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APPENDICES

DIVISION 1 - GENERAL

1.01 Executive Summary-City Policies

It is the policy of the City of Coachella (City) to encourage the orderly development of the City's service systems (water, streets, sewer, storm drain, parks etc.) to the greatest number of real properties that lie within the existing City boundary and those real properties that lie within the current City Sphere of Influence and are eligible for future annexation into the City. The City of Coachella boundary and Sphere of Influence are defined by the Local Agency Formation Commission (LAFCO); see Appendix A.

The City's subsidiary enterprise agencies include: (1) The Coachella Water Authority water production, storage, and distribution systems, (2) The Coachella Sanitary District wastewater collection and treatment systems.

The following Standard Specifications and Standard Drawings provide guidelines and requirements for the preparation and processing of private development within the City of Coachella. Facilities that are to be constructed by private developers and ultimately dedicated to the City shall meet or exceed all requirements described herein. It is the policy of the City to accept title to facilities only when such facilities are constructed in strict accordance with this Public Works Standard Specification and per the requirements, policies, and procedures prescribed in the *Coachella, CA, Municipal Code*.

The private developer is responsible for all costs associated with the planning, design, construction, and transfer of title of facilities to the City in accordance with the City's Standard Specifications. Such costs shall include water system assessments, sewer or water service feasibility studies, land acquisition, easement and right-of-way dedication, engineering services for design of construction documents, construction of private and dedicated facilities, and any and all other work conditioned by the City in the approved "Conditions of Approval" for said development.

The City will not construct facilities to provide utility service to land being divided for a subdivision or parcel map development. Where facilities to be constructed are part of the capital improvement program (CIP) for the utility system, as prescribed in the most recent master planning documents the City may share in the cost of improvements with the developer as determined in the conditions of approval. The City maintains planning documents for orderly development and growth of the City's infrastructure. The planning documents include: *Water System Master Plan* (last update, September 2006), *Wastewater Master Plan* (last update, July 2000), and *General Plan 2020* (adopted October 1998). These documents serve as the basis for CIP development and planning for future City infrastructure. Generally, the sewer and water connection fees are intended to cover the costs of such projects; however, in some instances, depending on phasing of development and CIP project schedules, in order to provide required service within a development, it may be necessary for the Developer to also provide certain off-site facilities or to provide for over-sizing of the facilities, which are to be dedicated to the City. In such event, the Developer may be entitled to reimbursement of certain costs for such off-site or over sizing of facilities as determined in the "Conditions of Approval".

The City of Coachella hereby adopts the *Greenbook* (*Standard Specifications for Public Works Construction*) with the exceptions noted herein. Where the *Greenbook* and this Specification conflict, this Specification shall take precedence.

1.02 Definition of Terms and Abbreviations

ADD THE FOLLOWING TO THE GREENBOOK, 1-2 DEFINITIONS:

Acceptance – The action by the City acknowledging that all provisions of the Agreement between the City and the Owner, Permittee, have been fulfilled in all respects in strict conformance with the City's Standard Specifications.

Agency – Shall be interpreted throughout the "Greenbook" as the City of Coachella.

Appurtenances – All utility services required, but not directly specified, to make a complete utility service installation.

Building Official – Shall refer to the designated official within the City's Public Works Department, Building and Safety, responsible for enforcing the City's adopted Building and Construction codes.

City Code – As used herein, shall mean the official code of the City of Coachella, *Coachella, CA Municipal Code*, as adopted by the City Council and any amendments thereto. (aka CMC)

City Engineer or Engineer – The California registered civil engineer employed by the City or the authorized agent of the City, appointed to act on the City's behalf.

City Manager – The manager employed by the City or authorized agent of the City, appointed to manage the City, including all departments and staff.

City or Coachella – "The City of Coachella"

Contractor – The person or entities entering into a contract with the Owner for performance of the work or improvement pursuant to certain specifications. The Contractor shall be a licensed State of California Class-A, or approved Class-34 or C-42 Contractor.

Council – The elected Council of the City of Coachella

CSD – The Coachella Sanitary District. Owner/operator of the wastewater collection and treatment system within the City of Coachella. Board is the elected City Council.

CWA – The Coachella Water Authority. Owner/operator of the potable water production and distribution system within the City of Coachella. Board is the elected City Council.

Division of Highway Standards Specifications – As used herein, shall mean the Standard Specifications, State of California Department of Transportation current issue.

Design Engineer – Same as Developer's Engineer.

Designer – Same as Developer's Engineer.

Developer – The person or entity entering into contract with the City for performance of the work or improvement pursuant to the terms of the Subdivision Improvement Agreement.

Developer's Engineer – A California registered civil engineer employed by the Owner.

Greenbook *– The Standard Specifications for Public Work Construction* – latest edition.

Improvement Plans – Shall refer to water system improvement plans, sewer system improvement plans, and surface improvement plans including grading plans, street plans, and storm drain plans and any other plans or designs to improve the project site.

Inspector – The representative of the City of Coachella acting through the City Manager, Public Works Director, or the City Engineer for monitoring and inspecting public works construction within the City.

Owner – Any property owner or agent thereof who makes application for City services or enters into an agreement with the City and/or any person or entity who agrees to construct and install facilities intended to be dedicated to the City. The Owner must select and employ a licensed Class-A or approved Class C-34 or C-42 contractor to perform the work.

Private Engineer – Same as Developer's Engineer.

Public Works Department or PW Dept. – The City of Coachella, Public Works Department

Public Works Director – The director employed by the City or authorized agent of the City, appointed to act as the head of the City of Coachella, Public Works Department.

Specifications – The City of Coachella *Specifications and Procedures* and the *Standard Specifications for Public Work Construction* – latest edition (*Greenbook*). If in conflict, the City's requirements take precedence.

Standard Drawings – The City of Coachella *Standard Drawings* developed and adopted by the City of Coachella for Public Works construction and development within the City.

1.03 Development Requirements and Procedures

This section sets forth the City of Coachella policy for the processing of plans and the supplemental documents required for private development and facilities intended to be dedicated to the City of Coachella.

A. General Requirements

1 Developer shall design, construct, and dedicate to the City of Coachella the water facilities, sewer facilities and surface improvements in accordance with the requirements of these Specifications, the Standard Drawings, and the City Municipal Code, as applicable.

2 Developer shall provide all financial arrangements necessary to plan, design, and construct the project.

3 Developer shall obtain and dedicate utility right-of-way to the City of Coachella. Dedicated facilities must be in either dedicated road right-of-way or in easements granted to City of Coachella.

4 Developer shall pay current applicable fees (refer to **CITY OF COACHELLA RATES AND CHARGES**, **contact the City Public Works Department for the most recent rates and charges**) in addition to completing those requirements listed above. Fees may include: Plan Checking Fees, Connection Charges, Inspection Fees, Added Facilities Charges, Main Participation Charges or Primary Facilities Fees, Service Connection Fees, and Water Meter Charges. The City of Coachella reserves the right to revise these

fees and charges at any time; the Public Works Department should be consulted for current and applicable fees.

5 City of Coachella will review all drawings, and may revise, modify, or require redesign of any concepts, drawings, or detail submitted at Developer's sole expense. All concepts and drawings must be approved by the City Engineer.

6 The Developer shall provide the City with a corrosion site survey for all Ductile Iron or steel pipelines. If required by City, the Developer shall have a cathodic protection system designed by a qualified registered corrosion engineer and approved by the City Engineer.

B. Plan Check Process

Following completion of the City's "Application to Subdivide", review by the Planning Department, and Approval by the City Council to Improve (Tract Map Approval), the Developer may begin the review process of facility improvements as described in these specifications. The plan check process is generally described in **PLAN CHECK PROCESS FLOW CHART, APPENDIX B**. All plan checks are subject to review fees as described in above. The City reserves the right to amend, change, or modify these procedures at any time. It is the Developer's responsibility to be aware of revisions to the plan check process and improvement approval procedures.

C. Legal Description and Annexation Status Determination

1 A legal description of the property to be developed and any property through which dedicated facilities will traverse must be filed with the City in the form of a Preliminary Title Report.

2 City staff will review the property location and City files to determine whether the subject property is within the existing City boundary, or whether the property must first be annexed to the City.

3 If the property is not currently within the City Boundary, City staff will determine if the property is within the "sphere of influence" approved by the Local Agency Formation Commission (LAFCO) and whether the property can physically be served by the City. See Appendix A.

4 City staff will inform the Applicant as to whether annexation is required and estimated to be feasible. The Applicant must then pay fees, as required, and follow the procedures necessary to annex to the City.

D. Tentative Map

1 The Developer shall submit with the City, a tentative map ("TM") of the proposed subdivision or parcel map project showing the proposed utility service facilities locations and profiles.

2 At the time of filing, the Developer shall deposit with the City an amount, as identified in the current City of Coachella fee schedule to cover the estimated cost of City TM review, plan checking, and engineering services.

3 The City will review the tentative map and return it to the Developer with any special requirements, (e.g. sewer collection or water distribution systems, park dedication, well site, etc) including annexation if necessary.

4 Tentative Map will be presented to City Council for approval prior to processing of improvement agreements and plans.

E. Easement or Right-Of-Way for Utility Facilities

1 Whenever the plans, as approved, provide for any portion of the utility facilities to be constructed in other than a dedicated public street or road, the Developer shall grant or cause to be granted an easement or right-of-way along with a title report and title insurance insuring clear title in favor of the City. Said easement shall be in the form specified by the City (Appendix C).

2 The grant of easement or right-of-way shall be accomplished through the recording of separate easement documents subject to review and approval by the City Engineer. Recording of necessary easements shall be completed prior to approval/signature of Improvement Plans. Easements shall be exclusive unless otherwise approved by the City Engineer.

3 All costs associated with filing and recording said easements or rights-of way, shall be borne solely by the Developer, unless explicitly stated otherwise in the approved Conditions of Approval.

4 The Grant of Easement shall be on City form, **GRANT OF EASEMENT, APPENDIX C** and shall consist of three parts, grant of easement form, legal description, and plat.

5 The legal description shall be designated as Exhibit "A" and if appropriate shall have the assessor's parcel number indicated on the upper right corner of the exhibits. The legal description shall be prepared by a California Registered Civil Engineer or Land Surveyor and signed and stamped by said engineer or surveyor.

6 The plat shall be designated as Exhibit "B" and shall be prepared on City plat map and signed and stamped. See Appendix C.

7 Easements shall be submitted together with the easement legal description; plat map; title report; and policy of title insurance insuring clear title to the easement area.

8 All CSD or CWA easements shall be exclusive, unless otherwise permitted by the City Engineer. The minimum easement width required is twenty feet, except where authorized by the City Engineer. Access to facilities shall be via a road consisting of 4-inch (minimum) Class 2 aggregate base with a maximum slope of 15 percent. Aggregate base shall be compacted to minimum 95% relative compaction and covered in an asphalt emulsion to bind the aggregate material. Any encroachment into or onto a CSD or CWA easement, requires an encroachment permit. The minimum distance of the centerline of the linear facility from edge of easement shall be 10 feet.

9 Only where approved by the City Engineer, easements may be joint use under the following conditions:

a The minimum separation distances prescribed in these Specifications are maintained.

b The minimum distance of the centerline of the sewer line or waterline from edge of easement or other authorized and permitted encroachment, such as a building roof overhang or other obstruction, shall be 10 feet.

F. Encroachment Permits

1 Encroachment Permit applications shall be submitted in the form of **ENCROACHMENT PERMIT, (APPENDIX D)**. Before any work can be done in the public right-of-way, a valid encroachment permit must be issued by the City of Coachella.

2 Other requirements:

a A California state contractor's license and proof of insurance

b One set of engineered plans must be submitted for checking and approval.

c Upon receipt of the Encroachment Permit and at least 48 hour before work is performed, an inspector must be called prior to backfilling, concrete pours, paving, excavation, etc. The encroachment permit number must be provided when requesting an inspection and the permit must be present at the job site for the inspector. The job site must also have any approved plans, grading permits, etc. for inspection.

G. Developer Security

1 At the-time of the execution of the **SUBDIVISION IMPROVEMENT AGREEMENT**, **APPENDIX E,** the Developer shall file with the City the following security:

a A good and sufficient **FAITHFUL PERFORMANCE BOND, (APPENDIX F)**, in an amount not less than 100% of the estimated cost of the improvements, to secure the faithful performance of the terms and conditions of this Agreement; and

b A good and sufficient **PAYMENT BOND, (APPENDIX G)**, in an amount not less than 100% of the estimated cost of the improvements, to secure the contractor, his subcontractors, and persons renting equipment or furnishing labor or materials to contractor or subcontractors for the improvements.

c Upon approval by the City Engineer, Developers of parcel maps may enter into a Future Improvement Agreement with the City. The manner of security will be at the discretion of the City Engineer, although the posting of bonds is the preferred method to ensure the prompt future construction of the improvements.

H. Final Map

2 Prior to approval of the Improvement Plans, the Final Map, prepared by the Developer's Engineer, shall be submitted to City Council for approval.

3 Final Map will only be submitted if accompanied with Developer Security, specified above, and three (3) original copies of the **SUBDIVISION IMPROVEMENT AGREEMENT**, **APPENDIX E,** fully signed by the Developer.

I. Improvement Plans

1 The Developer shall prepare detailed engineering drawings and other documents necessary for construction of the proposed facilities shown on the tentative map. Developer shall prepare the Improvement Plans (Water, Sewer, Street, Storm Drain, etc), Easements, and Encroachment Permits in accordance with the requirements of these specifications. All documents shall be submitted to the City Public Works Department for approval.

2 The City shall review the construction drawings and will accept, reject, or request revisions for Applicant compliance with City standards and specifications. This iterative process shall be continued until the Improvement Plans and associated documents are approved by the City Engineer. Reference Plan Check Status Sheet in Appendix H.

3 Following approval of the Improvement Plans by the City Engineer, and only after all other submittals are satisfactorily submitted and permits received, the Developer may begin construction in accordance with the **SUBDIVISION IMPROVEMENT AGREEMENT, APPENDIX E**. Developer shall schedule a pre-construction meeting with the City prior to commencement of any physical work on the project.

J. Pre-Construction Meeting

1 Following approval of the Improvement Plans by the City Engineer, and only after all other submittals are satisfactorily submitted and permits received, the Developer may schedule a pre-construction meeting with the City. No physical work on the project may begin until after this meeting is accomplished.

2 Upon completion of the pre-construction meeting, the Developer shall commence construction of the facilities in accordance with the **SUBDIVISION IMPROVEMENT AGREEMENT**, **APPENDIX E** the approved plans, and the City of Coachella Standard Specifications, Standard Drawings and the instructions given at the pre-construction meeting.

K. City Inspection

1 The City will provide inspection for all work to be performed under the Contract at the sole expense of the Developer and Developer shall reimburse City of Coachella for all such costs and expenses prior to final approval and acceptance. All materials installation and work shall be performed in the presence of the Inspector, unless otherwise authorized by the Public Works Director, and all work done in the absence of the Inspector shall be subject to rejection.

2 The inspection of work shall not relieve the Developer of any of their obligations to fulfill their agreement. Defective and/or unacceptable work shall be made good, as required by Public Works Director, and unsuitable and/or unapproved materials may be rejected, notwithstanding that such work and materials have been previously overlooked by the Engineer or Inspector and accepted. If the work, or any part thereof, shall be found unacceptable or defective at any time before the final acceptance of the whole work, the Developer or his Contractor shall forthwith make good such defect in a manner satisfactory to the City Engineer.

3 Upon receipt by the City of the approved plans, and prior to beginning construction of the facilities, the Developer shall schedule a pre-construction meeting with the City Engineer and Inspector.

4 Construction of the facilities shall be subject, at all times, to inspection by the City Engineer and/or Inspector. Developer shall provide safe and unobstructed access to the construction site at all times to facilitate inspection.

5 The Contractor shall request availability of inspection from the City at least forty-eight (48) hours in advance of any work to be done. Inspection will be provided as reasonably available and shall be coordinated with the Inspector. No inspection shall be available on holidays or weekends.

6 All costs for testing, retesting, and reinspection incurred by the City that are necessitated by unacceptable or defective materials and/or workmanship shall be at the sole expense of the Developer and shall be reimbursed to the City prior to final approval and acceptance.

7 Developer shall be responsible for all costs associated with testing improvement facilities including, but not limited to, soil compaction tests, pressure tests, bacteriological tests, mandrel tests, video and jetting sewer mains, and manhole vacuum tests as required by this Specification.

8 The Developer shall retain a City-approved material testing firm to monitor excavation, backfill and compaction efforts throughout construction. The testing firm shall maintain daily inspection records explicitly recording test location, depth, and reference Proctor curve. The amount of compaction testing shall be as necessary to adequately monitor the earthwork and shall satisfy the requirements of the City Inspector and City Engineer. The testing firm shall be responsive to City Inspector and have inspection records readily available for review at all times. At the end of construction, and prior to final acceptance, the testing firm shall submit a final certification of the earthwork on the job. Certification shall be stamped and signed by the project Geotechnical Engineer and shall state that all project earthwork is completed in conformance with the approved plans and the project geotechnical report. Daily inspection records shall be submitted as back-up to the certification.

L. Use of Utilities for Occupancy Prior To City Acceptance

1 The developer may purchase and obtain utility services for occupancy in the project prior to final acceptance of the project by the City, subject to the conditions stated below. Prior to the purchase of sewer capacity or water capacity for each connection, the Developer shall meet the following conditions:

a Sufficient funds will be on deposit in the Developer's City-account to cover anticipated City expenses.

b Per current City Ordinance, sewer system capacity, water system capacity and other appropriate fees and charges will be paid for each connection requested.

2 Prior to connection of any utility service(s), the system shall have been constructed in accordance with City specifications and requirements and received City acceptance.

3 During any period of non-use or use of the utility facility prior to City acceptance, the Developer shall be responsible for maintenance and cleaning, as necessary. Facilities shall meet all requirements of City Standard Specifications at time of Acceptance.

4 Prior to the connection of the last sewer service, the project shall be referred to the Public Works Director for acceptance and the entire length of new sewer shall be tested, then cleaned and free of all construction debris prior to acceptance.

M. Final Approval and Acceptance by the City

1 Upon completion of the facilities, with only minor outstanding construction items remaining, a preliminary walk through inspection and deficiency list of any outstanding items will be prepared by the City. It shall be the responsibility of the Developer to ensure any outstanding items are corrected in a timely manner.

2 Upon completion of construction of the facilities in accordance with City specifications and requirements, a final City inspection, completion of all outstanding deficiency list items, submittal and acceptance of the soils compaction certification, and when all Developer accounts with the City have been made current, the facilities shall be referred to the City Council for final acceptance.

N. One Year Maintenance Period

1 Upon execution of the **UNCONDITIONAL LIEN WAIVER AND RELEASE,** the City shall own, operate, and maintain the facilities.

2 Developer, Owner, and Contractor shall guarantee and require the same written guarantee by Contractor in the Construction contract for the subject facilities, all work and parts thereof against defective materials and workmanship, against settlement of backfill, and damage to surface improvements for a **period of one year from the date of acceptance of the project** by the City. The method of guarantee shall be a **MAINTENANCE BOND, APPENDIX I,** in the amount of ten per cent (10%) of the City's estimated value of the project.

3 When defective material or workmanship is discovered in the work, requiring repairs or replacement to be made under this guarantee, all such repair or replacement work shall be completed by the Developer at his own expense within ten (10) days after written notice has been given to him by the City. Should the Developer fail to complete repair or replacement of the work as directed within ten (10) days, the City may make the necessary repairs or replacement and charge the Developer with the actual cost of all labor and materials required. In emergencies demanding immediate attention, the City shall have the right to repair or replace the defect or damage and charge the Developer with the actual cost of all labor and material required.

4 Any collateral damage, including damage to other City property or other third party property caused by a defect in materials or workmanship during the maintenance period, including City expenses, shall be borne solely by the Developer through reimbursement to the City, or the City use of Developer posted Maintenance Bonds. This section does not otherwise limit the Developer's liability for defects under the law.

DIVISION 2 - DESIGN GUIDELINES

2.01 Grading Design

These grading standards and specifications are generally a statement of policy designed to achieve the objectives of the *General Plan* and the *Coachella, CA Municipal Code*.

Grading plans shall be prepared taking into account surrounding finished and proposed grades, to the greatest extent possible. Designer shall verify all existing grades including existing curb/gutter and streets, and neighboring building pad elevations. A topographic survey shall be performed and shall serve as the basis for design. A Designer site visit may be required.

The Designer shall prepare grading design plans to accommodate surface runoff and storm drain design per the *City of Coachella Standard Specifications and Standard Drawings*. Adequate provisions shall be made to accept and convey the existing tributary drainage flows around or through the site in a manner which will not adversely affect adjacent or downstream properties.

Pad elevations shall be set such that a 1-foot "freeboard" is provided above the proposed finished surface elevation at the right-of-way line in front of the property at the highest curb elevation. Furthermore, the pad elevation must be set above the closest downstream sewer manhole RIM elevation.

Retaining walls shall be avoided as much as possible. Retaining walls may be used only with the approval of the City Engineer. Retaining walls less than 4'-0" may be constructed per Standard Drawing S-28.1 and S-28.2. Retaining walls of elevation greater than 4'-0" shall be designed by a registered California Civil Engineer. Calculations shall be stamped and signed and shall be submitted to the City for review.

All accumulated stormwater runoff must be contained on the developed property. Runoff from a development may not be passed into City streets. See storm drain design section for further requirements.

2.02 Storm Drain Design

These storm drain design standards and specifications are generally a statement of policy designed to achieve the objectives of the *General Plan 2020* and the *Coachella, CA Municipal Code*.

A. Design Criteria

1. Hydrology (Drainage) Report: The Designer shall prepare hydrology reports demonstrating that the grades of proposed surface improvements will conform to the requirements of the City of Coachella Standard Specifications. Hydrology report shall be prepared by a Registered California Civil Engineer and shall be stamped, signed, and submitted to the City for review. The report shall contain a Hydrology Map showing on-site and off-site tributary drainage areas and shall be prepared in accordance with the requirements of the Riverside County Flood Control District. Adequate provisions shall be made to accept and conduct the existing tributary drainage flows around or through the site in a manner that will not adversely affect adjacent or downstream properties. Reports shall conform to design criteria requirements specified herein.

2. Flood Criteria: The City requires that all planned developments be designed such that the runoff from a 10-year storm event will be contained within street curb lines and that runoff from a 100-year storm event shall be contained within street right-of-way limits. A minimum of 1-foot of freeboard shall be provided between the street right-of-way line and any dwelling unit building pad.

3. Computations:

The design of storm drain laterals shall be based upon a minimum rain fall of 3" per hour with a minimum duration of thirty (30) minutes. The rational method is acceptable for computing run off by the formula Q=CIA.

Where Q = quantity of run off - cu ft/sec

Where C = Co-efficient of run off

Where A = Area in sq ft

Where I = Average rainfall intensity expressed in feet/second.

The following minimum value of C will be used.

Developed Residential	C = .60
Developed Commercial	C = .80
Developed Industrial	C = .70

Other formulas for calculating run off will be considered with the written authorization of the City Engineer.

4. Retention Basins: Retention basins shall be designed and sized by a Registered California Civil Engineer and design calculations shall be submitted to the City for review. Retention basins shall be sized to contain the runoff resulting from a 10-year storm event and the runoff from a 100-year storm event shall be contained in the same basin with shallow ponding, not to exceed 18". The retention basin shall be designed with a maximum depth of 3 feet (2.5' water depth with 0.5' freeboard). The maximum side slope of the basin shall be 3:1. The basin shall be designed to evacuate a 10-year storm event within 72 hours. The size of the retention basin (s) shall be determined by the hydrology report and shall be submitted to the City Engineer for approval. The retention basin shall be provided with a minimum of 2'-0" of imported sandy soil if native soil is determined to contain silt or clay materials. Maximum allowable percolation rate for design shall be 10 gallon/sqft/day, unless otherwise approved by the City Engineer. A percolation test and soil borings with sieve analysis for the site is required. A combination drywell-drain field shall be constructed at all points where runoff enters the retention basin. Underground storage chambers must be approved by the City Engineer.

5. Culverts:

Where streets cross natural drainage courses, culverts shall be provided which accommodate the 100-year flood event and which maintain ponding elevation no more than 2 feet below the road centerline profile grade. In dip sections, culverts not less than 18" in diameter shall be provided to accommodate the 10-year storm event.

Where streets cross improved channels, culverts adequate to accommodate the channel design flow shall be provided. Asphalt concrete is not acceptable as a channel liner.

6. Drywells: The maximum percolation rate for the standard drywell (Std. Dwg. SD-4.1) shall be 1" per hour, or half of the engineered percolation test, up to a maximum of 5" per hour. The surface area for percolation may be the outside area of the gravel (6'-6" diameter, typical). The highest runoff from a 100-year frequency storm, regardless of duration shall be utilized when calculating the storage capacity required for the drywell.

7. Pipe Sizes: Pipe sizes for storm drain system shall be as determined from the hydrology report. The minimum permissible storm drain pipe size shall be 12". Pipes shall be designed to flow at 75% full during the 10-year storm event, but may be designed to flow full during the 100-year storm event.

2.03 Street Design

These Street Standards and Specifications are generally a statement of policy designed to achieve the objectives of the *General Plan 2020* and *Coachella, CA Municipal Code*.

These Street Standards and Specifications have been prepared to ensure development of adequate street sections for the existing and projected future traffic on the various classes of streets throughout the City that have been adopted as the "Major Street System" in the General Plan.

These Standards and Specifications are also to serve as a guide to subdividers and developers in preparing standardized street plans and ensuring acceptable uniform design of local streets in conformity with the *2020 General Plan* and *CMC* concepts.

The City's future "Pueblo Viejo" (bounded on the north by the intersection of Harrison St. and Grapefruit Blvd, on the south by Bagdad Avenue, on the west by Harrison St, and on the east by Grapefruit Blvd.) may require special design considerations. Owners in this area shall contact the City Planning Department and the Public Works Department for specific requirements before beginning detailed street design.

The City's "Entertainment District" (bounded on the north by Avenue 44, on the south by Avenue 50, on the west by SR 86S, and on the east by the Coachella Valley Canal) may require special design considerations. Owners in this area shall contact the City Planning Department and the Public Works Department for specific requirements before beginning detailed street design.

A. Design Criteria

1. Flexible Pavement Design: The Structural section to be used on each of the different classes of City Streets shall be as hereinafter specified for the different classes of streets or based upon an engineered section design by the resistance value "R" Value method, designated as test No. 301-F of the State of California Department of Public Works, Division of Highway Design Manual.

   a. In calculating these sections, the following minimum traffic indexes shall be used:

Classification	Right of Way	T.I.
Residential Cul-de-sac	50' or <	5.0
Minor Collector (Residential)	60'	5.5
Major Collector (Secondary)	88'	7.5

Minor Arterial	100’	8.0
Primary Arterial	110’	8.5
Major Arterial	120’ or >	9.0

b. The following structural sections are the minimum acceptable to the City in lieu of an engineered section.

Classification	A.C.	CL2 Base
Residential Cul-de-sac	3”	6”
Minor Collector (Residential)	3”	6”
Major Collector (Secondary)	4”	10”
Minor Arterial	4”	10”
Primary Arterial	4”	12”
Major Arterial	4”	12”

2. Geometric Sections: The sections provided in the Standard Drawings are considered to be the desirable minimum acceptable to the City. Where circumstances and/or conditions warrant greater widths, additional R/W may be required or reserved and protected by building set-back lines.

3. Curve Data: Street and Highway curves are to be designed to safely handle the normal speed of the traffic for the area and type of street involved as specified in the CMC, Section 16-32.070, but shall not be less than the following minimum:

Classification	Min. Radius (Moderate Topo)	Min. Radius (Rough Topo)
Minor Collector (Residential)	230’	100’
Major Collector (Secondary)	600’	300’
Primary	1,000’	750’
Arterial	1,200’	--

Cul-de-Sac shall have a minimum property line radius of 47' and a minimum curb radius of 40 feet.

4. Street Intersections: Street intersections shall be designed in conformance with the general requirements of the CMC, Section 16.32.050. The intersection angle of street centerline shall not be less than 90 degrees unless approved by the City Engineer. Street centerlines should be in alignment and in the cases when that is not feasible, a minimum offset of 200’ shall be provided, with approval of the City Engineer.

5. Street Grade: The minimum permissible street grade is 0.35%. Lesser grades are subject to individual determination by the City Engineer. In either case, the slope or grade of cross gutters at intersections shall not be less than 0.50%.

6. Cross Gutters and Spandrels: Portland Cement concrete cross gutters and curb return spandrels are required in the flow line of all street intersections. For particular details, see City Standard Drawing No S-14.

7. Curb Returns: Portland Cement concrete curb returns are required at all intersections. The normal curb radius for the different classes of streets are as follows:

Class of Street	Curb Radius Length
Local Residential	25'
Commercial	25'
Industrial	25'
Collector	25'
Secondary	35’
Arterial	35'
Major Arterial	35'

8. Curbs and curbs and Gutter:

   a Curbs - Portland Cement Concrete straight face curb may be used on inverted streets and median island. Use in other areas is subject to approval by the City. The normal curb face is 6" for residential streets. For construction details, see City Drawing No S-7 and S-8.

   b Curb and Gutters - Portland Cement Concrete curb and gutter is required on all streets except where curb only is allowed (see typical street sections).

   The normal curb face height is six inches (6") although, eight inch (8") curb faces may be required on major collector and arterial streets.

   Curb and gutters are to be integral cast in accordance with City Standard Drawings and per the Greenbook, Section 303-5.

9. Driveways: Driveways are to be so designed as to provide the best access to the property served with the least number of openings. Driveway openings on Arterial streets are not desirable and frontage roads may be required as directed by the City Engineer.

   Driveway openings shall not exceed 40% of the property frontage, unless specifically approved by the City Engineer. Driveway openings will not be permitted in curb returns and in any case, shall not be less than 30' from the curb line of the intersecting street, measured perpendicular from the curb line extended.

   A minimum length 16' of full height curb shall be maintained between two driveways serving the same property.

   Driveway openings shall be measured along the flat on depressed type, and at the property line for those with a curb radius.

   The normal openings for the various zones are:

Zone	Min. Width	Maximum
Residential	16'	24'
Commercial	24'	36’
Industrial	32'	40’

Driveway openings in excess of those above are subject to individual determination by the City Engineer and only with submittal of calculations demonstrating that the above limits would not provide adequate access thereby limiting the use of the property.

Depressed curb driveways will normally be used to serve residential, commercial and industrial lots. The gutter sections of the industrial and commercial driveways shall be thickened and reinforced, and constructed in accordance with applicable *City Drawing*.

Curb radius type driveway openings are normally used to provide access to shopping centers and other large parking areas and shall be constructed in accordance with City Standard Drawing.

10. Driveway Approaches: Portland cement concrete driveway approaches are required at all depressed curb driveways and shall extend to inside edge of the sidewalk.

For all residential driveways, the maximum approach width at the property line shall be as defined above. If additional width is needed at the garage, the driveways shall be made to transition from the specified width at the right-of-way, widening nearer the garage.

Color or decorative driveways shall be approved by the City of Coachella, Planning Department. All driveways, whether colored or not, require a covenant for placement in public right-of-way. All approaches shall have a consistent uniform rough-broomed finish surface. No other finishes will be allowed.

11. Sidewalks: Portland Cement concrete sidewalks are required along all street frontages. The normal sidewalk thickness is 4" except as specified at driveway openings.

The minimum acceptable widths of sidewalks are as follows:

Zone	Width	Location
Residential	5'	Adj. to curb
Retail Commercial	Full width of parkway	Adj. to curb
Industrial	6'	Adj. to curb

Variations of these standards to allow for landscaping is subject to the approval of the landscape plan by the City of Coachella Planning Department. Reference Standard Drawings for separated curb, as approved by the City.

12. Utility Location: Where possible, utilities located between curb lines shall be in the parking lanes out of the travel way. If feasible, telephone, power, gas, and TV Cable will utilize a common ditch. Underground utilities located in the public right-of-way will generally be located as follows:

Facility	Location
Water	7' off face of curb, North or East of centerline
Gas	North & West side or Parkway w/ Gas Co. approval
Sewer	5' South or West of centerline
Telephone	Parkway
T.V. Cable	Parkway
Street Lights	Parkway
Electricity	Parkway

13. Monuments: Standard Monuments shall be set at all street centerline intersections, tangent points of centerline curve if possible, or at the BC and EC of curves. For standard monument details, see City Standard Drawings.

14. Street Name Signs: Double faced pole top mounted street name signs shall be installed at all intersections.

    The sign shall bear the street name as approved and the block number, and be installed in accordance with City Standard Drawing.

15. Street Lights: Street lighting is required along all street frontage and shall be installed in accordance with *Standard Drawings L-1 & L-2*.

16. Landscaping: Landscaping may be allowed in the parkway area not required for sidewalk upon approval of the plan by the City Planning Department and issuance of a permit. All landscape planters shall have a permanent irrigation system and all planters or landscape areas in the parkway between the sidewalk and property line shall be protected by a concrete curb extending 6" above the level of the sidewalk. Reference the *Coachella Landscape Plan* for full requirements.

17. Irrigation System: Permanent irrigation systems will be allowed in the parkways upon approval of the system by the Department of Public Works and issuance of an encroachment permit. The system shall be equipped with an approved reduced pressure backflow device mounted 12" above ground level at the highest head of the onsite system. Irrigation System shall conform to requirements of the *Coachella Landscape Plan*.

18. Ornamental Lighting: Ornamental lighting will be allowed in the parkway landscape area or on street trees upon approval of the plan by the Department of Public Works and issuance of an encroachment permit.

    All material and workmanship shall be in accordance with the latest edition of the *National Electrical Code*, and the *Uniform Wiring Code* and the *State Electrical Safety Orders* and the *City of Coachella Standard Specifications*.

    Junction and pull boxes shall be concrete with bolt on covers marked "HIGH VOLTAGE". All underground wiring is to be encased in PVC conduit with a minimum of 18" cover. Risers from PVC conduit to fixtures over 12" above ground level shall be of standard rigid galvanized conduit.

All light fixtures and utility boxes shall be water proof and located a minimum of 12" above the ground.

Conduits running up tree trunks shall be rigid metal tubing beginning at 12" above ground shall be equipped with weather proof fittings. The conduit shall be securely anchored to the tree at a minimum of four (4) foot intervals.

All conductors shall be copper. No splices will be permitted in underground runs between fixtures or junction boxes. All lights are to be weather sealed, directional flood type. Fixtures mounted below seven (7) feet in height shall be equipped with glare shields, directed away from traveled ways and with a wire guard that cannot be removed without tools. Any light mounted lower than seven (7) feet above ground shall not protrude more than twelve (12) inches from the tree.

The use of red, green, amber or any form of flashing lights in the vicinity of traffic signs or signals prohibited.

All control panels and necessary safety devices shall be located on the applicant's property. They shall be water tight, UL approved and equipped with a locking device and circuit breakers or fuses of a size required to protect the system.

2.04 Water System Facility Design

Water systems for inclusion into the City 's service area shall be designed and constructed in accordance with the City of Coachella's *Standard Specifications and Procedures* and *Standard Drawings*, latest revisions.

This section provides a description of the planning requirements for water system improvements within the Coachella Water Authority (CWA), which is located generally in the City of Coachella.

Reference is made to the *2006 CITY OF COACHELLA Water System Master Plan Update*, and the *2005 CITY OF COACHELLA Urban Water Management Plan*, which outline the District's requirements for water production, treatment, and distribution for existing and planned developments.

CWA is located in the City of Coachella and bordered by the City of Indio to the northwest and La Quinta to the west. These cities govern land use and public right-of-way encroachment requirements for their respective areas of jurisdiction.

The Authority’s "Sphere of Influence" for water service is larger than the current Authority’s boundary and includes additional service areas that are conceptually approved for annexation to the City by the Riverside Local Area Formation Commission (LAFCO).

An applicant for water service must first verify that the proposed service area is currently part of the City. If the parcels requesting water service are not already part of the City, then these parcels must be within the LAFCO Sphere of Influence and must be annexed in accordance with the procedures discussed in Division 1 of these specifications.

On tracts with residential units exceeding 100, the Developer will be required to provide, at a minimum, a 100 foot square fully developed well site (graded site, block wall, etc.). Drilling and development of the well may be required as determined by the City.

A. Hydraulic Network Analysis Criteria:

The City reserves the right to determine the criteria for each water system or subsystem based upon conditions that may exist for that particular location, anticipated level of development, planned use, or other criteria. In general, however, the water system shall be sized to handle the highest demand within the general area of the tract and shall conform to the following minimum standards:

1 Pipeline Sizing: Acceptable pipe diameters: 8", 10", 12", 14", 16", 20", 24", 30", 36", 42", 48". Minimum size for all waterlines shall be 8", except for commercial or industrial developments, in which the minimum size shall be 12". Exceptions will only be allowed with written approval of the City Engineer, but shall in no case conflict with Section 64628 or Title 22 of the California Administrative Code.

2 Pipeline Friction Factors for Approved Materials: Pipeline friction factors shall be as follows:

Pipe Material	Hazen-Williams Coefficient
Cement Mortar Lined Steel Pipe	C=130
Cement Mortar Lined Ductile Iron Pipe	C=130
Polyvinyl Chloride Pipe (PVC) 900	C=130

3 Water System Demands: Average day unit demands shall be determined utilizing the Average Day Demands (ADD) defined below:

Land Use	Average Day Demand
Specific Plan	TBD*
Residential	685 GPD/DU
High Density Residential (Apartments, Condos)	550 GPD/Unit
Non-Residential	2,500 GPD/AC*
Park/Golf Course/Resort Commercial	2,500 GPD/AC*
Open Space	2,500 GPD/AC*

*Non-residential demands unless approved otherwise by City Engineer

4 Peaking Factors: The peaking factors to be used, are as follows:

a Maximum Day Demand: For all zones, the Maximum Day Demand shall equal 1.70 times the Average Day Demand.

b Peak Hour Demand: For all zones, the Peak Hour Demand shall equal 2.8 times the Average Day Demand.

c Fire Flow: The fire flow requirements shall be in accordance with the applicable standards of the Insurance Services Office (ISO) and shall be those required by Riverside County Fire Department, or California Division of Forestry, as applicable for the type of development under consideration.

5 System Analysis: The proposed water system shall be analyzed for the following conditions:

a Static Pressure

The maximum static pressure at any location in the water system shall be 150 psi. The minimum static pressure shall be 60 psi, unless approved otherwise by the City Engineer.

b *Peak Hour Demand Flow*

For the Peak Hour Demand flow condition, the minimum pressure at any location within the system shall be 50 psi. A minimum pressure of 40 psi may be allowed if static pressure is less than 60 psi, with approval of the City Engineer. The maximum velocity in the pipeline shall be 7 feet per second.

c *Maximum Day Demand plus Fire Flow*

For the Maximum Day Demand plus fire flow, the pressure at any location in the system shall be a minimum of 20 psi at the flowrate identified above. The maximum velocity in the pipeline shall be 10 feet per second. Fire flow should be taken from the hydrant furthest from the connection(s) to the City 's distribution system, at the highest system elevation, and as directed by City .

B. Design Criteria

1 Pipeline Location: Unless otherwise approved by the City , all waterlines shall be located on the north or west side of the street, 7 feet off of curb face.

2 Minimum Design Pressure: Minimum design pressure shall be 1.25 times the static pressure with the total rounded up to the nearest 25 psi. Design pressure shall be shown on the waterline construction drawing profile.

3 Horizontal and Vertical Alignments: Pipelines shall be laid to maintain a minimum cover as much as practicable. Curved alignments (horizontal) may be used with the permission of the City Engineer. Pipe joint deflection shall not be more than manufacturer's recommended offset in a curved alignment. Joint deflection angles shall be indicated on all horizontal curves.

4 Pipeline Separation: Waterline installation near sewer lines shall be in accordance with State Department of Health Services, Criteria for the Separation of Watermains and Sanitary Sewers. In general, waterlines should cross perpendicular to sewer lines a minimum of 1 foot above the sewer. If a waterline crosses beneath a sewer or stormdrain then it should have a minimum separation of 1 foot, and be encased in concrete, or installed in steel or HDPE pipe casing, with no joints within 10 feet of each side of the sewer or stormdrain and shall be constructed of materials per aforementioned criteria. Waterlines parallel to sewer lines shall be located with a minimum of 10 feet clear space from the sewer line.

When crossing other utilities, provide a minimum of one foot vertical clearance.

5 Pipe Depth: The minimum cover over the top of pipe shall be 36-inches from finished road grade, and shall provide adequate depth so that gate valve stems and operating nuts have 12-inch clearance to finished road grade. When minimum cover cannot be provided, concrete encasement or protective slab construction over the pipeline may be provided, with approval of the City Engineer. Maximum pipe cover shall be 8-feet with approval of the City Engineer.

6 Pipe Materials: Unless otherwise authorized by City , all waterlines larger than 12 inches diameter shall be Ductile Iron Pipe (DIP) with Cement Mortar Lining (CML, AWWA C105) in accordance with City standards. All waterlines 12 inches and smaller shall be Polyvinyl Chloride Pipe (PVC C900 CL150 min.) in accordance with City standards unless conditions dictate the use of Ductile Iron pipe.

7 Pipe Slope: Minimum slope of waterlines shall be 0.5% unless otherwise authorized by City Engineer.

8 Valves: Buried valves 12 inches and smaller shall be resilient seated gate valves per **APPROVED MATERIAL LIST, APPENDIX J**. Buried valves 16 inches and larger shall be Butterfly valves per **APPROVED MATERIAL LIST, APPENDIX J**. Valves 24 inches and larger shall have a bypass valve installed around the mainline valve. In locations where the the static pressure exceeds 150 psi, plug valves with suitable pressure rating shall be provided. Valves shall be the same size as nominal pipeline diameter.

In general, three valves shall be installed on each tee and four valves shall be installed on each cross. However, the City maintains the right to add or subtract valves to facilitate efficient system operation. Valves shall be spaced with the following maximum spacing, or as directed by City Engineer.

Type of Pipeline	Max Spacing
Transmission Mains	1,000 feet
Residential Zones	750 feet
Non-Residential Zones	500 feet

Where possible, valves shall be arranged so that no more than two fire hydrants will be shut-off at one time when a waterline is shut down for repairs.

9 Fire Hydrants: Fire hydrants shall be in accordance with *City Standard Drawings*, constructed at right angles to the waterline.

Fire hydrants shall be located per the requirements of the Riverside County Fire Department as stated in the "Conditions of Approval" but no greater than 1,000 foot intervals.

Fire hydrants materials shall conform to those identified on the **APPROVED MATERIAL LIST, APPENDIX J.**

10 Air Valves: Air valves shall be combination air vacuum and air release valves in accordance with the City's *Standard Drawings*, constructed at right angles to the waterline.

Air valves shall be located at all high points of pipeline and downgrade of isolation valves. Minimum size of air valves shall be 1" and shall be sized per manufacturer's recommendation.

Air valve materials shall conform to those identified on the **APPROVED MATERIAL LIST, APPENDIX J.**

11 Blowoffs: Blowoffs shall be in accordance with City's *Standard Drawings*, constructed at right angles to the waterline. Where practical, fire hydrants shall be used in place of blowoffs.

Blowoffs shall be located at all low points of the pipeline at all dead-ends or termination points, and upgrade of isolation valves. Minimum size of blowoffs shall be 4", or larger as required by Hydraulic Analysis.

Blowoff materials shall conform to those identified on the **APPROVED MATERIAL LIST, APPENDIX J.**

12 Water Services: Water services shall be in accordance with City's *Standard Drawings*, constructed at right angles to the watermain. Service laterals can not be placed directly on a main over 12" in diameter except in special situations, explicitly approved by the City Engineer. Water services shall be sized per the following table:

Separate water service is required for each building:

a Residential – 1-inch service w/ 3/4 –inch meter, minimum.
b Commercial - 2-inch unless otherwise approved.
c Industrial - 2-inch.

Water services and sewer mains or laterals shall be located a minimum of 10 ft. horizontal clearance from each other.

No service laterals shall be installed on laterals for fire hydrants, blowoffs, or air valves, nor shall they be installed on pipeline dead ends.

All non-residential water services shall have a City approved backflow prevention device installed adjacent to meter unless otherwise directed by the City Engineer.

Water service materials shall conform to those identified on the **APPROVED MATERIAL LIST, APPENDIX J.**

13 Hot Taps: Hot taps to an existing waterline are allowed for water services, fire hydrants, air release valves and blow offs. All hot taps shall be done only with the approval of the City Engineer, and performed in the presence of the Inspector.

Prior to Construction, the Contractor shall pothole the exisitng pipe at the location of the proposed connection to verify pipe material, pipe size, and pipe depth. The new pipe construction shall be successfully pressure tested, disinfected, and have passed the bacteriological testing in accordance with these Specifications prior to connection to the existing pipeline. All tapping valves, saddles, and fittings shall be disinfected prior to use. The City Engineer or Inspector may postpone or reschedule any shutdown operation if, for any reason, there is concern that the Contractor is not properly prepared, with competent personnel, equipment, or materials to proceed with the connection.

14 Control Valves, Pressure Relief Valves, and Other Special Valves: Control valves, pressure relief valves, and other special valves shall be selected and located per the Design Engineer's Hydraulic Analysis or as directed by City Engineer.

15 Easement Criteria: Pipelines not located within public right-of-way must be located in easements granted to the City on the City's form, **GRANT OF EASEMENT, APPENDIX C**. Easements for waterlines shall be a minimum of 20 feet in width unless

otherwise approved by the City Engineer. Easements for other utilities may overlap City easement only if proper separations are maintained.

16 Well Sites: Developers shall grant to the City, adequate property for development and construction of a potable water well when required by conditions of subdivision approval. Generally, the site shall be minimum 10,000 sqft (100'x100' square) surrounded by a minimum 6' high CMU block wall and enclosed with double swing vehicle access gate and single swing pedestrian access gate.. Typical well site plans and facility plans are available for review at the Public Works Department. Sites of alternate dimensions will be considered by the City Engineer, provided the following criteria are satisfactorily provided:

a Minimum 20' driveway onto site with minimum 40' frontage to public R/W access.

b Minimum 15' clear space around all sides of site facilities.

c Adequate driveway on-site for vehicle turn-around, typically 900 sqft.

d Minimum 10,000 gallon on-site retention pond for well blow-off with dry-well as approved by the City Engineer.

e Acceptable space on-site for typical well house and mechanical piping, electrical gear including transformer, switchgear, transfer switch, and stand-by generator yard.

2.05 Sewer System Facility Design

This section provides a description of the planning requirements for sewer improvements within the Coachella Sanitation District (CSD), which is located generally in the City of Coachella.

Reference shall be made to the *2000 CITY OF COACHELLA Wastewater Collection System Master Plan*, which outlines the District's requirements for wastewater conveyance, treatment and disposal for planned development.

The CSD is located in the City of Coachella and bordered by the City of Indio to the northwest and La Quinta to the west. These cities govern land use and public right-of-way encroachment requirements for their respective areas of jurisdiction.

The District's "Sphere of Influence" for sewer service is larger than the current District boundary and includes additional service areas that are conceptually approved for annexation to CSD by the Riverside Local Area Formation Commission (LAFCO).

An applicant for sewer service must first verify that the proposed service area is currently part of the District. If the parcels requesting sewer service are not already part of the District, then these parcels must be within the LAFCO Sphere of Influence and must be annexed in accordance with the procedures discussed in Division 1 of these specifications.

A. Hydraulic System Analysis Criteria

The Design Engineer shall submit preliminary design calculations showing sewer line alignments, locations and elevations of tie-ins to existing system and pipe design calculations including pipe

size, slope, depth, and capacity. Calculations will be reviewed by City Engineer in conjunction with submittal of improvement plans.

1 Pipeline Sizing Requirements: In general, gravity sewer pipelines shall be sized to achieve the minimum required velocity using open channel flow formulas at peak flow conditions. The minimum velocity at peak flow shall be 2 ft/sec and the maximum velocity at peak flow shall be 10 ft/sec. Minimum size for sewer lines shall be eight (8) in diameter, unless approved by City Engineer. Service laterals shall be a minimum of four (4) inches in diameter. Minimum six (6) inch diameter laterals are required for commercial/industrial developments.

2 Pipeline Friction Factors: A Manning's coefficient of roughness of 0.013 shall be used for all pipeline conditions unless otherwise approved by the City Engineer.

3 Flow Estimate for Future Development: Sewer flows shall be calculated using appropriate industry standard techniques. The flow estimates must account for proposed upstream development using land use projections prescribed by the City of Coachella Planning Department and outlined in the *2000 Master Plan*.

4 Land Use: Ultimate land use projections shall be used for estimating wastewater flows from developments. The ultimate land use designations and population densities shall be based on the *2000 City of Coachella Wastewater Collection System Master Plan,* or most recent update.

5 Flow Estimates: Flow estimates shall be determined as the product of the number of equivalent dwelling units (EDU's) and a unit flow factor. Flow factors for average and peak flows are presented in the following paragraphs.

a Average Flow: A flow factor of 300gpd/EDU shall be used to calculate average sewage flows.

b Flow Factors: When estimating number of EDUs for a given development, use the following factors for a given land use:

Land Use Category	EDU Factor
Single Family Residential	1.0
Recreational Vehicles/Motel Rooms	0.5
RV park w/o hook-ups (per space)	0.167
"Rally Field" w/ pump stations(per acre)	0.5
Dump Stations for RV's and Buses (per station)	15.0
Professional Building (Tenant)	1.0
Admin. offices-city, county, state (per 5 employees)	1.0
Hospital (per 2 beds)	1.0
Animal Hospital/Clinic/Kennel	3.0
Churches and Library	1.0
with kitchen	2.0
Theatres (per 100 seats)	1.0
Schools	
Pre-school, K-5 (per 23 students)	1.0
Junior High or High School (per 14 pupils)	1.0
Laundry/Laundromat (per washer)	0.75

Restaurant/Taverns (per unit of 7 seats or fraction thereof	3.0
Restaurant and Tavern or Drive-Thru (no food service seats)	4.0
Service Station (up to 4 pumps)	2.0
Adder for each Wash Rack, pit, or floor drain	3.0
Car Wash	*
Commercial Users	
Barbershop/Beauty Shop (1 ea. 2 sinks)	1.0
Retail Stores (per 2000 SF or fraction of)	1.0
Warehousing (per restroom)	1.0
Food Markets (per 2000 SF or fraction of)	1.0

*to be determined by engineering calculation and approved by City Engineer

6 Peaking Factor: Sewer pipelines must be designed and sized using peak flow conditions determined by multiplying average flows by a peaking factor. The peaking factor has been determined to be 2.5 for the Coachella Sanitary District collection system.

7 System Analysis: Sewers less than 12 inches in diameter shall be designed to flow ½ full at peak flow at ultimate build-out of the District. Sewers 12 inches in diameter or more shall be designed to flow ¾ full at peak flow at ultimate build-out of the District.

Manning's formula for open channel flow shall be used for hydraulic calculations:

$$\mathbf{Q = (1.486/n)*A*(R^{2/3})*(S^{1/2})} \quad \text{and} \quad \mathbf{Q = AV}$$

V = Velocity in feet per second
n = Manning coefficient of roughness = 0.013
R = Hydraulic radius in feet = Area/Wetted Perimeter at specified depth of flow
S = Slope in feet per foot
Q = Flow in cubic feet per second
A = Cross sectional open area of the pipe in square feet

B. Design Criteria

1 Pipeline Location: Unless otherwise approved by the City, all sewer lines shall be located on the south or east side of the street, 5 feet off of the centerline. Sewer lines shall be located on the centerline of easements. If sewers cannot be located five (5) feet off of centerline due to an obstruction like a median, than the sewer shall be located between the vehicle tracks in the street.

2 Horizontal and Vertical Alignments: Sewers shall be placed on straight lines between structures wherever possible. Curved alignments will be allowed only with approval of the City Engineer and only if they meet the requirements described below.

3 Change in Direction. The maximum change in direction allowed along any sewer main is 90° for pipelines 15 inches in diameter and less, and 45° for pipelines 18 inches and greater

4 Pipeline Separation: The minimum horizontal separation between sewer and water pipelines shall be 10 feet as required by the State of California, Department of Health

Services. Special sewer construction requirements are required for conditions where 10 feet of separation cannot be achieved.

The minimum horizontal separation between sewer and all other utilities is five-feet, unless otherwise approved by the City Engineer. Sewer laterals shall be placed a minimum of five-feet apart along the main, and 5 feet from the nearest manhole. Sewer laterals shall be placed a minimum of 10 feet from water laterals. No sewer laterals will be allowed to connect directly to a manhole without written approval of City Engineer.

A minimum vertical separation of one-foot shall be provided and the sewer shall cross under water and reclaimed water pipelines, unless approval from the State Health Department is provided to the District in writing for the specific crossing.

Sewers shall cross other utilities at a perpendicular angle, unless otherwise approved. In any case, utilities crossing at a skew angle of 75° or less shall be avoided. The minimum vertical distance between sewers and other utilities shall be one (1) foot. Special design is required for sewer laterals or gravity mains over water lines. Force mains are not permitted over water lines.

5 Pipe Depth: The minimum sewer pipeline cover in streets, measured vertically from the top of pipe to the finished grade, shall be five (5) feet. In public street parkways the minimum sewer pipeline cover shall be six (6) feet. Greater depths may be required where it is necessary to extend sewers to serve other areas, or to achieve a 48-inch depth of the laterals at the curb. In off-street areas, a minimum cover of four (4) feet may be considered for approval by the City Engineer provided sufficient erosion protection and depth for sewer extension to unsewered areas are satisfied. The maximum depth of sewer shall be 20 feet of cover over the top of pipe, unless approved in writing by the City Engineer. The maximum depth of sewer is based on sewer cleaning access requirements. Request for approval for deeper sewers shall include a sewer alignment and profile study showing that no other way of providing a sewer less than 20 feet of cover is possible.

6 Pipe Materials: The District prefers the use of polyvinyl chloride (PVC) pipe in most instances. Acceptable gravity sewer pipeline materials include PVC, High Density Poly Ethylene (HDPE). Materials and construction methods shall be in accordance with the CSD Sewer Standards and the Standard Specifications for Public Works Construction (Green Book), latest editions respectfully.

7 Pipe Slopes: The pipeline slopes shall be established such that peak flow periods produce a minimum allowable velocity of 2 ft/sec and a maximum velocity of 10 ft/sec for peak flows. In all cases, the minimum slopes for sewer lines shall be as follows:

Pipe Diameter (Inches)	Minimum Slope (ft per ft)
8	0.0033
10	0.0024
12	0.0019
15	0.0014
≥ 18	0.0014

If the minimum velocity cannot be achieved because of small flows, then pipelines shall be designed with steeper slopes, as approved by the City Engineer. For instance,

pipelines serving less than 10 EDU's, primarily in cul-de-sacs, shall be designed using a minimum slope of two (2) percent. Submit specific designs for review and approval of the City Engineer.

If the estimated velocity exceeds 10 ft/sec, special design (concrete encasement and AWWA C900 or C905 PVC pipe installation) requirements shall apply, as directed by the City Engineer.

Pipeline slopes shall be as uniformly continuous as practical.

8 Vertical Curves: Vertical curves shall be avoided as much as possible and will only be allowed with approval of the City Engineer. Reverse curves are not permitted under any circumstances. If vertical curves cannot be avoided, special design calculations should be provided to the City Engineer for review and approval.

9 Horizontal Curves. Horizontal curves shall be avoided whenever practicable. Horizontal and vertical curves are not permitted in the same length of pipe. The minimum radius of any horizontal curve is 1.5 times the manufacturer's recommendations. Joint deflection in PVC pipe is not allowed. The maximum length of any curve is 300 feet. Horizontal curve requirements for rigid (VCP) and flexible (PVC) pipe are given below.

a Curvature in Rigid Pipes - Restrained joints provide no deflection. Flexible joints (gasketed) allow joint deflection.

(1) Curvature in clay pipe (VCP) shall conform to the following:

	MINIMUM RADIUS OF CURVATURE, R (feet)
Nominal Pipe Diameter (inches)	Pipe Length 6' or less
6 to12	200
15 to 24	300
27 to 36	400
39 to 42	500

(2) Curvature in AWWA C900 and AWWA C905 PVC "Water" Pipe and Ductile Iron Pipe used as forcemain shall be accommodated solely through joint deflection with axial bending not allowed. Allowable joint deflection shall be one-half of the deflection allowed by the pipe manufacturer's catalog literature. Such literature shall be submitted to the City Engineer for review and approval.

b Curvature in SDR 21 or 26 PVC Sewer Pipe - Longitudinal bending (up to 15-inch diameter pipe) of PVC pipe with gasketed joints is allowed through axial flexure of the pipe. Mechanical means shall not be allowed to accomplish these radii. The curvature shall be accomplished in the trench by the workers. The curve shall be accomplished by bending of the pipe without deflecting the joints. Overbelling of joints is not allowed. Minimum radii shall be as follows

ALLOWABLE MINIMUM RADIUS OF CURVATURE FOR SEWER PIPE (by longitudinal bending)	
Pipe Size (inches)	Radius (feet)
4 to 8	200
10	250
12	300
15	350

c Pipe Bedding and Pipe Zone Requirements: Normal practice is to install sewer pipe on native soil. The following requirements apply to sewer installations:

(1) Excavation. Excavate pipe trench to subgrade only. Overexcavation shall be avoided unless recommended by the geotechnical engineer. Over-excavations shall be bridged with imported crushed rock, ½-inch gradation, Greenbook Section 200-1.2.

(2) Imported Pipe Zone Requirement. For sewer pipes 15" and larger or smaller pipes installed with greater than 10' of cover, provide a crushed rock bedding and pipe zone in accordance with Green Book Section 306-1.2.13. Maximum ½-inch gradation Greenbook Section 200-1.2 crushed rock shall be used in the bedding zone for pipe up to and including 15-inch diameter and ¾-inch rock shall be used for piping larger than 15-inch. The Design Engineer shall submit a special design with trench load and pipe deflection calculations for all pipes with greater than 20 feet of cover.

(3) Pipe Zone Wrap Requirement. For PVC pipe in areas of high ground water, or suspected high ground water, provide crushed rock bedding, per above specifications, encased in an approved geotextile fabric. The Design Engineer or project geotechnical engineer shall submit a recommended geotextile suitable for the in-situ soil conditions for approval by the City Engineer.

(4) Pipe Zone Water Stops. In order to inhibit longitudinal flow of groundwater in the crushed rock pipe zone in areas of high ground water, or suspected high ground water, 1-foot long lean concrete cutoffs shall be installed in the pipe zone and shall extend at least one foot into undisturbed soil on both sides of the trench. The concrete cutoffs shall be the full height of crushed rock subgrade and pipe zone material, and shall be spaced not more than 150'.

(5) For PVC in dry or wet clay soils between 13-feet and 20-feet of cover, utilize concrete encasement in the pipe zone per City Standard Drawing.

10 Manholes: All manholes shall be constructed in accordance with City of Coachella Standard Drawings D-2 and D-3 and per Specifications herein.

a Manhole Size: Manholes shall be four (4) feet in diameter for pipelines 15 inches and less; five (5) foot diameter manhole shall be used when pipe diameter exceeds 15 inches or when depth exceeds 12 feet. Scaled detail plans shall be provided for all manholes with multiple angled inlets and outlet with adequate clearance provided between manhole base penetrations to assure clearance and water tightness

b Manhole Spacing: The maximum allowable spacing between manholes is 300 feet for all pipelines. Manholes shall be placed at the following locations:

(1) Changes in direction

(2) Changes in grade

(3) Changes in pipe size or material

(4) At intersection of mains

(5) At the beginning and end of vertical curves (if allowed) of 200 feet or longer.

(6) As directed by City Engineer

c Change in Grade: Where the change in grade of the incoming and outgoing pipelines is greater than 10%, or the potential for a hydraulic jump in the manhole exists, the grade change shall be made in a smooth vertical curve with a manhole 25 feet downstream from where the sewer levels out to a lesser grade.

d Manholes Prohibited: Manholes shall not be located in the following locations:

(1) Inaccessible areas.

(2) Gutters and other depressions or areas subject to inundation.

(3) In sidewalks or crosswalks.

(4) In freeway ramps.

(5) Between railroad tracks.

(6) Other locations determined by the City Engineer

e Invert Across Manhole: A minimum drop of 0.05 feet shall be used on a straight-through line for pipelines and any incoming pipelines that the incident angle is less than 45 degrees. For incoming pipelines which the angle is 45 to 90 degrees, the drop through the manhole shall be 0.10 feet. For drops through manholes where there is a pipeline size increase, drop shall be designed to maintain constant design working water surface through the manhole, as shown in the following table.

Invert Change Across Manhole

Upstream Pipe Diameter (in) \ Downstream Pipe Diameter (in.)	8	10	12	15	18	24	30	36	42	48	54
6	0.08	0.17	0.25	0.38	0.88	1.25	1.63	2	2.38	2.75	3.13
8		0.08	0.17	0.29	0.79	1.17	1.54	1.92	2.29	2.67	3.04
10			0.08	0.21	0.71	1.08	1.46	1.83	2.21	2.58	2.96
12				0.13	0.63	1	1.38	1.75	2.13	2.5	2.88
15					0.5	0.88	1.25	1.63	2	2.38	2.75
18						0.38	0.75	1.13	1.5	1.88	2.25
24							0.38	0.75	1.13	1.5	1.88
30								0.38	0.75	1.13	1.5
36									0.38	0.75	1.13
42										0.38	0.75
48											0.38

f Drop Manholes: Drop manholes may only be used with approval of the City Engineer. Drop manholes may be allowed when two collection lines have a vertical difference of 4-feet or more and are connected at a manhole. Construction shall conform to City *Standard Drawings.*.

g Manhole Lining: City-approved, Integrally Locking PVC lining (T-Lock) or Polyurethane Protective Lining System per Section 500-2 of the *Greenbook* shall be provided for all manholes meeting the following conditions:

(1) all new manholes on sewers 15-inches or greater diameter,

(2) all new manholes where entering pipe slope is 5% or greater,

(3) all existing manholes with new connections,

(4) all manholes within 1,000 feet of receiving a force main discharge.

11 Mainline Cleanouts: Mainline cleanouts can be used at the upstream end of a line that will not be extended in the future. The maximum distance between a cleanout and manhole is 175 feet. Cleanouts shall be in accordance with City *Standard Drawing***.** For cleanouts that terminate in streets where minimum cover is not met, the cleanout will have to be concrete encased.

12 Sewer Laterals: Each lot shall be served by at least one service lateral that extends from the main to the back of the public utility easement (PUE) or property line parallel to the street. Laterals shall not be placed in driveways or within ten (10) feet of the property line between lots. Individual sewer customers shall be served by individual laterals and multi-customer laterals are not allowed

a Lateral Location: Laterals shall be placed perpendicular to the sewer main and no laterals shall be connected to manholes. If necessary, laterals may enter the main up to 45 degrees from perpendicular on the upstream side of the main, per City *Standard Drawing*. Laterals shall be spaced a minimum of five (5) feet from all other utilities or structures, including adjacent sewer laterals, manholes, and a minimum of ten (10) feet from water service laterals.

b Lateral Alignment: Bends are not allowed in laterals without the approval of the City Engineer. When bends are approved, they shall be provided with cleanouts at each approved bend.

c Lateral Size: The minimum size of service laterals is 4-inches for residential properties and 6-inches for commercial properties or single owner multi-unit properties. Residential 4-inch laterals shall be placed at a minimum slope of two (2) percent (¼" per foot). A one (1) percent slope (1/8" per foot) is acceptable for 6-inch laterals.

d Lateral Connection to Main:

(1) New lateral connections to new PVC mains shall be made only with standard prefabricated wyes glued to mains.

(2) New lateral connections to existing PVC mains shall only be made with gasketed 45 degree sewer saddles with stainless steel straps. The saddles shall be used to make a guide mark. The pipe shall be cut clean with the diameter of the hole not exceeding the outside diameter of the saddle stem by more than 1/4-inch. The cut hole shall be beveled as necessary. The saddle shall be properly positioned such that there is full contact of the rubber gasket. A combination of two 45 degree elbows shall be installed directly after the wye or saddle to allow the lateral to be laid square to the main without overstressing the fittings. Lateral connection to be encased in concrete after City-acceptance.

(3) For new lateral connections to existing VCP pipe only, core drill cut-ins are required and shall be encased with 4-inches of Class 470-C-2000 concrete.

13 Main Connections to Existing Sewers: Where a proposed sewer connects to an existing manhole, the elevation of the inlets and outlets of the existing manhole shall be determined by actual survey and shown on the sewer profile as part of the improvement plan design and approval process. If the proposed sewer connection requires a new

manhole on the existing main between existing manholes, the approximate elevation of the proposed manhole shall be determined by actual survey of the existing upstream and downstream manholes design and shall thereafter be field verified by potholing and survey prior to construction of the new upstream sewer. For connections of new pipe to existing manholes, the existing manhole shall be core drilled. No jacking of existing manholes will be allowed.

14 Pump Stations: Wastewater pump stations shall be avoided whenever possible. Specific written agreement from the City Engineer for the use of a pump station is required prior to approval of tentative map, grading, or improvement plans.

Prior to the start of design of any pump station, meetings with City Engineer and District operations staff shall be held to discuss the District's design criteria prior to the submittal of preliminary drawings or specifications. The City Engineer shall determine, at his sole discretion, design criteria, facility components, and ancillary pump station components. The Designer shall prepare a preliminary design report outlining all facility design components and the PDR shall receive favorable review by the City prior to commencement of design.

During construction, inspections or operational checks for compliance with all requirements will be coordinated with the District staff at one (1) month intervals until completion and twelve (12) month intervals thereafter for warranty of facilities.

15 Grease Interceptors: Grease interceptors shall be installed for any commercial building that contains cooking facilities, services automobiles, or generates grease or oil.

Grease interceptors shall be in accordance with the requirements of Section 1014.0 of the Uniform Plumbing Code (UPC), latest edition. Grease interceptors should be sized per Appendix H of the UPC. Minimum size shall be 1,500 gallons, unless otherwise approved by the City Engineer.

16 Polk Street Interceptor: The Polk Street Trunk sewer, 42" and 54" diameter between Avenue 52 and the headworks at the Avenue 54 Wastewater Treatment Plant is Profile Wall PVC pipe (Diamond Plastic Corporation, Pro-21™). Special connection requirements are required as follows:

a Contractor shall utilize a properly sized Inserta-Tee ®, at 45-degrees from top of pipe. Inserta-Tee shall be installed per the manufacturer's written directions.

b After installation of the Inserta-Tee®, Contractor shall inject eurothane epoxy sealant into the profile wall per the manufacturer's written directions. Epoxy shall be injected so as to completely fill the pipe wall a minimum of 1'-0" from the perimeter of the penetration. Epoxy shall be DP605NS as manufacturered by 3M Corporation.

c Contractor shall provide CCTV service to inspect the hot tap from the inside of the trunk sewer pipe to ensure that the inner wall of the profile wall PVC pipe has not been damaged at the hot tap location. Any damage identified shall be repaired per the pipe manufacture's written directions and to the satisfaction of the City Engineer.

d The hot tap location shall be backfilled with 3/8" crushed rock, worked to ensure adequate compaction around the tap location. Where disturbed, the gravel pipe

zone bedding around the trunk sewer shall be replaced and Mirafi fabric gravel wrap shall be repaired.

e Hot Tap and procedures described above shall be performed only in the presence of City Inspector. Contractor shall review installation and repair procedures and be familiar with all manufacturer recommendations.

2.06 Park Design

City parks shall be designed in compliance with *Public Parks Design Guidelines and Preferred Materials Checklist*, available from the City's Park and Recreation Division. Developers shall consult with the Park and Recreation Division prior to beginning design.

DIVISION 3 - CONSTRUCTION DRAWING PREPARATION

3.01 General Requirements

The developer's design engineer shall prepare improvement drawings that are clear, concise, and meet City standards.

Drawings shall be drawn in ink on D size mylar sheets (24" x 36") with CITY OF COACHELLA approval block on each drawing sheet.

The drawings shall be professional quality drawings especially prepared for the proposed project. Work shall be of standard engineering practice and shall be legible and present the proposed construction without confusion.

Water and sewer design may be shown on the same drawings if the drawings are clear and concise. The City shall be the sole judge as to when separate drawings are necessary.

Storm drain design may be shown on the street improvement drawings provided the drawings are clear and concise. The City shall be the sole judge as to when separate drawings are necessary.

3.02 Cover Sheet

The Cover Sheet Shall Show as a Minimum:

1 City of Coachella General notes

2 Legend with Estimate of Quantities

3 Approval for Construction Box (See Appendix K)

4 Water/Sewer System Certification (See Appendix K)

5 Index of Drawings

6 Vicinity Map (reasonable scale)

7 Title and Location of Project

- a Index Map (reasonable scale)
- b North Arrow
- c Tract Layout with Street Names and Lot Numbers
- d Proposed Waterlines and Appurtenances Identified by Size and Type
- e Proposed Sewerlines and Manholes Identified
- f Symbols for all water system Appurtenances
  - (1) Fire Hydrants
  - (2) Air Valves

(3) Blowoffs
(4) Tees, Crosses
(5) Valves
(6) Water Services

g Sheet Numbers Corresponding to Plan and Profile Sheets.

3.03 Plan and Profile Sheets - Water, Sewer, and Storm Drain

The plan/profile sheets shall be drawn at a horizontal scale of 1" =40' and a vertical scale of 1" = 4', and as a minimum the drawings shall show the following:

1 Plan Portion:

a Title Block: Title block shall show Tract No., pressure zone (for water lines), and scale of drawings. City approval blocks shall be incorporated into the title block.

b North Arrow: North arrow shall point up or to the right if possible to conform with Item k.

c Right-of-Way: Existing and proposed right-of-way shall be identified with dimensions.

d Curb Separation: Existing and/or proposed curb separation shall be identified with dimensions.

e Easements: Existing or proposed easements shall be identified with dimensions. Easement Document numbers and record date shall be included on plans.

f Street Names: All street names shall be shown.

g Lot Lines: All lot lines and parcel lines shall be shown. All lots shall be numbered or labeled. All adjacent tracts shall be identified.

h Utilities: All existing and proposed Utilities shall be shown. Utilities to be shown shall include, but not be limited to, water, sewer, gas, power, telephone, storm drain, irrigation, traffic, and cable television. Each utility shall be identified with a symbol and the size of the utility shall be shown. Utility crossings shall be indicated with correct location and elevations noted on plan and profile drawings. Existing water and sewer lines shall be identified with City Plan No.

i Existing and Proposed Improvements: All existing surface improvements shall be shown including, but not limited to, curb and gutter, edge of pavement, power poles, irrigation stand-pipes, telephone pedestals, utility boxes, water/sewer facilities, driveways, sidewalks, and fences.

j Match Lines: Match lines for each end of the street shall be shown as follows:

Sta 15+00.00 Match Line
See Sheet 5

k Stationing: Stationing along the centerline of the improvement (street) shall be shown. Unless otherwise specified, station shall increase from left to right. Stationing shall be identified with tick marks at 50 foot intervals.

l Proposed Pipeline: Proposed pipeline shall be indicated with a heavy line. Dimensions from street centerline to centerline of pipeline shall be shown. Pipeline shall be identified as:

(Size)" - (Material) (Sewer/Water/Storm Drain)

m Appurtenances: All waterline appurtenances including tees, crosses, elbows, and blind flanges or plugs or air valves, blow-offs, fire hydrants, etc. shall be identified with a construction note legend bubble item. "Construction Notes" shall appear on each plan/profile sheet and shall include material specification, size, and reference to City standard drawings as applicable. All Manholes shall be identified with a construction note legend bubble item. "Construction Notes" shall appear on each plan/profile sheet and shall include size and reference to City Standard Drawing.

2 Profile Portion: Only profiles for water, sewer, and storm drain (when applicable) shall be shown. All other utility profiles shall not be shown unless conflicting or where crossing over or under (i.e. storm drain).

a Stationing: Stations shall be shown along bottom of profile at 100 foot intervals. Profile stationing shall line up with plan stationing.

b Elevations: Elevations shall be shown on both ends of the profile sheet. Utility crossing shall be identified with correct location and elevations of top and bottom of both pipes crossing.

c Existing and Proposed Ground Surface: Existing ground surface or pavement over the proposed pipeline shall be identified as follows:

"Existing Top of Pavement (or ground surface) over Centerline of Pipeline"

d Proposed ground surface or pavement over the proposed pipeline shall be identified as follows:

"Proposed Top of Pavement (or ground surface) over Centerline of Pipeline"

e Match Lines: Match lines for each end of sheet shall be shown as follows:

Sta. 15+00.00 Match Line
See Sheet 5

f Size and type of proposed pipeline shall be identified similar to plan call-out.

g Stationing and Flow Line Elevation for Pipes: Pipeline stationing and flow line elevations shall be shown for each grade break as follows:

Sta. 14+00.00 GB
1192.35 FL Deflection Angle = 1°

Pipeline stationing and flow line elevations shall be shown for each tee, cross, elbow, BC, EC, hot tap, and end of pipeline as follows:

Sta 12+25.00, l2"xl2"x8" Tee
1190.00 FL

Pipeline stationing and flow line elevations shall be shown for all air valves, blowoffs, and fire hydrants as follows:

Sta 12+25.00, 4" Blowoff
1190.00 FL

Pipeline station and flow line elevation shall be show for each utility crossing.

h Pipeline Lengths and Pipeline Slopes: Pipeline lengths and pipeline slopes shall be shown between all grade breaks or between manholes and cleanouts for sewer lines as follows:

S = 0.005 135.00 LF 12" PVC

i Maximum Working Pressure: Water pipeline pressure shall be shown at top of each sheet as follows:

Maximum Working Pressure = 150 psi

j Waterline Minimum Cover: Minimum cover specified above shall be shown between top of pipe and existing or proposed ground surface for waterline profiles (finished surface).

k Stationing and Invert Elevation for Sewer lines: Center of manhole stations shall be shown in the profile. Invert elevations into and out of manhole shall be called out in the profile. Vertical curves, when allowed, shall have begin and end stations and elevations as well as curve data in the profile.

3.04 Street Plans

The plan view shall show bearing and distances between intersections, curve data including arc length, included angle and tangent length of all street centerlines in sufficient details for establishment of these lines.

The profile shall show curb and centerline of street elevation at grade changes and at curb returns, and the percent of grade between these points. The profile shall also show the elevation of flow lines of cross gutters and drainage structures.

The plan view shall also include all curve data of curb lines including arc length, tangent length, included angle and station numbers of the end and beginning curves and curb returns, in sufficient detail for field engineering and inspection.

The plan view shall also show the location of all drainage structures, valves, manholes, underground utility vaults, handicap ramps, driveways, cross gutters, curb and gutter, sidewalk and street lights either existing or to be constructed. Also include details, typical sections, and any items necessary for the completion of the project.

Coachella Standard Drawings shall be referenced where applicable. Where special detailed drawings are required, they shall be shown in detail on the plans or on a separate detail sheet.