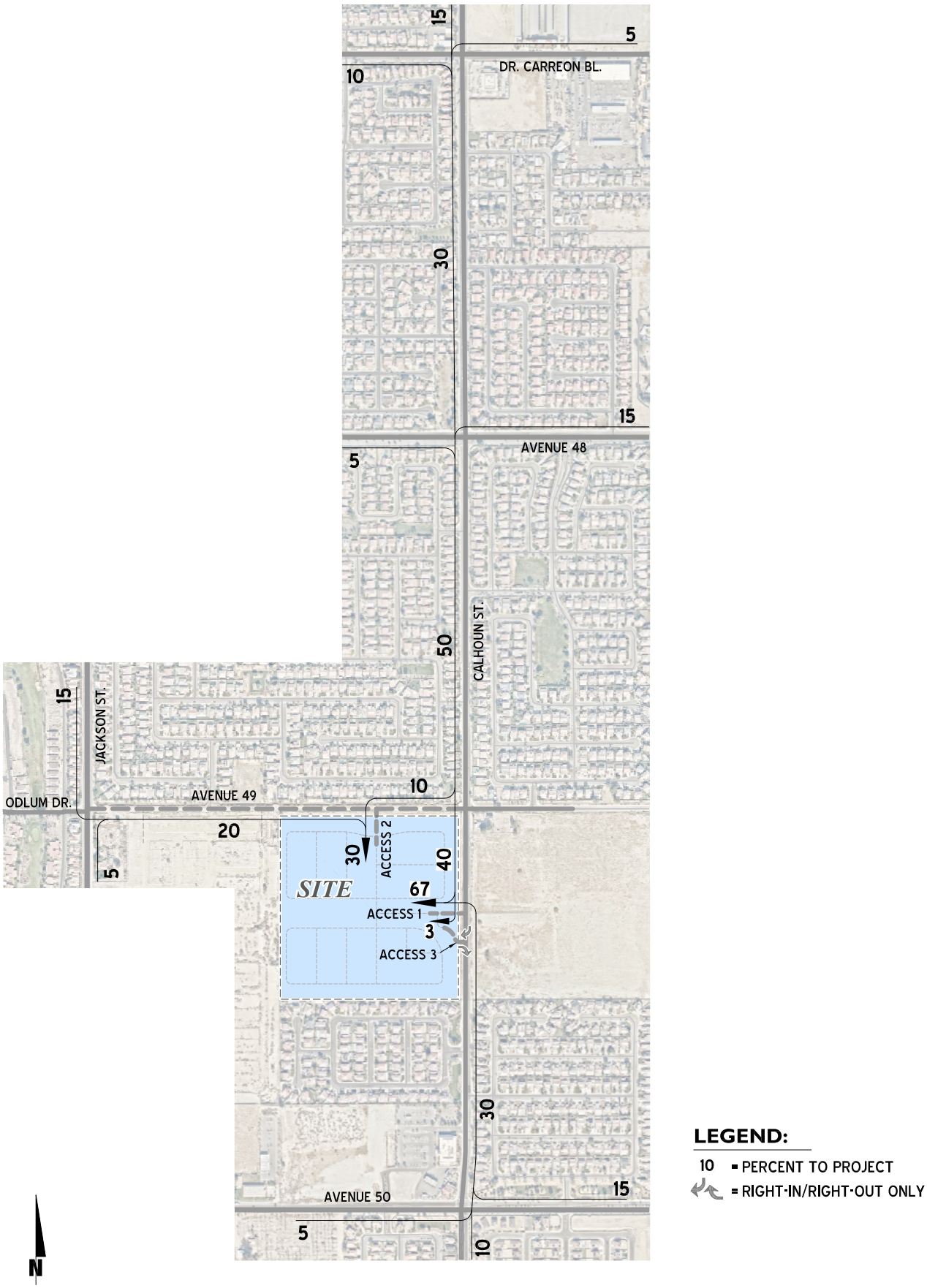
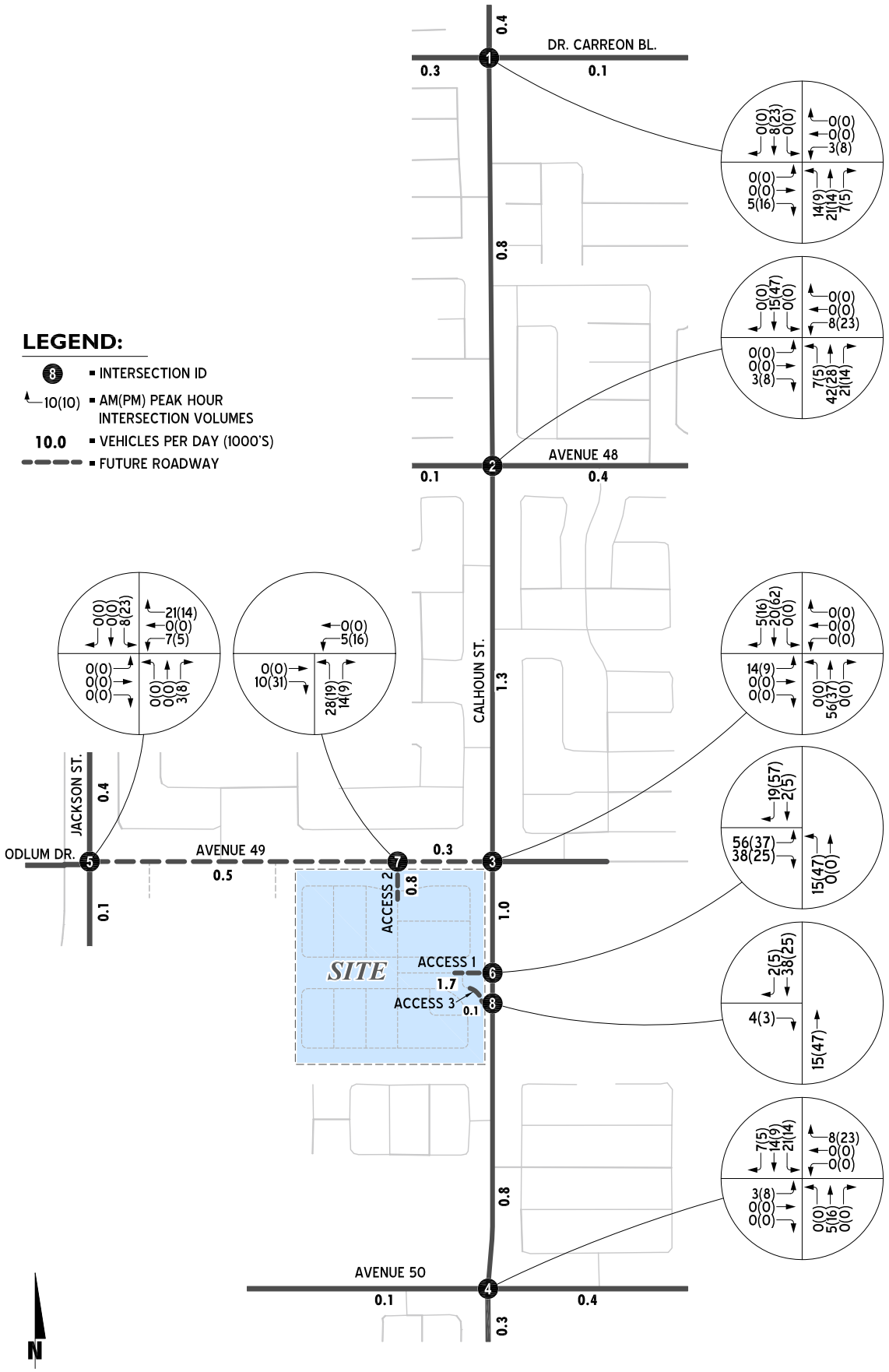


EXHIBIT 5: PROJECT ONLY TRAFFIC VOLUMES



LEVEL OF SERVICE (LOS) CRITERIA AND THRESHOLDS OF SIGNIFICANCE

The City of Coachella's current General Plan applies LOS D as a performance threshold for roadway segments and intersections.

The following thresholds of significance will be applied to study area intersections to identify significant impacts through a comparison of Existing and EAP traffic conditions:

- If an intersection is projected to operate at an acceptable level of service (i.e., LOS D or better) under Existing traffic conditions and the addition of project traffic is expected to cause the intersection to operate at an unacceptable level of service (i.e., LOS E or F), the impact is considered significant;
- If an intersection is projected to operate at LOS E or LOS F under Existing, with the addition of project traffic, the impact is considered significant.

EXISTING COUNT DATA

New traffic counts will be conducted during a typical weekday when local schools are in session and operating on a typical bell schedule. No adjustments are proposed to the traffic counts for the baseline traffic condition with the exception of volume balancing between closely spaced intersections. Traffic counts are scheduled and will be conducted on August 27th with school in full session and not during music festival weekends.

Intersection turning movement counts will be conducted at the study area intersection locations for weekday AM (7-9AM) and weekday PM (4-6PM).

CITY GENERAL PLAN CIRCULATION ELEMENT

The adopted City of Coachella General Plan Circulation Element is shown on Exhibit 6. Exhibit 7 shows the City of Coachella General Plan roadway cross-sections.

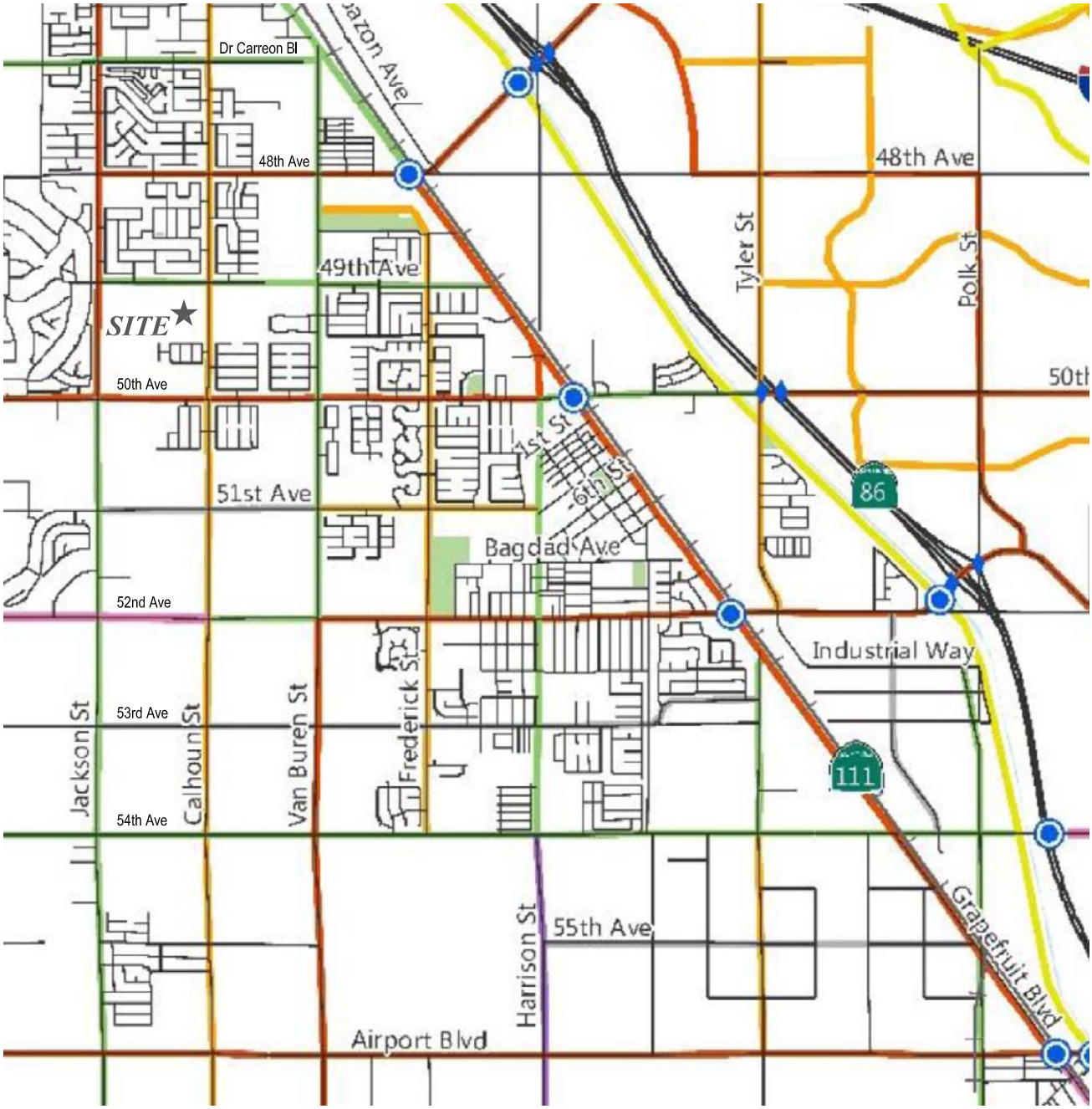
CUMULATIVE DEVELOPMENT

It is requested that City staff review the list of cumulative development projects (shown on Exhibit 8 and listed on Table 2) and any additional information for projects that should be included in this traffic study that may not be reflected Exhibit 8.

Information pertaining to project location, land use, and intensity are necessary for consideration and to estimate trip generation.

If you have any questions, please contact us directly at jkain@urbanxroads.com for John or mwhiteman@urbanxroads.com for Marlie.

EXHIBIT 6: CITY OF COACHELLA GENERAL PLAN CIRCULATION ELEMENT



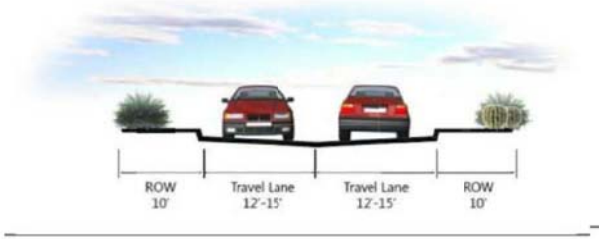
SOURCE: CITY OF COACHELLA

LEGEND:

3 = EXISTING ANALYSIS LOCATION

N

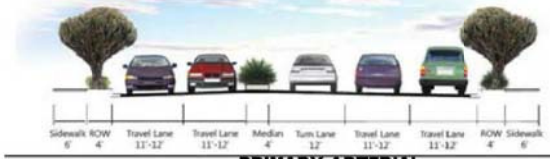
EXHIBIT 7: CITY OF COACHELLA GENERAL PLAN ROADWAY CROSS-SECTIONS



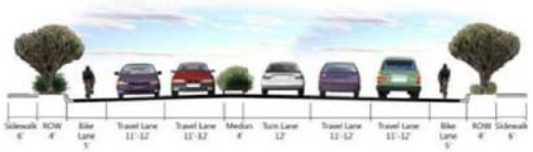
COUNTRY ROAD

MAJOR ARTERIAL

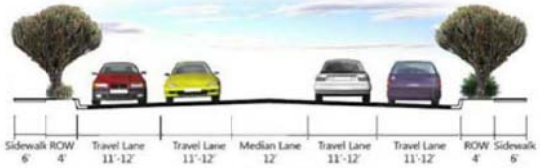
MAJOR ARTERIAL WITH ENHANCED BICYCLE FACILITIES



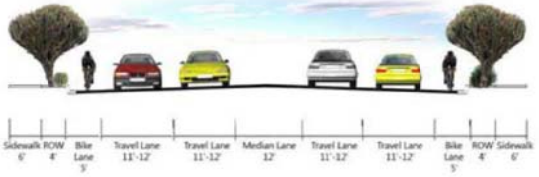
PRIMARY ARTERIAL



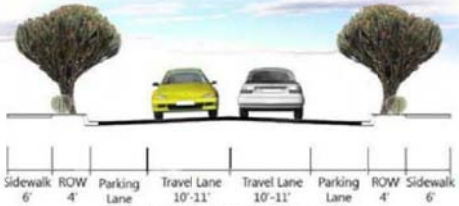
PRIMARY ARTERIAL WITH ENHANCED BICYCLE FACILITIES



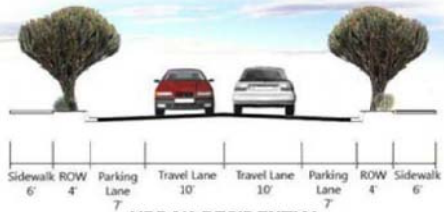
COLLECTOR



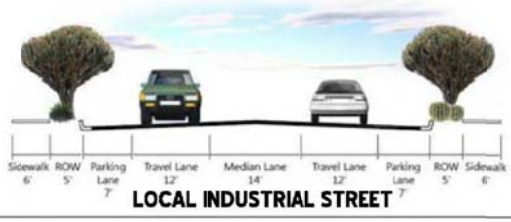
COLLECTOR WITH ENHANCED BICYCLE FACILITIES



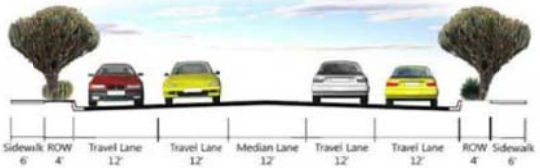
SURURBAN RESIDENTIAL WITH PARKING



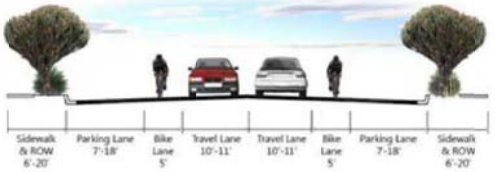
URBAN RESIDENTIAL WITH PARKING



LOCAL INDUSTRIAL STREET



INDUSTRIAL COLLECTOR



URBAN STREET 2-LANE

URBAN STREET 4-LANE

EXHIBIT 8: CUMULATIVE DEVELOPMENT MAP

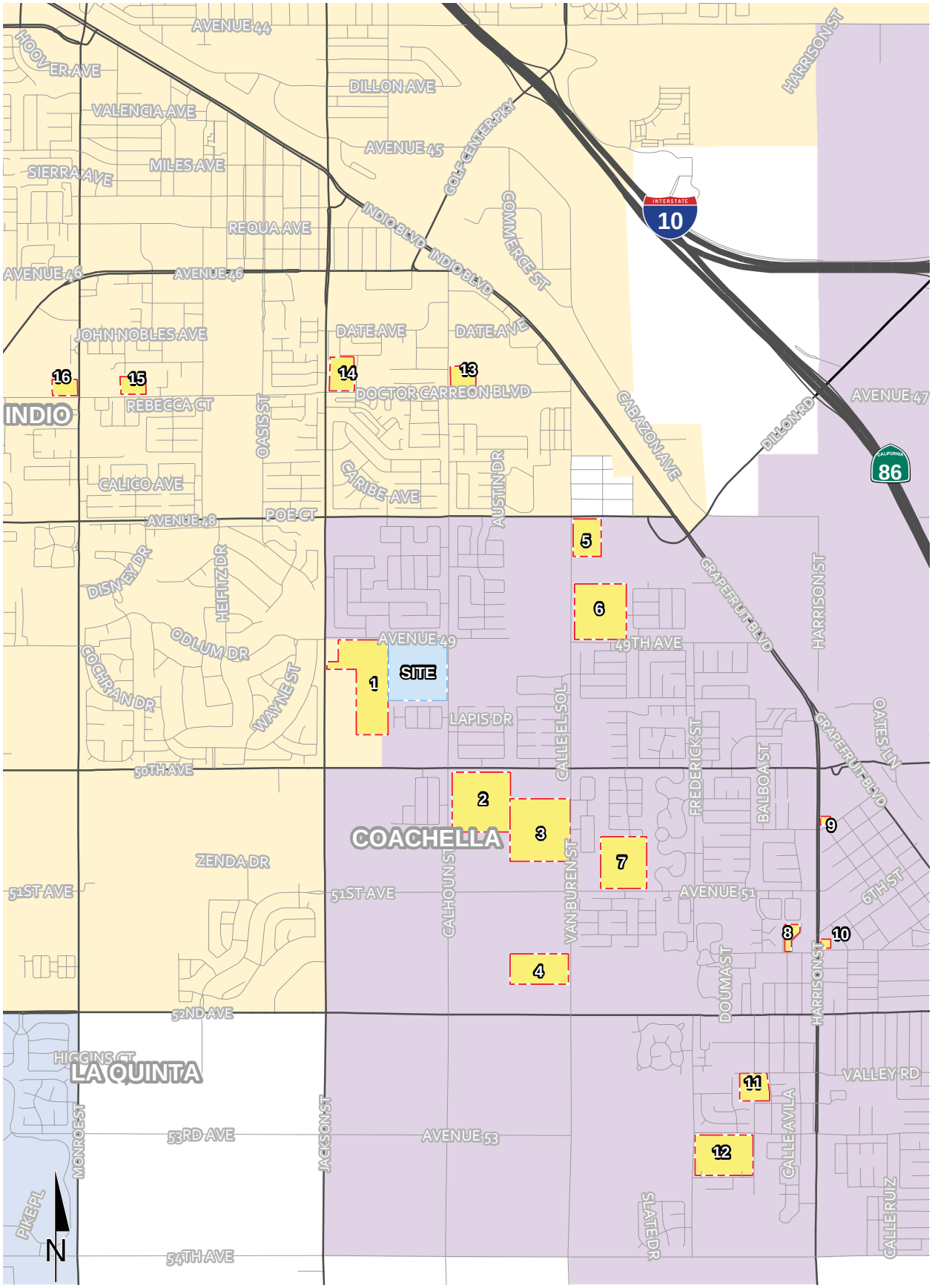


TABLE 2: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

TAZ	Project	Land Use	Quantity	Units[1]
1	TT 38072	Single Family Residential	173	DU
2	Mariposa Pointe	Single Family Residential	155	DU
3	Sevilla II	Single Family Residential	204	DU
4	Encanto	Single Family Residential	112	DU
5	Glenroy Hotel Project	Resort casitas/bungalows	620	RM
		Hotel	130	RM
		Restaurant	3.6	TSF
		Retail Cannabis	3.12	TSF
		General Store	2.5	TSF
		Coffee shop with drive thru	2.5	TSF
6	Rancho Flores 2	Single Family Residential	124	DU
7	Sevilla by Pulte	Single Family Residential	232	DU
8	Placita Dolores Huerta	Multifamily Residential	110	DU
9	Fountainhead Plaza (NEC 1st St. & Cesar Chavez St.)	Supermarket	20.422	TSF
		Fast-Food Restaurant	2.6	TSF
		Coffee Shop w/ Restaurant	2.1	TSF
10	Tripoli Mixed-Use	Multifamily Residential	108	DU
11	Villa Verde Apartments	Multifamily Residential	152	DU
12	Bellissima (Tract 31978)	Single Family Residential	111	DU
13	West Coast Self Storage	Self-Storage Facility	62	TSF
14	Indio Public Safety Campus (NEC Jackson St. & Dr. Carreon Bl.)	Fire Station Expansion	4.1	TSF
		Police Headquarters Expansion	44	EMP
		Government Office Complex	30.1	TSF
15	Coachella Medical Center (North of Dr. Carreon Bl., b/w Monroe & Arabia)	Skilled Nursing Facility	288	Beds
16	Tower Market	Convenience Mkt. w/ Pumps	12	VFP

[1] DU = Dwelling Units; TSF = Thousand Square Feet; RM = Rooms; EMP = Employees; VFP = Vehicle Fueling Positions

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APPENDIX 1.2: VMT SCREENING

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URBAN | CROSSROADS

June 18, 2024

Mr. Andrew Simmons, P.E.
City of Coachella
53990 Enterprise Way
Coachella, CA 92236

CALHOUN STREET SUBDIVISION VEHICLE MILES TRAVELED (VMT) SCREENING

Mr. Andrew Simmons, P.E.,

Urban Crossroads, Inc. is pleased to provide the following Vehicle Miles Traveled (VMT) Screening for the Calhoun Street Subdivision development (Project), which is located at the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella.

PROJECT OVERVIEW

It is our understanding that the Project is to consist of 258 dwelling units and an 1.5 acre park with dog run on approximately 40 acres. A preliminary site plan for the proposed Project is shown on Exhibit 1. Access to the Project is provided via two full access driveways (Access 1 at Calhoun Street and Access 2 at Avenue 49), and one right-in/right-out only access for the park (Access 3 at Calhoun Street).

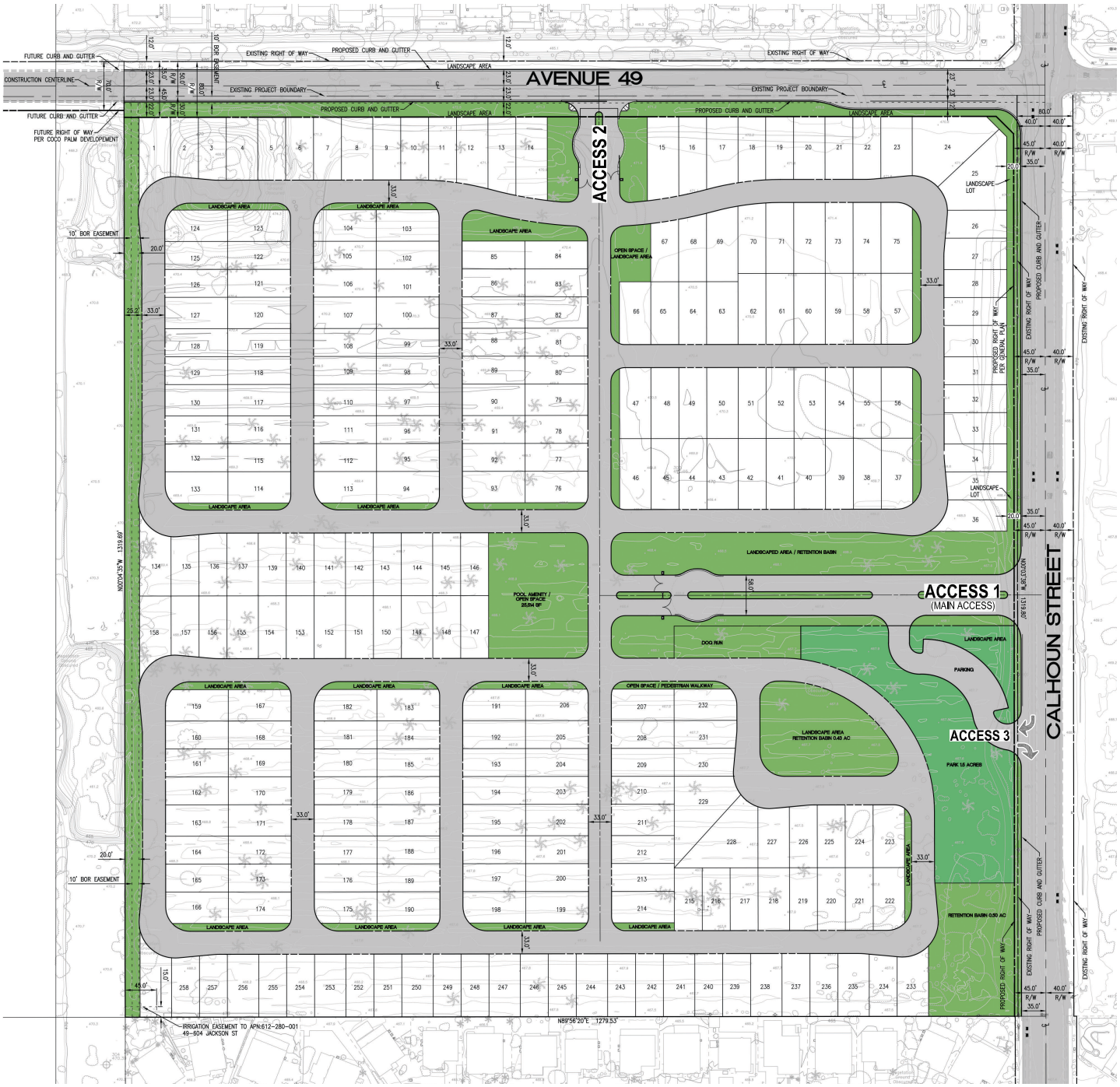
BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which requires all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate went into effect July 1, 2020. To aid in this transition, the Governor's Office of Planning and Research (OPR) released a Technical Advisory on Evaluating Transportation Impacts in CEQA (December of 2018) (**Technical Advisory**) (1). Based on OPR's Technical Advisory, the County of Riverside adopted their Transportation Analysis Guidelines for Level of Service Vehicle Miles Traveled (December of 2020) (**County Guidelines**) (2). The City of Coachella utilizes the adopted County Guidelines.

Consistent with County Guidelines, projects should evaluate available screening criteria based on their location and project type to determine if a presumption of a less than significant transportation impact can be made. The following project screening thresholds were selected for review based on their applicability to the proposed Project:

- Small Projects Screening
- High Quality Transit Areas (HQTA) Screening
- Map-Based Screening
- Local Essential Service Screening

EXHIBIT 1: PRELIMINARY SITE PLAN



SMALL PROJECTS SCREENING

County Guidelines identify those projects forecasted to generate greenhouse gas (GHG) emissions below 3,000 Metric Tons of Carbon Dioxide Equivalent ($MTCO_2e$) per year are also assumed to cause a less than significant VMT impact.[1] The County Guidelines provides a list of land use types based on quantity (i.e., dwelling units or square footage) and provides a typical development potential to be below the 3,000 $MTCO_2e$ per year. Single Family Housing projects less than or equal to 110 dwelling units have been identified to meet the County threshold[2].

The Project quantity of 258 dwelling units is more than the residential VMT screening criteria.

Small Projects screening criteria is not met.

HIGH QUALITY TRANSIT AREAS (HQTA) SCREENING

Projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[3] or an existing stop along a "high-quality transit corridor"[4]) may be presumed to have a less than significant impact absent substantial evidence to the contrary. The Project is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

HQTA screening criteria is not met.

MAP-BASED SCREENING

The County Guidelines note that "residential projects that locate in areas with low VMT, and that incorporate similar features (i.e., density, mix of uses, transit accessibility), will tend to exhibit similarly low VMT."[5] Urban Crossroads has obtained a VMT data table from County Staff for all TAZs within Riverside County that identifies VMT per capita for the purposes of identifying low VMT areas. The data utilizes the sub-regional Riverside Transportation Analysis Model (RIVTAM) to measure baseline VMT performance, and a comparison was made to the applicable impact threshold.

The Project's TAZ was identified in the Riverside County Transportation Analysis Model (RIVTAM) as TAZ 4787.

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[1] County Guidelines; Page 19.
[2] County Guidelines; Page 42, Table 1
[3] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[4] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").
[5] Technical Advisory; Page 12

The County's data table identifies the Project's TAZ 4787 to generate 7.974 VMT per capita. The County regional threshold is 15.2 VMT per capita[6]; therefore the Project is located in a low VMT area.

Map-Based screening criteria is met for residential.

LOCAL ESSENTIAL SERVICE SCREENING

The introduction of new local essential services shortens non-discretionary trips by putting those goods and services closer to complimentary land uses, resulting in conditions which do not increase overall VMT. The park with dog run provides a local service to adjacent land uses that otherwise attract travelers from more distant locations; therefore, the park with dog run is presumed to not increase overall VMT.

Local Essential Service screening criteria is met for park with dog run.

CONCLUSION

In summary, the Project was evaluated consistent with available screening criteria as presented in the County Guidelines. The map based screening criteria is met for residential uses and the local essential service screening criteria is met for park with dog run, so a full analysis of VMT associated with site is not required. The Project is presumed to have a less than significant impact on VMT.

If you have any questions, please contact us at jkain@urbanxroads.com for John or mwhiteman@urbanxroads.com for Marlie.

Respectfully submitted,

URBAN CROSSROADS, INC.

John Kain, AICP
Principal

Marlie Whiteman, P.E.
Senior Associate

[6] County Guidelines; Page 22

REFERENCES

1. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.
2. **County of Riverside.** *Transportation Analysis Guidelines for Level of Service Vehicle Miles Traveled.* County of Riverside : s.n., December 2020.

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APPENDIX 3.1: TRAFFIC COUNTS –2024

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Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Coachella
N/S: Calhoun Street
E/W: Dr Carreon Boulevard
Weather: Clear

File Name : 01_COA_Cal_Dr C AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Dr Carreon Boulevard Westbound				Calhoun Street Northbound				Dr Carreon Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	10	31	29	70	4	22	10	36	23	103	6	132	10	15	4	29	267
07:15 AM	18	30	48	96	2	38	16	56	39	112	18	169	17	29	14	60	381
07:30 AM	14	54	29	97	7	57	17	81	57	112	19	188	19	46	11	76	442
07:45 AM	16	65	24	105	8	63	15	86	50	115	15	180	14	41	9	64	435
Total	58	180	130	368	21	180	58	259	169	442	58	669	60	131	38	229	1525
08:00 AM	19	61	17	97	4	75	23	102	45	87	14	146	16	35	15	66	411
08:15 AM	11	51	12	74	6	58	8	72	18	63	9	90	9	34	18	61	297
08:30 AM	9	44	15	68	1	45	8	54	22	60	4	86	9	41	10	60	268
08:45 AM	8	41	3	52	3	35	6	44	19	39	4	62	10	18	15	43	201
Total	47	197	47	291	14	213	45	272	104	249	31	384	44	128	58	230	1177
Grand Total	105	377	177	659	35	393	103	531	273	691	89	1053	104	259	96	459	2702
Apprch %	15.9	57.2	26.9		6.6	74	19.4		25.9	65.6	8.5		22.7	56.4	20.9		
Total %	3.9	14	6.6	24.4	1.3	14.5	3.8	19.7	10.1	25.6	3.3	39	3.8	9.6	3.6	17	

	Calhoun Street Southbound				Dr Carreon Boulevard Westbound				Calhoun Street Northbound				Dr Carreon Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	18	30	**48**	96	2	38	16	56	39	112	18	169	17	29	14	60	381
07:30 AM	14	54	29	97	7	57	17	81	**57**	112	**19**	**188**	**19**	**46**	11	**76**	**442**
07:45 AM	16	**65**	24	**105**	**8**	63	15	86	50	**115**	15	180	14	41	9	64	435
08:00 AM	**19**	61	17	97	4	**75**	**23**	**102**	45	87	14	146	16	35	**15**	66	411
Total Volume	67	210	118	395	21	233	71	325	191	426	66	683	66	151	49	266	1669
% App. Total	17	53.2	29.9		6.5	71.7	21.8		28	62.4	9.7		24.8	56.8	18.4		
PHF	.882	.808	.615	.940	.656	.777	.772	.797	.838	.926	.868	.908	.868	.821	.817	.875	.944

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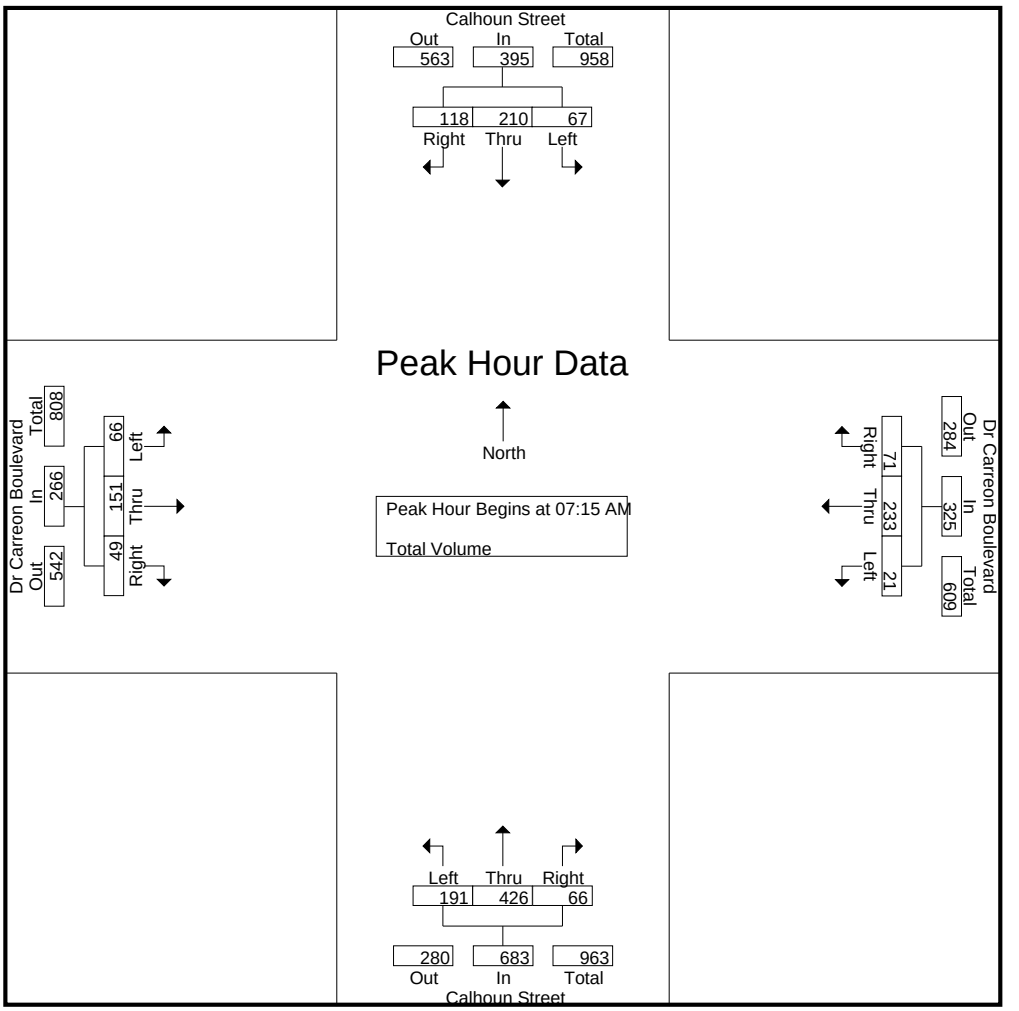
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:30 AM				07:15 AM				07:30 AM			
+0 mins.	18	30	**48**	96	7	57	17	81	39	112	18	169	**19**	**46**	11	**76**
+15 mins.	14	54	29	97	**8**	63	15	86	**57**	112	**19**	**188**	14	41	9	64
+30 mins.	16	**65**	24	**105**	4	**75**	**23**	**102**	50	**115**	15	180	16	35	15	66
+45 mins.	**19**	61	17	97	6	58	8	72	45	87	14	146	9	34	**18**	61
Total Volume	67	210	118	395	25	253	63	341	191	426	66	683	58	156	53	267
% App. Total	17	53.2	29.9		7.3	74.2	18.5		28	62.4	9.7		21.7	58.4	19.9	
PHF	.882	.808	.615	.940	.781	.843	.685	.836	.838	.926	.868	.908	.763	.848	.736	.878

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City of Coachella
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Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Dr Carreon Boulevard Westbound				Calhoun Street Northbound				Dr Carreon Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	21	110	16	147	6	26	13	45	13	44	2	59	10	46	35	91	342
04:15 PM	11	113	17	141	1	38	14	53	16	48	2	66	5	42	21	68	328
04:30 PM	11	107	22	140	7	28	19	54	19	60	6	85	13	41	24	78	357
04:45 PM	7	88	15	110	3	27	10	40	14	54	8	76	11	33	24	68	294
Total	50	418	70	538	17	119	56	192	62	206	18	286	39	162	104	305	1321
05:00 PM	8	98	16	122	4	27	13	44	16	59	6	81	12	30	28	70	317
05:15 PM	7	116	23	146	3	24	13	40	19	62	8	89	8	41	25	74	349
05:30 PM	13	100	26	139	3	37	6	46	18	54	6	78	8	34	30	72	335
05:45 PM	8	93	13	114	9	33	16	58	19	53	4	76	9	22	9	40	288
Total	36	407	78	521	19	121	48	188	72	228	24	324	37	127	92	256	1289
Grand Total	86	825	148	1059	36	240	104	380	134	434	42	610	76	289	196	561	2610
Apprch %	8.1	77.9	14		9.5	63.2	27.4		22	71.1	6.9		13.5	51.5	34.9		
Total %	3.3	31.6	5.7	40.6	1.4	9.2	4	14.6	5.1	16.6	1.6	23.4	2.9	11.1	7.5	21.5	

	Calhoun Street Southbound				Dr Carreon Boulevard Westbound				Calhoun Street Northbound				Dr Carreon Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	**21**	110	16	**147**	6	26	13	45	13	44	2	59	10	**46**	**35**	**91**	342
04:15 PM	11	**113**	17	141	1	**38**	14	53	16	48	2	66	5	42	21	68	328
04:30 PM	11	107	**22**	140	**7**	28	**19**	**54**	**19**	**60**	6	**85**	**13**	41	24	78	**357**
04:45 PM	7	88	15	110	3	27	10	40	14	54	**8**	76	11	33	24	68	294
Total Volume	50	418	70	538	17	119	56	192	62	206	18	286	39	162	104	305	1321
% App. Total	9.3	77.7	13		8.9	62	29.2		21.7	72	6.3		12.8	53.1	34.1		
PHF	.595	.925	.795	.915	.607	.783	.737	.889	.816	.858	.563	.841	.750	.880	.743	.838	.925

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City of Coachella
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E/W: Dr Carreon Boulevard
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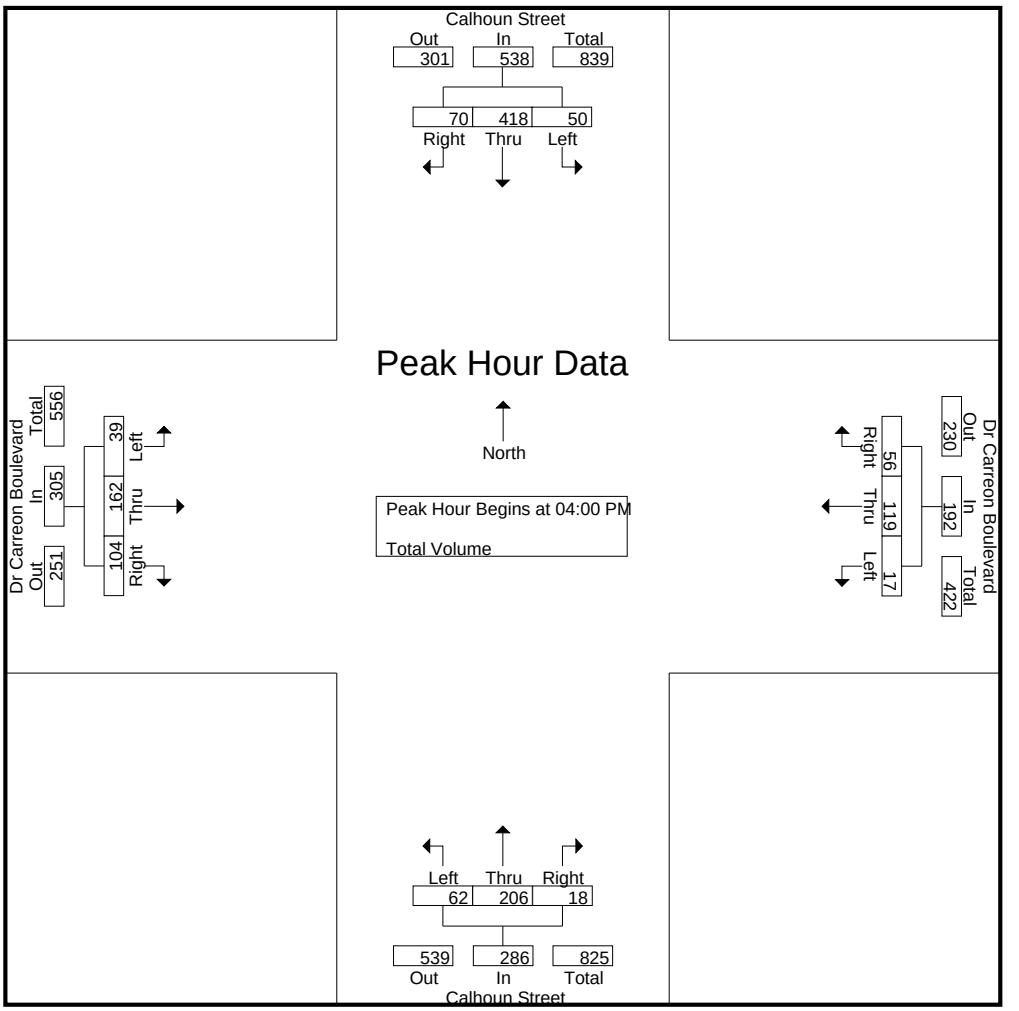
File Name : 01_COA_Cal_Dr C PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:30 PM				04:00 PM			
+0 mins.	**21**	110	16	**147**	6	26	13	45	**19**	60	6	85	10	**46**	**35**	**91**
+15 mins.	11	**113**	17	141	1	**38**	14	53	14	54	**8**	76	5	42	21	68
+30 mins.	11	107	**22**	140	**7**	28	**19**	**54**	16	59	6	81	**13**	41	24	78
+45 mins.	7	88	15	110	3	27	10	40	19	**62**	8	**89**	11	33	24	68
Total Volume	50	418	70	538	17	119	56	192	68	235	28	331	39	162	104	305
% App. Total	9.3	77.7	13		8.9	62	29.2		20.5	71	8.5		12.8	53.1	34.1	
PHF	.595	.925	.795	.915	.607	.783	.737	.889	.895	.948	.875	.930	.750	.880	.743	.838

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(951) 268-6268

City of Coachella
N/S: Calhoun Street
E/W: Avenue 48
Weather: Clear

File Name : 02_COA_Cal_Ave 48 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 48 Westbound				Calhoun Street Northbound				Avenue 48 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	8	25	15	48	3	76	13	92	42	92	8	142	8	45	13	66	348
07:15 AM	10	24	11	45	3	81	14	98	30	105	10	145	17	64	22	103	391
07:30 AM	14	50	12	76	7	142	18	167	62	115	13	190	9	73	24	106	539
07:45 AM	15	58	16	89	7	146	25	178	69	127	15	211	12	108	19	139	617
Total	47	157	54	258	20	445	70	535	203	439	46	688	46	290	78	414	1895
08:00 AM	11	47	17	75	7	132	20	159	59	76	12	147	16	75	26	117	498
08:15 AM	11	41	13	65	2	104	11	117	41	45	5	91	16	46	29	91	364
08:30 AM	5	34	21	60	3	90	7	100	34	48	5	87	13	72	23	108	355
08:45 AM	8	28	19	55	6	96	8	110	23	38	6	67	12	57	16	85	317
Total	35	150	70	255	18	422	46	486	157	207	28	392	57	250	94	401	1534
Grand Total	82	307	124	513	38	867	116	1021	360	646	74	1080	103	540	172	815	3429
Apprch %	16	59.8	24.2		3.7	84.9	11.4		33.3	59.8	6.9		12.6	66.3	21.1		
Total %	2.4	9	3.6	15	1.1	25.3	3.4	29.8	10.5	18.8	2.2	31.5	3	15.7	5	23.8	

	Calhoun Street Southbound				Avenue 48 Westbound				Calhoun Street Northbound				Avenue 48 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	10	24	11	45	3	81	14	98	30	105	10	145	**17**	64	22	103	391
07:30 AM	14	50	12	76	**7**	142	18	167	62	115	13	190	9	73	24	106	539
07:45 AM	**15**	**58**	16	**89**	7	**146**	**25**	**178**	**69**	**127**	**15**	**211**	12	**108**	19	**139**	**617**
08:00 AM	11	47	**17**	75	7	132	20	159	59	76	12	147	16	75	**26**	117	498
Total Volume	50	179	56	285	24	501	77	602	220	423	50	693	54	320	91	465	2045
% App. Total	17.5	62.8	19.6		4	83.2	12.8		31.7	61	7.2		11.6	68.8	19.6		
PHF	.833	.772	.824	.801	.857	.858	.770	.846	.797	.833	.833	.821	.794	.741	.875	.836	.829

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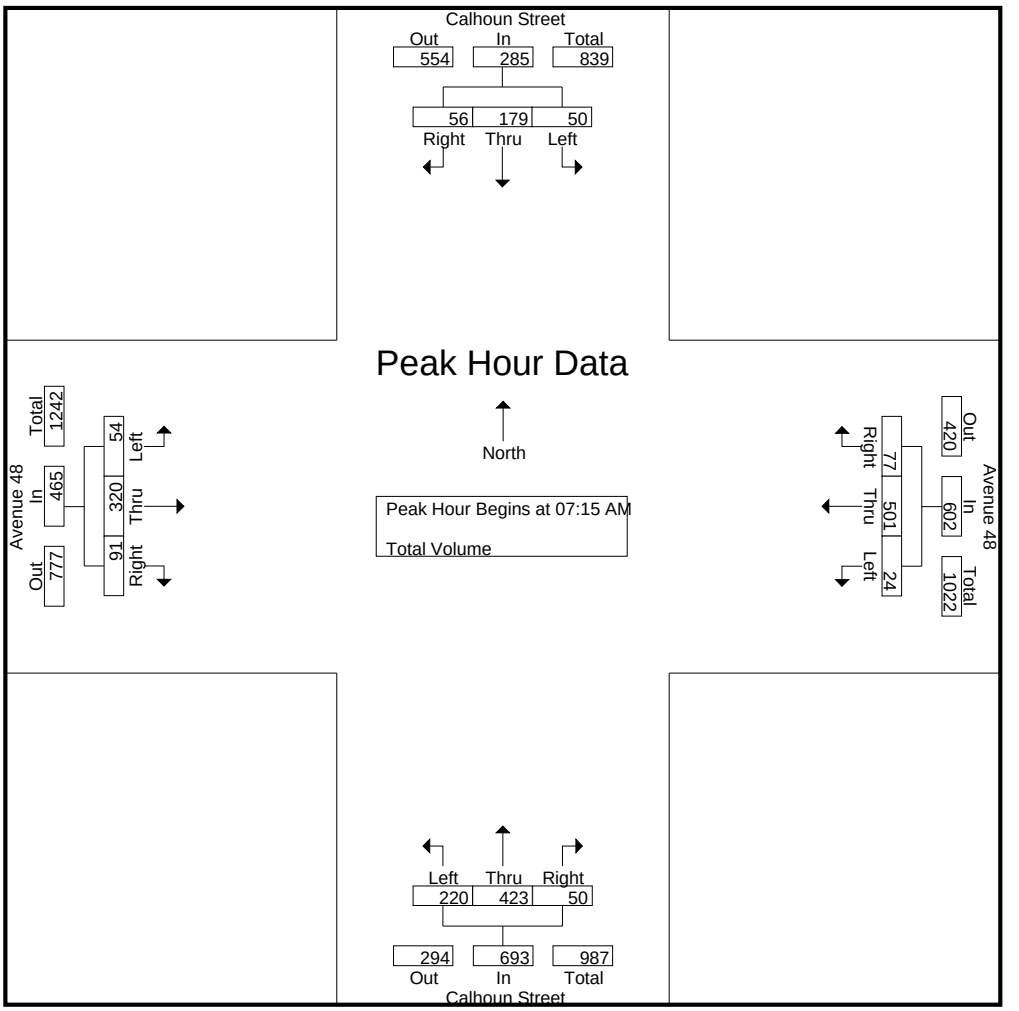
City of Coachella
N/S: Calhoun Street
E/W: Avenue 48
Weather: Clear

File Name : 02_COA_Cal_Ave 48 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:15 AM				07:15 AM			
+0 mins.	14	50	12	76	**7**	142	18	167	30	105	10	145	**17**	64	22	103
+15 mins.	**15**	**58**	16	**89**	7	**146**	**25**	**178**	62	115	13	190	9	73	24	106
+30 mins.	11	47	**17**	75	7	132	20	159	**69**	**127**	**15**	**211**	12	**108**	19	**139**
+45 mins.	11	41	13	65	2	104	11	117	59	76	12	147	16	75	**26**	117
Total Volume	51	196	58	305	23	524	74	621	220	423	50	693	54	320	91	465
% App. Total	16.7	64.3	19		3.7	84.4	11.9		31.7	61	7.2		11.6	68.8	19.6	
PHF	.850	.845	.853	.857	.821	.897	.740	.872	.797	.833	.833	.821	.794	.741	.875	.836

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City of Coachella
N/S: Calhoun Street
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File Name : 02_COA_Cal_Ave 48 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 48 Westbound				Calhoun Street Northbound				Avenue 48 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	19	91	17	127	10	95	9	114	19	40	6	65	12	124	60	196	502
04:15 PM	16	77	15	108	9	89	9	107	37	31	6	74	16	125	58	199	488
04:30 PM	13	82	22	117	5	76	12	93	24	57	8	89	9	143	50	202	501
04:45 PM	10	85	16	111	6	93	4	103	23	50	5	78	14	103	62	179	471
Total	58	335	70	463	30	353	34	417	103	178	25	306	51	495	230	776	1962
05:00 PM	22	85	21	128	9	83	10	102	31	41	7	79	11	124	63	198	507
05:15 PM	11	85	21	117	5	81	6	92	23	69	10	102	11	116	59	186	497
05:30 PM	16	75	18	109	2	89	14	105	36	34	9	79	18	109	53	180	473
05:45 PM	8	70	16	94	6	91	6	103	27	49	7	83	9	92	58	159	439
Total	57	315	76	448	22	344	36	402	117	193	33	343	49	441	233	723	1916
Grand Total	115	650	146	911	52	697	70	819	220	371	58	649	100	936	463	1499	3878
Apprch %	12.6	71.4	16		6.3	85.1	8.5		33.9	57.2	8.9		6.7	62.4	30.9		
Total %	3	16.8	3.8	23.5	1.3	18	1.8	21.1	5.7	9.6	1.5	16.7	2.6	24.1	11.9	38.7	

	Calhoun Street Southbound				Avenue 48 Westbound				Calhoun Street Northbound				Avenue 48 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	13	82	**22**	117	5	76	**12**	93	24	57	8	89	9	**143**	50	**202**	501
04:45 PM	10	**85**	16	111	6	**93**	4	**103**	23	50	5	78	**14**	103	62	179	471
05:00 PM	**22**	85	21	**128**	**9**	83	10	102	**31**	41	7	79	11	124	**63**	198	**507**
05:15 PM	11	85	21	117	5	81	6	92	23	**69**	**10**	**102**	11	116	59	186	497
Total Volume	56	337	80	473	25	333	32	390	101	217	30	348	45	486	234	765	1976
% App. Total	11.8	71.2	16.9		6.4	85.4	8.2		29	62.4	8.6		5.9	63.5	30.6		
PHF	.636	.991	.909	.924	.694	.895	.667	.947	.815	.786	.750	.853	.804	.850	.929	.947	.974

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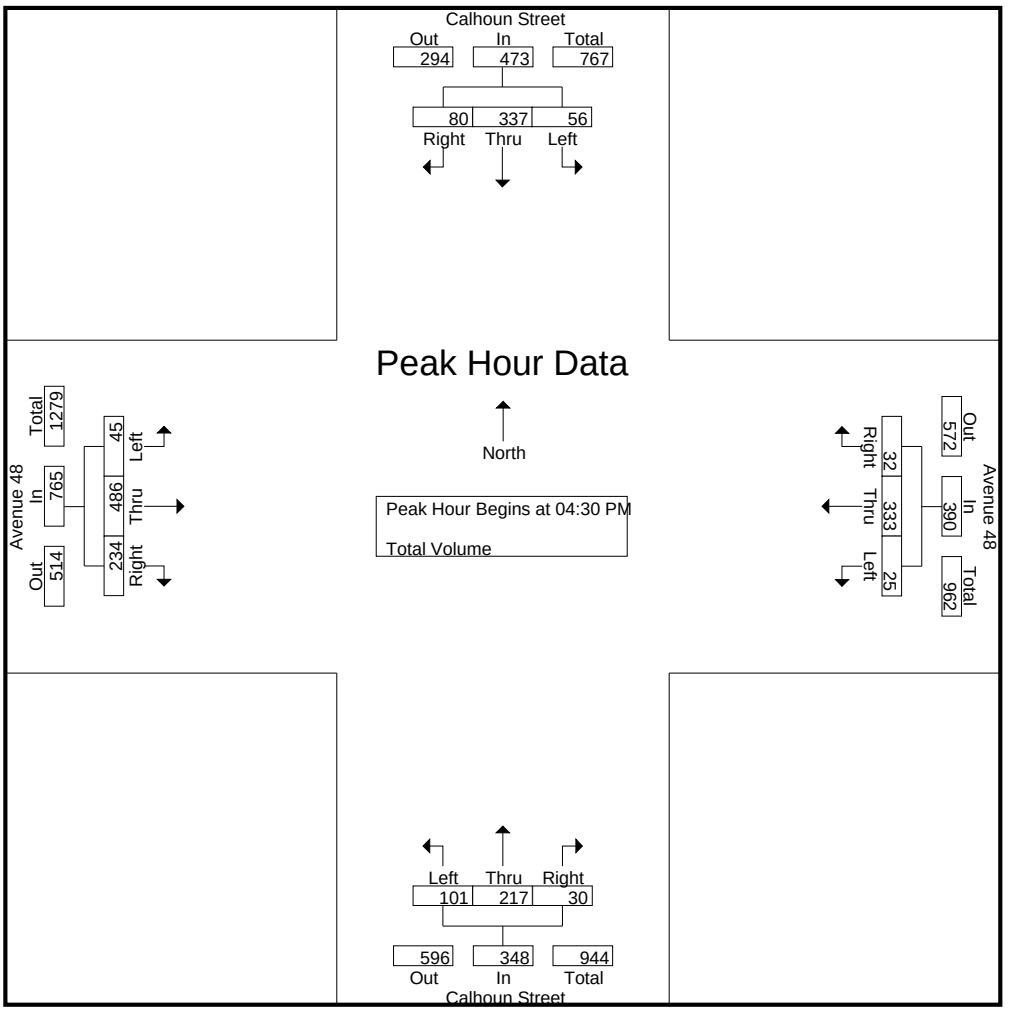
City of Coachella
N/S: Calhoun Street
E/W: Avenue 48
Weather: Clear

File Name : 02_COA_Cal_Ave 48 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				04:30 PM				04:15 PM			
+0 mins.	13	82	**22**	117	**10**	**95**	9	**114**	24	57	8	89	**16**	125	58	199
+15 mins.	10	**85**	16	111	9	89	9	107	23	50	5	78	9	**143**	50	**202**
+30 mins.	**22**	85	21	**128**	5	76	**12**	93	**31**	41	7	79	14	103	62	179
+45 mins.	11	85	21	117	6	93	4	103	23	**69**	**10**	**102**	11	124	**63**	198
Total Volume	56	337	80	473	30	353	34	417	101	217	30	348	50	495	233	778
% App. Total	11.8	71.2	16.9		7.2	84.7	8.2		29	62.4	8.6		6.4	63.6	29.9	
PHF	.636	.991	.909	.924	.750	.929	.708	.914	.815	.786	.750	.853	.781	.865	.925	.963

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City of Coachella
N/S: Calhoun Street
E/W: Avenue 49
Weather: Clear

File Name : 03_COA_Cal_Ave 49 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 49 Westbound				Calhoun Street Northbound				Avenue 49 (Dirt) Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	2	47	0	49	8	0	9	17	0	116	4	120	0	0	0	0	186
07:15 AM	1	60	0	61	9	0	6	15	0	126	3	129	0	0	0	0	205
07:30 AM	2	90	0	92	10	0	10	20	0	147	9	156	0	0	0	0	268
07:45 AM	4	97	0	101	16	0	10	26	0	148	6	154	0	0	0	0	281
Total	9	294	0	303	43	0	35	78	0	537	22	559	0	0	0	0	940
08:00 AM	5	71	1	77	7	0	5	12	0	118	6	124	1	0	0	1	214
08:15 AM	6	70	0	76	6	0	7	13	0	76	2	78	0	0	0	0	167
08:30 AM	3	59	0	62	4	0	7	11	0	67	7	74	0	0	0	0	147
08:45 AM	2	45	0	47	2	0	6	8	0	54	3	57	1	0	1	2	114
Total	16	245	1	262	19	0	25	44	0	315	18	333	2	0	1	3	642
Grand Total	25	539	1	565	62	0	60	122	0	852	40	892	2	0	1	3	1582
Apprch %	4.4	95.4	0.2		50.8	0	49.2		0	95.5	4.5		66.7	0	33.3		
Total %	1.6	34.1	0.1	35.7	3.9	0	3.8	7.7	0	53.9	2.5	56.4	0.1	0	0.1	0.2	

	Calhoun Street Southbound				Avenue 49 Westbound				Calhoun Street Northbound				Avenue 49 (Dirt) Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	1	60	0	61	9	0	6	15	0	126	3	129	0	0	0	0	205
07:30 AM	2	90	0	92	10	0	**10**	20	0	147	**9**	**156**	0	0	0	0	268
07:45 AM	4	**97**	0	**101**	**16**	0	10	**26**	0	**148**	6	154	0	0	0	0	**281**
08:00 AM	**5**	71	**1**	77	7	0	5	12	0	118	6	124	**1**	0	0	**1**	214
Total Volume	12	318	1	331	42	0	31	73	0	539	24	563	1	0	0	1	968
% App. Total	3.6	96.1	0.3		57.5	0	42.5		0	95.7	4.3		100	0	0		
PHF	.600	.820	.250	.819	.656	.000	.775	.702	.000	.910	.667	.902	.250	.000	.000	.250	.861

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City of Coachella
N/S: Calhoun Street
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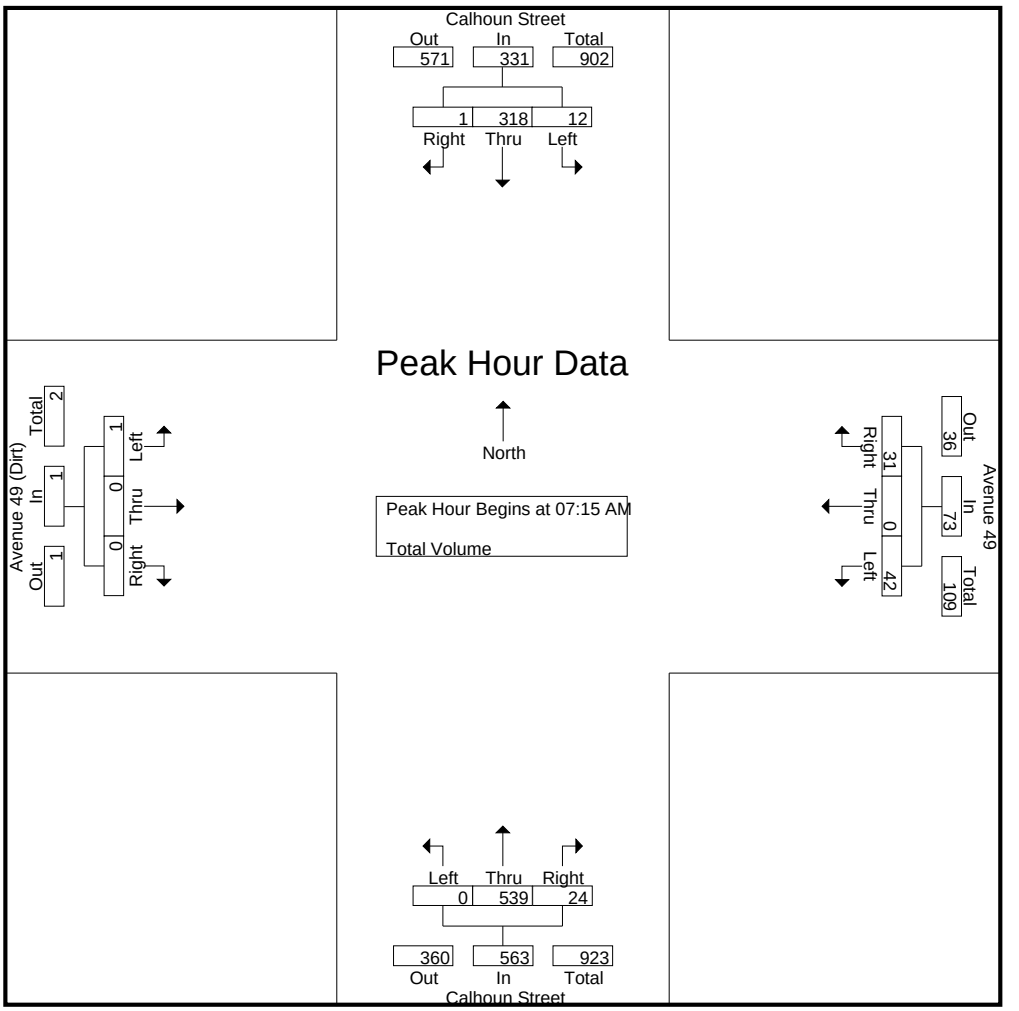
Weather: Clear

File Name : 03_COA_Cal_Ave 49 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:00 AM				07:15 AM				08:00 AM			
+0 mins.	2	90	0	92	8	0	9	17	0	126	3	129	**1**	0	0	1
+15 mins.	4	**97**	0	**101**	9	0	6	15	0	147	**9**	**156**	0	0	0	0
+30 mins.	5	71	**1**	77	10	0	**10**	20	0	**148**	6	154	0	0	0	0
+45 mins.	**6**	70	0	76	**16**	0	10	**26**	0	118	6	124	1	0	**1**	**2**
Total Volume	17	328	1	346	43	0	35	78	0	539	24	563	2	0	1	3
% App. Total	4.9	94.8	0.3		55.1	0	44.9		0	95.7	4.3		66.7	0	33.3	
PHF	.708	.845	.250	.856	.672	.000	.875	.750	.000	.910	.667	.902	.500	.000	.250	.375

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City of Coachella
N/S: Calhoun Street
E/W: Avenue 49
Weather: Clear

File Name : 03_COA_Cal_Ave 49 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 49 Westbound				Calhoun Street Northbound				Avenue 49 (Dirt) Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	3	133	0	136	7	0	3	10	1	77	14	92	0	0	0	0	238
04:15 PM	10	118	0	128	4	0	4	8	0	60	7	67	1	0	0	1	204
04:30 PM	6	113	0	119	5	0	3	8	0	86	8	94	0	0	0	0	221
04:45 PM	8	110	0	118	9	0	5	14	0	72	3	75	0	0	0	0	207
Total	27	474	0	501	25	0	15	40	1	295	32	328	1	0	0	1	870
05:00 PM	6	113	0	119	8	0	3	11	0	84	2	86	1	0	0	1	217
05:15 PM	3	124	0	127	7	0	6	13	0	85	6	91	0	0	0	0	231
05:30 PM	5	104	0	109	6	0	4	10	0	74	7	81	0	0	0	0	200
05:45 PM	4	114	0	118	11	0	7	18	0	75	13	88	0	0	0	0	224
Total	18	455	0	473	32	0	20	52	0	318	28	346	1	0	0	1	872
Grand Total	45	929	0	974	57	0	35	92	1	613	60	674	2	0	0	2	1742
Apprch %	4.6	95.4	0		62	0	38		0.1	90.9	8.9		100	0	0		
Total %	2.6	53.3	0	55.9	3.3	0	2	5.3	0.1	35.2	3.4	38.7	0.1	0	0	0.1	

	Calhoun Street Southbound				Avenue 49 Westbound				Calhoun Street Northbound				Avenue 49 (Dirt) Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	6	113	0	119	5	0	3	8	0	**86**	**8**	**94**	0	0	0	0	221
04:45 PM	**8**	110	0	118	**9**	0	5	**14**	0	72	3	75	0	0	0	0	207
05:00 PM	6	113	0	119	8	0	3	11	0	84	2	86	**1**	0	0	**1**	217
05:15 PM	3	**124**	0	**127**	7	0	**6**	13	0	85	6	91	0	0	0	0	**231**
Total Volume	23	460	0	483	29	0	17	46	0	327	19	346	1	0	0	1	876
% App. Total	4.8	95.2	0		63	0	37		0	94.5	5.5		100	0	0		
PHF	.719	.927	.000	.951	.806	.000	.708	.821	.000	.951	.594	.920	.250	.000	.000	.250	.948

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City of Coachella
N/S: Calhoun Street
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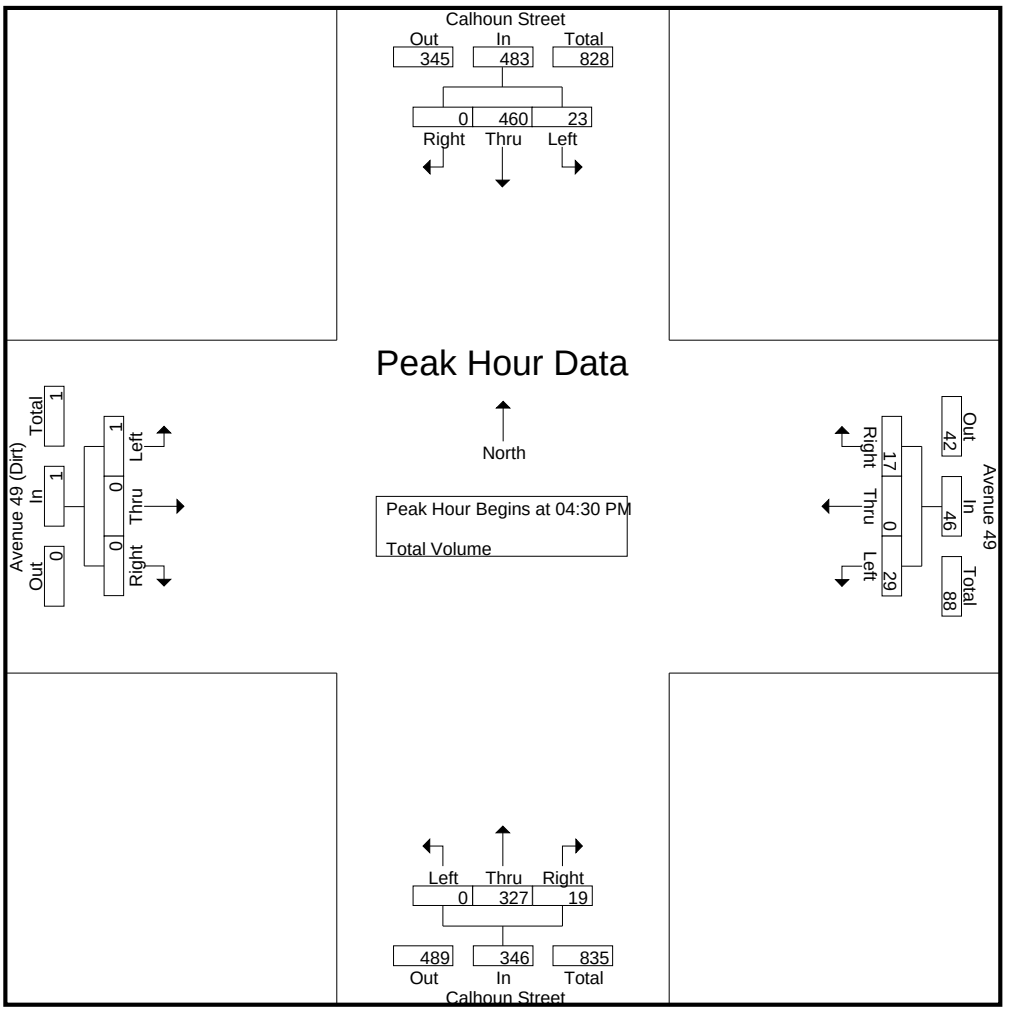
File Name : 03_COA_Cal_Ave 49 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				04:30 PM				04:15 PM			
+0 mins.	3	**133**	0	**136**	8	0	3	11	0	**86**	**8**	**94**	**1**	0	0	**1**
+15 mins.	**10**	118	0	128	7	0	6	13	0	72	3	75	0	0	0	0
+30 mins.	6	113	0	119	6	0	4	10	0	84	2	86	0	0	0	0
+45 mins.	8	110	0	118	**11**	0	**7**	**18**	0	85	6	91	1	0	0	1
Total Volume	27	474	0	501	32	0	20	52	0	327	19	346	2	0	0	2
% App. Total	5.4	94.6	0		61.5	0	38.5		0	94.5	5.5		100	0	0	
PHF	.675	.891	.000	.921	.727	.000	.714	.722	.000	.951	.594	.920	.500	.000	.000	.500

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City of Coachella
N/S: Calhoun Street
E/W: Avenue 50
Weather: Clear

File Name : 04_COA_Cal_Ave 50 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

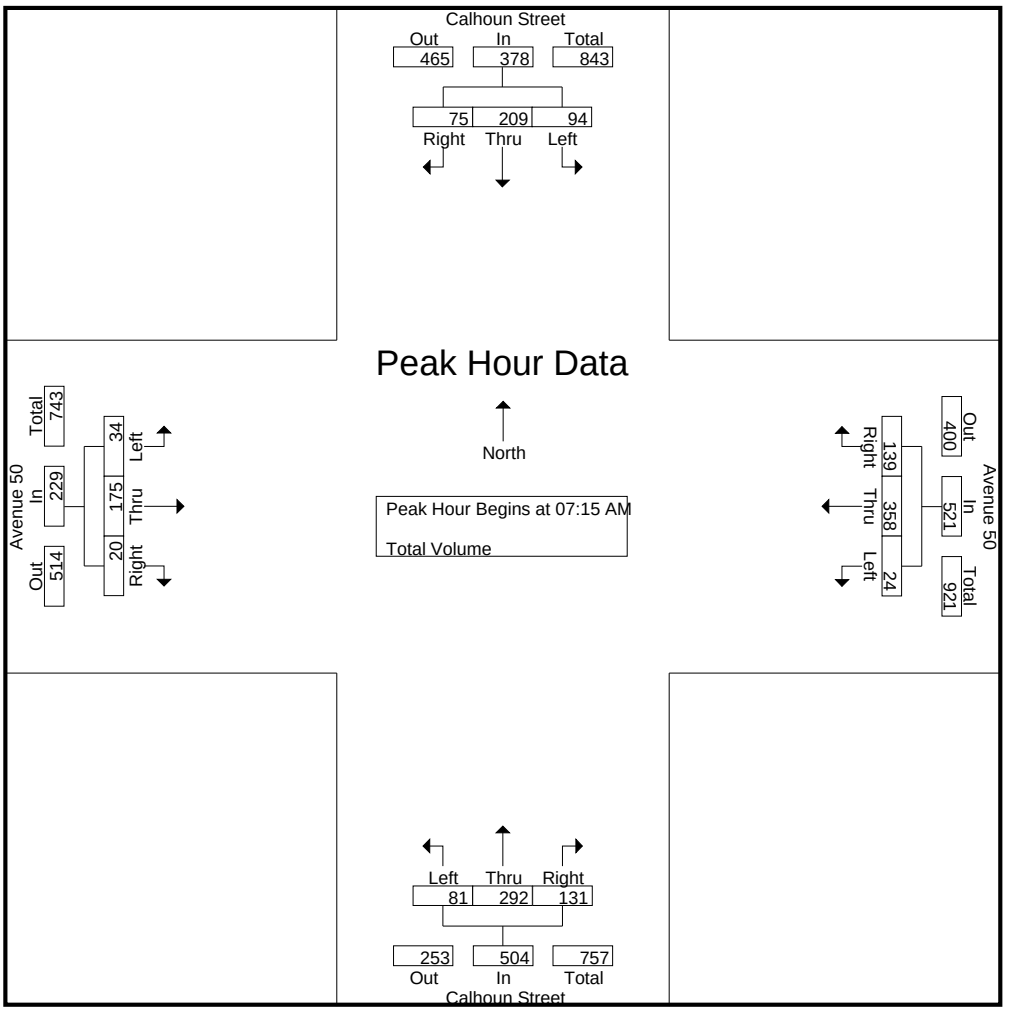
	Calhoun Street Southbound				Avenue 50 Westbound				Calhoun Street Northbound				Avenue 50 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	19	30	8	57	9	79	24	112	17	84	22	123	3	28	2	33	325
07:15 AM	16	39	9	64	4	89	28	121	21	74	21	116	7	35	6	48	349
07:30 AM	23	64	19	106	5	93	32	130	27	79	33	139	8	32	6	46	421
07:45 AM	36	59	30	125	7	77	40	124	18	82	67	167	11	54	4	69	485
Total	94	192	66	352	25	338	124	487	83	319	143	545	29	149	18	196	1580
08:00 AM	19	47	17	83	8	99	39	146	15	57	10	82	8	54	4	66	377
08:15 AM	24	40	9	73	3	106	26	135	7	31	7	45	7	45	10	62	315
08:30 AM	21	26	14	61	2	71	17	90	4	30	5	39	9	53	7	69	259
08:45 AM	18	25	6	49	3	73	12	88	5	20	10	35	13	45	2	60	232
Total	82	138	46	266	16	349	94	459	31	138	32	201	37	197	23	257	1183
Grand Total	176	330	112	618	41	687	218	946	114	457	175	746	66	346	41	453	2763
Apprch %	28.5	53.4	18.1		4.3	72.6	23		15.3	61.3	23.5		14.6	76.4	9.1		
Total %	6.4	11.9	4.1	22.4	1.5	24.9	7.9	34.2	4.1	16.5	6.3	27	2.4	12.5	1.5	16.4	

	Calhoun Street Southbound				Avenue 50 Westbound				Calhoun Street Northbound				Avenue 50 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	16	39	9	64	4	89	28	121	21	74	21	116	7	35	**6**	48	349
07:30 AM	23	**64**	19	106	5	93	32	130	**27**	79	33	139	8	32	6	46	421
07:45 AM	**36**	59	**30**	**125**	7	77	**40**	124	18	**82**	**67**	**167**	**11**	**54**	4	**69**	**485**
08:00 AM	19	47	17	83	**8**	**99**	39	**146**	15	57	10	82	8	54	4	66	377
Total Volume	94	209	75	378	24	358	139	521	81	292	131	504	34	175	20	229	1632
% App. Total	24.9	55.3	19.8		4.6	68.7	26.7		16.1	57.9	26		14.8	76.4	8.7		
PHF	.653	.816	.625	.756	.750	.904	.869	.892	.750	.890	.489	.754	.773	.810	.833	.830	.841

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Coachella
N/S: Calhoun Street
E/W: Avenue 50
Weather: Clear

File Name : 04_COA_Cal_Ave 50 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:00 AM				07:45 AM			
+0 mins.	23	**64**	19	106	5	93	32	130	17	**84**	22	123	**11**	**54**	4	**69**
+15 mins.	**36**	59	**30**	**125**	7	77	**40**	124	21	74	21	116	8	54	4	66
+30 mins.	19	47	17	83	**8**	99	39	**146**	**27**	79	33	139	7	45	**10**	62
+45 mins.	24	40	9	73	3	**106**	26	135	18	82	**67**	**167**	9	53	7	69
Total Volume	102	210	75	387	23	375	137	535	83	319	143	545	35	206	25	266
% App. Total	26.4	54.3	19.4		4.3	70.1	25.6		15.2	58.5	26.2		13.2	77.4	9.4	
PHF	.708	.820	.625	.774	.719	.884	.856	.916	.769	.949	.534	.816	.795	.954	.625	.964

Counts Unlimited, Inc.
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City of Coachella
N/S: Calhoun Street
E/W: Avenue 50
Weather: Clear

File Name : 04_COA_Cal_Ave 50 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Calhoun Street Southbound				Avenue 50 Westbound				Calhoun Street Northbound				Avenue 50 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	36	64	8	108	2	73	31	106	9	44	9	62	10	91	10	111	387
04:15 PM	32	72	17	121	2	76	24	102	13	37	7	57	12	81	11	104	384
04:30 PM	29	59	10	98	5	81	22	108	15	45	23	83	10	76	8	94	383
04:45 PM	35	60	13	108	2	44	15	61	7	38	13	58	9	77	6	92	319
Total	132	255	48	435	11	274	92	377	44	164	52	260	41	325	35	401	1473
05:00 PM	32	53	14	99	5	60	21	86	13	45	18	76	8	96	7	111	372
05:15 PM	29	59	16	104	1	77	18	96	7	42	24	73	14	88	12	114	387
05:30 PM	25	56	12	93	1	66	26	93	15	39	6	60	12	91	8	111	357
05:45 PM	39	61	11	111	1	62	35	98	12	42	7	61	10	77	9	96	366
Total	125	229	53	407	8	265	100	373	47	168	55	270	44	352	36	432	1482
Grand Total	257	484	101	842	19	539	192	750	91	332	107	530	85	677	71	833	2955
Apprch %	30.5	57.5	12		2.5	71.9	25.6		17.2	62.6	20.2		10.2	81.3	8.5		
Total %	8.7	16.4	3.4	28.5	0.6	18.2	6.5	25.4	3.1	11.2	3.6	17.9	2.9	22.9	2.4	28.2	

	Calhoun Street Southbound				Avenue 50 Westbound				Calhoun Street Northbound				Avenue 50 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	32	53	14	99	**5**	60	21	86	13	**45**	18	**76**	8	**96**	7	111	372
05:15 PM	29	59	**16**	104	1	**77**	18	96	7	42	**24**	73	**14**	88	**12**	**114**	**387**
05:30 PM	25	56	12	93	1	66	26	93	**15**	39	6	60	12	91	8	111	357
05:45 PM	**39**	**61**	11	**111**	1	62	**35**	**98**	12	42	7	61	10	77	9	96	366
Total Volume	125	229	53	407	8	265	100	373	47	168	55	270	44	352	36	432	1482
% App. Total	30.7	56.3	13		2.1	71	26.8		17.4	62.2	20.4		10.2	81.5	8.3		
PHF	.801	.939	.828	.917	.400	.860	.714	.952	.783	.933	.573	.888	.786	.917	.750	.947	.957

Counts Unlimited, Inc.
PO Box 1178
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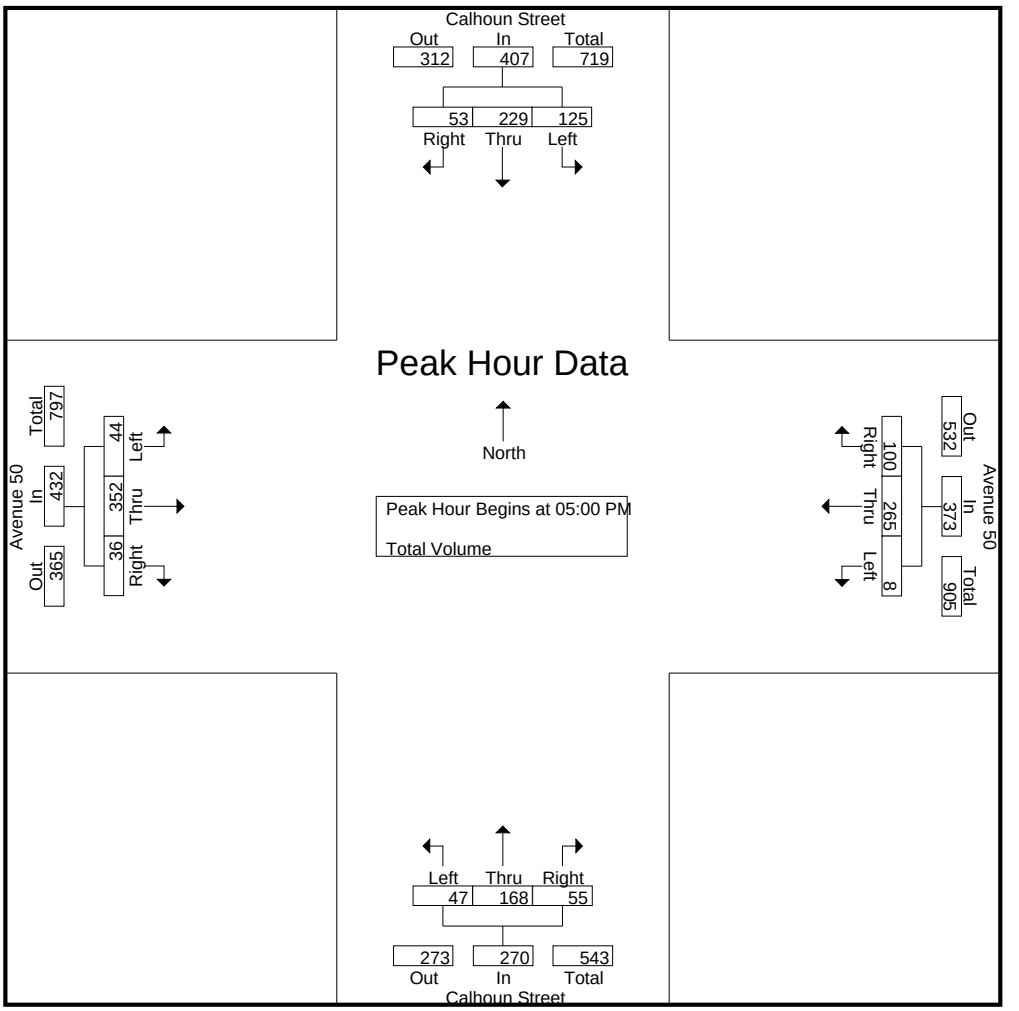
(951) 268-6268

City of Coachella
N/S: Calhoun Street
E/W: Avenue 50
Weather: Clear

File Name : 04_COA_Cal_Ave 50 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:30 PM				05:00 PM			
+0 mins.	**36**	64	8	108	2	73	**31**	106	**15**	**45**	23	**83**	8	**96**	7	111
+15 mins.	32	**72**	**17**	**121**	2	76	24	102	7	38	13	58	**14**	88	**12**	**114**
+30 mins.	29	59	10	98	**5**	**81**	22	**108**	13	45	18	76	12	91	8	111
+45 mins.	35	60	13	108	2	44	15	61	7	42	**24**	73	10	77	9	96
Total Volume	132	255	48	435	11	274	92	377	42	170	78	290	44	352	36	432
% App. Total	30.3	58.6	11		2.9	72.7	24.4		14.5	58.6	26.9		10.2	81.5	8.3	
PHF	.917	.885	.706	.899	.550	.846	.742	.873	.700	.944	.813	.873	.786	.917	.750	.947

Counts Unlimited, Inc.
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City of Coachella
N/S: Jackson Street
E/W: Odlum Drive/ Avenue 49
Weather: Clear

File Name : 05_COA_Jack_Ave 49 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Jackson Street Southbound				Avenue 49 (Dirt) Westbound				Jackson Street Northbound				Odlum Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	3	79	2	84	1	0	0	1	2	93	0	95	11	0	8	19	199
07:15 AM	1	105	1	107	1	0	0	1	1	109	1	111	14	0	7	21	240
07:30 AM	1	115	5	121	1	0	2	3	0	122	1	123	28	0	10	38	285
07:45 AM	0	119	8	127	1	0	1	2	2	100	0	102	16	0	4	20	251
Total	5	418	16	439	4	0	3	7	5	424	2	431	69	0	29	98	975
08:00 AM	0	88	8	96	1	0	1	2	3	115	1	119	16	1	5	22	239
08:15 AM	1	100	8	109	0	0	1	1	1	99	1	101	14	0	7	21	232
08:30 AM	3	81	8	92	4	0	1	5	0	107	0	107	10	0	3	13	217
08:45 AM	0	75	5	80	0	0	1	1	1	113	0	114	9	0	5	14	209
Total	4	344	29	377	5	0	4	9	5	434	2	441	49	1	20	70	897
Grand Total	9	762	45	816	9	0	7	16	10	858	4	872	118	1	49	168	1872
Apprch %	1.1	93.4	5.5		56.2	0	43.8		1.1	98.4	0.5		70.2	0.6	29.2		
Total %	0.5	40.7	2.4	43.6	0.5	0	0.4	0.9	0.5	45.8	0.2	46.6	6.3	0.1	2.6	9	

	Jackson Street Southbound				Avenue 49 (Dirt) Westbound				Jackson Street Northbound				Odlum Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**1**	105	1	107	**1**	0	0	1	1	109	**1**	111	14	0	7	21	240
07:30 AM	1	115	5	121	1	0	**2**	**3**	0	**122**	1	**123**	**28**	0	**10**	**38**	**285**
07:45 AM	0	**119**	**8**	**127**	1	0	1	2	2	100	0	102	16	0	4	20	251
08:00 AM	0	88	8	96	1	0	1	2	**3**	115	1	119	16	**1**	5	22	239
Total Volume	2	427	22	451	4	0	4	8	6	446	3	455	74	1	26	101	1015
% App. Total	0.4	94.7	4.9		50	0	50		1.3	98	0.7		73.3	1	25.7		
PHF	.500	.897	.688	.888	1.00	.000	.500	.667	.500	.914	.750	.925	.661	.250	.650	.664	.890

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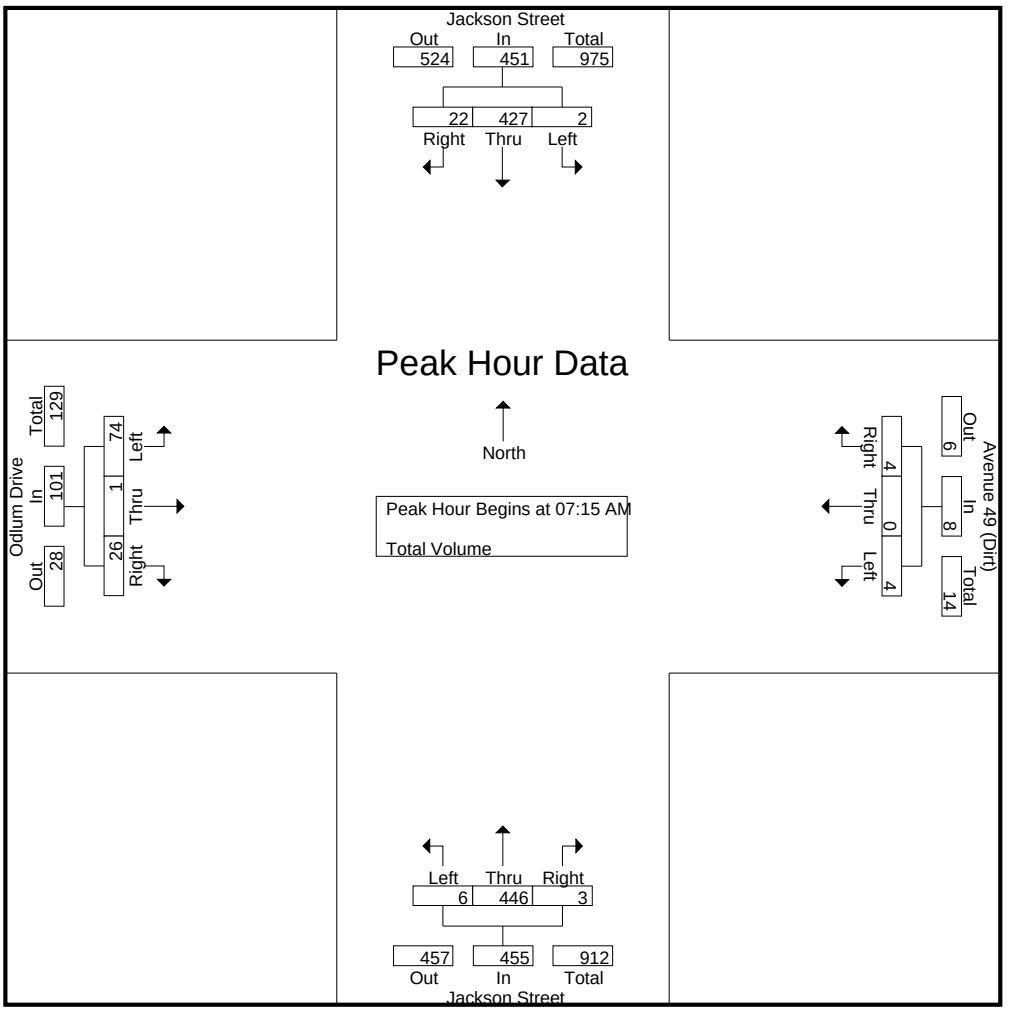
City of Coachella
N/S: Jackson Street
E/W: Odlum Drive/ Avenue 49
Weather: Clear

File Name : 05_COA_Jack_Ave 49 AM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:45 AM				07:15 AM				07:15 AM			
+0 mins.	**1**	115	5	121	1	0	**1**	2	1	109	**1**	111	14	0	7	21
+15 mins.	0	**119**	**8**	**127**	1	0	1	2	0	**122**	1	**123**	**28**	0	**10**	**38**
+30 mins.	0	88	8	96	0	0	1	1	2	100	0	102	16	0	4	20
+45 mins.	1	100	8	109	**4**	0	1	**5**	**3**	115	1	119	16	**1**	5	22
Total Volume	2	422	29	453	6	0	4	10	6	446	3	455	74	1	26	101
% App. Total	0.4	93.2	6.4		60	0	40		1.3	98	0.7		73.3	1	25.7	
PHF	.500	.887	.906	.892	.375	.000	1.000	.500	.500	.914	.750	.925	.661	.250	.650	.664

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City of Coachella
N/S: Jackson Street
E/W: Odlum Drive/ Avenue 49
Weather: Clear

File Name : 05_COA_Jack_Ave 49 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 1

Groups Printed- Total Volume

	Jackson Street Southbound				Avenue 49 (Dirt) Westbound				Jackson Street Northbound				Odlum Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	115	10	125	0	0	0	0	4	121	0	125	12	0	2	14	264
04:15 PM	1	120	18	139	0	0	1	1	4	95	0	99	18	0	4	22	261
04:30 PM	0	108	15	123	0	0	3	3	5	103	0	108	15	0	5	20	254
04:45 PM	0	134	12	146	0	0	2	2	4	88	2	94	10	0	7	17	259
Total	1	477	55	533	0	0	6	6	17	407	2	426	55	0	18	73	1038
05:00 PM	0	147	16	163	1	0	0	1	4	93	0	97	10	0	2	12	273
05:15 PM	0	134	18	152	0	0	0	0	4	88	0	92	5	0	5	10	254
05:30 PM	0	106	16	122	0	0	4	4	2	101	0	103	13	0	4	17	246
05:45 PM	0	103	18	121	0	0	0	0	4	91	0	95	4	0	4	8	224
Total	0	490	68	558	1	0	4	5	14	373	0	387	32	0	15	47	997
Grand Total	1	967	123	1091	1	0	10	11	31	780	2	813	87	0	33	120	2035
Apprch %	0.1	88.6	11.3		9.1	0	90.9		3.8	95.9	0.2		72.5	0	27.5		
Total %	0	47.5	6	53.6	0	0	0.5	0.5	1.5	38.3	0.1	40	4.3	0	1.6	5.9	

	Jackson Street Southbound				Avenue 49 (Dirt) Westbound				Jackson Street Northbound				Odlum Drive Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	**1**	120	**18**	139	0	0	1	1	4	95	0	99	**18**	0	4	**22**	261
04:30 PM	0	108	15	123	0	0	**3**	**3**	**5**	**103**	0	**108**	15	0	5	20	254
04:45 PM	0	134	12	146	0	0	2	2	4	88	**2**	94	10	0	**7**	17	259
05:00 PM	0	**147**	16	**163**	**1**	0	0	1	4	93	0	97	10	0	2	12	**273**
Total Volume	1	509	61	571	1	0	6	7	17	379	2	398	53	0	18	71	1047
% App. Total	0.2	89.1	10.7		14.3	0	85.7		4.3	95.2	0.5		74.6	0	25.4		
PHF	.250	.866	.847	.876	.250	.000	.500	.583	.850	.920	.250	.921	.736	.000	.643	.807	.959

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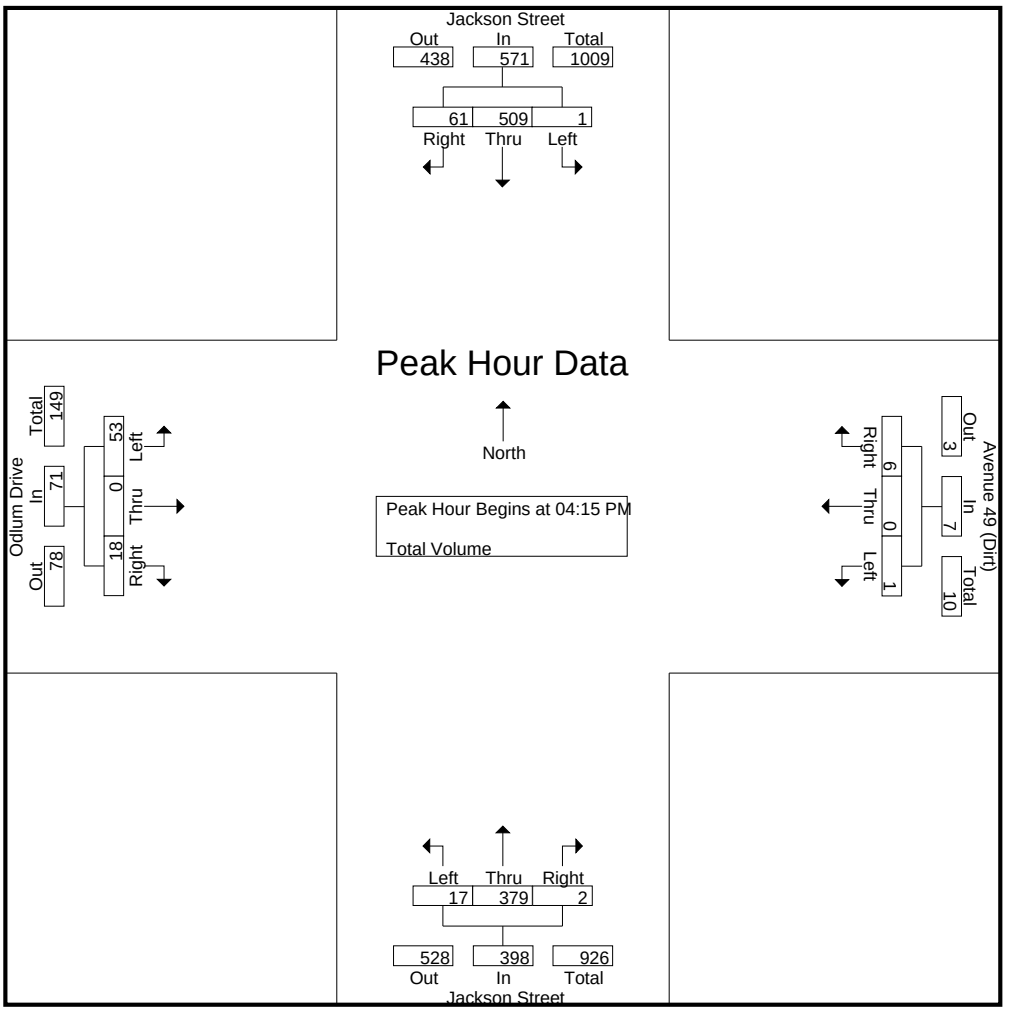
City of Coachella
N/S: Jackson Street
E/W: Odlum Drive/ Avenue 49
Weather: Clear

File Name : 05_COA_Jack_Ave 49 PM
Site Code : 05124698
Start Date : 8/27/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:15 PM				04:00 PM				04:00 PM			
+0 mins.	0	108	15	123	0	0	1	1	4	**121**	0	**125**	12	0	2	14
+15 mins.	0	134	12	146	0	0	**3**	**3**	4	95	0	99	**18**	0	4	**22**
+30 mins.	0	**147**	16	**163**	0	0	2	2	**5**	103	0	108	15	0	5	20
+45 mins.	0	134	**18**	152	**1**	0	0	1	4	88	**2**	94	10	0	**7**	17
Total Volume	0	523	61	584	1	0	6	7	17	407	2	426	55	0	18	73
% App. Total	0	89.6	10.4		14.3	0	85.7		4	95.5	0.5		75.3	0	24.7	
PHF	.000	.889	.847	.896	.250	.000	.500	.583	.850	.841	.250	.852	.764	.000	.643	.830

Counts Unlimited, Inc.

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City of Coachella
Calhoun Street
S/ Avenue 48
24 Hour Directional Volume Count

COA001
Site Code: 051-24698

Start Time	8/27/24 Tue	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		8	51			18	78				
12:15		7	80			13	69				
12:30		7	57			3	102				
12:45		3	74	25	262	19	76	53	325	78	587
01:00		4	76			9	68				
01:15		4	55			10	70				
01:30		3	65			7	80				
01:45		0	72	11	268	3	89	29	307	40	575
02:00		1	85			0	89				
02:15		5	90			3	98				
02:30		5	**112**			3	138				
02:45		4	**102**	15	389	3	155	9	480	24	869
03:00		3	**132**			4	130				
03:15		7	**93**			2	135				
03:30		15	104			3	133				
03:45		16	70	41	399	5	111	14	509	55	908
04:00		15	70			5	**169**				
04:15		16	79			13	**156**				
04:30		34	89			3	**146**				
04:45		47	77	112	315	4	**158**	25	629	137	944
05:00		28	80			21	159				
05:15		38	98			20	164				
05:30		66	77			28	146				
05:45		57	87	189	342	44	148	113	617	302	959
06:00		66	74			52	110				
06:15		68	81			69	120				
06:30		84	79			85	108				
06:45		110	80	328	314	90	118	296	456	624	770
07:00		141	73			47	116				
07:15		**167**	61			69	108				
07:30		**184**	54			**108**	94				
07:45		**198**	50	690	238	**97**	97	321	415	1011	653
08:00		**143**	56			**84**	115				
08:15		90	50			**71**	106				
08:30		85	51			62	141				
08:45		71	43	389	200	48	103	265	465	654	665
09:00		67	46			59	85				
09:15		56	25			49	78				
09:30		69	36			43	70				
09:45		58	22	250	129	42	60	193	293	443	422
10:00		64	18			54	46				
10:15		50	25			53	51				
10:30		55	13			48	38				
10:45		50	14	219	70	51	40	206	175	425	245
11:00		56	20			61	24				
11:15		45	13			63	17				
11:30		55	13			59	25				
11:45		53	11	209	57	70	14	253	80	462	137
Total		2478	2983	2478	2983	1777	4751	1777	4751	4255	7734
Combined Total		5461		5461		6528		6528		11989	
AM Peak	-	07:15	-	-	-	07:30	-	-	-	-	-
Vol.	-	692	-	-	-	360	-	-	-	-	-
P.H.F.		0.874				0.833					
PM Peak	-	-	02:30	-	-	-	04:00	-	-	-	-
Vol.	-	-	439	-	-	-	629	-	-	-	-
P.H.F.			0.831				0.930				
Percentage		45.4%	54.6%			27.2%	72.8%				
ADT/AADT		ADT 11,989		AADT 11,989							

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
(951) 268-6268
email: counts@countsunlimited.com

City of Coachella
Calhoun Street
S/ Avenue 49
24 Hour Directional Volume Count

COA002
Site Code: 051-24698

Start Time	8/27/24 Tue	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		13	72			9	44				
12:15		10	51			4	66				
12:30		3	88			5	51				
12:45		9	66	35	277	2	60	20	221	55	498
01:00		5	69			4	58				
01:15		8	60			3	52				
01:30		4	76			3	56				
01:45		4	82	21	287	1	72	11	238	32	525
02:00		0	84			2	72				
02:15		1	102			4	**91**				
02:30		2	124			6	**116**				
02:45		3	134	6	444	3	**109**	15	388	21	832
03:00		4	110			3	**146**				
03:15		2	110			5	89				
03:30		4	113			10	98				
03:45		3	87	13	420	8	66	26	399	39	819
04:00		6	**140**			12	92				
04:15		13	**124**			11	68				
04:30		11	**118**			24	90				
04:45		11	**120**	41	502	31	78	78	328	119	830
05:00		17	123			18	84				
05:15		23	134			30	94				
05:30		38	108			44	82				
05:45		60	130	138	495	42	84	134	344	272	839
06:00		40	88			56	72				
06:15		60	86			56	78				
06:30		91	102			77	59				
06:45		83	87	274	363	98	76	287	285	561	648
07:00		56	82			118	69				
07:15		72	70			**134**	58				
07:30		**97**	64			**156**	46				
07:45		**121**	76	346	292	**154**	52	562	225	908	517
08:00		**82**	88			**121**	56				
08:15		**78**	68			76	57				
08:30		64	88			76	55				
08:45		44	68	268	312	58	49	331	217	599	529
09:00		51	68			56	46				
09:15		47	49			41	32				
09:30		43	48			50	37				
09:45		46	40	187	205	55	17	202	132	389	337
10:00		52	30			44	25				
10:15		45	28			46	25				
10:30		44	25			52	13				
10:45		48	28	189	111	42	19	184	82	373	193
11:00		50	16			44	20				
11:15		64	9			50	13				
11:30		51	15			52	14				
11:45		76	6	241	46	47	11	193	58	434	104
Total		1759	3754	1759	3754	2043	2917	2043	2917	3802	6671
Combined Total		5513		5513		4960		4960		10473	
AM Peak	-	07:30	-	-	-	07:15	-	-	-	-	-
Vol.	-	378	-	-	-	565	-	-	-	-	-
P.H.F.		0.781				0.905					
PM Peak	-	-	04:00	-	-	-	02:15	-	-	-	-
Vol.	-	-	502	-	-	-	462	-	-	-	-
P.H.F.			0.896				0.791				
Percentage		31.9%	68.1%			41.2%	58.8%				
ADT/AADT		ADT 10,473		AADT 10,473							

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
(951) 268-6268
email: counts@countsunlimited.com

City of Coachella
Jackson Street
N/ Odium Drive
24 Hour Directional Volume Count

COA003
Site Code: 051-24698

Start Time	8/27/24 Tue	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		10	134			13	107				
12:15		7	141			7	88				
12:30		5	128			8	120				
12:45		3	129	25	532	7	112	35	427	60	959
01:00		4	139			1	83				
01:15		6	136			5	76				
01:30		2	164			8	106				
01:45		2	164	14	603	4	103	18	368	32	971
02:00		2	145			2	100				
02:15		5	184			3	133				
02:30		7	**199**			3	121				
02:45		4	**173**	18	701	3	131	11	485	29	1186
03:00		5	**190**			3	149				
03:15		6	**188**			2	144				
03:30		13	145			6	115				
03:45		6	127	30	650	1	164	12	572	42	1222
04:00		8	175			8	151				
04:15		22	162			16	160				
04:30		27	171			20	**158**				
04:45		40	148	97	656	31	**176**	75	645	172	1301
05:00		39	160			29	**183**				
05:15		57	149			53	**180**				
05:30		70	169			74	147				
05:45		87	154	253	632	118	139	274	649	527	1281
06:00		82	157			85	101				
06:15		97	141			96	114				
06:30		119	125			101	108				
06:45		157	126	455	549	97	99	379	422	834	971
07:00		138	104			100	80				
07:15		**188**	109			**132**	67				
07:30		**207**	113			**136**	89				
07:45		**164**	126	697	452	**135**	80	503	316	1200	768
08:00		**190**	128			**124**	104				
08:15		150	85			116	77				
08:30		159	97			106	63				
08:45		171	71	670	381	99	72	445	316	1115	697
09:00		140	56			71	76				
09:15		139	37			86	71				
09:30		120	56			93	62				
09:45		144	34	543	183	107	53	357	262	900	445
10:00		129	39			85	28				
10:15		160	28			98	34				
10:30		156	27			80	24				
10:45		142	17	587	111	111	20	374	106	961	217
11:00		145	9			95	29				
11:15		153	19			77	23				
11:30		146	10			88	13				
11:45		113	5	557	43	76	13	336	78	893	121
Total		3946	5493	3946	5493	2819	4646	2819	4646	6765	10139
Combined Total		9439		9439		7465		7465		16904	
AM Peak	-	07:15	-	-	-	07:15	-	-	-	-	-
Vol.	-	749	-	-	-	527	-	-	-	-	-
P.H.F.		0.905				0.969					
PM Peak	-	-	02:30	-	-	-	04:30	-	-	-	-
Vol.	-	-	750	-	-	-	697	-	-	-	-
P.H.F.			0.942				0.952				
Percentage		41.8%	58.2%			37.8%	62.2%				
ADT/AADT		ADT 16,904		AADT 16,904							

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APPENDIX 3.2: EXISTING (2024) CONDITIONS

INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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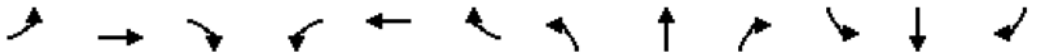


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	181	59	25	280	85	229	511	79	80	252	142
Future Volume (vph)	79	181	59	25	280	85	229	511	79	80	252	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	102.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	79	181	59	25	280	85	229	511	79	80	252	142
Future Vol, veh/h	79	181	59	25	280	85	229	511	79	80	252	142
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	84	193	63	27	298	90	244	544	84	85	268	151
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

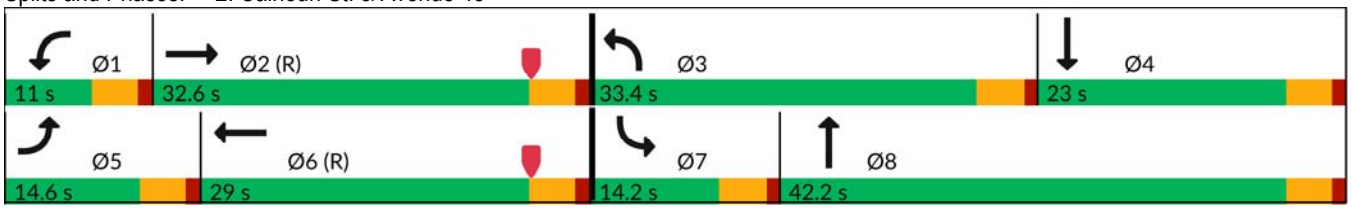
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	24.9	106.1	173.3	28.1
HCM LOS	C	F	F	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	77%	0%	100%	37%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	23%	0%	0%	63%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	229	511	79	79	181	59	25	365	80	168	226
LT Vol	229	0	0	79	0	0	25	0	80	0	0
Through Vol	0	511	0	0	181	0	0	280	0	168	84
RT Vol	0	0	79	0	0	59	0	85	0	0	142
Lane Flow Rate	244	544	84	84	193	63	27	388	85	179	240
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.705	1.485	0.214	0.267	0.586	0.179	0.08	1.099	0.259	0.519	0.669
Departure Headway (Hd)	10.882	10.362	9.634	12.411	11.892	11.165	11.489	10.826	11.944	11.421	10.961
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	334	353	375	292	306	323	314	338	303	318	332
Service Time	8.582	8.062	7.334	10.111	9.592	8.865	9.189	8.526	9.644	9.121	8.661
HCM Lane V/C Ratio	0.731	1.541	0.224	0.288	0.631	0.195	0.086	1.148	0.281	0.563	0.723
HCM Control Delay, s/veh	35.9	259.4	14.9	19.6	30.1	16.3	15.2	112.3	18.8	25.8	33.2
HCM Lane LOS	E	F	B	C	D	C	C	F	C	D	D
HCM 95th-tile Q	5.1	28	0.8	1.1	3.5	0.6	0.3	13.9	1	2.8	4.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	384	109	29	601	92	264	508	60	60	215	67
Future Volume (vph)	65	384	109	29	601	92	264	508	60	60	215	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	14.6	32.6		11.0	29.0		33.4	42.2		14.2	23.0	
Total Split (%)	14.6%	32.6%		11.0%	29.0%		33.4%	42.2%		14.2%	23.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Calhoun St. & Avenue 48



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	384	109	29	601	92	264	508	60	60	215	67
Future Volume (veh/h)	65	384	109	29	601	92	264	508	60	60	215	67
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	78	463	131	35	724	111	318	612	72	72	259	81
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	1434	393	55	1496	227	357	1208	142	93	613	188
Arrive On Green	0.06	0.36	0.36	0.03	0.33	0.33	0.20	0.38	0.38	0.05	0.23	0.23
Sat Flow, veh/h	1781	3986	1092	1781	4473	679	1781	3203	376	1781	2680	820
Grp Volume(v), veh/h	78	393	201	35	549	286	318	339	345	72	170	170
Grp Sat Flow(s),veh/h/ln	1781	1702	1674	1781	1702	1748	1781	1777	1803	1781	1777	1723
Q Serve(g_s), s	4.3	8.4	8.7	1.9	12.8	13.0	17.4	14.7	14.7	4.0	8.1	8.5
Cycle Q Clear(g_c), s	4.3	8.4	8.7	1.9	12.8	13.0	17.4	14.7	14.7	4.0	8.1	8.5
Prop In Lane	1.00		0.65	1.00		0.39	1.00		0.21	1.00		0.48
Lane Grp Cap(c), veh/h	100	1225	602	55	1139	585	357	670	680	93	407	394
V/C Ratio(X)	0.78	0.32	0.33	0.63	0.48	0.49	0.89	0.51	0.51	0.78	0.42	0.43
Avail Cap(c_a), veh/h	180	1225	602	116	1139	585	515	670	680	173	407	394
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.6	23.2	23.3	47.9	26.4	26.5	38.9	24.0	24.0	46.8	32.9	33.0
Incr Delay (d2), s/veh	12.1	0.7	1.5	11.3	1.5	2.9	13.1	2.7	2.7	12.8	3.1	3.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	3.2	3.4	1.0	5.0	5.5	8.5	6.2	6.4	2.0	3.7	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.6	23.9	24.8	59.2	27.9	29.4	52.0	26.7	26.7	59.6	36.0	36.4
LnGrp LOS	E	C	C	E	C	C	D	C	C	E	D	D
Approach Vol, veh/h		672			870			1002			412	
Approach Delay, s/veh		28.2			29.6			34.7			40.3	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	40.5	24.5	27.4	10.1	38.0	9.7	42.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	28.1	28.9	18.5	10.1	24.5	9.7	37.7
Max Q Clear Time (g_c+I1), s	3.9	10.7	19.4	10.5	6.3	15.0	6.0	16.7
Green Ext Time (p_c), s	0.0	3.1	0.6	1.1	0.0	3.3	0.0	3.8

Intersection Summary	
HCM 7th Control Delay, s/veh	32.5
HCM 7th LOS	C

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	50	37	647	29	14	382
Future Volume (vph)	50	37	647	29	14	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	60				60	
Link Speed (mph)	30		45			45
Link Distance (ft)	1354		2442			287
Travel Time (s)	30.8		37.0			4.3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)						
Sign Control	Stop		Stop			Stop

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	51.2
Intersection LOS	F

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	37	647	29	14	382
Future Vol, veh/h	50	37	647	29	14	382
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	43	752	34	16	444
Number of Lanes	1	0	1	0	1	1

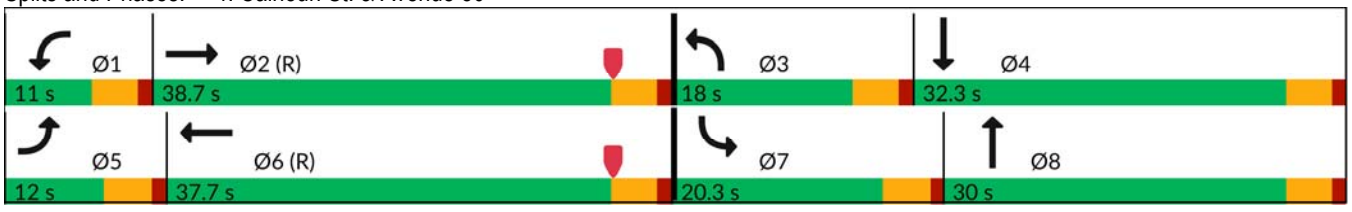
Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay, s/veh	11.2	75.2	19
HCM LOS	B	F	C

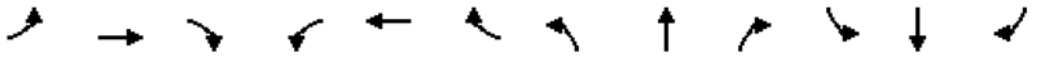
Lane	NBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	57%	100%	0%
Vol Thru, %	96%	0%	0%	100%
Vol Right, %	4%	43%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	676	87	14	382
LT Vol	0	50	14	0
Through Vol	647	0	0	382
RT Vol	29	37	0	0
Lane Flow Rate	786	101	16	444
Geometry Grp	4a	2	5	5
Degree of Util (X)	1.07	0.184	0.027	0.679
Departure Headway (Hd)	4.902	6.716	6.125	5.619
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	731	537	588	649
Service Time	2.994	4.716	3.825	3.319
HCM Lane V/C Ratio	1.075	0.188	0.027	0.684
HCM Control Delay, s/veh	75.2	11.2	9	19.4
HCM Lane LOS	F	B	A	C
HCM 95th-tile Q	20.5	0.7	0.1	5.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	210	24	29	430	167	97	350	157	113	251	90
Future Volume (vph)	41	210	24	29	430	167	97	350	157	113	251	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	12.0	38.7		11.0	37.7		18.0	30.0		20.3	32.3	
Total Split (%)	12.0%	38.7%		11.0%	37.7%		18.0%	30.0%		20.3%	32.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Calhoun St. & Avenue 50





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	210	24	29	430	167	97	350	157	113	251	90
Future Volume (veh/h)	41	210	24	29	430	167	97	350	157	113	251	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	49	250	29	35	512	199	115	417	187	135	299	107
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	66	1381	159	55	1061	411	144	635	282	167	717	251
Arrive On Green	0.04	0.43	0.43	0.03	0.42	0.42	0.08	0.27	0.27	0.09	0.28	0.28
Sat Flow, veh/h	1781	3212	369	1781	2504	969	1781	2394	1062	1781	2580	904
Grp Volume(v), veh/h	49	137	142	35	363	348	115	308	296	135	204	202
Grp Sat Flow(s),veh/h/ln	1781	1777	1804	1781	1777	1696	1781	1777	1679	1781	1777	1708
Q Serve(g_s), s	2.7	4.8	4.9	1.9	14.8	14.9	6.3	15.4	15.7	7.4	9.4	9.7
Cycle Q Clear(g_c), s	2.7	4.8	4.9	1.9	14.8	14.9	6.3	15.4	15.7	7.4	9.4	9.7
Prop In Lane	1.00		0.20	1.00		0.57	1.00		0.63	1.00		0.53
Lane Grp Cap(c), veh/h	66	764	776	55	753	719	144	472	446	167	494	475
V/C Ratio(X)	0.74	0.18	0.18	0.63	0.48	0.48	0.80	0.65	0.66	0.81	0.41	0.43
Avail Cap(c_a), veh/h	134	764	776	116	753	719	240	472	446	281	494	475
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.7	17.6	17.6	47.9	20.9	20.9	45.1	32.6	32.8	44.4	29.4	29.6
Incr Delay (d2), s/veh	14.8	0.5	0.5	11.3	2.2	2.3	9.6	6.9	7.6	9.0	2.5	2.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	1.9	2.0	1.0	6.0	5.8	3.1	7.2	7.0	3.6	4.1	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.5	18.1	18.2	59.2	23.1	23.2	54.7	39.6	40.3	53.4	32.0	32.3
LnGrp LOS	E	B	B	E	C	C	D	D	D	D	C	C
Approach Vol, veh/h		328			746			719			541	
Approach Delay, s/veh		24.8			24.8			42.3			37.5	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	47.5	12.6	32.3	8.2	46.9	13.9	31.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	34.2	13.5	27.8	7.5	33.2	15.8	25.5
Max Q Clear Time (g_c+I1), s	3.9	6.9	8.3	11.7	4.7	16.9	9.4	17.7
Green Ext Time (p_c), s	0.0	1.4	0.1	1.9	0.0	3.6	0.2	2.1

Intersection Summary	
HCM 7th Control Delay, s/veh	33.1
HCM 7th LOS	C

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	89	32	7	540	515	26
Future Volume (vph)	89	32	7	540	515	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	50	100			205
Storage Lanes	0	1	1			1
Taper Length (ft)	60		60			
Link Speed (mph)	30			50	50	
Link Distance (ft)	590			968	636	
Travel Time (s)	13.4			13.2	8.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	51.9
Intersection LOS	F

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	89	32	7	540	515	26
Future Vol, veh/h	89	32	7	540	515	26
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	100	36	8	607	579	29
Number of Lanes	1	1	1	1	2	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	3	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay, s/veh	13.3	95.2	16.7
HCM LOS	B	F	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	0%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	540	89	32	258	258	26
LT Vol	7	0	89	0	0	0	0
Through Vol	0	540	0	0	258	258	0
RT Vol	0	0	0	32	0	0	26
Lane Flow Rate	8	607	100	36	289	289	29
Geometry Grp	6	6	6	6	6	6	6
Degree of Util (X)	0.015	1.109	0.235	0.073	0.534	0.534	0.034
Departure Headway (Hd)	7.084	6.579	8.793	7.563	6.896	6.896	4.424
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	506	552	411	476	527	527	814
Service Time	4.822	4.316	6.493	5.263	4.596	4.596	2.124
HCM Lane V/C Ratio	0.016	1.1	0.243	0.076	0.548	0.548	0.036
HCM Control Delay, s/veh	9.9	96.3	14.2	10.9	17.2	17.2	7.3
HCM Lane LOS	A	F	B	B	C	C	A
HCM 95th-tile Q	0	19.2	0.9	0.2	3.1	3.1	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	194	125	20	143	67	74	247	22	60	502	84
Future Volume (vph)	47	194	125	20	143	67	74	247	22	60	502	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	28.7
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	194	125	20	143	67	74	247	22	60	502	84
Future Vol, veh/h	47	194	125	20	143	67	74	247	22	60	502	84
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	51	209	134	22	154	72	80	266	24	65	540	90
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

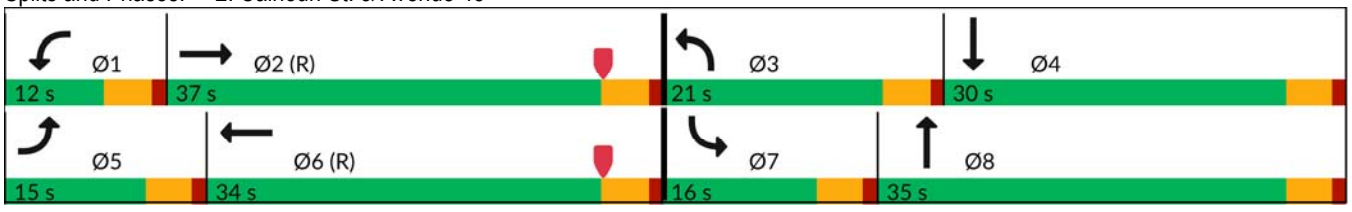
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	19.6	23.8	27.1	36.5
HCM LOS	C	C	D	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	68%	0%	100%	67%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	32%	0%	0%	33%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	74	247	22	47	194	125	20	210	60	335	251
LT Vol	74	0	0	47	0	0	20	0	60	0	0
Through Vol	0	247	0	0	194	0	0	143	0	335	167
RT Vol	0	0	22	0	0	125	0	67	0	0	84
Lane Flow Rate	80	266	24	51	209	134	22	226	65	360	270
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.221	0.701	0.058	0.14	0.55	0.328	0.06	0.589	0.166	0.876	0.64
Departure Headway (Hd)	10.018	9.504	8.783	10.002	9.492	8.778	10.106	9.383	9.276	8.763	8.523
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	357	380	406	358	380	409	354	384	386	414	422
Service Time	7.801	7.286	6.565	7.782	7.271	6.556	7.884	7.16	7.049	6.536	6.295
HCM Lane V/C Ratio	0.224	0.7	0.059	0.142	0.55	0.328	0.062	0.589	0.168	0.87	0.64
HCM Control Delay, s/veh	15.6	31.9	12.1	14.4	23.4	15.8	13.5	24.8	13.9	48.9	25.4
HCM Lane LOS	C	D	B	B	C	C	B	C	B	E	D
HCM 95th-tile Q	0.8	5.1	0.2	0.5	3.2	1.4	0.2	3.6	0.6	8.8	4.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	583	281	30	400	38	121	260	36	67	404	96
Future Volume (vph)	54	583	281	30	400	38	121	260	36	67	404	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	37.0		12.0	34.0		21.0	35.0		16.0	30.0	
Total Split (%)	15.0%	37.0%		12.0%	34.0%		21.0%	35.0%		16.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Calhoun St. & Avenue 48



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	583	281	30	400	38	121	260	36	67	404	96
Future Volume (veh/h)	54	583	281	30	400	38	121	260	36	67	404	96
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	56	601	290	31	412	39	125	268	37	69	416	99
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	72	1484	691	51	2016	188	156	958	131	89	763	180
Arrive On Green	0.04	0.44	0.44	0.03	0.42	0.42	0.09	0.31	0.31	0.05	0.27	0.27
Sat Flow, veh/h	1781	3404	1585	1781	4751	443	1781	3141	429	1781	2853	673
Grp Volume(v), veh/h	56	601	290	31	293	158	125	150	155	69	258	257
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1791	1781	1777	1793	1781	1777	1749
Q Serve(g_s), s	3.1	12.1	12.6	1.7	5.4	5.6	6.9	6.4	6.6	3.8	12.4	12.6
Cycle Q Clear(g_c), s	3.1	12.1	12.6	1.7	5.4	5.6	6.9	6.4	6.6	3.8	12.4	12.6
Prop In Lane	1.00		1.00	1.00		0.25	1.00		0.24	1.00		0.38
Lane Grp Cap(c), veh/h	72	1484	691	51	1444	760	156	542	547	89	475	468
V/C Ratio(X)	0.77	0.40	0.42	0.60	0.20	0.21	0.80	0.28	0.28	0.77	0.54	0.55
Avail Cap(c_a), veh/h	187	1484	691	134	1444	760	294	542	547	205	475	468
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.5	19.3	19.5	48.0	18.1	18.2	44.8	26.4	26.4	46.9	31.4	31.5
Incr Delay (d2), s/veh	15.9	0.8	1.9	10.8	0.3	0.6	9.1	1.3	1.3	13.1	4.4	4.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	4.5	4.6	0.9	2.0	2.2	3.3	2.8	2.9	2.0	5.6	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	63.4	20.1	21.3	58.8	18.5	18.8	53.9	27.7	27.7	60.1	35.8	36.0
LnGrp LOS	E	C	C	E	B	B	D	C	C	E	D	D
Approach Vol, veh/h		947			482			430			584	
Approach Delay, s/veh		23.1			21.2			35.3			38.8	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	48.1	13.3	31.3	8.6	46.9	9.5	35.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	32.5	16.5	25.5	10.5	29.5	11.5	30.5
Max Q Clear Time (g_c+I1), s	3.7	14.6	8.9	14.6	5.1	7.6	5.8	8.6
Green Ext Time (p_c), s	0.0	5.1	0.2	2.1	0.0	2.4	0.0	1.5

Intersection Summary	
HCM 7th Control Delay, s/veh	28.6
HCM 7th LOS	C

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	35	20	392	23	28	552
Future Volume (vph)	35	20	392	23	28	552
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	100	
Storage Lanes	1	0		0	1	
Taper Length (ft)	60				60	
Link Speed (mph)	30		45			45
Link Distance (ft)	1354		2442			287
Travel Time (s)	30.8		37.0			4.3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Stop		Stop			Stop

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	20.3
Intersection LOS	C

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	20	392	23	28	552
Future Vol, veh/h	35	20	392	23	28	552
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	21	413	24	29	581
Number of Lanes	1	0	1	0	1	1

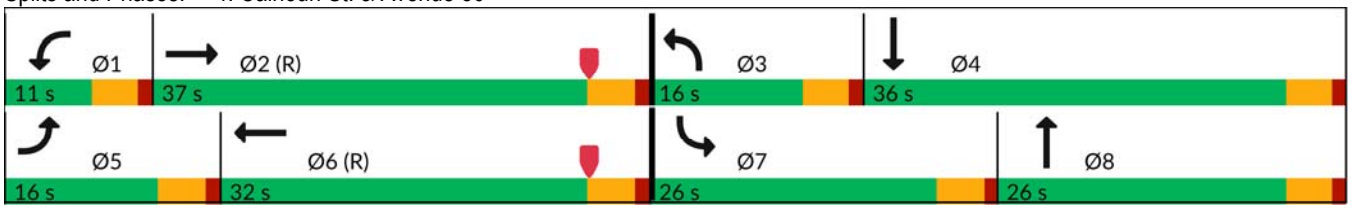
Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay, s/veh	9.9	14.7	25.3
HCM LOS	A	B	D

Lane	NBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	64%	100%	0%
Vol Thru, %	94%	0%	0%	100%
Vol Right, %	6%	36%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	415	55	28	552
LT Vol	0	35	28	0
Through Vol	392	0	0	552
RT Vol	23	20	0	0
Lane Flow Rate	437	58	29	581
Geometry Grp	4a	2	5	5
Degree of Util (X)	0.589	0.099	0.045	0.814
Departure Headway (Hd)	4.857	6.16	5.544	5.041
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	738	576	644	715
Service Time	2.908	4.258	3.294	2.79
HCM Lane V/C Ratio	0.592	0.101	0.045	0.813
HCM Control Delay, s/veh	14.7	9.9	8.6	26.1
HCM Lane LOS	B	A	A	D
HCM 95th-tile Q	3.9	0.3	0.1	8.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	422	43	10	318	120	56	202	66	150	275	64
Future Volume (vph)	53	422	43	10	318	120	56	202	66	150	275	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	16.0	37.0		11.0	32.0		16.0	26.0		26.0	36.0	
Total Split (%)	16.0%	37.0%		11.0%	32.0%		16.0%	26.0%		26.0%	36.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Calhoun St. & Avenue 50



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	422	43	10	318	120	56	202	66	150	275	64
Future Volume (veh/h)	53	422	43	10	318	120	56	202	66	150	275	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	440	45	10	331	125	58	210	69	156	286	67
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	1468	149	22	1073	398	75	663	212	191	903	208
Arrive On Green	0.04	0.45	0.45	0.01	0.42	0.42	0.04	0.25	0.25	0.11	0.31	0.31
Sat Flow, veh/h	1781	3256	332	1781	2537	941	1781	2649	846	1781	2867	661
Grp Volume(v), veh/h	55	239	246	10	230	226	58	139	140	156	175	178
Grp Sat Flow(s),veh/h/ln	1781	1777	1811	1781	1777	1701	1781	1777	1718	1781	1777	1751
Q Serve(g_s), s	3.1	8.5	8.6	0.6	8.6	8.8	3.2	6.4	6.7	8.6	7.5	7.7
Cycle Q Clear(g_c), s	3.1	8.5	8.6	0.6	8.6	8.8	3.2	6.4	6.7	8.6	7.5	7.7
Prop In Lane	1.00		0.18	1.00		0.55	1.00		0.49	1.00		0.38
Lane Grp Cap(c), veh/h	71	801	816	22	752	719	75	444	430	191	560	552
V/C Ratio(X)	0.77	0.30	0.30	0.46	0.31	0.31	0.77	0.31	0.33	0.82	0.31	0.32
Avail Cap(c_a), veh/h	205	801	816	116	752	719	205	444	430	383	560	552
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	17.4	17.5	49.1	19.1	19.2	47.4	30.5	30.6	43.7	26.0	26.1
Incr Delay (d2), s/veh	16.1	1.0	0.9	14.6	1.1	1.1	15.3	1.8	2.0	8.4	1.5	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.4	3.5	0.3	3.5	3.4	1.7	2.8	2.9	4.1	3.2	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	63.7	18.4	18.4	63.7	20.2	20.3	62.7	32.3	32.6	52.1	27.5	27.6
LnGrp LOS	E	B	B	E	C	C	E	C	C	D	C	C
Approach Vol, veh/h		540			466			337			509	
Approach Delay, s/veh		23.0			21.2			37.7			35.1	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	49.6	8.7	36.0	8.5	46.8	15.2	29.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	32.5	11.5	31.5	11.5	27.5	21.5	21.5
Max Q Clear Time (g_c+I1), s	2.6	10.6	5.2	9.7	5.1	10.8	10.6	8.7
Green Ext Time (p_c), s	0.0	2.4	0.0	1.8	0.0	2.1	0.3	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	28.5
HCM 7th LOS	C

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	64	22	20	462	612	73
Future Volume (vph)	64	22	20	462	612	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	50	100			205
Storage Lanes	0	1	1			1
Taper Length (ft)	60		60			
Link Speed (mph)	30			50	50	
Link Distance (ft)	590			968	636	
Travel Time (s)	13.4			13.2	8.7	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)						
Sign Control	Stop			Stop	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	23
Intersection LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	64	22	20	462	612	73
Future Vol, veh/h	64	22	20	462	612	73
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	67	23	21	481	638	76
Number of Lanes	1	1	1	1	2	1

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	3	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	3	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay, s/veh	12.1	35.5	15.6
HCM LOS	B	E	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	100%	0%	0%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	462	64	22	306	306	73
LT Vol	20	0	64	0	0	0	0
Through Vol	0	462	0	0	306	306	0
RT Vol	0	0	0	22	0	0	73
Lane Flow Rate	21	481	67	23	319	319	76
Geometry Grp	6	6	6	6	6	6	6
Degree of Util (X)	0.04	0.858	0.155	0.046	0.554	0.554	0.08
Departure Headway (Hd)	6.924	6.42	8.383	7.16	6.255	6.255	3.796
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	516	563	426	497	574	574	936
Service Time	4.679	4.175	6.171	4.947	4.011	4.011	1.551
HCM Lane V/C Ratio	0.041	0.854	0.157	0.046	0.556	0.556	0.081
HCM Control Delay, s/veh	10	36.6	12.7	10.3	16.6	16.6	6.9
HCM Lane LOS	A	E	B	B	C	C	A
HCM 95th-tile Q	0.1	9.3	0.5	0.1	3.4	3.4	0.3

APPENDIX 3.3: TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

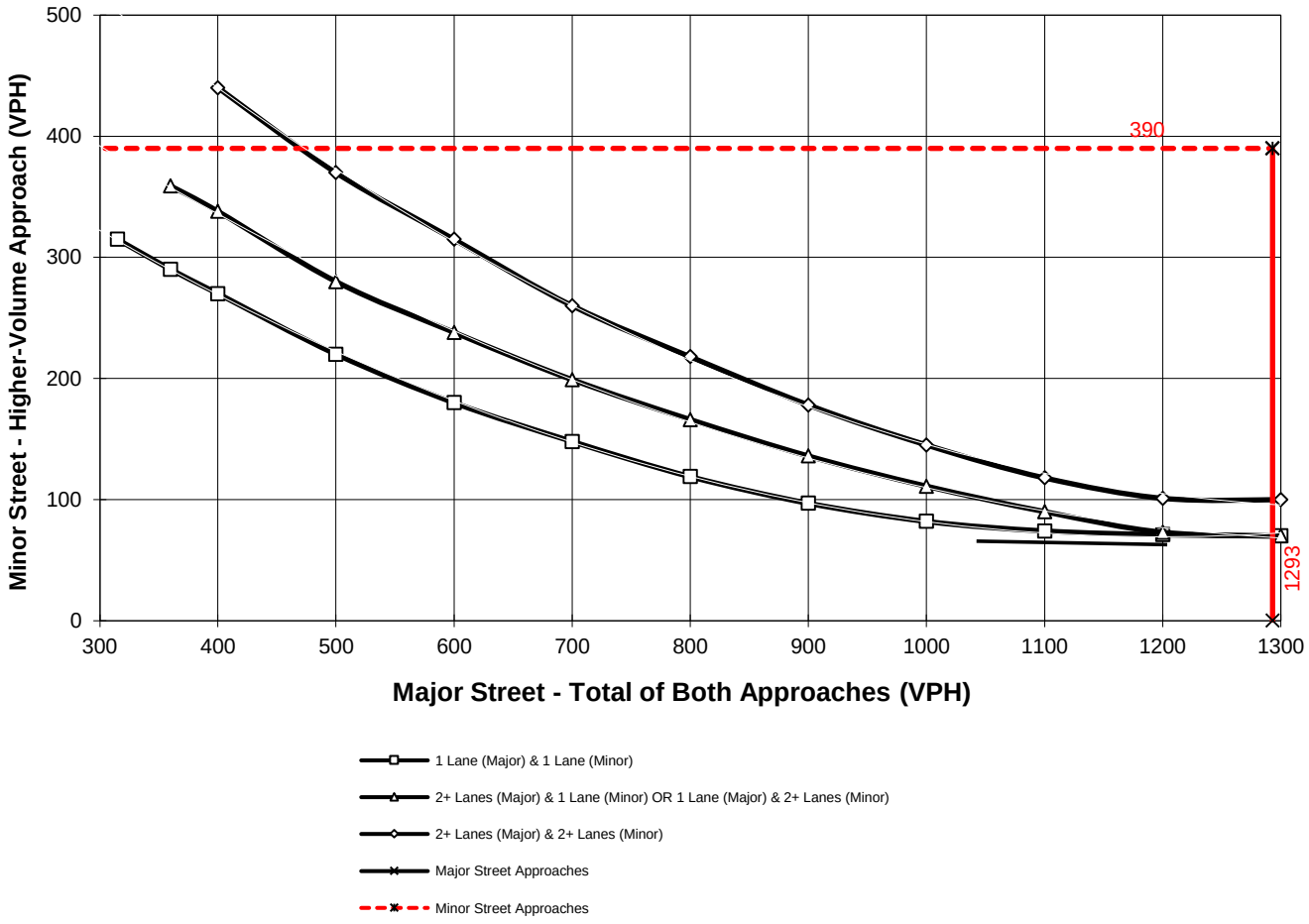
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) AM PEAK HOUR WARRANTS**

Major Street Name = **Calhoun St.**
Total of Both Approaches (VPH) = **1,293**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Dr. Carreon Bl.**
High Volume Approach (VPH) = **390**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #1

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

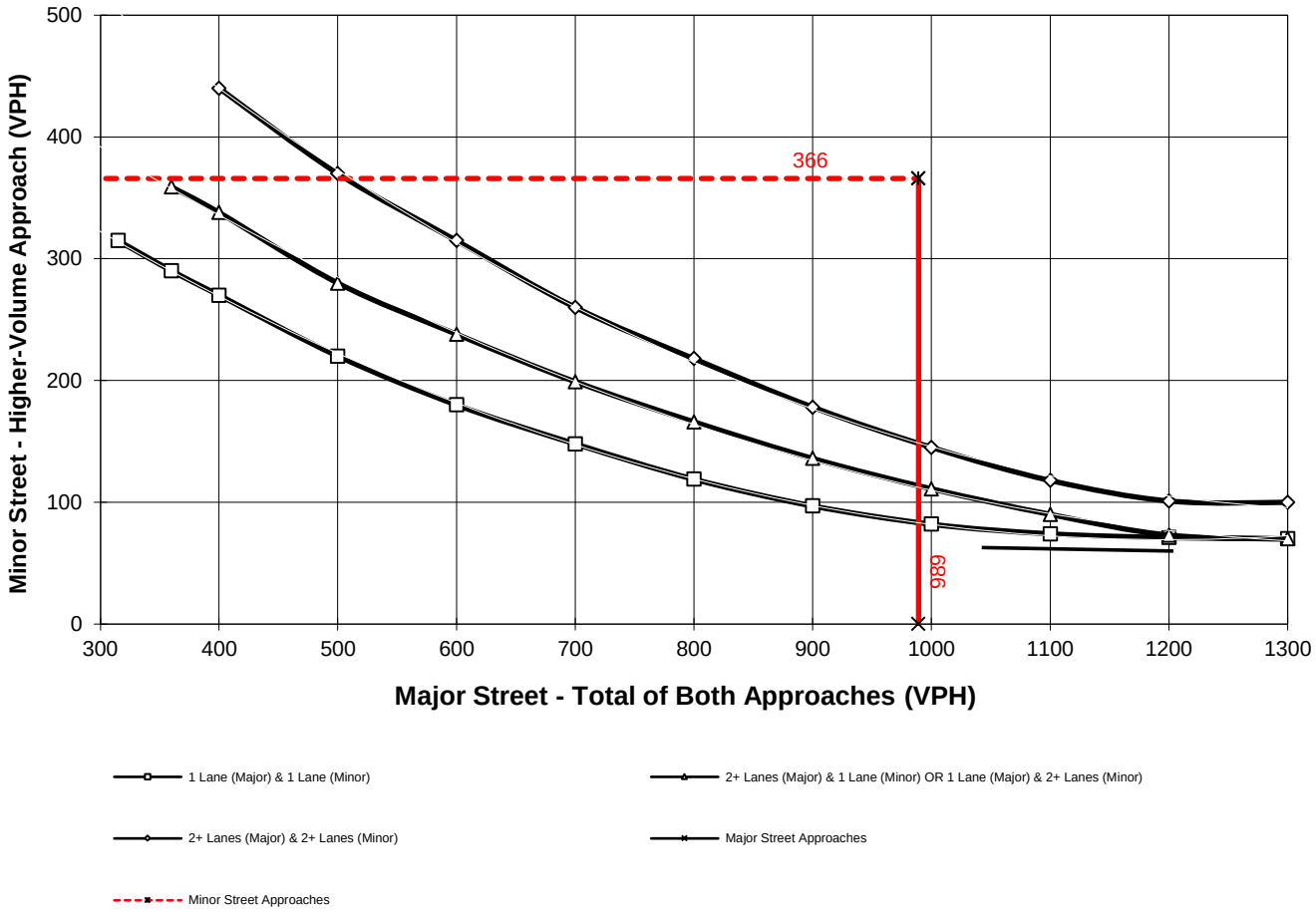
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) PM PEAK HOUR WARRANTS**

Major Street Name = **Calhoun St.**
Total of Both Approaches (VPH) = **989**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Dr. Carreon Bl.**
High Volume Approach (VPH) = **366**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #1

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

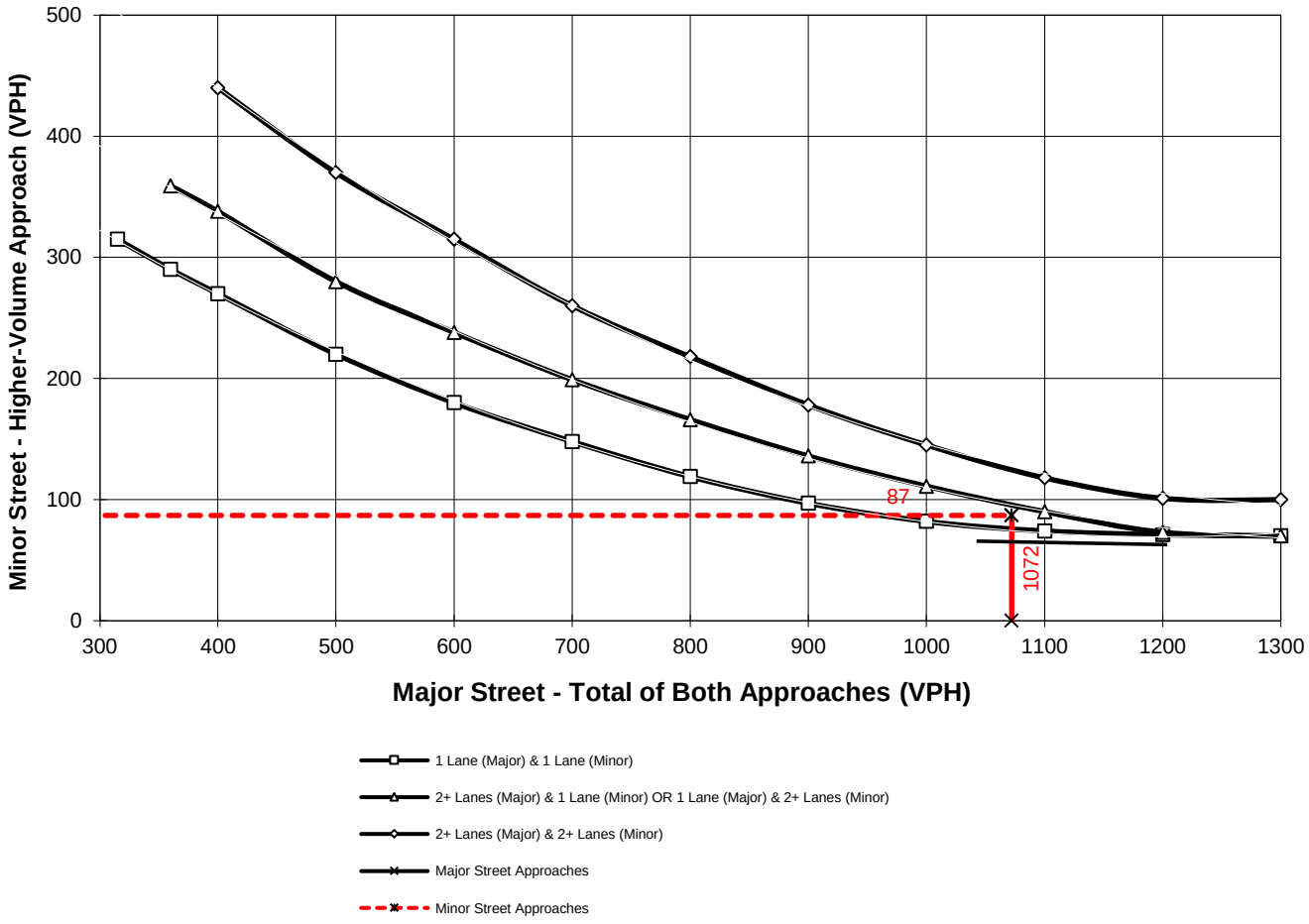
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) AM PEAK HOUR WARRANTS**

Major Street Name = **Calhoun St.**
Total of Both Approaches (VPH) = **1,072**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Avenue 49**
High Volume Approach (VPH) = **87**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #3

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

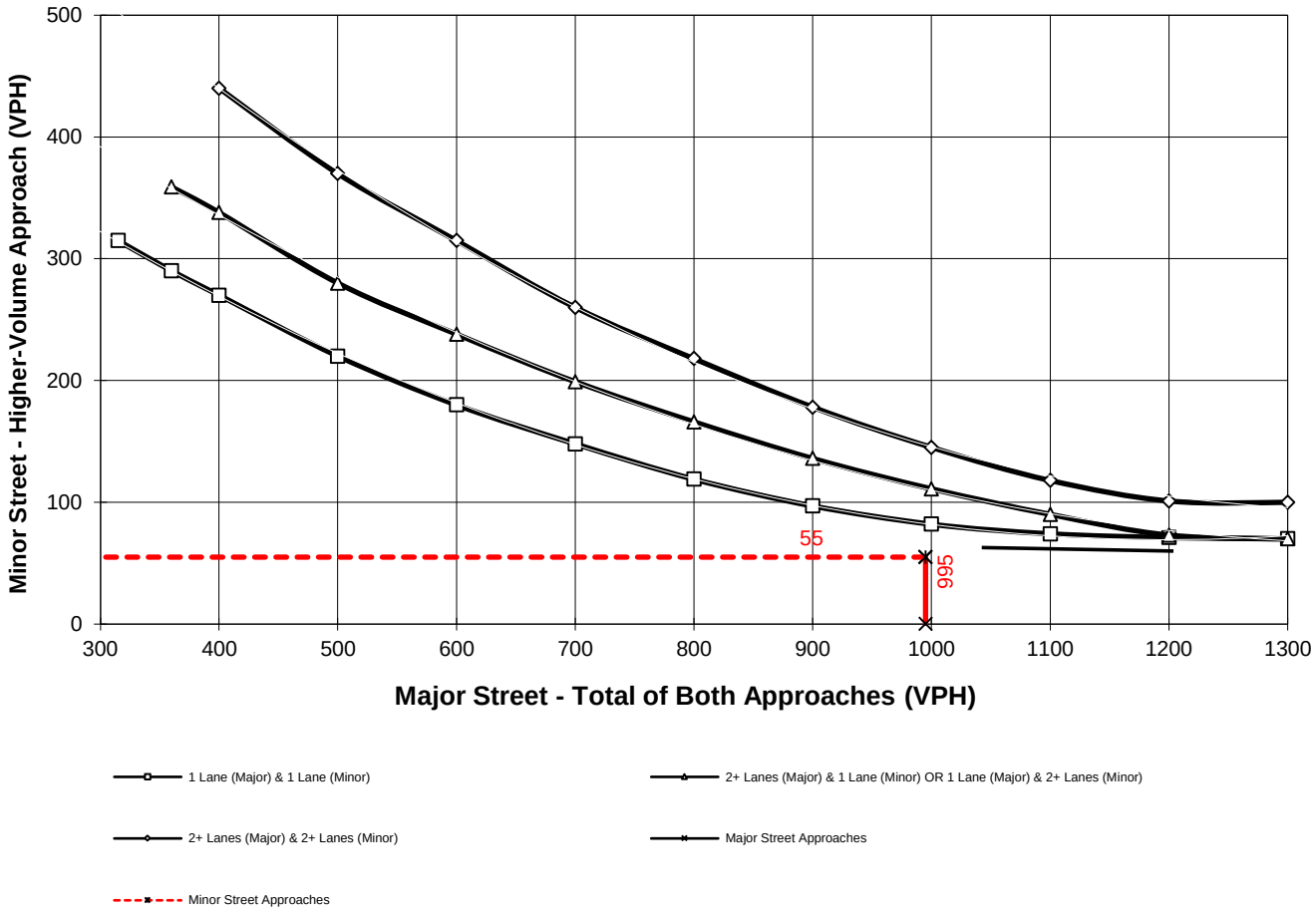
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) PM PEAK HOUR WARRANTS**

Major Street Name = **Calhoun St.**
Total of Both Approaches (VPH) = **995**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Avenue 49**
High Volume Approach (VPH) = **55**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #3

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

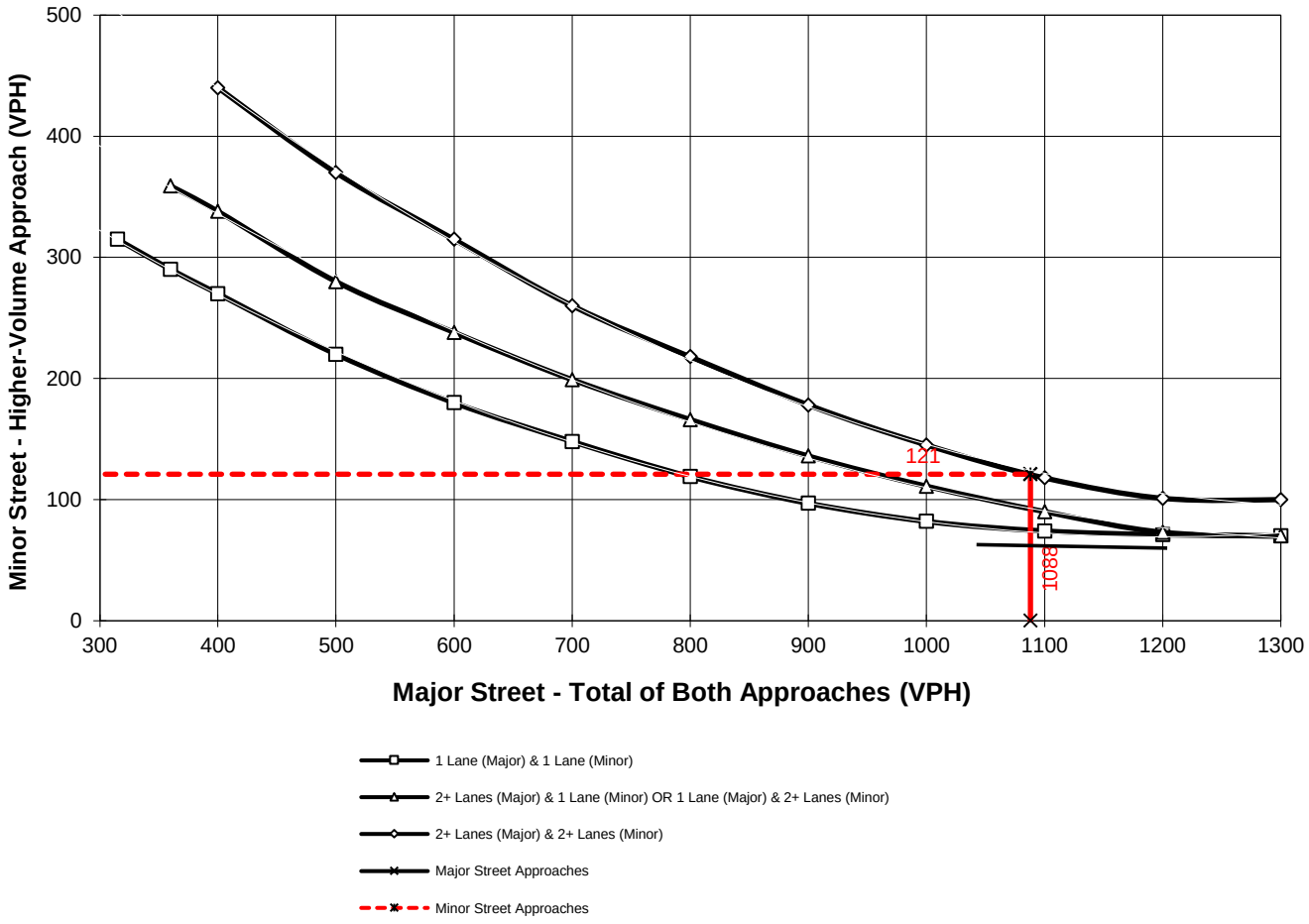
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) AM PEAK HOUR WARRANTS**

Major Street Name = **Jackson St.** Total of Both Approaches (VPH) = **1,088**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Avenue 49 - Odlum Dr.** High Volume Approach (VPH) = **121**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #5

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

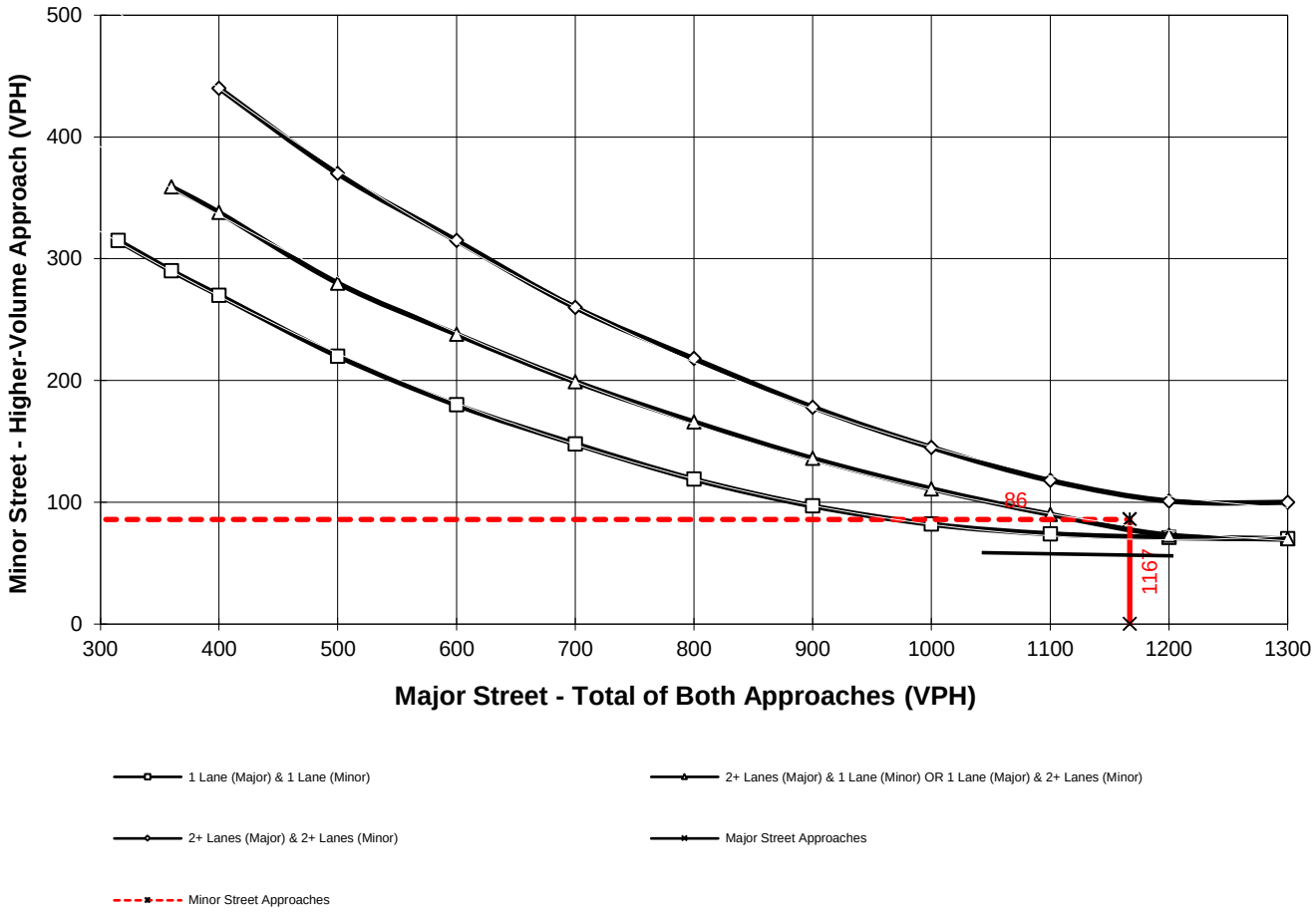
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **EXISTING (2024) PM PEAK HOUR WARRANTS**

Major Street Name = **Jackson St.**
Total of Both Approaches (VPH) = **1,167**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Avenue 49 - Odlum Dr.**
High Volume Approach (VPH) = **86**
Number of Approach Lanes Minor Street = **1**

WARRANTED FOR A SIGNAL



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Intersection ID: #5

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM		TRAFFIC CONDITIONS		EAC (2026)
				CALC	JC	DATE	09/03/24
Jurisdiction:	City of Coachella			CHK		DATE	
Major Street:	Jackson St.				Critical Approach Speed (Major)		45 mph
Minor Street:	Avenue 49 - Odlum Dr.				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **2** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **21,208** vpd Minor Street Future ADT = **1,179** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. √

or

In built up area of isolated community of < 10,000 population ……..

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements ADT: Vehicles Per Day on Major Street (Total of Both Approaches)		Minimum Requirements ADT: Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	XX				
CONDITION A - Minimum Vehicular Volume					
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1	*1*	8,000	5,600	2,400	1,680
2 + **21,208**	*1* **1,179**	9,600	6,720 *	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic					
Satisfied	Not Satisfied				
XX					
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1	*1*	12,000	8,400	1,200	850
2 + **21,208**	*1* **1,179**	14,400	10,080 *	1,200	850 *
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 70% **B** 100%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

___ DIST	___ CO	___ RTE	___ PM	TRAFFIC CONDITIONS	**EAP (2026)**
				CALC JC	DATE 09/03/24
Jurisdiction: **City of Coachella**				CHK	DATE
Major Street: **Calhoun St.**				Critical Approach Speed (Major)	45 mph
Minor Street: **Access 1**				Critical Approach Speed (Minor)	25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **13,958** vpd Minor Street Future ADT = **882** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……... [√]

or **RURAL (R)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Number of lanes for moving traffic on each approach: Major Street	Minor Street	Minimum Requirements ADT: Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
CONDITION A - Minimum Vehicular Volume						
Satisfied / Not Satisfied XX						
	1 **13,958**	*1* **882**	8,000	5,600 *	2,400	1,680
	2 +	*1*	9,600	6,720	2,400	1,680
	2 +	*2* +	9,600	6,720	3,200	2,240
	1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic						
Satisfied XX / Not Satisfied						
	1 **13,958**	*1* **882**	12,000	8,400 *	1,200	850 *
	2 +	*1*	14,400	10,080	1,200	850
	2 +	*2* +	14,400	10,080	1,600	1,120
	1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B						
Satisfied / Not Satisfied XX						
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 53%	**B** 100%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS	EAP (2026)
				CALC JC	DATE 09/03/24
				CHK	DATE

Jurisdiction: **City of Coachella**
Major Street: **Access 2** — Critical Approach Speed (Major) 30 mph
Minor Street: **Avenue 49** — Critical Approach Speed (Minor) 25 mph

Major Street Approach Lanes = **1** lane — Minor Street Approach Lanes **1** lane

Major Street Future ADT = **378** vpd — Minor Street Future ADT = **378** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Number of lanes for moving traffic on each approach		Minimum Requirements ADT			
			Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Major Street	Minor Street	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume						
Satisfied: Not Satisfied XX						
	1 **378**	*1* **378**	8,000	5,600	2,400	1,680
	2 +	*1*	9,600	6,720	2,400	1,680
	2 +	*2* +	9,600	6,720	3,200	2,240
	1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic						
Satisfied: Not Satisfied XX						
	1 **378**	*1* **378**	12,000	8,400	1,200	850
	2 +	*1*	14,400	10,080	1,200	850
	2 +	*2* +	14,400	10,080	1,600	1,120
	1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B						
Satisfied: Not Satisfied XX			2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 5%	**B** 3%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM		TRAFFIC CONDITIONS		EAPC (2026)
				CALC	JC	DATE	09/03/24
Jurisdiction:	City of Coachella			CHK		DATE	
Major Street:	Access 2				Critical Approach Speed (Major)		45 mph
Minor Street:	Avenue 49				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane

Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **378** vpd

Minor Street Future ADT = **378** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……... [√]

or

In built up area of isolated community of < 10,000 population …….. [ ]

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements ADT			
	XX				
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **378**	*1* **378**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **378**	*1* **378**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX				
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 7% **B** 5%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

APPENDIX 5.1: EAP (2026) CONDITIONS

INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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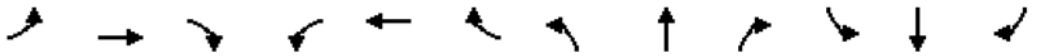


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	188	66	29	291	88	252	553	89	83	270	148
Future Volume (vph)	82	188	66	29	291	88	252	553	89	83	270	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	129.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	82	188	66	29	291	88	252	553	89	83	270	148
Future Vol, veh/h	82	188	66	29	291	88	252	553	89	83	270	148
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	87	200	70	31	310	94	268	588	95	88	287	157
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

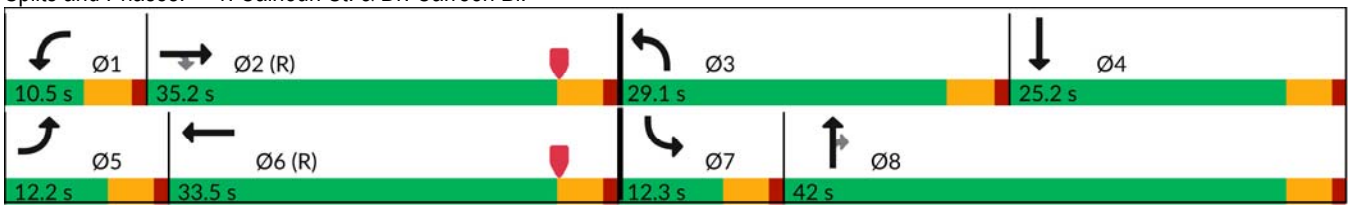
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	27.3	136.4	219.1	32.3
HCM LOS	D	F	F	D

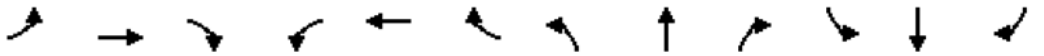
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	77%	0%	100%	38%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	23%	0%	0%	62%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	252	553	89	82	188	66	29	379	83	180	238
LT Vol	252	0	0	82	0	0	29	0	83	0	0
Through Vol	0	553	0	0	188	0	0	291	0	180	90
RT Vol	0	0	89	0	0	66	0	88	0	0	148
Lane Flow Rate	268	588	95	87	200	70	31	403	88	191	253
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.788	1.649	0.247	0.283	0.623	0.205	0.096	1.19	0.274	0.568	0.72
Departure Headway (Hd)	11.311	10.79	10.059	12.953	12.433	11.704	11.979	11.316	12.478	11.954	11.497
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	322	341	359	279	292	309	301	323	290	304	316
Service Time	9.011	8.49	7.759	10.653	10.133	9.404	9.679	9.016	10.178	9.654	9.197
HCM Lane V/C Ratio	0.832	1.724	0.265	0.312	0.685	0.227	0.103	1.248	0.303	0.628	0.801
HCM Control Delay, s/veh	45.6	330.8	16	20.7	33.7	17.4	15.9	145.6	19.8	29.3	38.9
HCM Lane LOS	E	F	C	C	D	C	C	F	C	D	E
HCM 95th-tile Q	6.4	33.3	1	1.1	3.9	0.8	0.3	16.3	1.1	3.3	5.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	188	66	29	291	88	252	553	89	83	270	148
Future Volume (vph)	82	188	66	29	291	88	252	553	89	83	270	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8			
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5	9.5	22.5	
Total Split (s)	12.2	35.2	35.2	10.5	33.5		29.1	42.0	42.0	12.3	25.2	
Total Split (%)	12.2%	35.2%	35.2%	10.5%	33.5%		29.1%	42.0%	42.0%	12.3%	25.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max	Max	None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Calhoun St. & Dr. Carreon Bl.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	188	66	29	291	88	252	553	89	83	270	148
Future Volume (veh/h)	82	188	66	29	291	88	252	553	89	83	270	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	87	200	70	31	310	94	268	588	95	88	287	157
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	111	661	560	51	441	134	305	701	594	112	597	318
Arrive On Green	0.06	0.35	0.35	0.03	0.32	0.32	0.17	0.38	0.38	0.06	0.27	0.27
Sat Flow, veh/h	1781	1870	1585	1781	1377	418	1781	1870	1585	1781	2240	1192
Grp Volume(v), veh/h	87	200	70	31	0	404	268	588	95	88	226	218
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1795	1781	1870	1585	1781	1777	1656
Q Serve(g_s), s	4.8	7.7	3.0	1.7	0.0	19.7	14.7	28.7	4.0	4.9	10.7	11.1
Cycle Q Clear(g_c), s	4.8	7.7	3.0	1.7	0.0	19.7	14.7	28.7	4.0	4.9	10.7	11.1
Prop In Lane	1.00		1.00	1.00		0.23	1.00		1.00	1.00		0.72
Lane Grp Cap(c), veh/h	111	661	560	51	0	574	305	701	594	112	474	441
V/C Ratio(X)	0.79	0.30	0.13	0.60	0.00	0.70	0.88	0.84	0.16	0.79	0.48	0.49
Avail Cap(c_a), veh/h	137	661	560	107	0	574	438	701	594	139	474	441
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.83	0.83	0.83	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	23.4	21.9	48.0	0.0	29.8	40.4	28.5	20.8	46.2	30.8	31.0
Incr Delay (d2), s/veh	20.9	1.2	0.5	10.8	0.0	7.1	11.4	9.7	0.5	20.6	3.4	3.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	3.5	1.1	0.9	0.0	9.2	7.1	13.7	1.5	2.7	4.9	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	67.1	24.6	22.3	58.8	0.0	36.9	51.9	38.2	21.3	66.8	34.2	34.9
LnGrp LOS	E	C	C	E		D	D	D	C	E	C	C
Approach Vol, veh/h		357			435			951			532	
Approach Delay, s/veh		34.5			38.5			40.4			39.9	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	39.8	21.6	31.2	10.7	36.5	10.8	42.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.0	30.7	24.6	20.7	7.7	29.0	7.8	37.5
Max Q Clear Time (g_c+I1), s	3.7	9.7	16.7	13.1	6.8	21.7	6.9	30.7
Green Ext Time (p_c), s	0.0	1.2	0.5	1.5	0.0	1.3	0.0	2.2

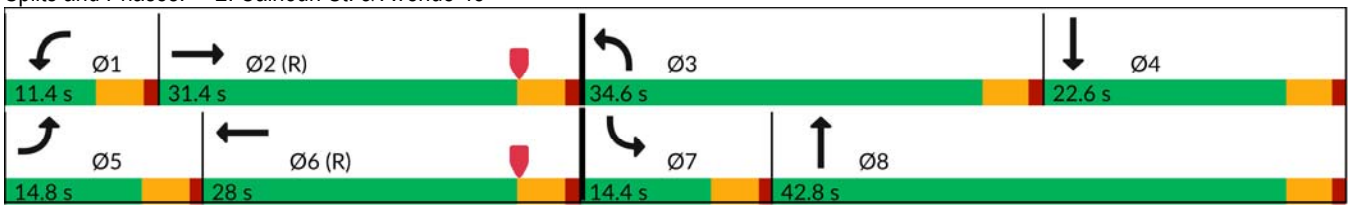
Intersection Summary	
HCM 7th Control Delay, s/veh	39.0
HCM 7th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	400	115	38	625	96	282	571	83	62	240	70
Future Volume (vph)	68	400	115	38	625	96	282	571	83	62	240	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	14.8	31.4		11.4	28.0		34.6	42.8		14.4	22.6	
Total Split (%)	14.8%	31.4%		11.4%	28.0%		34.6%	42.8%		14.4%	22.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 2: Calhoun St. & Avenue 48



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	400	115	38	625	96	282	571	83	62	240	70
Future Volume (veh/h)	68	400	115	38	625	96	282	571	83	62	240	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	482	139	46	753	116	340	688	100	75	289	84
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	1375	384	64	1446	221	379	1193	173	97	613	175
Arrive On Green	0.06	0.35	0.35	0.04	0.32	0.32	0.21	0.38	0.38	0.05	0.22	0.22
Sat Flow, veh/h	1781	3966	1109	1781	4469	683	1781	3114	452	1781	2729	778
Grp Volume(v), veh/h	82	412	209	46	572	297	340	392	396	75	186	187
Grp Sat Flow(s),veh/h/ln	1781	1702	1671	1781	1702	1747	1781	1777	1789	1781	1777	1730
Q Serve(g_s), s	4.5	9.0	9.4	2.6	13.7	13.8	18.6	17.5	17.5	4.2	9.1	9.4
Cycle Q Clear(g_c), s	4.5	9.0	9.4	2.6	13.7	13.8	18.6	17.5	17.5	4.2	9.1	9.4
Prop In Lane	1.00		0.66	1.00		0.39	1.00		0.25	1.00		0.45
Lane Grp Cap(c), veh/h	105	1180	579	64	1102	566	379	681	685	97	399	388
V/C Ratio(X)	0.78	0.35	0.36	0.72	0.52	0.52	0.90	0.58	0.58	0.78	0.47	0.48
Avail Cap(c_a), veh/h	183	1180	579	123	1102	566	536	681	685	176	399	388
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	24.3	24.4	47.7	27.5	27.6	38.3	24.4	24.4	46.7	33.6	33.7
Incr Delay (d2), s/veh	11.6	0.8	1.7	13.8	1.8	3.5	13.7	3.5	3.5	12.4	3.9	4.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.5	3.7	1.3	5.4	5.9	9.1	7.5	7.6	2.1	4.2	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.0	25.1	26.1	61.5	29.2	31.0	52.0	28.0	28.0	59.1	37.5	37.9
LnGrp LOS	E	C	C	E	C	C	D	C	C	E	D	D
Approach Vol, veh/h		703			915			1128			448	
Approach Delay, s/veh		29.3			31.4			35.2			41.3	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	39.2	25.8	27.0	10.4	36.9	9.9	42.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.9	26.9	30.1	18.1	10.3	23.5	9.9	38.3
Max Q Clear Time (g_c+I1), s	4.6	11.4	20.6	11.4	6.5	15.8	6.2	19.5
Green Ext Time (p_c), s	0.0	3.1	0.7	1.1	0.0	3.0	0.0	4.3

Intersection Summary	
HCM 7th Control Delay, s/veh	33.7
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	2	52	2	38	2	729	30	15	418	5
Future Volume (vph)	14	2	2	52	2	38	2	729	30	15	418	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	165.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	2	2	52	2	38	2	729	30	15	418	5
Future Vol, veh/h	14	2	2	52	2	38	2	729	30	15	418	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	2	2	60	2	44	2	848	35	17	486	6
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	12.2	13.3	267.6	25.2
HCM LOS	B	B	F	D

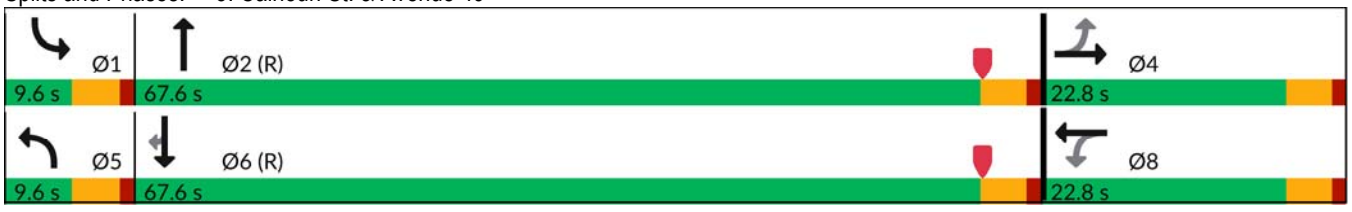
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	78%	57%	100%	0%	0%
Vol Thru, %	0%	96%	11%	2%	0%	100%	0%
Vol Right, %	0%	4%	11%	41%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	759	18	92	15	418	5
LT Vol	2	0	14	52	15	0	0
Through Vol	0	729	2	2	0	418	0
RT Vol	0	30	2	38	0	0	5
Lane Flow Rate	2	883	21	107	17	486	6
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.004	1.539	0.047	0.218	0.03	0.763	0.008
Departure Headway (Hd)	6.812	6.278	9.082	8.32	6.683	6.174	5.461
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	528	582	397	434	539	588	659
Service Time	4.514	3.981	6.782	6.02	4.383	3.874	3.161
HCM Lane V/C Ratio	0.004	1.517	0.053	0.247	0.032	0.827	0.009
HCM Control Delay, s/veh	9.5	268.3	12.2	13.3	9.6	26	8.2
HCM Lane LOS	A	F	B	B	A	D	A
HCM 95th-tile Q	0	45.8	0.1	0.8	0.1	6.9	0

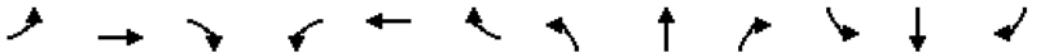
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	2	52	2	38	2	729	30	15	418	5
Future Volume (vph)	14	2	2	52	2	38	2	729	30	15	418	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	22.8	22.8		22.8	22.8		9.6	67.6		9.6	67.6	67.6
Total Split (%)	22.8%	22.8%		22.8%	22.8%		9.6%	67.6%		9.6%	67.6%	67.6%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 3: Calhoun St. & Avenue 49





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	2	2	52	2	38	2	729	30	15	418	5
Future Volume (veh/h)	14	2	2	52	2	38	2	729	30	15	418	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	2	2	60	2	44	2	848	35	17	486	6
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	161	20	13	125	9	56	5	1352	56	34	1448	1227
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.00	0.76	0.76	0.02	0.77	0.77
Sat Flow, veh/h	1093	231	147	785	106	632	1781	1783	74	1781	1870	1585
Grp Volume(v), veh/h	20	0	0	106	0	0	2	0	883	17	486	6
Grp Sat Flow(s),veh/h/ln	1470	0	0	1523	0	0	1781	0	1857	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	5.6	0.0	0.0	0.1	0.0	21.9	0.9	7.9	0.1
Cycle Q Clear(g_c), s	1.1	0.0	0.0	6.8	0.0	0.0	0.1	0.0	21.9	0.9	7.9	0.1
Prop In Lane	0.80		0.10	0.57		0.42	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	194	0	0	190	0	0	5	0	1408	34	1448	1227
V/C Ratio(X)	0.10	0.00	0.00	0.56	0.00	0.00	0.42	0.00	0.63	0.51	0.34	0.00
Avail Cap(c_a), veh/h	329	0	0	332	0	0	91	0	1408	91	1448	1227
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	0.0	0.0	44.6	0.0	0.0	49.8	0.0	5.6	48.6	3.4	2.6
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.0	48.5	0.0	2.1	11.4	0.6	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	2.7	0.0	0.0	0.1	0.0	6.2	0.5	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	42.3	0.0	0.0	47.1	0.0	0.0	98.3	0.0	7.7	60.0	4.1	2.6
LnGrp LOS	D			D			F		A	E	A	A
Approach Vol, veh/h		20			106			885			509	
Approach Delay, s/veh		42.3			47.1			7.9			5.9	
Approach LOS		D			D			A			A	

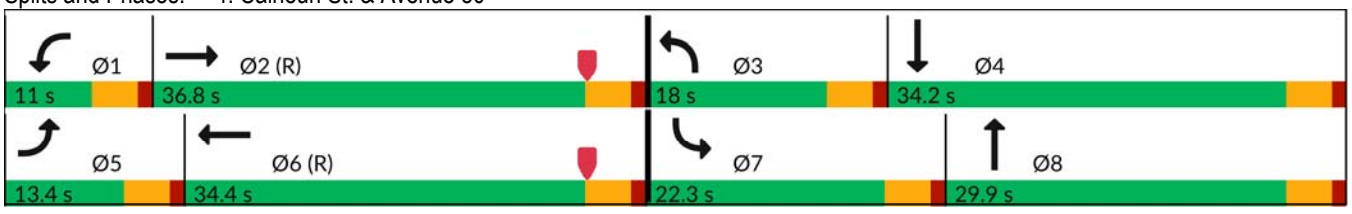
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	80.3		13.3	4.8	81.9		13.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	63.1		18.3	5.1	63.1		18.3				
Max Q Clear Time (g_c+I1), s	2.9	23.9		3.1	2.1	9.9		8.8				
Green Ext Time (p_c), s	0.0	7.4		0.0	0.0	3.1		0.3				

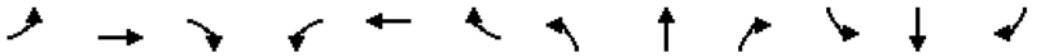
Intersection Summary												
HCM 7th Control Delay, s/veh			10.4									
HCM 7th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	218	25	30	447	182	101	369	163	139	275	101
Future Volume (vph)	46	218	25	30	447	182	101	369	163	139	275	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	13.4	36.8		11.0	34.4		18.0	29.9		22.3	34.2	
Total Split (%)	13.4%	36.8%		11.0%	34.4%		18.0%	29.9%		22.3%	34.2%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Calhoun St. & Avenue 50





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	218	25	30	447	182	101	369	163	139	275	101
Future Volume (veh/h)	46	218	25	30	447	182	101	369	163	139	275	101
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	260	30	36	532	217	120	439	194	165	327	120
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	1309	150	56	984	400	150	648	284	199	760	274
Arrive On Green	0.04	0.41	0.41	0.03	0.40	0.40	0.08	0.27	0.27	0.11	0.30	0.30
Sat Flow, veh/h	1781	3214	367	1781	2465	1002	1781	2405	1053	1781	2559	922
Grp Volume(v), veh/h	55	143	147	36	383	366	120	323	310	165	225	222
Grp Sat Flow(s),veh/h/ln	1781	1777	1804	1781	1777	1690	1781	1777	1681	1781	1777	1704
Q Serve(g_s), s	3.1	5.2	5.3	2.0	16.5	16.6	6.6	16.3	16.5	9.1	10.2	10.5
Cycle Q Clear(g_c), s	3.1	5.2	5.3	2.0	16.5	16.6	6.6	16.3	16.5	9.1	10.2	10.5
Prop In Lane	1.00		0.20	1.00		0.59	1.00		0.63	1.00		0.54
Lane Grp Cap(c), veh/h	71	724	735	56	709	675	150	479	453	199	528	506
V/C Ratio(X)	0.78	0.20	0.20	0.64	0.54	0.54	0.80	0.68	0.68	0.83	0.43	0.44
Avail Cap(c_a), veh/h	159	724	735	116	709	675	240	479	453	317	528	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	19.1	19.1	47.9	23.0	23.0	45.0	32.6	32.7	43.5	28.3	28.4
Incr Delay (d2), s/veh	16.3	0.6	0.6	11.4	2.9	3.1	9.5	7.4	8.1	9.7	2.5	2.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.1	2.2	1.0	6.9	6.6	3.2	7.6	7.4	4.4	4.5	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	63.9	19.7	19.7	59.3	25.9	26.2	54.4	40.1	40.8	53.2	30.8	31.2
LnGrp LOS	E	B	B	E	C	C	D	D	D	D	C	C
Approach Vol, veh/h		345			785			753			612	
Approach Delay, s/veh		26.8			27.6			42.7			37.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	45.2	12.9	34.2	8.5	44.4	15.7	31.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	32.3	13.5	29.7	8.9	29.9	17.8	25.4
Max Q Clear Time (g_c+I1), s	4.0	7.3	8.6	12.5	5.1	18.6	11.1	18.5
Green Ext Time (p_c), s	0.0	1.4	0.1	2.2	0.0	3.2	0.2	2.0

Intersection Summary	
HCM 7th Control Delay, s/veh	34.3
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	2	33	9	2	23	7	562	4	10	536	27
Future Volume (vph)	93	2	33	9	2	23	7	562	4	10	536	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	60			60			60			60		
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	74.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	93	2	33	9	2	23	7	562	4	10	536	27
Future Vol, veh/h	93	2	33	9	2	23	7	562	4	10	536	27
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	104	2	37	10	2	26	8	631	4	11	602	30
Number of Lanes	0	1	1	0	1	0	1	1	0	1	2	0

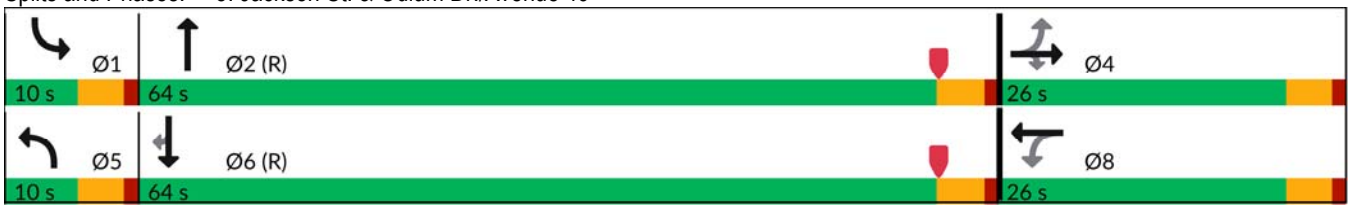
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	2
HCM Control Delay, s/veh	14.3	12.5	140.9	24.6
HCM LOS	B	B	F	C

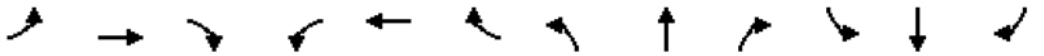
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	98%	0%	26%	100%	0%	0%
Vol Thru, %	0%	99%	2%	0%	6%	0%	100%	87%
Vol Right, %	0%	1%	0%	100%	68%	0%	0%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	566	95	33	34	10	357	206
LT Vol	7	0	93	0	9	10	0	0
Through Vol	0	562	2	0	2	0	357	179
RT Vol	0	4	0	33	23	0	0	27
Lane Flow Rate	8	636	107	37	38	11	401	231
Geometry Grp	6	6	6	6	6	6	6	6
Degree of Util (X)	0.016	1.23	0.26	0.078	0.089	0.023	0.767	0.436
Departure Headway (Hd)	7.476	6.964	9.332	8.105	8.967	7.848	7.338	7.244
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	478	521	387	445	402	459	498	501
Service Time	5.229	4.716	7.032	5.805	6.667	5.548	5.038	4.944
HCM Lane V/C Ratio	0.017	1.221	0.276	0.083	0.095	0.024	0.805	0.461
HCM Control Delay, s/veh	10.4	142.5	15.3	11.5	12.5	10.7	30.3	15.4
HCM Lane LOS	B	F	C	B	B	B	D	C
HCM 95th-tile Q	0	24.4	1	0.3	0.3	0.1	6.7	2.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	2	33	9	2	23	7	562	4	10	536	27
Future Volume (vph)	93	2	33	9	2	23	7	562	4	10	536	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	60			60			60			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Detector Phase	4	4	4	8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	26.0	26.0	26.0	26.0	26.0		10.0	64.0		10.0	64.0	64.0
Total Split (%)	26.0%	26.0%	26.0%	26.0%	26.0%		10.0%	64.0%		10.0%	64.0%	64.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Jackson St. & Odlum Dr./Avenue 49





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	2	33	9	2	23	7	562	4	10	536	27
Future Volume (veh/h)	93	2	33	9	2	23	7	562	4	10	536	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	104	2	37	10	2	26	8	631	4	11	602	30
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	200	3	274	54	29	82	18	1261	8	23	2425	1082
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.01	0.68	0.68	0.01	0.68	0.68
Sat Flow, veh/h	747	19	1585	51	169	475	1781	1856	12	1781	3554	1585
Grp Volume(v), veh/h	106	0	37	38	0	0	8	0	635	11	602	30
Grp Sat Flow(s),veh/h/ln	765	0	1585	694	0	0	1781	0	1868	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	2.0	0.3	0.0	0.0	0.4	0.0	16.5	0.6	6.5	0.6
Cycle Q Clear(g_c), s	15.1	0.0	2.0	15.3	0.0	0.0	0.4	0.0	16.5	0.6	6.5	0.6
Prop In Lane	0.98		1.00	0.26		0.68	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	203	0	274	165	0	0	18	0	1269	23	2425	1082
V/C Ratio(X)	0.52	0.00	0.14	0.23	0.00	0.00	0.45	0.00	0.50	0.47	0.25	0.03
Avail Cap(c_a), veh/h	262	0	341	230	0	0	98	0	1269	98	2425	1082
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.4	0.0	35.0	35.5	0.0	0.0	49.2	0.0	7.8	49.0	6.1	5.1
Incr Delay (d2), s/veh	2.1	0.0	0.2	0.7	0.0	0.0	16.8	0.0	1.4	13.9	0.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	0.8	0.8	0.0	0.0	0.3	0.0	5.4	0.4	1.9	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	42.5	0.0	35.3	36.2	0.0	0.0	66.1	0.0	9.2	62.8	6.3	5.2
LnGrp LOS	D		D	D			E		A	E	A	A
Approach Vol, veh/h		143			38			643			643	
Approach Delay, s/veh		40.6			36.2			9.9			7.2	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.8	72.4		21.8	5.5	72.7		21.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	59.5		21.5	5.5	59.5		21.5				
Max Q Clear Time (g_c+I1), s	2.6	18.5		17.1	2.4	8.5		17.3				
Green Ext Time (p_c), s	0.0	4.1		0.2	0.0	4.1		0.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			12.4									
HCM 7th LOS			B									

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	56	42	16	703	449	21
Future Volume (vph)	56	42	16	703	449	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	60		60			
Link Speed (mph)	30			45	45	
Link Distance (ft)	293			1762	680	
Travel Time (s)	6.7			26.7	10.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

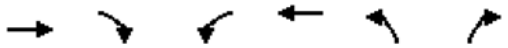
Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	56	42	16	703	449	21
Future Vol, veh/h	56	42	16	703	449	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	44	17	740	473	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1257	484	495	0	-	0
Stage 1	484	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	189	583	1069	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	455	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	186	583	1069	-	-	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	610	-	-	-	-	-
Stage 2	455	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	27.33	0.19	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1069	-	262	-	-
HCM Lane V/C Ratio	0.016	-	0.393	-	-
HCM Control Delay (s/veh)	8.4	-	27.3	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	1.8	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	10	5	2	28	14
Future Volume (vph)	2	10	5	2	28	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	2033			636	356	
Travel Time (s)	46.2			14.5	8.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

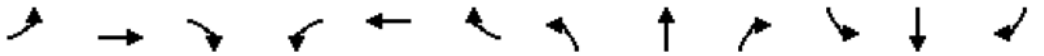
Intersection	
Int Delay, s/veh	6.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	10	5	2	28	14
Future Vol, veh/h	2	10	5	2	28	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	11	5	2	29	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	13	0	20	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	13	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1606	-	997	1075
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1606	-	994	1075
Mov Cap-2 Maneuver	-	-	-	-	994	-
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1007	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	5.18	8.69
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1019	-	-	1286	-
HCM Lane V/C Ratio	0.043	-	-	0.003	-
HCM Control Delay (s/veh)	8.7	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	202	146	29	149	70	86	271	28	62	545	87
Future Volume (vph)	49	202	146	29	149	70	86	271	28	62	545	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	41.7
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	202	146	29	149	70	86	271	28	62	545	87
Future Vol, veh/h	49	202	146	29	149	70	86	271	28	62	545	87
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	217	157	31	160	75	92	291	30	67	586	94
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	23.1	28.6	37.5	59.3
HCM LOS	C	D	E	F

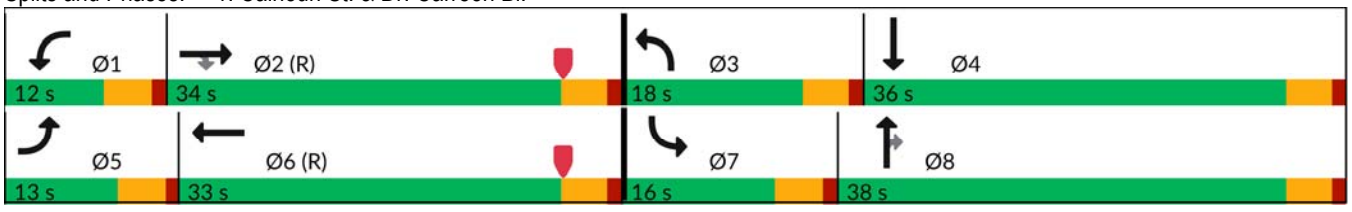
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	68%	0%	100%	68%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	32%	0%	0%	32%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	86	271	28	49	202	146	29	219	62	363	269
LT Vol	86	0	0	49	0	0	29	0	62	0	0
Through Vol	0	271	0	0	202	0	0	149	0	363	182
RT Vol	0	0	28	0	0	146	0	70	0	0	87
Lane Flow Rate	92	291	30	53	217	157	31	235	67	391	289
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.274	0.821	0.079	0.156	0.613	0.412	0.093	0.657	0.185	1.029	0.742
Departure Headway (Hd)	10.79	10.272	9.548	10.812	10.299	9.581	10.904	10.18	9.997	9.481	9.247
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	335	356	378	334	352	378	331	358	361	387	393
Service Time	8.49	7.972	7.248	8.512	7.999	7.281	8.604	7.88	7.697	7.181	6.947
HCM Lane V/C Ratio	0.275	0.817	0.079	0.159	0.616	0.415	0.094	0.656	0.186	1.01	0.735
HCM Control Delay, s/veh	17.5	46.3	13.1	15.5	28	18.8	14.7	30.4	15	85.3	34.3
HCM Lane LOS	C	E	B	C	D	C	B	D	B	F	D
HCM 95th-tile Q	1.1	7.2	0.3	0.5	3.9	2	0.3	4.4	0.7	12.8	5.9

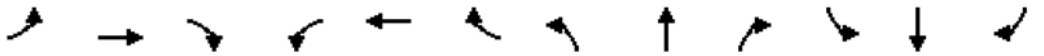
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	202	146	29	149	70	86	271	28	62	545	87
Future Volume (vph)	49	202	146	29	149	70	86	271	28	62	545	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8			
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5	9.5	22.5	
Total Split (s)	13.0	34.0	34.0	12.0	33.0		18.0	38.0	38.0	16.0	36.0	
Total Split (%)	13.0%	34.0%	34.0%	12.0%	33.0%		18.0%	38.0%	38.0%	16.0%	36.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max	Max	None	Max	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 1: Calhoun St. & Dr. Carreon Bl.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	202	146	29	149	70	86	271	28	62	545	87
Future Volume (veh/h)	49	202	146	29	149	70	86	271	28	62	545	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	217	157	31	160	75	92	291	30	67	586	94
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	69	762	646	51	479	225	118	627	531	87	974	156
Arrive On Green	0.04	0.41	0.41	0.03	0.40	0.40	0.07	0.34	0.34	0.05	0.32	0.32
Sat Flow, veh/h	1781	1870	1585	1781	1204	564	1781	1870	1585	1781	3068	491
Grp Volume(v), veh/h	53	217	157	31	0	235	92	291	30	67	339	341
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1769	1781	1870	1585	1781	1777	1782
Q Serve(g_s), s	2.9	7.8	6.5	1.7	0.0	9.2	5.1	12.3	1.3	3.7	16.1	16.2
Cycle Q Clear(g_c), s	2.9	7.8	6.5	1.7	0.0	9.2	5.1	12.3	1.3	3.7	16.1	16.2
Prop In Lane	1.00		1.00	1.00		0.32	1.00		1.00	1.00		0.28
Lane Grp Cap(c), veh/h	69	762	646	51	0	704	118	627	531	87	564	566
V/C Ratio(X)	0.77	0.28	0.24	0.60	0.00	0.33	0.78	0.46	0.06	0.77	0.60	0.60
Avail Cap(c_a), veh/h	151	762	646	134	0	704	240	627	531	205	564	566
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.96	0.96	0.96	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	19.9	19.5	48.0	0.0	20.9	46.0	26.2	22.5	47.0	28.8	28.8
Incr Delay (d2), s/veh	16.5	0.9	0.9	10.8	0.0	1.3	10.2	2.4	0.2	13.4	4.7	4.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.4	2.4	0.9	0.0	3.9	2.5	5.5	0.5	1.9	7.3	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	64.2	20.8	20.4	58.8	0.0	22.2	56.2	28.6	22.7	60.5	33.4	33.5
LnGrp LOS	E	C	C	E		C	E	C	C	E	C	C
Approach Vol, veh/h		427			266			413			747	
Approach Delay, s/veh		26.0			26.5			34.3			35.9	
Approach LOS		C			C			C			D	

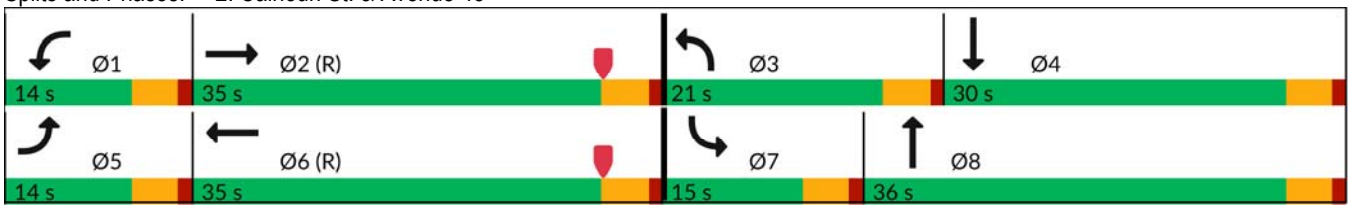
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	45.2	11.1	36.3	8.4	44.3	9.4	38.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	29.5	13.5	31.5	8.5	28.5	11.5	33.5
Max Q Clear Time (g_c+I1), s	3.7	9.8	7.1	18.2	4.9	11.2	5.7	14.3
Green Ext Time (p_c), s	0.0	1.6	0.1	3.3	0.0	1.1	0.0	1.5

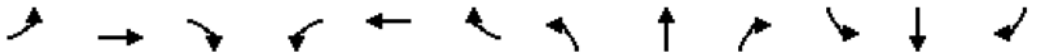
Intersection Summary	
HCM 7th Control Delay, s/veh	31.9
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	607	300	54	416	40	131	299	51	70	467	100
Future Volume (vph)	56	607	300	54	416	40	131	299	51	70	467	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	14.0	35.0		14.0	35.0		21.0	36.0		15.0	30.0	
Total Split (%)	14.0%	35.0%		14.0%	35.0%		21.0%	36.0%		15.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Calhoun St. & Avenue 48

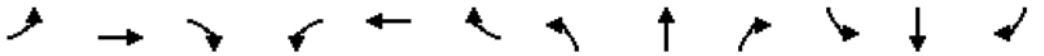




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	607	300	54	416	40	131	299	51	70	467	100
Future Volume (veh/h)	56	607	300	54	416	40	131	299	51	70	467	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	58	626	309	56	429	41	135	308	53	72	481	103
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	1403	653	72	1950	184	167	957	163	93	797	170
Arrive On Green	0.04	0.41	0.41	0.04	0.41	0.41	0.09	0.31	0.31	0.05	0.27	0.27
Sat Flow, veh/h	1781	3404	1585	1781	4747	447	1781	3038	517	1781	2915	621
Grp Volume(v), veh/h	58	626	309	56	306	164	135	179	182	72	292	292
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1790	1781	1777	1777	1781	1777	1759
Q Serve(g_s), s	3.2	13.2	14.2	3.1	5.8	5.9	7.4	7.7	7.8	4.0	14.3	14.5
Cycle Q Clear(g_c), s	3.2	13.2	14.2	3.1	5.8	5.9	7.4	7.7	7.8	4.0	14.3	14.5
Prop In Lane	1.00		1.00	1.00		0.25	1.00		0.29	1.00		0.35
Lane Grp Cap(c), veh/h	75	1403	653	72	1398	735	167	560	560	93	486	481
V/C Ratio(X)	0.77	0.45	0.47	0.77	0.22	0.22	0.81	0.32	0.33	0.77	0.60	0.61
Avail Cap(c_a), veh/h	169	1403	653	169	1398	735	294	560	560	187	486	481
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.4	21.2	21.5	47.5	19.1	19.1	44.4	26.1	26.1	46.8	31.6	31.6
Incr Delay (d2), s/veh	15.5	1.0	2.4	16.0	0.4	0.7	8.9	1.5	1.5	12.8	5.4	5.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	5.0	5.3	1.6	2.2	2.4	3.6	3.3	3.4	2.0	6.5	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.9	22.2	23.9	63.5	19.4	19.8	53.4	27.6	27.7	59.6	37.0	37.2
LnGrp LOS	E	C	C	E	B	B	D	C	C	E	D	D
Approach Vol, veh/h		993			526			496			656	
Approach Delay, s/veh		25.1			24.2			34.6			39.6	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	45.7	13.9	31.8	8.7	45.6	9.7	36.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	30.5	16.5	25.5	9.5	30.5	10.5	31.5
Max Q Clear Time (g_c+I1), s	5.1	16.2	9.4	16.5	5.2	7.9	6.0	9.8
Green Ext Time (p_c), s	0.0	4.8	0.2	2.2	0.0	2.5	0.0	1.8

Intersection Summary	
HCM 7th Control Delay, s/veh	30.3
HCM 7th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	2	36	2	21	2	446	24	29	636	16
Future Volume (vph)	9	2	2	36	2	21	2	446	24	29	636	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	46.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	2	2	36	2	21	2	446	24	29	636	16
Future Vol, veh/h	9	2	2	36	2	21	2	446	24	29	636	16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	2	2	38	2	22	2	469	25	31	669	17
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

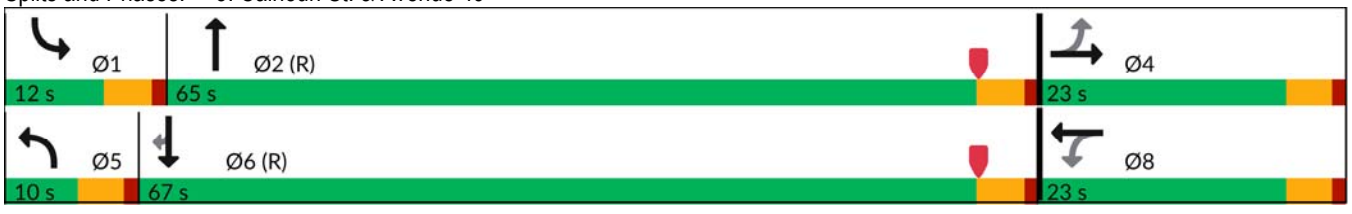
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	11.1	11.6	38.6	55.2
HCM LOS	B	B	E	F

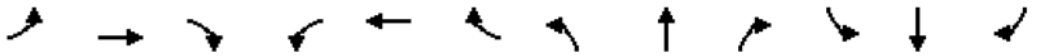
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	69%	61%	100%	0%	0%
Vol Thru, %	0%	95%	15%	3%	0%	100%	0%
Vol Right, %	0%	5%	15%	36%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	470	13	59	29	636	16
LT Vol	2	0	9	36	29	0	0
Through Vol	0	446	2	2	0	636	0
RT Vol	0	24	2	21	0	0	16
Lane Flow Rate	2	495	14	62	31	669	17
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.004	0.876	0.031	0.132	0.05	1.004	0.022
Departure Headway (Hd)	6.916	6.376	8.049	7.656	5.904	5.399	4.692
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	517	569	444	468	607	676	763
Service Time	4.659	4.12	5.818	5.416	3.63	3.125	2.419
HCM Lane V/C Ratio	0.004	0.87	0.032	0.132	0.051	0.99	0.022
HCM Control Delay, s/veh	9.7	38.7	11.1	11.6	8.9	58.5	7.5
HCM Lane LOS	A	E	B	B	A	F	A
HCM 95th-tile Q	0	9.9	0.1	0.5	0.2	16	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	2	36	2	21	2	446	24	29	636	16
Future Volume (vph)	9	2	2	36	2	21	2	446	24	29	636	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	23.0	23.0		23.0	23.0		10.0	65.0		12.0	67.0	67.0
Total Split (%)	23.0%	23.0%		23.0%	23.0%		10.0%	65.0%		12.0%	67.0%	67.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 3: Calhoun St. & Avenue 49





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	2	2	36	2	21	2	446	24	29	636	16
Future Volume (veh/h)	9	2	2	36	2	21	2	446	24	29	636	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	9	2	2	38	2	22	2	469	25	31	669	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	114	25	14	106	5	29	5	1377	73	51	1512	1281
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.78	0.78	0.03	0.81	0.81
Sat Flow, veh/h	993	464	265	890	91	540	1781	1760	94	1781	1870	1585
Grp Volume(v), veh/h	13	0	0	62	0	0	2	0	494	31	669	17
Grp Sat Flow(s),veh/h/ln	1723	0	0	1521	0	0	1781	0	1853	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	3.3	0.0	0.0	0.1	0.0	7.9	1.7	10.7	0.2
Cycle Q Clear(g_c), s	0.7	0.0	0.0	4.0	0.0	0.0	0.1	0.0	7.9	1.7	10.7	0.2
Prop In Lane	0.69		0.15	0.61		0.35	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	154	0	0	140	0	0	5	0	1450	51	1512	1281
V/C Ratio(X)	0.08	0.00	0.00	0.44	0.00	0.00	0.42	0.00	0.34	0.60	0.44	0.01
Avail Cap(c_a), veh/h	347	0	0	334	0	0	98	0	1450	134	1512	1281
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.1	0.0	0.0	46.6	0.0	0.0	49.8	0.0	3.2	48.0	2.9	1.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.2	0.0	0.0	48.5	0.0	0.6	10.8	0.9	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.6	0.0	0.0	0.1	0.0	1.9	0.9	2.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.3	0.0	0.0	48.8	0.0	0.0	98.3	0.0	3.9	58.8	3.8	1.9
LnGrp LOS	D			D			F		A	E	A	A
Approach Vol, veh/h		13			62			496			717	
Approach Delay, s/veh		45.3			48.8			4.3			6.1	
Approach LOS		D			D			A			A	

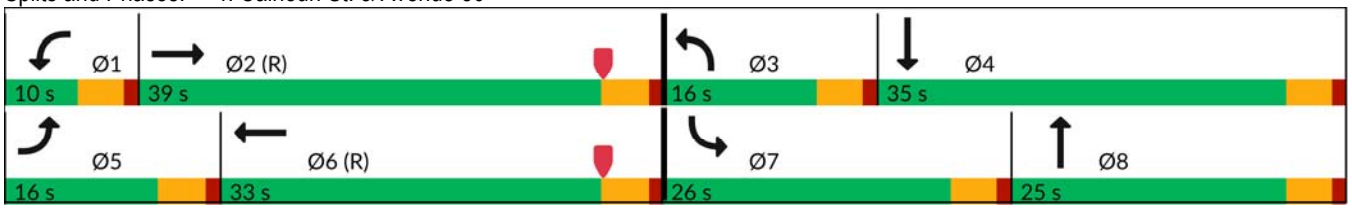
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	82.7		9.9	4.8	85.3		9.9				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.5	60.5		18.5	5.5	62.5		18.5				
Max Q Clear Time (g_c+I1), s	3.7	9.9		2.7	2.1	12.7		6.0				
Green Ext Time (p_c), s	0.0	3.1		0.0	0.0	4.8		0.2				

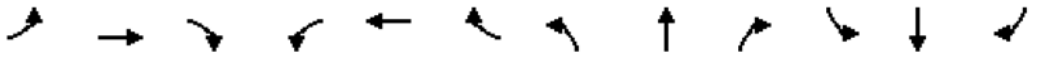
Intersection Summary		
HCM 7th Control Delay, s/veh	7.9	
HCM 7th LOS	A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	439	45	10	331	148	58	226	69	170	295	72
Future Volume (vph)	63	439	45	10	331	148	58	226	69	170	295	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	16.0	39.0		10.0	33.0		16.0	25.0		26.0	35.0	
Total Split (%)	16.0%	39.0%		10.0%	33.0%		16.0%	25.0%		26.0%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Calhoun St. & Avenue 50





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	439	45	10	331	148	58	226	69	170	295	72
Future Volume (veh/h)	63	439	45	10	331	148	58	226	69	170	295	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	66	457	47	10	345	154	60	235	72	177	307	75
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	1494	153	22	1018	446	78	618	185	212	866	208
Arrive On Green	0.05	0.46	0.46	0.01	0.42	0.42	0.04	0.23	0.23	0.12	0.31	0.31
Sat Flow, veh/h	1781	3254	333	1781	2404	1054	1781	2696	806	1781	2841	683
Grp Volume(v), veh/h	66	249	255	10	253	246	60	153	154	177	190	192
Grp Sat Flow(s),veh/h/ln	1781	1777	1810	1781	1777	1681	1781	1777	1725	1781	1777	1747
Q Serve(g_s), s	3.7	8.8	8.9	0.6	9.6	9.9	3.3	7.3	7.6	9.7	8.3	8.6
Cycle Q Clear(g_c), s	3.7	8.8	8.9	0.6	9.6	9.9	3.3	7.3	7.6	9.7	8.3	8.6
Prop In Lane	1.00		0.18	1.00		0.63	1.00		0.47	1.00		0.39
Lane Grp Cap(c), veh/h	85	816	831	22	752	712	78	407	396	212	542	533
V/C Ratio(X)	0.77	0.30	0.31	0.46	0.34	0.35	0.77	0.38	0.39	0.83	0.35	0.36
Avail Cap(c_a), veh/h	205	816	831	98	752	712	205	407	396	383	542	533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	17.0	17.0	49.1	19.4	19.5	47.3	32.5	32.6	43.1	27.0	27.1
Incr Delay (d2), s/veh	13.6	1.0	1.0	14.6	1.2	1.3	14.8	2.6	2.9	8.2	1.8	1.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	3.5	3.6	0.3	3.9	3.8	1.7	3.3	3.3	4.6	3.6	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.7	18.0	18.0	63.7	20.6	20.8	62.2	35.1	35.5	51.3	28.8	29.0
LnGrp LOS	E	B	B	E	C	C	E	D	D	D	C	C
Approach Vol, veh/h		570			509			367			559	
Approach Delay, s/veh		22.9			21.5			39.7			36.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	50.4	8.9	35.0	9.3	46.8	16.4	27.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	34.5	11.5	30.5	11.5	28.5	21.5	20.5
Max Q Clear Time (g_c+I1), s	2.6	10.9	5.3	10.6	5.7	11.9	11.7	9.6
Green Ext Time (p_c), s	0.0	2.6	0.0	1.9	0.0	2.4	0.3	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	29.3
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	2	23	7	2	16	21	481	10	25	637	76
Future Volume (vph)	67	2	23	7	2	16	21	481	10	25	637	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	60			60			60			60		
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	35
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	67	2	23	7	2	16	21	481	10	25	637	76
Future Vol, veh/h	67	2	23	7	2	16	21	481	10	25	637	76
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	70	2	24	7	2	17	22	501	10	26	664	79
Number of Lanes	0	1	1	0	1	0	1	1	0	1	2	0

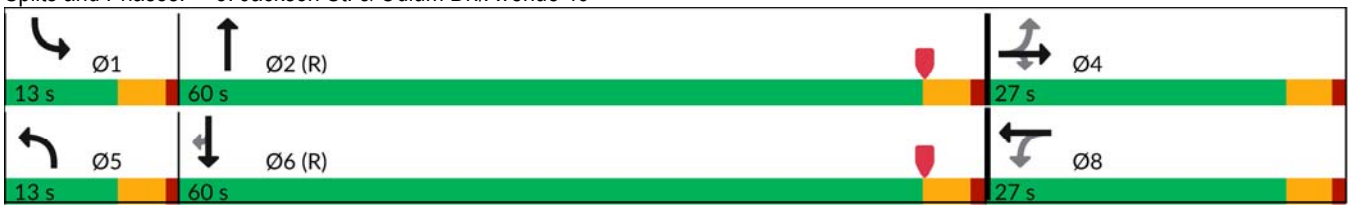
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	2
HCM Control Delay, s/veh	12.9	11.7	54.8	24.9
HCM LOS	B	B	F	C

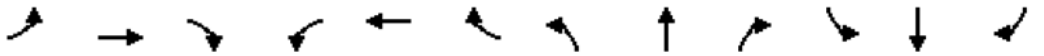
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	97%	0%	28%	100%	0%	0%
Vol Thru, %	0%	98%	3%	0%	8%	0%	100%	74%
Vol Right, %	0%	2%	0%	100%	64%	0%	0%	26%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	21	491	69	23	25	25	425	288
LT Vol	21	0	67	0	7	25	0	0
Through Vol	0	481	2	0	2	0	425	212
RT Vol	0	10	0	23	16	0	0	76
Lane Flow Rate	22	511	72	24	26	26	442	300
Geometry Grp	6	6	6	6	6	6	6	6
Degree of Util (X)	0.044	0.964	0.179	0.052	0.061	0.051	0.807	0.532
Departure Headway (Hd)	7.303	6.784	8.985	7.769	8.491	7.075	6.568	6.381
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	487	532	402	464	424	502	549	559
Service Time	5.099	4.579	6.687	5.471	6.198	4.874	4.367	4.18
HCM Lane V/C Ratio	0.045	0.961	0.179	0.052	0.061	0.052	0.805	0.537
HCM Control Delay, s/veh	10.4	56.7	13.6	10.9	11.7	10.3	31.6	16.3
HCM Lane LOS	B	F	B	B	B	B	D	C
HCM 95th-tile Q	0.1	12.6	0.6	0.2	0.2	0.2	7.8	3.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	2	23	7	2	16	21	481	10	25	637	76
Future Volume (vph)	67	2	23	7	2	16	21	481	10	25	637	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	60			60			60			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Detector Phase	4	4	4	8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	27.0	27.0	27.0	27.0	27.0		13.0	60.0		13.0	60.0	60.0
Total Split (%)	27.0%	27.0%	27.0%	27.0%	27.0%		13.0%	60.0%		13.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Jackson St. & Odlum Dr./Avenue 49





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	2	23	7	2	16	21	481	10	25	637	76
Future Volume (veh/h)	67	2	23	7	2	16	21	481	10	25	637	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	2	24	7	2	17	22	501	10	26	664	79
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	3	106	54	19	53	41	1411	28	46	2754	1228
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.02	0.77	0.77	0.03	0.78	0.78
Sat Flow, veh/h	1441	41	1585	128	290	790	1781	1827	36	1781	3554	1585
Grp Volume(v), veh/h	72	0	24	26	0	0	22	0	511	26	664	79
Grp Sat Flow(s),veh/h/ln	1482	0	1585	1208	0	0	1781	0	1864	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	1.4	0.0	0.0	0.0	1.2	0.0	8.6	1.4	5.2	1.2
Cycle Q Clear(g_c), s	4.7	0.0	1.4	4.7	0.0	0.0	1.2	0.0	8.6	1.4	5.2	1.2
Prop In Lane	0.97		1.00	0.27		0.65	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	170	0	106	127	0	0	41	0	1439	46	2754	1228
V/C Ratio(X)	0.42	0.00	0.23	0.21	0.00	0.00	0.54	0.00	0.36	0.57	0.24	0.06
Avail Cap(c_a), veh/h	392	0	357	370	0	0	151	0	1439	151	2754	1228
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	0.0	44.2	44.2	0.0	0.0	48.3	0.0	3.6	48.2	3.1	2.7
Incr Delay (d2), s/veh	1.7	0.0	1.1	0.8	0.0	0.0	10.7	0.0	0.7	10.6	0.2	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.6	0.6	0.0	0.0	0.6	0.0	2.1	0.7	1.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	47.3	0.0	45.2	45.0	0.0	0.0	59.0	0.0	4.3	58.7	3.3	2.8
LnGrp LOS	D		D	D			E		A	E	A	A
Approach Vol, veh/h		96			26			533			769	
Approach Delay, s/veh		46.8			45.0			6.5			5.1	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	81.7		11.2	6.8	82.0		11.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	8.5	55.5		22.5	8.5	55.5		22.5				
Max Q Clear Time (g_c+I1), s	3.4	10.6		6.7	3.2	7.2		6.7				
Green Ext Time (p_c), s	0.0	3.1		0.3	0.0	4.7		0.1				

Intersection Summary	
HCM 7th Control Delay, s/veh	9.2
HCM 7th LOS	A

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	38	28	47	432	611	62
Future Volume (vph)	38	28	47	432	611	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	60		60			
Link Speed (mph)	30			45	45	
Link Distance (ft)	293			1762	680	
Travel Time (s)	6.7			26.7	10.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

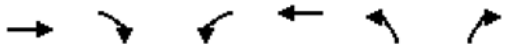
Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	38	28	47	432	611	62
Future Vol, veh/h	38	28	47	432	611	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	29	49	455	643	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1229	676	708	0	-	0
Stage 1	676	-	-	-	-	-
Stage 2	554	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	196	454	890	-	-	-
Stage 1	505	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	185	454	890	-	-	-
Mov Cap-2 Maneuver	185	-	-	-	-	-
Stage 1	477	-	-	-	-	-
Stage 2	576	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	25.13	0.91	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	890	-	247	-	-
HCM Lane V/C Ratio	0.056	-	0.281	-	-
HCM Control Delay (s/veh)	9.3	-	25.1	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.2	-	1.1	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	31	16	2	19	9
Future Volume (vph)	2	31	16	2	19	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	2033			636	356	
Travel Time (s)	46.2			14.5	8.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	31	16	2	19	9
Future Vol, veh/h	2	31	16	2	19	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	33	17	2	20	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	35	0	54	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1577	-	954	1060
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	987	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1577	-	944	1060
Mov Cap-2 Maneuver	-	-	-	-	944	-
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	976	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	6.5	8.79
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	978	-	-	1575	-
HCM Lane V/C Ratio	0.03	-	-	0.011	-
HCM Control Delay (s/veh)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

APPENDIX 6.1: EAPC (2026) CONDITIONS

INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	229	69	29	357	89	260	623	89	83	298	148
Future Volume (vph)	83	229	69	29	357	89	260	623	89	83	298	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	189.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	83	229	69	29	357	89	260	623	89	83	298	148
Future Vol, veh/h	83	229	69	29	357	89	260	623	89	83	298	148
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	88	244	73	31	380	95	277	663	95	88	317	157
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

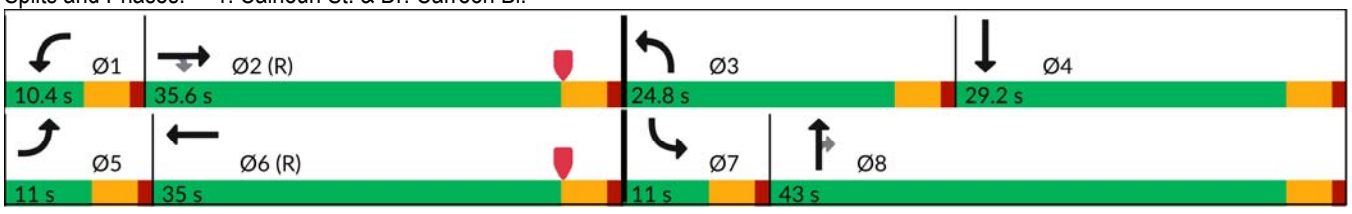
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	38.3	235.1	308.9	39.5
HCM LOS	E	F	F	E

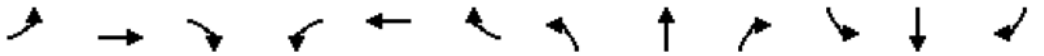
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	80%	0%	100%	40%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	20%	0%	0%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	260	623	89	83	229	69	29	446	83	199	247
LT Vol	260	0	0	83	0	0	29	0	83	0	0
Through Vol	0	623	0	0	229	0	0	357	0	199	99
RT Vol	0	0	89	0	0	69	0	89	0	0	148
Lane Flow Rate	277	663	95	88	244	73	31	474	88	211	263
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.843	1.93	0.258	0.292	0.774	0.219	0.099	1.447	0.282	0.645	0.773
Departure Headway (Hd)	12.223	11.697	10.96	13.812	13.289	12.555	12.663	12.023	13.546	13.017	12.573
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	299	318	329	262	275	288	285	308	267	279	289
Service Time	9.923	9.397	8.66	11.512	10.989	10.255	10.363	9.723	11.246	10.717	10.273
HCM Lane V/C Ratio	0.926	2.085	0.289	0.336	0.887	0.253	0.109	1.539	0.33	0.756	0.91
HCM Control Delay, s/veh	56.3	455.9	17.4	22.1	50.1	18.7	16.7	249.3	21.5	36.6	47.8
HCM Lane LOS	F	F	C	C	F	C	C	F	C	E	E
HCM 95th-tile Q	7.2	41.2	1	1.2	5.8	0.8	0.3	23.6	1.1	4.1	5.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	229	69	29	357	89	260	623	89	83	298	148
Future Volume (vph)	83	229	69	29	357	89	260	623	89	83	298	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8			
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5	9.5	22.5	
Total Split (s)	11.0	35.6	35.6	10.4	35.0		24.8	43.0	43.0	11.0	29.2	
Total Split (%)	11.0%	35.6%	35.6%	10.4%	35.0%		24.8%	43.0%	43.0%	11.0%	29.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max	Max	None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Calhoun St. & Dr. Carreon Bl.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	229	69	29	357	89	260	623	89	83	298	148
Future Volume (veh/h)	83	229	69	29	357	89	260	623	89	83	298	148
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	88	244	73	31	380	95	277	663	95	88	317	157
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	642	544	51	447	112	311	720	610	112	634	307
Arrive On Green	0.06	0.34	0.34	0.03	0.31	0.31	0.17	0.38	0.38	0.06	0.27	0.27
Sat Flow, veh/h	1781	1870	1585	1781	1444	361	1781	1870	1585	1781	2321	1124
Grp Volume(v), veh/h	88	244	73	31	0	475	277	663	95	88	241	233
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1805	1781	1870	1585	1781	1777	1668
Q Serve(g_s), s	4.9	9.9	3.2	1.7	0.0	24.7	15.2	33.8	3.9	4.9	11.4	11.8
Cycle Q Clear(g_c), s	4.9	9.9	3.2	1.7	0.0	24.7	15.2	33.8	3.9	4.9	11.4	11.8
Prop In Lane	1.00		1.00	1.00		0.20	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	112	642	544	51	0	559	311	720	610	112	486	456
V/C Ratio(X)	0.79	0.38	0.13	0.60	0.00	0.85	0.89	0.92	0.16	0.79	0.50	0.51
Avail Cap(c_a), veh/h	116	642	544	105	0	559	362	720	610	116	486	456
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.75	0.75	0.75	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	24.8	22.6	48.0	0.0	32.4	40.4	29.3	20.1	46.2	30.5	30.7
Incr Delay (d2), s/veh	28.6	1.7	0.5	10.8	0.0	15.0	16.8	15.3	0.4	28.6	3.6	4.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	4.5	1.2	0.9	0.0	12.5	7.8	16.9	1.4	3.0	5.2	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	74.8	26.5	23.1	58.8	0.0	47.3	57.2	44.5	20.5	74.8	34.1	34.7
LnGrp LOS	E	C	C	E		D	E	D	C	E	C	C
Approach Vol, veh/h		405			506			1035			562	
Approach Delay, s/veh		36.4			48.0			45.7			40.8	
Approach LOS		D			D			D			D	

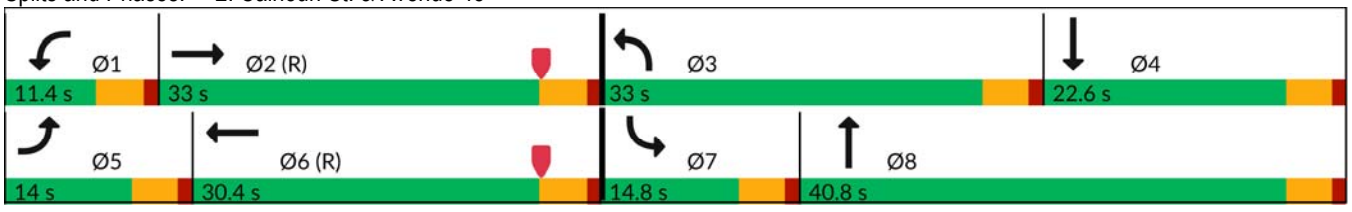
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	38.8	21.9	31.8	10.8	35.5	10.8	43.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.9	31.1	20.3	24.7	6.5	30.5	6.5	38.5
Max Q Clear Time (g_c+I1), s	3.7	11.9	17.2	13.8	6.9	26.7	6.9	35.8
Green Ext Time (p_c), s	0.0	1.4	0.2	2.0	0.0	1.0	0.0	1.2

Intersection Summary	
HCM 7th Control Delay, s/veh	43.6
HCM 7th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	445	115	38	662	104	282	641	83	69	264	70
Future Volume (vph)	68	445	115	38	662	104	282	641	83	69	264	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	14.0	33.0		11.4	30.4		33.0	40.8		14.8	22.6	
Total Split (%)	14.0%	33.0%		11.4%	30.4%		33.0%	40.8%		14.8%	22.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Calhoun St. & Avenue 48



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	445	115	38	662	104	282	641	83	69	264	70
Future Volume (veh/h)	68	445	115	38	662	104	282	641	83	69	264	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	82	536	139	46	798	125	340	772	100	83	318	84
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	1467	371	64	1507	234	378	1148	149	107	588	153
Arrive On Green	0.06	0.36	0.36	0.04	0.34	0.34	0.21	0.36	0.36	0.06	0.21	0.21
Sat Flow, veh/h	1781	4061	1028	1781	4456	693	1781	3164	410	1781	2791	726
Grp Volume(v), veh/h	82	447	228	46	608	315	340	433	439	83	201	201
Grp Sat Flow(s),veh/h/ln	1781	1702	1685	1781	1702	1746	1781	1777	1797	1781	1777	1740
Q Serve(g_s), s	4.5	9.7	10.0	2.6	14.4	14.6	18.6	20.6	20.6	4.6	10.1	10.3
Cycle Q Clear(g_c), s	4.5	9.7	10.0	2.6	14.4	14.6	18.6	20.6	20.6	4.6	10.1	10.3
Prop In Lane	1.00		0.61	1.00		0.40	1.00		0.23	1.00		0.42
Lane Grp Cap(c), veh/h	105	1229	609	64	1151	590	378	645	652	107	374	366
V/C Ratio(X)	0.78	0.36	0.37	0.72	0.53	0.53	0.90	0.67	0.67	0.78	0.54	0.55
Avail Cap(c_a), veh/h	169	1229	609	123	1151	590	508	645	652	183	374	366
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	23.5	23.6	47.7	26.7	26.7	38.4	26.8	26.8	46.4	35.1	35.2
Incr Delay (d2), s/veh	11.7	0.8	1.8	13.8	1.7	3.4	15.4	5.5	5.5	11.6	5.4	5.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.7	4.0	1.3	5.7	6.2	9.3	9.1	9.2	2.3	4.7	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.1	24.3	25.4	61.5	28.4	30.1	53.7	32.3	32.3	57.9	40.5	41.1
LnGrp LOS	E	C	C	E	C	C	D	C	C	E	D	D
Approach Vol, veh/h		757			969			1212			485	
Approach Delay, s/veh		28.3			30.5			38.3			43.7	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	40.6	25.7	25.6	10.4	38.3	10.5	40.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.9	28.5	28.5	18.1	9.5	25.9	10.3	36.3
Max Q Clear Time (g_c+I1), s	4.6	12.0	20.6	12.3	6.5	16.6	6.6	22.6
Green Ext Time (p_c), s	0.0	3.5	0.6	1.0	0.0	3.7	0.0	4.3

Intersection Summary	
HCM 7th Control Delay, s/veh	34.7
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	2	52	2	38	2	799	30	15	442	5
Future Volume (vph)	14	2	2	52	2	38	2	799	30	15	442	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	211.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	2	2	52	2	38	2	799	30	15	442	5
Future Vol, veh/h	14	2	2	52	2	38	2	799	30	15	442	5
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	2	2	60	2	44	2	929	35	17	514	6
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	12.6	13.7	338.9	29.4
HCM LOS	B	B	F	D

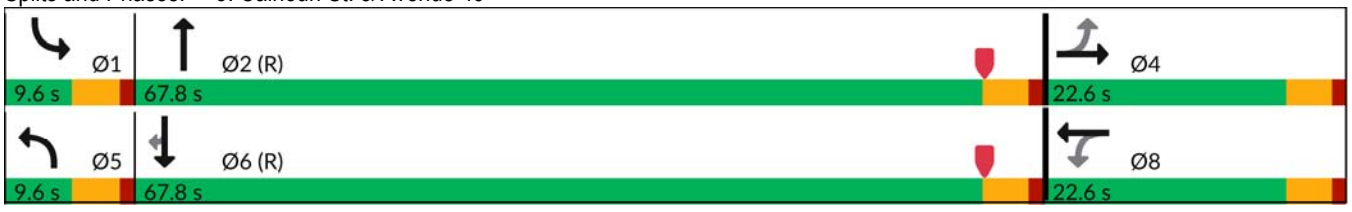
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	78%	57%	100%	0%	0%
Vol Thru, %	0%	96%	11%	2%	0%	100%	0%
Vol Right, %	0%	4%	11%	41%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	829	18	92	15	442	5
LT Vol	2	0	14	52	15	0	0
Through Vol	0	799	2	2	0	442	0
RT Vol	0	30	2	38	0	0	5
Lane Flow Rate	2	964	21	107	17	514	6
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.004	1.702	0.047	0.22	0.03	0.808	0.008
Departure Headway (Hd)	6.886	6.355	9.408	8.606	6.809	6.299	5.585
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	523	578	383	420	529	581	645
Service Time	4.586	4.055	7.108	6.306	4.509	3.999	3.285
HCM Lane V/C Ratio	0.004	1.668	0.055	0.255	0.032	0.885	0.009
HCM Control Delay, s/veh	9.6	339.7	12.6	13.7	9.7	30.3	8.3
HCM Lane LOS	A	F	B	B	A	D	A
HCM 95th-tile Q	0	56.1	0.1	0.8	0.1	8	0

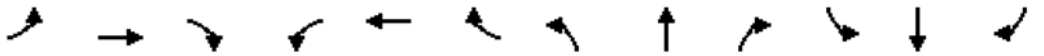
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	2	2	52	2	38	2	799	30	15	442	5
Future Volume (vph)	14	2	2	52	2	38	2	799	30	15	442	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	22.6	22.6		22.6	22.6		9.6	67.8		9.6	67.8	67.8
Total Split (%)	22.6%	22.6%		22.6%	22.6%		9.6%	67.8%		9.6%	67.8%	67.8%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	C-Min

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 72.9 (73%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 3: Calhoun St. & Avenue 49





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	2	2	52	2	38	2	799	30	15	442	5
Future Volume (veh/h)	14	2	2	52	2	38	2	799	30	15	442	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	2	2	60	2	44	2	929	35	17	514	6
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	161	20	13	125	9	56	5	1358	51	34	1448	1227
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.00	0.76	0.76	0.02	0.77	0.77
Sat Flow, veh/h	1093	231	147	785	106	632	1781	1791	67	1781	1870	1585
Grp Volume(v), veh/h	20	0	0	106	0	0	2	0	964	17	514	6
Grp Sat Flow(s),veh/h/ln	1470	0	0	1523	0	0	1781	0	1858	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	5.6	0.0	0.0	0.1	0.0	26.1	0.9	8.5	0.1
Cycle Q Clear(g_c), s	1.1	0.0	0.0	6.8	0.0	0.0	0.1	0.0	26.1	0.9	8.5	0.1
Prop In Lane	0.80		0.10	0.57		0.42	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	194	0	0	190	0	0	5	0	1409	34	1448	1227
V/C Ratio(X)	0.10	0.00	0.00	0.56	0.00	0.00	0.42	0.00	0.68	0.51	0.35	0.00
Avail Cap(c_a), veh/h	326	0	0	329	0	0	91	0	1409	91	1448	1227
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	0.0	0.0	44.6	0.0	0.0	49.8	0.0	6.1	48.6	3.5	2.6
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.5	0.0	0.0	48.5	0.0	2.7	11.4	0.7	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	2.7	0.0	0.0	0.1	0.0	7.4	0.5	2.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	42.3	0.0	0.0	47.1	0.0	0.0	98.3	0.0	8.8	60.0	4.2	2.6
LnGrp LOS	D			D			F		A	E	A	A
Approach Vol, veh/h		20			106			966			537	
Approach Delay, s/veh		42.3			47.1			9.0			5.9	
Approach LOS		D			D			A			A	

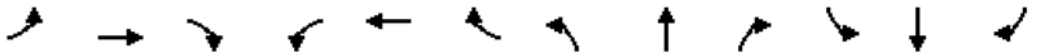
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	80.3		13.3	4.8	81.9		13.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.1	63.3		18.1	5.1	63.3		18.1				
Max Q Clear Time (g_c+I1), s	2.9	28.1		3.1	2.1	10.5		8.8				
Green Ext Time (p_c), s	0.0	8.5		0.0	0.0	3.3		0.3				

Intersection Summary												
HCM 7th Control Delay, s/veh			10.9									
HCM 7th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	242	29	30	502	224	113	397	163	154	284	101
Future Volume (vph)	46	242	29	30	502	224	113	397	163	154	284	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	12.0	40.0		11.0	39.0		19.8	28.0		21.0	29.2	
Total Split (%)	12.0%	40.0%		11.0%	39.0%		19.8%	28.0%		21.0%	29.2%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

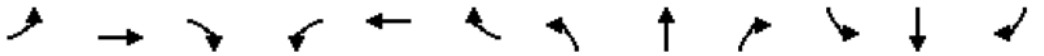
Splits and Phases: 4: Calhoun St. & Avenue 50



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	242	29	30	502	224	113	397	163	154	284	101
Future Volume (veh/h)	46	242	29	30	502	224	113	397	163	154	284	101
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	55	288	35	36	598	267	135	473	194	183	338	120
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	1379	166	56	1012	452	167	579	236	217	680	237
Arrive On Green	0.04	0.43	0.43	0.03	0.42	0.42	0.09	0.24	0.24	0.12	0.26	0.26
Sat Flow, veh/h	1781	3193	385	1781	2389	1066	1781	2463	1003	1781	2583	902
Grp Volume(v), veh/h	55	159	164	36	445	420	135	340	327	183	231	227
Grp Sat Flow(s),veh/h/ln	1781	1777	1801	1781	1777	1679	1781	1777	1690	1781	1777	1708
Q Serve(g_s), s	3.1	5.6	5.7	2.0	19.2	19.3	7.4	18.1	18.3	10.1	11.0	11.3
Cycle Q Clear(g_c), s	3.1	5.6	5.7	2.0	19.2	19.3	7.4	18.1	18.3	10.1	11.0	11.3
Prop In Lane	1.00		0.21	1.00		0.64	1.00		0.59	1.00		0.53
Lane Grp Cap(c), veh/h	71	767	778	56	753	711	167	418	397	217	467	449
V/C Ratio(X)	0.78	0.21	0.21	0.64	0.59	0.59	0.81	0.81	0.82	0.84	0.49	0.51
Avail Cap(c_a), veh/h	134	767	778	116	753	711	273	418	397	294	467	449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	17.7	17.8	47.9	22.2	22.2	44.5	36.2	36.3	43.0	31.2	31.3
Incr Delay (d2), s/veh	16.4	0.6	0.6	11.4	3.4	3.6	9.0	15.9	17.3	15.2	3.7	4.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.2	2.3	1.0	8.0	7.6	3.6	9.3	9.1	5.2	5.0	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	64.0	18.3	18.4	59.3	25.5	25.8	53.5	52.1	53.6	58.2	34.9	35.3
LnGrp LOS	E	B	B	E	C	C	D	D	D	E	C	D
Approach Vol, veh/h		378			901			802			641	
Approach Delay, s/veh		25.0			27.0			52.9			41.7	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	47.7	13.9	30.8	8.5	46.9	16.7	28.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	35.5	15.3	24.7	7.5	34.5	16.5	23.5
Max Q Clear Time (g_c+I1), s	4.0	7.7	9.4	13.3	5.1	21.3	12.1	20.3
Green Ext Time (p_c), s	0.0	1.6	0.1	1.9	0.0	4.1	0.2	1.2

Intersection Summary	
HCM 7th Control Delay, s/veh	37.8
HCM 7th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	2	33	14	2	64	7	594	6	24	547	27
Future Volume (vph)	93	2	33	14	2	64	7	594	6	24	547	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	60			60			60			60		
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	100
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	93	2	33	14	2	64	7	594	6	24	547	27
Future Vol, veh/h	93	2	33	14	2	64	7	594	6	24	547	27
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	104	2	37	16	2	72	8	667	7	27	615	30
Number of Lanes	0	1	1	0	1	0	1	1	0	1	2	0

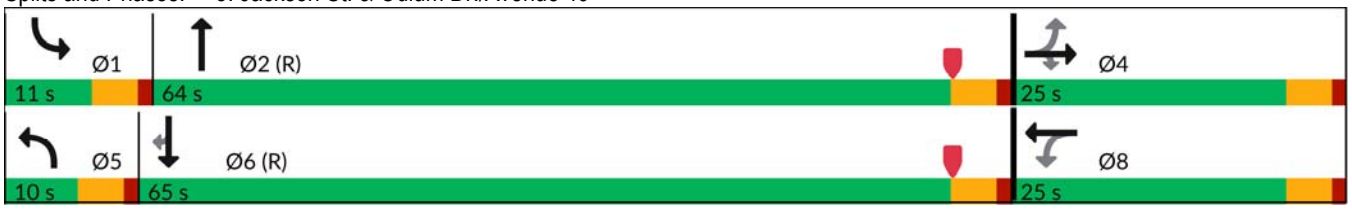
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	2
HCM Control Delay, s/veh	15.2	14.3	199.6	28.6
HCM LOS	C	B	F	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	98%	0%	18%	100%	0%	0%
Vol Thru, %	0%	99%	2%	0%	2%	0%	100%	87%
Vol Right, %	0%	1%	0%	100%	80%	0%	0%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	7	600	95	33	80	24	365	209
LT Vol	7	0	93	0	14	24	0	0
Through Vol	0	594	2	0	2	0	365	182
RT Vol	0	6	0	33	64	0	0	27
Lane Flow Rate	8	674	107	37	90	27	410	235
Geometry Grp	6	6	6	6	6	6	6	6
Degree of Util (X)	0.017	1.373	0.269	0.081	0.209	0.057	0.812	0.46
Departure Headway (Hd)	7.847	7.33	9.972	8.735	9.219	8.367	7.855	7.762
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	454	499	363	413	392	431	463	468
Service Time	5.624	5.107	7.672	6.435	6.919	6.067	5.555	5.462
HCM Lane V/C Ratio	0.018	1.351	0.295	0.09	0.23	0.063	0.886	0.502
HCM Control Delay, s/veh	10.8	201.8	16.3	12.2	14.3	11.6	36.5	16.9
HCM Lane LOS	B	F	C	B	B	B	E	C
HCM 95th-tile Q	0.1	30.8	1.1	0.3	0.8	0.2	7.6	2.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	2	33	14	2	64	7	594	6	24	547	27
Future Volume (vph)	93	2	33	14	2	64	7	594	6	24	547	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	60			60			60			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Detector Phase	4	4	4	8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	25.0	25.0	25.0	25.0	25.0		10.0	64.0		11.0	65.0	65.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	25.0%		10.0%	64.0%		11.0%	65.0%	65.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Jackson St. & Odlum Dr./Avenue 49



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	2	33	14	2	64	7	594	6	24	547	27
Future Volume (veh/h)	93	2	33	14	2	64	7	594	6	24	547	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	104	2	37	16	2	72	8	667	7	27	615	30
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	172	3	325	42	26	105	18	1171	12	47	2310	1030
Arrive On Green	0.20	0.20	0.20	0.20	0.20	0.20	0.01	0.63	0.63	0.03	0.65	0.65
Sat Flow, veh/h	492	13	1585	0	128	511	1781	1847	19	1781	3554	1585
Grp Volume(v), veh/h	106	0	37	90	0	0	8	0	674	27	615	30
Grp Sat Flow(s),veh/h/ln	505	0	1585	639	0	0	1781	0	1867	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	1.9	0.0	0.0	0.0	0.4	0.0	20.7	1.5	7.3	0.7
Cycle Q Clear(g_c), s	20.5	0.0	1.9	20.5	0.0	0.0	0.4	0.0	20.7	1.5	7.3	0.7
Prop In Lane	0.98		1.00	0.18		0.80	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	175	0	325	173	0	0	18	0	1183	47	2310	1030
V/C Ratio(X)	0.61	0.00	0.11	0.52	0.00	0.00	0.45	0.00	0.57	0.57	0.27	0.03
Avail Cap(c_a), veh/h	175	0	325	173	0	0	98	0	1183	116	2310	1030
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.9	0.0	32.4	34.2	0.0	0.0	49.2	0.0	10.5	48.1	7.4	6.2
Incr Delay (d2), s/veh	5.9	0.0	0.2	2.7	0.0	0.0	16.8	0.0	2.0	10.6	0.3	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.7	2.0	0.0	0.0	0.3	0.0	7.4	0.8	2.3	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.8	0.0	32.5	37.0	0.0	0.0	66.1	0.0	12.5	58.7	7.7	6.3
LnGrp LOS	D		C	D			E		B	E	A	A
Approach Vol, veh/h		143			90			682			672	
Approach Delay, s/veh		42.4			37.0			13.1			9.7	
Approach LOS		D			D			B			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	67.9		25.0	5.5	69.5		25.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.5	59.5		20.5	5.5	60.5		20.5				
Max Q Clear Time (g_c+I1), s	3.5	22.7		22.5	2.4	9.3		22.5				
Green Ext Time (p_c), s	0.0	4.5		0.0	0.0	4.2		0.0				

Intersection Summary			
HCM 7th Control Delay, s/veh		15.7	
HCM 7th LOS		B	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	56	42	16	773	473	21
Future Volume (vph)	56	42	16	773	473	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	60		60			
Link Speed (mph)	30			45	45	
Link Distance (ft)	293			1762	680	
Travel Time (s)	6.7			26.7	10.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

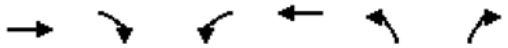
Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	56	42	16	773	473	21
Future Vol, veh/h	56	42	16	773	473	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	59	44	17	814	498	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1356	509	520	0	-	0
Stage 1	509	-	-	-	-	-
Stage 2	847	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	164	564	1046	-	-	-
Stage 1	604	-	-	-	-	-
Stage 2	420	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	162	564	1046	-	-	-
Mov Cap-2 Maneuver	162	-	-	-	-	-
Stage 1	594	-	-	-	-	-
Stage 2	420	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	32.17	0.17	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1046	-	233	-	-
HCM Lane V/C Ratio	0.016	-	0.443	-	-
HCM Control Delay (s/veh)	8.5	-	32.2	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	2.1	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	10	5	2	28	14
Future Volume (vph)	2	10	5	2	28	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	2033			636	356	
Travel Time (s)	46.2			14.5	8.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	6.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	10	5	2	28	14
Future Vol, veh/h	2	10	5	2	28	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	11	5	2	29	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	13	0	20	7
Stage 1	-	-	-	-	7	-
Stage 2	-	-	-	-	13	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1606	-	997	1075
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1606	-	994	1075
Mov Cap-2 Maneuver	-	-	-	-	994	-
Stage 1	-	-	-	-	1016	-
Stage 2	-	-	-	-	1007	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	5.18	8.69
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1019	-	-	1286	-
HCM Lane V/C Ratio	0.043	-	-	0.003	-
HCM Control Delay (s/veh)	8.7	-	-	7.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	256	155	29	188	70	91	320	28	63	625	88
Future Volume (vph)	49	256	155	29	188	70	91	320	28	63	625	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	83.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	49	256	155	29	188	70	91	320	28	63	625	88
Future Vol, veh/h	49	256	155	29	188	70	91	320	28	63	625	88
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	53	275	167	31	202	75	98	344	30	68	672	95
Number of Lanes	1	1	1	1	1	0	1	1	1	1	2	0

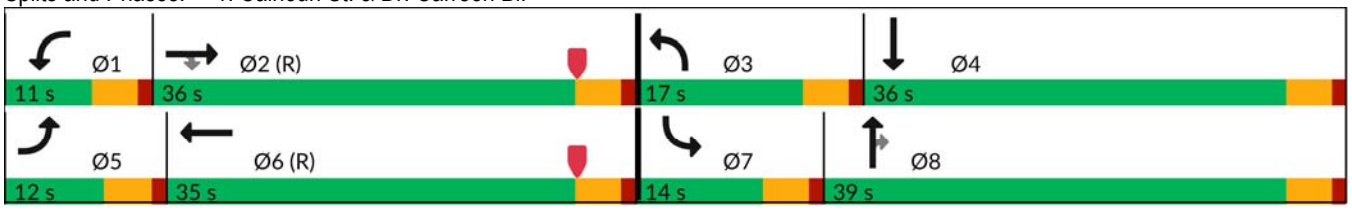
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	3
HCM Control Delay, s/veh	39.3	51.8	77.6	124.1
HCM LOS	E	F	F	F

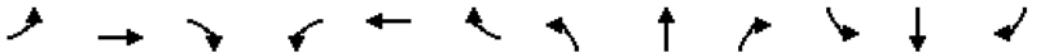
Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	73%	0%	100%	70%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	27%	0%	0%	30%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	91	320	28	49	256	155	29	258	63	417	296
LT Vol	91	0	0	49	0	0	29	0	63	0	0
Through Vol	0	320	0	0	256	0	0	188	0	417	208
RT Vol	0	0	28	0	0	155	0	70	0	0	88
Lane Flow Rate	98	344	30	53	275	167	31	277	68	448	319
Geometry Grp	6	6	6	6	6	6	6	6	6	6	6
Degree of Util (X)	0.311	1.048	0.086	0.168	0.84	0.477	0.102	0.859	0.206	1.301	0.907
Departure Headway (Hd)	12.046	11.525	10.795	12.054	11.537	10.813	12.047	11.357	11.212	10.691	10.474
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	300	317	334	299	317	335	299	322	322	345	347
Service Time	9.746	9.225	8.495	9.754	9.237	8.513	9.747	9.057	8.912	8.391	8.174
HCM Lane V/C Ratio	0.327	1.085	0.09	0.177	0.868	0.499	0.104	0.86	0.211	1.299	0.919
HCM Control Delay, s/veh	20.1	99.5	14.5	17.2	53.4	23	16.1	55.8	16.8	185.3	60.9
HCM Lane LOS	C	F	B	C	F	C	C	F	C	F	F
HCM 95th-tile Q	1.3	12.1	0.3	0.6	7.3	2.5	0.3	7.7	0.8	20.6	9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	256	155	29	188	70	91	320	28	63	625	88
Future Volume (vph)	49	256	155	29	188	70	91	320	28	63	625	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		0	105		0	100		0	100		100
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	90			60			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		40			40			45			40	
Link Distance (ft)		2582			982			2694			905	
Travel Time (s)		44.0			16.7			40.8			15.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Shared Lane Traffic (%)												
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8			
Detector Phase	5	2	2	1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5	9.5	22.5	
Total Split (s)	12.0	36.0	36.0	11.0	35.0		17.0	39.0	39.0	14.0	36.0	
Total Split (%)	12.0%	36.0%	36.0%	11.0%	35.0%		17.0%	39.0%	39.0%	14.0%	36.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	Max	Max	None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 1: Calhoun St. & Dr. Carreon Bl.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	256	155	29	188	70	91	320	28	63	625	88
Future Volume (veh/h)	49	256	155	29	188	70	91	320	28	63	625	88
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	53	275	167	31	202	75	98	344	30	68	672	95
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	69	742	629	51	504	187	125	645	547	88	1014	143
Arrive On Green	0.04	0.40	0.40	0.03	0.39	0.39	0.07	0.34	0.34	0.05	0.32	0.32
Sat Flow, veh/h	1781	1870	1585	1781	1301	483	1781	1870	1585	1781	3126	441
Grp Volume(v), veh/h	53	275	167	31	0	277	98	344	30	68	382	385
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	0	1783	1781	1870	1585	1781	1777	1791
Q Serve(g_s), s	2.9	10.4	7.1	1.7	0.0	11.3	5.4	14.8	1.3	3.8	18.5	18.5
Cycle Q Clear(g_c), s	2.9	10.4	7.1	1.7	0.0	11.3	5.4	14.8	1.3	3.8	18.5	18.5
Prop In Lane	1.00		1.00	1.00		0.27	1.00		1.00	1.00		0.25
Lane Grp Cap(c), veh/h	69	742	629	51	0	691	125	645	547	88	576	581
V/C Ratio(X)	0.77	0.37	0.27	0.60	0.00	0.40	0.79	0.53	0.05	0.77	0.66	0.66
Avail Cap(c_a), veh/h	134	742	629	116	0	691	223	645	547	169	576	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.6	21.3	20.3	48.0	0.0	22.2	45.8	26.3	21.9	47.0	29.1	29.1
Incr Delay (d2), s/veh	16.5	1.4	1.0	10.8	0.0	1.7	9.9	3.0	0.2	13.4	5.9	5.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	4.6	2.6	0.9	0.0	4.8	2.7	6.7	0.5	2.0	8.4	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	64.2	22.7	21.4	58.8	0.0	24.0	55.6	29.3	22.0	60.4	35.0	35.0
LnGrp LOS	E	C	C	E		C	E	C	C	E	C	C
Approach Vol, veh/h		495			308			472			835	
Approach Delay, s/veh		26.7			27.5			34.3			37.0	
Approach LOS		C			C			C			D	

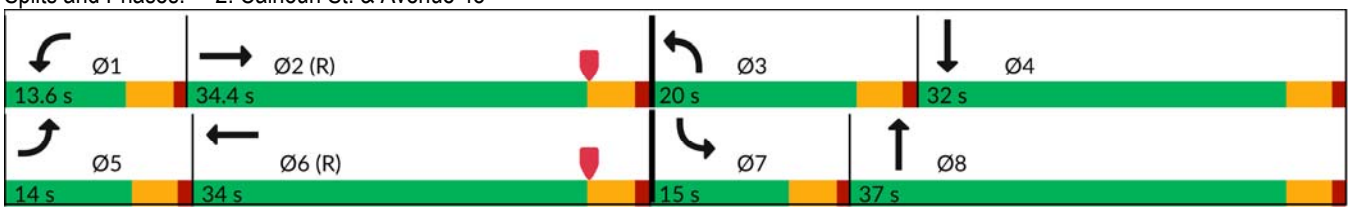
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.4	44.2	11.5	36.9	8.4	43.2	9.4	39.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	31.5	12.5	31.5	7.5	30.5	9.5	34.5
Max Q Clear Time (g_c+I1), s	3.7	12.4	7.4	20.5	4.9	13.3	5.8	16.8
Green Ext Time (p_c), s	0.0	1.9	0.1	3.4	0.0	1.4	0.0	1.8

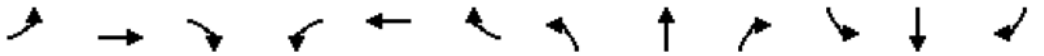
Intersection Summary	
HCM 7th Control Delay, s/veh	32.6
HCM 7th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	658	300	54	468	48	131	345	51	80	546	100
Future Volume (vph)	56	658	300	54	468	48	131	345	51	80	546	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	110		0	105		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		1021			1428			2333			2694	
Travel Time (s)		13.9			19.5			35.3			40.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	14.0	34.4		13.6	34.0		20.0	37.0		15.0	32.0	
Total Split (%)	14.0%	34.4%		13.6%	34.0%		20.0%	37.0%		15.0%	32.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow, Master Intersection	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	

Splits and Phases: 2: Calhoun St. & Avenue 48

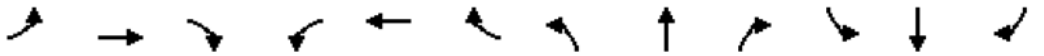




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	658	300	54	468	48	131	345	51	80	546	100
Future Volume (veh/h)	56	658	300	54	468	48	131	345	51	80	546	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	58	678	309	56	482	49	135	356	53	82	563	103
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	1363	612	72	1857	186	167	1010	149	105	872	159
Arrive On Green	0.04	0.40	0.40	0.04	0.39	0.39	0.09	0.32	0.32	0.06	0.29	0.29
Sat Flow, veh/h	1781	3448	1547	1781	4716	473	1781	3106	459	1781	3001	547
Grp Volume(v), veh/h	58	669	318	56	346	185	135	202	207	82	333	333
Grp Sat Flow(s),veh/h/ln	1781	1702	1592	1781	1702	1785	1781	1777	1788	1781	1777	1772
Q Serve(g_s), s	3.2	14.8	15.1	3.1	6.9	7.0	7.4	8.7	8.8	4.5	16.3	16.4
Cycle Q Clear(g_c), s	3.2	14.8	15.1	3.1	6.9	7.0	7.4	8.7	8.8	4.5	16.3	16.4
Prop In Lane	1.00		0.97	1.00		0.26	1.00		0.26	1.00		0.31
Lane Grp Cap(c), veh/h	75	1346	629	72	1341	703	167	577	581	105	516	515
V/C Ratio(X)	0.77	0.50	0.51	0.78	0.26	0.26	0.81	0.35	0.36	0.78	0.64	0.65
Avail Cap(c_a), veh/h	169	1346	629	162	1341	703	276	577	581	187	516	515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.4	22.8	22.8	47.5	20.5	20.5	44.5	25.7	25.8	46.4	31.0	31.0
Incr Delay (d2), s/veh	15.5	1.3	2.9	16.0	0.5	0.9	9.0	1.7	1.7	11.6	6.1	6.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	5.7	5.7	1.6	2.6	2.9	3.6	3.7	3.8	2.3	7.5	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	62.9	24.1	25.7	63.6	20.9	21.4	53.5	27.4	27.5	58.0	37.0	37.2
LnGrp LOS	E	C	C	E	C	C	D	C	C	E	D	D
Approach Vol, veh/h		1045			587			544			748	
Approach Delay, s/veh		26.7			25.1			33.9			39.4	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	44.0	13.9	33.6	8.7	43.9	10.4	37.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.1	29.9	15.5	27.5	9.5	29.5	10.5	32.5
Max Q Clear Time (g_c+I1), s	5.1	17.1	9.4	18.4	5.2	9.0	6.5	10.8
Green Ext Time (p_c), s	0.0	4.8	0.1	2.5	0.0	2.8	0.0	2.1

Intersection Summary	
HCM 7th Control Delay, s/veh	31.0
HCM 7th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	2	36	2	21	2	492	24	29	715	16
Future Volume (vph)	9	2	2	36	2	21	2	492	24	29	715	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	75.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	2	2	36	2	21	2	492	24	29	715	16
Future Vol, veh/h	9	2	2	36	2	21	2	492	24	29	715	16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	2	2	38	2	22	2	518	25	31	753	17
Number of Lanes	0	1	0	0	1	0	1	1	0	1	1	1

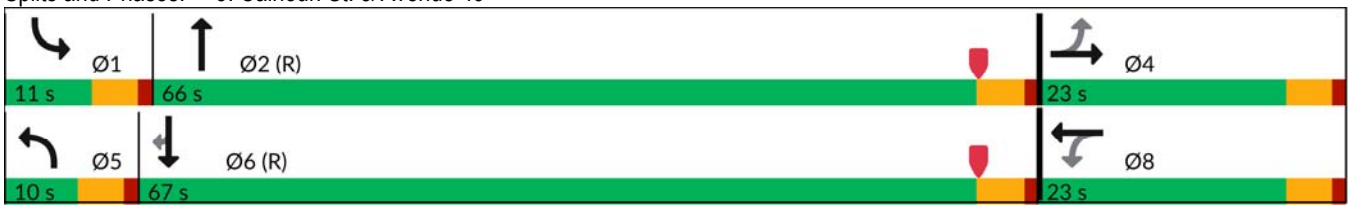
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	1
HCM Control Delay, s/veh	11.4	11.9	52.9	96.8
HCM LOS	B	B	F	F

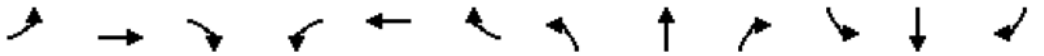
Lane	NBLn1	NBLn2	EBLn1	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	69%	61%	100%	0%	0%
Vol Thru, %	0%	95%	15%	3%	0%	100%	0%
Vol Right, %	0%	5%	15%	36%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	2	516	13	59	29	715	16
LT Vol	2	0	9	36	29	0	0
Through Vol	0	492	2	2	0	715	0
RT Vol	0	24	2	21	0	0	16
Lane Flow Rate	2	543	14	62	31	753	17
Geometry Grp	6	6	5	5	5	5	5
Degree of Util (X)	0.004	0.953	0.031	0.132	0.051	1.143	0.022
Departure Headway (Hd)	7.162	6.625	8.424	8.001	5.973	5.467	4.76
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	503	554	427	451	602	670	755
Service Time	4.862	4.325	6.124	5.701	3.681	3.175	2.468
HCM Lane V/C Ratio	0.004	0.98	0.033	0.137	0.051	1.124	0.023
HCM Control Delay, s/veh	9.9	53.1	11.4	11.9	9	102.4	7.6
HCM Lane LOS	A	F	B	B	A	F	A
HCM 95th-tile Q	0	12.4	0.1	0.5	0.2	23.7	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	2	2	36	2	21	2	492	24	29	715	16
Future Volume (vph)	9	2	2	36	2	21	2	492	24	29	715	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		0	100		0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (ft)	60			60			90			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			45			45	
Link Distance (ft)		636			1354			680			287	
Travel Time (s)		14.5			30.8			10.3			4.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	23.0	23.0		23.0	23.0		10.0	66.0		11.0	67.0	67.0
Total Split (%)	23.0%	23.0%		23.0%	23.0%		10.0%	66.0%		11.0%	67.0%	67.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 3: Calhoun St. & Avenue 49





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	2	2	36	2	21	2	492	24	29	715	16
Future Volume (veh/h)	9	2	2	36	2	21	2	492	24	29	715	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	9	2	2	38	2	22	2	518	25	31	753	17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	114	25	14	106	5	29	5	1384	67	51	1512	1281
Arrive On Green	0.05	0.05	0.05	0.05	0.05	0.05	0.00	0.78	0.78	0.03	0.81	0.81
Sat Flow, veh/h	993	464	265	890	91	540	1781	1770	85	1781	1870	1585
Grp Volume(v), veh/h	13	0	0	62	0	0	2	0	543	31	753	17
Grp Sat Flow(s),veh/h/ln	1723	0	0	1521	0	0	1781	0	1855	1781	1870	1585
Q Serve(g_s), s	0.0	0.0	0.0	3.3	0.0	0.0	0.1	0.0	9.0	1.7	12.9	0.2
Cycle Q Clear(g_c), s	0.7	0.0	0.0	4.0	0.0	0.0	0.1	0.0	9.0	1.7	12.9	0.2
Prop In Lane	0.69		0.15	0.61		0.35	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	154	0	0	140	0	0	5	0	1451	51	1512	1281
V/C Ratio(X)	0.08	0.00	0.00	0.44	0.00	0.00	0.42	0.00	0.37	0.60	0.50	0.01
Avail Cap(c_a), veh/h	347	0	0	334	0	0	98	0	1451	116	1512	1281
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.1	0.0	0.0	46.6	0.0	0.0	49.8	0.0	3.4	48.0	3.1	1.9
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.2	0.0	0.0	48.5	0.0	0.7	10.8	1.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.6	0.0	0.0	0.1	0.0	2.2	0.9	2.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.3	0.0	0.0	48.8	0.0	0.0	98.3	0.0	4.1	58.8	4.2	1.9
LnGrp LOS	D			D			F		A	E	A	A
Approach Vol, veh/h		13			62			545			801	
Approach Delay, s/veh		45.3			48.8			4.4			6.3	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	82.7		9.9	4.8	85.3		9.9				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.5	61.5		18.5	5.5	62.5		18.5				
Max Q Clear Time (g_c+I1), s	3.7	11.0		2.7	2.1	14.9		6.0				
Green Ext Time (p_c), s	0.0	3.5		0.0	0.0	5.7		0.2				

Intersection Summary		
HCM 7th Control Delay, s/veh	7.8	
HCM 7th LOS	A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	501	59	10	371	176	66	244	69	218	326	72
Future Volume (vph)	63	501	59	10	371	176	66	244	69	218	326	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	115		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	90			90			90			90		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		50			50			45			45	
Link Distance (ft)		2636			2238			1460			368	
Travel Time (s)		35.9			30.5			22.1			5.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	15.0	37.0		10.0	32.0		15.0	24.0		29.0	38.0	
Total Split (%)	15.0%	37.0%		10.0%	32.0%		15.0%	24.0%		29.0%	38.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Max		None	Max	

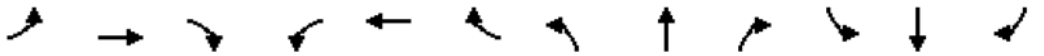
Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: Calhoun St. & Avenue 50

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	501	59	10	371	176	66	244	69	218	326	72
Future Volume (veh/h)	63	501	59	10	371	176	66	244	69	218	326	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	66	522	61	10	386	183	69	254	72	227	340	75
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	85	1356	158	22	910	425	89	650	180	264	972	212
Arrive On Green	0.05	0.42	0.42	0.01	0.39	0.39	0.05	0.24	0.24	0.15	0.34	0.34
Sat Flow, veh/h	1781	3206	374	1781	2350	1099	1781	2747	762	1781	2901	632
Grp Volume(v), veh/h	66	289	294	10	290	279	69	162	164	227	207	208
Grp Sat Flow(s),veh/h/ln	1781	1777	1803	1781	1777	1673	1781	1777	1733	1781	1777	1757
Q Serve(g_s), s	3.7	11.2	11.3	0.6	12.0	12.2	3.8	7.7	8.0	12.4	8.7	9.0
Cycle Q Clear(g_c), s	3.7	11.2	11.3	0.6	12.0	12.2	3.8	7.7	8.0	12.4	8.7	9.0
Prop In Lane	1.00		0.21	1.00		0.66	1.00		0.44	1.00		0.36
Lane Grp Cap(c), veh/h	85	751	762	22	688	647	89	421	410	264	595	588
V/C Ratio(X)	0.77	0.38	0.39	0.46	0.42	0.43	0.77	0.39	0.40	0.86	0.35	0.35
Avail Cap(c_a), veh/h	187	751	762	98	688	647	187	421	410	436	595	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	19.9	19.9	49.1	22.5	22.5	46.9	32.1	32.2	41.6	25.0	25.1
Incr Delay (d2), s/veh	13.7	1.5	1.5	14.6	1.9	2.1	13.2	2.7	2.9	9.0	1.6	1.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	4.5	4.6	0.3	5.0	4.8	2.0	3.5	3.5	5.9	3.7	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	60.8	21.4	21.4	63.7	24.4	24.6	60.1	34.7	35.1	50.6	26.6	26.8
LnGrp LOS	E	C	C	E	C	C	E	C	D	D	C	C
Approach Vol, veh/h		649			579			395			642	
Approach Delay, s/veh		25.4			25.2			39.3			35.1	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.7	46.8	9.5	38.0	9.3	43.2	19.3	28.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.5	32.5	10.5	33.5	10.5	27.5	24.5	19.5
Max Q Clear Time (g_c+I1), s	2.6	13.3	5.8	11.0	5.7	14.2	14.4	10.0
Green Ext Time (p_c), s	0.0	2.9	0.0	2.2	0.0	2.5	0.4	1.1

Intersection Summary	
HCM 7th Control Delay, s/veh	30.5
HCM 7th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	2	23	10	2	43	21	502	15	71	673	76
Future Volume (vph)	67	2	23	10	2	43	21	502	15	71	673	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		0
Taper Length (ft)	60			60			60			60		
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Intersection Delay, s/veh	47.9
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	67	2	23	10	2	43	21	502	15	71	673	76
Future Vol, veh/h	67	2	23	10	2	43	21	502	15	71	673	76
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	70	2	24	10	2	45	22	523	16	74	701	79
Number of Lanes	0	1	1	0	1	0	1	1	0	1	2	0

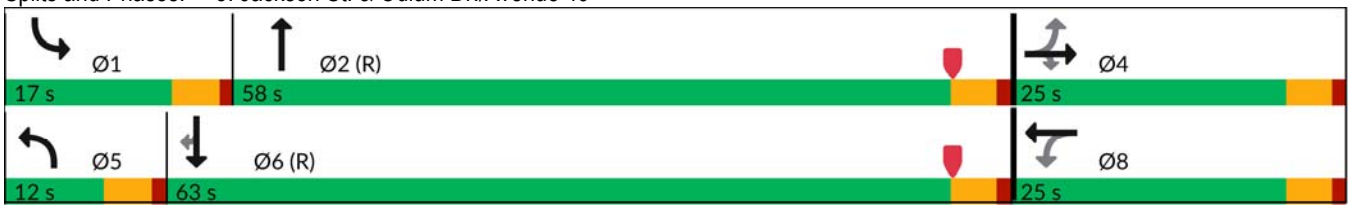
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	2	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	3	1	2
HCM Control Delay, s/veh	13.7	12.8	83.5	30.7
HCM LOS	B	B	F	D

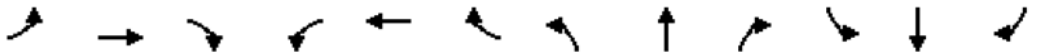
Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	97%	0%	18%	100%	0%	0%
Vol Thru, %	0%	97%	3%	0%	4%	0%	100%	75%
Vol Right, %	0%	3%	0%	100%	78%	0%	0%	25%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	21	517	69	23	55	71	449	300
LT Vol	21	0	67	0	10	71	0	0
Through Vol	0	502	2	0	2	0	449	224
RT Vol	0	15	0	23	43	0	0	76
Lane Flow Rate	22	539	72	24	57	74	467	313
Geometry Grp	6	6	6	6	6	6	6	6
Degree of Util (X)	0.047	1.069	0.183	0.053	0.134	0.15	0.881	0.574
Departure Headway (Hd)	7.671	7.144	9.533	8.31	8.737	7.508	6.999	6.819
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	464	506	379	434	413	481	523	532
Service Time	5.465	4.937	7.233	6.01	6.437	5.208	4.699	4.519
HCM Lane V/C Ratio	0.047	1.065	0.19	0.055	0.138	0.154	0.893	0.588
HCM Control Delay, s/veh	10.8	86.5	14.4	11.5	12.8	11.5	42	18.3
HCM Lane LOS	B	F	B	B	B	B	E	C
HCM 95th-tile Q	0.1	16.4	0.7	0.2	0.5	0.5	9.8	3.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	2	23	10	2	43	21	502	15	71	673	76
Future Volume (vph)	67	2	23	10	2	43	21	502	15	71	673	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		50	0		0	100		150	100		205
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	60			60			60			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		590			2033			968			636	
Travel Time (s)		13.4			46.2			13.2			8.7	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Shared Lane Traffic (%)												
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8								6
Detector Phase	4	4	4	8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	25.0	25.0	25.0	25.0	25.0		12.0	58.0		17.0	63.0	63.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	25.0%		12.0%	58.0%		17.0%	63.0%	63.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	

Splits and Phases: 5: Jackson St. & Odlum Dr./Avenue 49





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	2	23	10	2	43	21	502	15	71	673	76
Future Volume (veh/h)	67	2	23	10	2	43	21	502	15	71	673	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	70	2	24	10	2	45	22	523	16	74	701	79
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	3	123	48	13	69	41	1324	41	96	2716	1211
Arrive On Green	0.08	0.08	0.08	0.08	0.08	0.08	0.02	0.73	0.73	0.05	0.76	0.76
Sat Flow, veh/h	1248	36	1585	76	161	890	1781	1805	55	1781	3554	1585
Grp Volume(v), veh/h	72	0	24	57	0	0	22	0	539	74	701	79
Grp Sat Flow(s),veh/h/ln	1284	0	1585	1127	0	0	1781	0	1860	1781	1777	1585
Q Serve(g_s), s	0.0	0.0	1.4	0.1	0.0	0.0	1.2	0.0	10.9	4.1	5.8	1.2
Cycle Q Clear(g_c), s	5.6	0.0	1.4	5.7	0.0	0.0	1.2	0.0	10.9	4.1	5.8	1.2
Prop In Lane	0.97		1.00	0.18		0.79	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	171	0	123	130	0	0	41	0	1364	96	2716	1211
V/C Ratio(X)	0.42	0.00	0.19	0.44	0.00	0.00	0.54	0.00	0.40	0.77	0.26	0.07
Avail Cap(c_a), veh/h	345	0	325	328	0	0	134	0	1364	223	2716	1211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.1	0.0	43.2	44.1	0.0	0.0	48.3	0.0	5.0	46.7	3.5	2.9
Incr Delay (d2), s/veh	1.6	0.0	0.8	2.3	0.0	0.0	10.7	0.0	0.9	12.4	0.2	0.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.6	1.4	0.0	0.0	0.6	0.0	3.1	2.1	1.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	46.8	0.0	43.9	46.4	0.0	0.0	59.0	0.0	5.9	59.1	3.7	3.0
LnGrp LOS	D		D	D			E		A	E	A	A
Approach Vol, veh/h		96			57			561			854	
Approach Delay, s/veh		46.0			46.4			7.9			8.4	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	77.8		12.3	6.8	80.9		12.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	12.5	53.5		20.5	7.5	58.5		20.5				
Max Q Clear Time (g_c+I1), s	6.1	12.9		7.6	3.2	7.8		7.7				
Green Ext Time (p_c), s	0.1	3.3		0.3	0.0	5.1		0.2				

Intersection Summary			
HCM 7th Control Delay, s/veh		11.9	
HCM 7th LOS		B	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	38	28	47	478	690	62
Future Volume (vph)	38	28	47	478	690	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	100			0
Storage Lanes	1	0	1			0
Taper Length (ft)	60		60			
Link Speed (mph)	30			45	45	
Link Distance (ft)	293			1762	680	
Travel Time (s)	6.7			26.7	10.3	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

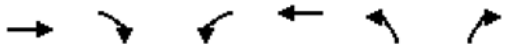
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	38	28	47	478	690	62
Future Vol, veh/h	38	28	47	478	690	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	29	49	503	726	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1361	759	792	0	-	0
Stage 1	759	-	-	-	-	-
Stage 2	602	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	163	406	829	-	-	-
Stage 1	462	-	-	-	-	-
Stage 2	547	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	154	406	829	-	-	-
Mov Cap-2 Maneuver	154	-	-	-	-	-
Stage 1	435	-	-	-	-	-
Stage 2	547	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	30.6	3 0.86	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	829	-	209	-	-
HCM Lane V/C Ratio	0.06	-	0.333	-	-
HCM Control Delay (s/veh)	9.6	-	30.6	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.2	-	1.4	-	-



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2	31	16	2	19	9
Future Volume (vph)	2	31	16	2	19	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Link Speed (mph)	30			30	30	
Link Distance (ft)	2033			636	356	
Travel Time (s)	46.2			14.5	8.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2	31	16	2	19	9
Future Vol, veh/h	2	31	16	2	19	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	33	17	2	20	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	35	0	54	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	36	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1577	-	954	1060
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	987	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1577	-	944	1060
Mov Cap-2 Maneuver	-	-	-	-	944	-
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	976	-

Approach	EB	WB	NB
HCM Control Delay, s/v	0	6.5	8.79
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	978	-	-	1575	-
HCM Lane V/C Ratio	0.03	-	-	0.011	-
HCM Control Delay (s/veh)	8.8	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Appendix G
Calhoun Street Housing Development Vehicle Miles Traveled Screening Assessment

URBAN CROSSROADS

June 18, 2024

Mr. Andrew Simmons, P.E.
City of Coachella
53990 Enterprise Way
Coachella, CA 92236

CALHOUN STREET SUBDIVISION VEHICLE MILES TRAVELED (VMT) SCREENING

Mr. Andrew Simmons, P.E.,

Urban Crossroads, Inc. is pleased to provide the following Vehicle Miles Traveled (VMT) Screening for the Calhoun Street Subdivision development (Project), which is located at the southwest corner of Calhoun Street and Avenue 49 in the City of Coachella.

PROJECT OVERVIEW

It is our understanding that the Project is to consist of 258 dwelling units and an 1.5 acre park with dog run on approximately 40 acres. A preliminary site plan for the proposed Project is shown on Exhibit 1. Access to the Project is provided via two full access driveways (Access 1 at Calhoun Street and Access 2 at Avenue 49), and one right-in/right-out only access for the park (Access 3 at Calhoun Street).

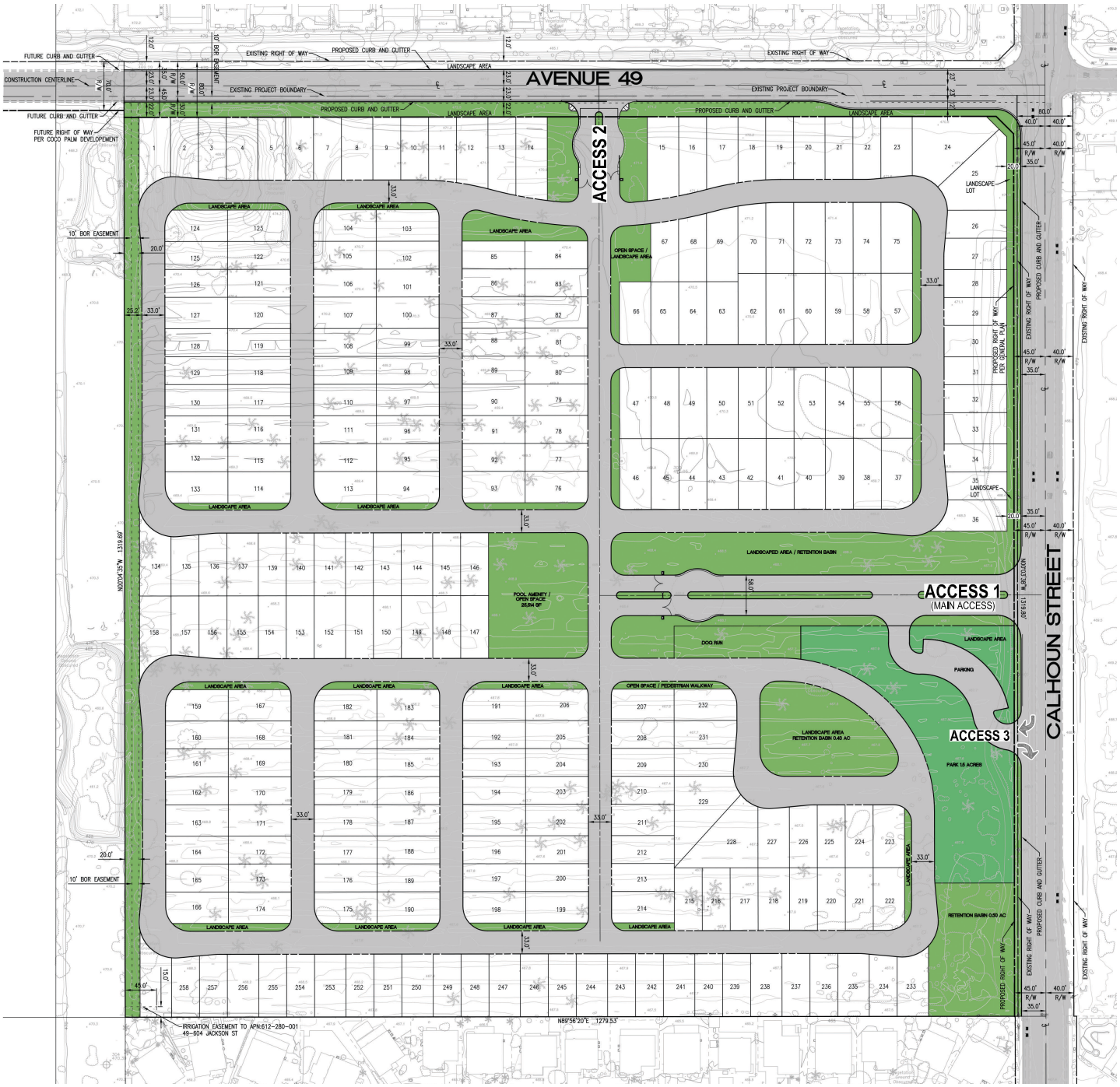
BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which requires all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate went into effect July 1, 2020. To aid in this transition, the Governor's Office of Planning and Research (OPR) released a Technical Advisory on Evaluating Transportation Impacts in CEQA (December of 2018) (**Technical Advisory**) (1). Based on OPR's Technical Advisory, the County of Riverside adopted their Transportation Analysis Guidelines for Level of Service Vehicle Miles Traveled (December of 2020) (**County Guidelines**) (2). The City of Coachella utilizes the adopted County Guidelines.

Consistent with County Guidelines, projects should evaluate available screening criteria based on their location and project type to determine if a presumption of a less than significant transportation impact can be made. The following project screening thresholds were selected for review based on their applicability to the proposed Project:

- Small Projects Screening
- High Quality Transit Areas (HQTA) Screening
- Map-Based Screening
- Local Essential Service Screening

EXHIBIT 1: PRELIMINARY SITE PLAN



LEGEND:

▪ RIGHT-IN/RIGHT-OUT ONLY

N

SMALL PROJECTS SCREENING

County Guidelines identify those projects forecasted to generate greenhouse gas (GHG) emissions below 3,000 Metric Tons of Carbon Dioxide Equivalent ($MTCO_2e$) per year are also assumed to cause a less than significant VMT impact.[1] The County Guidelines provides a list of land use types based on quantity (i.e., dwelling units or square footage) and provides a typical development potential to be below the 3,000 $MTCO_2e$ per year. Single Family Housing projects less than or equal to 110 dwelling units have been identified to meet the County threshold[2].

The Project quantity of 258 dwelling units is more than the residential VMT screening criteria.

Small Projects screening criteria is not met.

HIGH QUALITY TRANSIT AREAS (HQTA) SCREENING

Projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[3] or an existing stop along a "high-quality transit corridor"[4]) may be presumed to have a less than significant impact absent substantial evidence to the contrary. The Project is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

HQTA screening criteria is not met.

MAP-BASED SCREENING

The County Guidelines note that "residential projects that locate in areas with low VMT, and that incorporate similar features (i.e., density, mix of uses, transit accessibility), will tend to exhibit similarly low VMT."[5] Urban Crossroads has obtained a VMT data table from County Staff for all TAZs within Riverside County that identifies VMT per capita for the purposes of identifying low VMT areas. The data utilizes the sub-regional Riverside Transportation Analysis Model (RIVTAM) to measure baseline VMT performance, and a comparison was made to the applicable impact threshold.

The Project's TAZ was identified in the Riverside County Transportation Analysis Model (RIVTAM) as TAZ 4787.

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[1] County Guidelines; Page 19.
[2] County Guidelines; Page 42, Table 1
[3] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[4] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").
[5] Technical Advisory; Page 12

The County's data table identifies the Project's TAZ 4787 to generate 7.974 VMT per capita. The County regional threshold is 15.2 VMT per capita[6]; therefore the Project is located in a low VMT area.

Map-Based screening criteria is met for residential.

LOCAL ESSENTIAL SERVICE SCREENING

The introduction of new local essential services shortens non-discretionary trips by putting those goods and services closer to complimentary land uses, resulting in conditions which do not increase overall VMT. The park with dog run provides a local service to adjacent land uses that otherwise attract travelers from more distant locations; therefore, the park with dog run is presumed to not increase overall VMT.

Local Essential Service screening criteria is met for park with dog run.

CONCLUSION

In summary, the Project was evaluated consistent with available screening criteria as presented in the County Guidelines. The map based screening criteria is met for residential uses and the local essential service screening criteria is met for park with dog run, so a full analysis of VMT associated with site is not required. The Project is presumed to have a less than significant impact on VMT.

If you have any questions, please contact us at jkain@urbanxroads.com for John or mwhiteman@urbanxroads.com for Marlie.

Respectfully submitted,

URBAN CROSSROADS, INC.

John Kain, AICP
Principal

Marlie Whiteman, P.E.
Senior Associate

[6] County Guidelines; Page 22

REFERENCES

1. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.
2. **County of Riverside.** *Transportation Analysis Guidelines for Level of Service Vehicle Miles Traveled.* County of Riverside : s.n., December 2020.