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**** WARNING ** WARNING ** WARNING ** WARNING ****
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October 2, 2006

12-Ora-90-19.0/20.9
12-056214
HP21L-6212(011)E

Addendum No. 1

Dear Contractor:

This addendum is being issued to the contract for construction on State highway in ORANGE COUNTY IN YORBA LINDA AND ANAHEIM ON ROUTE 90 FROM 0.95 KM EAST OF KELLOGG DRIVE UNDERCROSSING TO LA PALMA AVENUE.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on November 2, 2006, instead of the original date of October 19, 2006.

This addendum is being issued to set a new bid opening date as shown herein and revise the Project Plans, the Notice to Contractors and Special Provisions, the Proposal and Contract and the Federal Minimum Wages with Modification Number 32 dated 9-22-06.

Project Plan Sheets 1, 9, 14, 15, 17, 43, 67, 88, 89, 90, 91, 92, 93, 94, 95, 96, 101, 111, 121, 131, 133, 157, 190, 193, 195, 196, 197, 198, 256, 257, 259, 261, 276, 277, 289, 290, 291, 292, 294, 298, 302, 310, 314, 318, 319, 320, 336, 347, 348, 349, 362, 371, 372, 375, 380, 389 are revised. Half-sized copies of the revised sheets are attached for substitution for the like-numbered sheets.

Project Plan Sheets 88A, 88B, 88C, 88D, 88E, 88F, 305A, 336A are added. Half-sized copies of the added sheets are attached for addition to the project plans.

In the Notice to Contractors, the fourth paragraph is revised as follows:

"Bidders are advised that, as required by federal law, the Department has established a statewide overall DBE goal. The Department is required to report to FHWA on DBE participation for all Federal-aid contracts each year so that attainment efforts may be evaluated. In order to ascertain whether the statewide overall DBE goal is being achieved, the Department is tracking DBE participation on all Federal-aid contracts."

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In the Special Provisions, Section 2-1.03, "DBE AVAILABILITY ADVISORY," is deleted.

In the Special Provisions, Section 4, "BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES," is revised as attached.

In the Special Provisions, Section 5-1.17, "PAYMENTS," the following is added at the end of the fourth paragraph:

"GG. Sewer Pipes and Appurtenances"

In the Special Provisions, Section 5-1.18, "PROJECT INFORMATION," the fourth paragraph is revised as follows:

"Information available for inspection at the District Office is as follows:

A. Cross Sections"

In the Special Provisions, Section 5-1.18, "PROJECT INFORMATION," the following paragraph is added after the fifth paragraph:

"At the bidders option, paper cross sections will be made available to the bidder to photo copy at their own expense. At the bidders option, a CD containing cross sections, is available for purchase for \$1.00 at the District Office."

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the third, fourth, fifth and sixth paragraphs are revised as follows:

"For the Drainage system No.1, Golf Course U.C. construction, the Contractor shall be allowed to close the Golf Course U.C. to traffic during two weeks in October. Contractor will coordinate this closure with the Management of the Yorba Linda Country Club and the Engineer.

Contractor shall contact Yorba Linda Country club manager at 714-779-2467 and the Engineer, 30 working days prior to beginning work on Drainage system No.1 to coordinate construction activities and any closure of the Golf Course U.C.

Golf Cart road within the Parcel 102149-3 (TCE) must be kept open during the hours of operation of the Country Club.

Work around area Parcels 102147-1 and 102148-1 as shown on the plans will be available on or before 12:00AM, April 1, 2007."

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the following paragraph is added after the fourteenth paragraph:

"Attention is directed to "Relations with California Regional Water Quality Control Board" of these special provisions regarding dewatering. The Contractor shall notify the Engineer prior to discharging any groundwater into storm drains or surface waters in compliance with NPDES permit requirements."

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the following paragraph is added after the thirty-sixth paragraph:

"The sewer system shall be in place and operational prior to the removal of the existing sewer system and prior to demolishing the existing sewer system. The Contractor shall notify the Engineer 10 working days prior to beginning work on any existing sewer system."

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In the Special Provisions, Section 10-1.14, "OBSTRUCTIONS," the table in the sixth paragraph is revised as follows:

Utility Facility	Location
900mm Southern California Gas Line – 2 lines	2.5m left of Sta.10+00 'D' line, and 4m Right of Sta. 10+00 'D'
200mm Southern California Gas Line	2.5 m right of Sta. 12+36 'D' line
150mm Southern California Gas line	11.7m right of Sta. 10+44 'D' line.
Chevron fuel line	39m right of Sta. 11+69 'D' line
AT&T telephone line	8.4m left of Sta. 10+33 'D' line
City of Anaheim 200mm water line	8.2m left of Sta. 11+75 'D' line
Sprint Fiber optic line	12m left of Sta. 10+59 'D' line
300mm Golden State Water line	14m right of Sta.12+50 'D' line
300mm Orange County Sanitation sewer line	10m left of Sta. 10+00 'D' line
Level 3 Fiber optic line	26.5m right of Sta. 10+41 'D' line

In the Special Provisions, Section 10-1.14, "OBSTRUCTIONS," the following paragraphs and tables are added after the last paragraph:

"It is anticipated that the following utility facilities will be relocated prior to the dates shown:

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Utility	Location	Date
City of Anaheim Electrical 9 Power Poles	State Route 90 127+20 to 129+70 "A" Line	Dec. 1, 2006
City of Anaheim Electrical Underground 12 kV Facility	Orangethrope Avenue 11+05 to 11+25 "D" Line	Dec. 1, 2006
Southern California Gas 150 mm Gas Line	Orangethrope Avenue \ Esperanza Road 12+05 to 12+70 "D" Line	Dec. 1, 2006
Southern California Gas 200 mm Gas Line	State Route 90 126+80 to 129+80 "A" Line	Dec. 1, 2006
Southern California Gas 19 mm Service Line	Esperanza Road 13+95 "D" Line	Dec. 1, 2006
Southern California Gas 25 mm Service Line	Esperanza Road 14+70 "D" Line	Dec. 1, 2006
Southern California Edison Transmission 10 Power Poles with City of Anaheim Electrical And Adelpia Cable	Orangethrope Avenue \ Esperanza Road 9+60 to 15+00 "D" Line	Dec. 1, 2006
Southern California Edison Distribution 5 Power Poles with AT&T	State Route 90 125+10 to 126+60 "A" Line	Dec. 1, 2006
Yorba Linda Water District 200 mm Sewer Line with manhole	Esperanza Road 13+70 to 13+90 "D" Line	Dec. 1, 2006
AT&T Above Ground Cabinet	Orangethrope Avenue 11+50 "D" Line	Dec. 1, 2006
AT&T Above Ground Cabinet Under Ground Duct	Esperanza Road 13+30 to 13+80 "D" Line	Dec. 1, 2006
AT&T 100 mm Duct	Esperanza Road 14+55 "D" Line	Dec. 1, 2006
Golden State Water 25 mm Service Line	Esperanza Road 13+10 "D" Line	Dec. 1, 2006
Golden State Water 25 mm Service Line	Esperanza Road 14+55 "D" Line	Dec. 1, 2006
Golden State Water 25 mm Service Line	Esperanza Road 14+85 "D" Line	Dec. 1, 2006
Adelpia Cable Underground Conduits and Pull Boxes	Orangethrope Avenue 9+40 to 12+10 "D" Line	Dec. 1, 2006
City of Anaheim Water 200 mm Water Line (Imperial Terrance)	Orangethrope Avenue 11+05 "D" Line	April 1, 2007 Removed
City of Anaheim Sewer 200 mm VCP Sewer (Imperial Terrance)	Orangethrope Avenue 11+00 "D" Line	April 1, 2007 Removed
Southern California Gas 50 mm Service Line (Imperial Terrance)	Orangethrope Avenue 10+90 "D" Line	April 1, 2007 Removed

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Installation relocation or removal of the following utility facilities will require coordination with the Contractor's operations. The Contractor shall make the necessary arrangements with the utility company, through the Engineer, and shall submit a schedule of work, verified by a representative of the utility company, to the Engineer. The schedule of work shall provide not less than the following number of working days, as defined in Section 8-1.06, "Time of Completion," of the Standard Specifications for the utility company to complete their work:"

Utility (address)	Location	Working Days
Golden State Water 300 mm Water Line	Orangethrope Avenue \ Esperanza Road 12+10 to 12+50 "D" Line	5
Southern California Edison Transmission Pole No. 1540998E	State Route 90 123+30 "A" Line	3
City of Anaheim Water Fire Hydrant	Orangethrope Avenue 9+90 "D" Line	5
City of Anaheim Water Fire Hydrant	Orangethrope Avenue 11+60 "D" Line	5

In the Special Provisions, Section 10-1.29, "EXISTING HIGHWAY FACILITIES," the following subsections, "ABANDON SEWER MANHOLE" and "ABANDON SEWER PIPE," are added after subsection, "ABANDON CULVERT AND PIPE":

"ABANDON SEWER MANHOLE

Existing sewer manholes, where shown on the plans to be abandoned, shall be abandoned.

Abandoned manholes are to have the cone and grade rings removed and disposed of as required by these special provisions. All portion of manhole should be removed to a depth of at least 300mm below street subgrade. Connecting conduits shall be sealed as described in "Abandoned Sewer Pipe" specification. Bottom of manhole shall be perforated or broken to prevent the entrapment of water. The structure is to be backfilled with conforming "Slurry Cement Backfill.

ABANDON SEWER PIPE

Existing sewer pipe, where shown on the plans to be abandoned, shall be removed and disposed of. Resulting openings into existing structures that are to remain in place shall be plugged with commercial quality concrete containing not less than 300 kg of cement per cubic meter.

Disposal shall conform to the provisions in Section 7-1.13, "Disposal of Materials Outside the Highway Right of Way," of the Standard Specifications.

Abandoning sewer pipe in place shall conform to the following:

A. Sewer pipe shall, at the Contractor's option, be backfilled with either sand, controlled low strength material or slurry cement backfill conforming to the provisions in Section 19-3.062, "Slurry Cement Backfill," of the Standard Specifications by any method acceptable to the Engineer that completely fills the pipe. Sand backfill material shall be clean, free draining, and free from roots and other deleterious substances.

B. The ends of sewer pipe shall be securely closed by a 150 mm thick tight fitting plug or wall of commercial quality concrete.

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Sewer pipe shall not be abandoned until their use is no longer required. The Contractor shall notify the Engineer in advance of any intended sewer pipe abandonment.

If the Contractor elects to remove and dispose of a sewer pipe which is specified to be abandoned, as provided herein, backfill specified for the sewer pipe will be measured and paid for in the same manner as if the sewer pipe has been abandoned in place.

Full compensation for concrete plugs, pipe removal, structure excavation, and backfill (including sand, controlled low strength material or slurry cement backfill) shall be considered as included in the contract price paid per meter for abandon sewer pipe and no additional compensation will be allowed therefor."

In the Special Provisions, Section 10-1.29, "EXISTING HIGHWAY FACILITIES," the following subsection, "REMOVE SEWER MANHOLE," is added after subsection, "REMOVE CONCRETE".

"REMOVE SEWER MANHOLE

Existing sewer manholes, where any portion of these structures is within one meter of the grading plane in excavation areas, or within 0.3-m of original ground in embankment areas, or where shown on the plans to be removed, shall be completely removed and disposed of."

In the Special Provisions, Section 10-1.663, "MISCELLANEOUS SEWER FACILITIES," is added as attached.

In the Special Provisions, Section 10-1.667, "PRECAST CONCRETE PIPE SEWER MANHOLE," is added as attached.

In the Special Provisions, "SECTION 10-4. SEWERS," is added as attached.

In the Proposal and Contract, the Engineer's Estimate Items 83, 86, 87, 103, 105, 155 are revised, Items 200, 201, 202, 203, 204, 205, 206, 207, 208, 209 are added and Item 199 is deleted as attached.

To Proposal and Contract book holders:

Replace pages 8, 9, 11, and 13 of the Engineer's Estimate in the Proposal with the attached revised pages 8, 9, 11, 13 and added 13A of the Engineer's Estimate. The revised Engineer's Estimate is to be used in the bid.

Inquiries or questions in regard to this addendum must be communicated as a bidder inquiry and must be made as noted in the NOTICE TO CONTRACTORS section of the Notice to Contractors and Special Provisions.

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the proposal.

Submit bids in the Proposal and Contract book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

Inform subcontractors and suppliers as necessary.

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This office is sending this addendum by UPS overnight mail to Proposal and Contract book holders to ensure that each receives it. A copy of this addendum and the modified wage rates are available for the contractor's use on the Internet Site:

http://www.dot.ca.gov/hq/esc/oe/weekly_ads/addendum_page.html

If you are not a Proposal and Contract book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,

ORIGINAL SIGNED BY

REBECCA D. HARNAGEL, Chief
Office of Plans, Specifications & Estimates
Office Engineer

Attachments

SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES

Attention is directed to the provisions in Section 8-1.03, "Beginning of Work," Section 8-1.06, "Time of Completion," and Section 8-1.07, "Liquidated Damages," of the Standard Specifications and these special provisions.

No work shall be performed before February 1, 2007.

After the contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department of Transportation the Contractor shall begin work within 15 calendar days after February 1, 2007.

The work shall be diligently prosecuted to completion before the expiration of **850 WORKING DAYS** beginning on the date that work begins or beginning on the fifteenth calendar day after February 1, 2007, whichever occurs first.

The Contractor shall pay to the State of California the sum of \$4500 per day, for each and every calendar day's delay in finishing the work in excess of **850 WORKING DAYS**.

10-1.663 MISCELLANEOUS SEWER FACILITIES

Sewer facilities shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications and these special provisions.

The sewers are owned and operated by the Orange County Sanitation District (OCSD).

Sewer manholes, PVC sewer pipe, appurtenances, and trench excavation and backfill, shall be furnished and installed or constructed as shown on the plans or as directed by the Engineer, in accordance with the provisions in the Standard Specifications, and these special provisions.

The dimensions and elevations of existing structures and locations of existing equipment, pipelines and grades shown on the plans are not guaranteed for accuracy.

The Contractor shall pothole all join locations, utility and drainage crossings prior to the start of construction. The Contractor shall provide pothole data, including horizontal and vertical location and dimensions to the Engineer. The requirement to pothole at specific locations does not limit the Contractor's responsibility to check dimensions and elevations in other areas.

The Contractor shall verify dimensions and elevations of existing structures, pipelines, grades or other existing items affecting the work under this contract, prior to the start of construction of sewers.

Grade and/or alignment changes shall be made only if approved by the Engineer.

Full compensation for potholing shall be considered as included in the contract prices paid for the various items of work involved and no separate payment will be made therefor.

Existing sewer laterals shall be reconnected to new sewer pipe as shown on the plans and as directed by the Engineer.

Any damage to the existing sewer pipes caused by the construction operations shall be repaired at the Contractor's expense.

TELEVISION INSPECTION

Prior to the start of construction of sewer work and after sewer work has been completed, the Contractor shall perform a closed circuit television (CCTV) inspection of the existing sewer pipes from one manhole upstream of the construction to one manhole downstream of the construction. CCTV inspection will not be required on segments, between existing manholes, that will be completely removed or abandoned.

CCTV inspection shall be documented in a written report (Inspection Report) and video recording.

The Contractor shall submit 2 copies of each inspection report and video recording to the Engineer.

The Contractor shall submit to the Engineer, 2 weeks in advance of any CCTV inspection, a sample video recording and Inspection Report for approval.

Full compensation for television inspection regardless of the number of times performed, shall be considered as included in the contract price paid per meter for clay sewer pipe and no additional compensation will be allowed therefor.

Safety

CCTV inspection shall be conducted from above ground. Manhole entry, if required, shall be conducted in strict accordance OSHA Confined Entry Procedures.

Prior to opening a manhole cover or a confined space area, a gas monitor shall be used to detect the following: oxygen level, presence of explosive or flammable gases, vapors, or mist in excess of 10% of the (LEL/LFL), and toxic gases in excess of the permissible exposure levels (hydrogen sulfide, Carbon Monoxide.)

Contractor shall provide Engineer rescue plan prior to beginning work.

CCTV Equipment

CCTV equipment shall include video cameras, a video monitor, cables, power sources, and all equipment necessary to perform a CCTV inspection.

The camera shall be specifically designed and constructed for the sewer or storm drain environment. The camera and video monitor shall produce a minimum 460 lines of resolution. Illumination sensitivity shall be 3 lux or less. During inspection, lighting intensity shall be adjusted to minimize reflective glare. Lighting and picture quality shall be adjusted to provide a clear, in-focus picture of the entire periphery of the pipeline for all conditions encountered. Camera focal distance shall be adjustable through a range from 25 mm (1 inch) to infinity.

CCTV inspections shall be performed using one of the following video camera systems:

1. Pan-and-tilt cameras (with a minimum of 360 x 270 degree rotation)
2. Rotating-Head cameras
3. Remote-focus stationary lens cameras as approved by the Engineer

The video inspection shall be recorded in color.

The video recording shall be, at the option of the Contractor, either video tape (VHS) or digital (CD).

All original recordings shall become the property of the State. Inspection of the pipeline shall be conducted during optimum flow levels. Telephones, radios, or other suitable means of communication shall be set up to ensure adequate communication between crew members.

The CCTV inspection system shall be approved by the Engineer prior to beginning inspection.

CCTV Inspection

The camera shall be lowered into the manhole and placed into the pipe. The camera cable shall be retracted to remove slack to ensure an accurate distance reading. The cable distance-counter shall be reset to the distance between the centerline of the manhole and the front lens of the camera. The camera shall move through the pipeline in a downstream direction whenever possible at a maximum uniform rate of 9 meters per minute. The cable distance-counter shall measure the distance between each inspection segment – centerline to centerline. The counter shall be accurate to less than 1- percent error over the measured distance.

The camera shall stop at all significant observations to ensure a clear and focused view of the pipe condition. Each observation shall be documented by text overlay on the video recording and voice recording. The observations shall be also noted on the inspection report. These observations shall include but not be limited to:

- Laterals - standard
- Laterals - protruding
- Cracks
- Offset joints
- Open joints
- Sags
- Line Deviations
- Siphons
- Missing sections
- Mortar
- Infiltration
- Debris
- Grease
- Roots

If the camera cannot pass through the entire section of pipeline (blockage, etc.), the Contractor shall reset the equipment at the downstream manhole and attempt to inspect the section of pipe from the opposite direction. If the camera again fails to pass through the blocked section, the video inspection shall be temporarily suspended and the Contractor shall notify the Engineer for direction.

During the post construction CCTV inspection, the camera shall stop at all significant observations to ensure a clear and complete view of the pipe condition. Each observation encountered shall be documented by text overlay and voice recording to the video recording. The observations shall also be noted on the Inspection Report for each segment.

CCTV Inspection Report and Video Recording

The inspection report shall include the following:

1. Brief summary of work performed
2. Summary list of all pipeline segments inspected (i.e. manhole to manhole)
3. Inspection reports (log sheets) of each segment
4. All original recordings (videotapes, CDs)
5. Photographs of major defects for each pipeline segment (if required)

Minimum documentation shall consist of the Video Recording(s) and the Inspection Report. The Inspection report for each segment shall be as specified above and shall contain one or more of the following:

1. Sewer Owner
2. Contract Number
3. District, County, Route, Postmile
4. CCTV date
5. CCTV time
6. Weather condition
7. Contractor name
8. Operator(s) name
9. Street name or location
10. Cross street name or location
11. Surface material (asphalt, concrete, dirt, etc.)
12. Manhole number (access point) - up
13. Manhole number (access point) - down (dn)
14. Sewer segment unit (if any)
15. Manhole depth - up
16. Manhole depth - down (dn)
17. Direction of camera (with or against flow)
18. Pipe - size
19. Pipe - shape
20. Pipe - slope
21. Pipe -drop (total invert elevation change)
22. Pipe - distance centerlines (on plan)
23. Pipe - distance centerlines (on CCTV)
24. Pipe - flow up (percent of pipe at inlet or height of flow)
25. Pipe - flow dn (percent of pipe at outlet or height of flow)
26. Number of pipe joints
27. Joint to joint measurement
28. Tape (CD) video number
29. Tape (CD) VTR - start
30. Tape (CD) VTR - end
31. Schematic of pipeline showing laterals and observations
32. Photographs of major defects or typical pipe condition

Voice recordings on the video recording shall be clear, complete and distinct. A vocal description shall be recorded at the beginning of each video recording and at the beginning of each inspection while the "Initial Screen Text" is displayed. A voice recording shall also be performed during each observation and at the conclusion of each inspection. Inappropriate language or idle chatter are not acceptable and shall be grounds for rejection by the Engineer. If rejected, the non-conforming video recording(s) shall be corrected at the Contractor's expense.

Running Screen Text

During the CCTV inspection, the running screen shall show the running distance traveled and the following text information at the bottom of the screen:

1. Manhole unit or number- upstream
2. Manhole unit or number- downstream
3. Pipe size
4. Pipe length - total distance shown on the plans
5. Date
6. Time of day

The format of the above data shall be shown as follows:

"Mh 1/3 (250 mm – 187 M) 6/1/05 - 3:32 P.M."

Initial Screen Text

Each pipe segment (manhole to manhole) shall be identified with an initial screen text and voice recording. The initial screen text and voice recording shall include the following:

1. Sewer Owner
2. Contract Number
3. District, County, Route, Postmile
4. CCTV date
5. CCTV time
6. Weather condition
7. Contractor name
8. Operator(s) name
9. Street name or location
10. Manhole number - up
11. Manhole number - down
12. Direction of camera (with or against flow)
13. Pipe material - as shown on the plans
14. Pipe length

Ending Screen Text

At the end of each pipe segment, an ending screen text and voice recording shall include the following:

1. "End of Segment Inspection"
2. Manhole unit - up
3. Manhole unit - down
4. Condition that prevented complete inspection, if applicable
5. Pipe material found (per CCTV)
6. Plan distance and CCTV distance

At the option of the Contractor, the ending screen may be the "Running Screen" with the following added text:

"END OF SEGMENT"

"Mh 1/3 (250 mm – 187 M) 6/1/05 - 3:45 P.M."

"Materials found - VCP"

CCTV Recording Labels

Each CCTV recording (VHS or digital) may contain one or more pipeline segments. The CCTV recording shall have a label affixed to both the top (face label) and edge (spine label). Both labels shall be printed.

The top label shall contain the following printed text:

1. Sewer Owner
2. Contract Number
3. District, County, Route, Postmile
4. Summary of pipeline segment(s). Each listing shall show:
 - a. Manhole number - up
 - b. Manhole number - down
 - c. Distances - plan & CCTV
 - d. Tape (CD) number and total - i.e. (6 of 12)
 - e. Date(s) of CCTV
 - f. Contractor name
 - g. Street and cross street reference
 - h. Station to station reference

The edge label shall contain the following printed text:

1. Sewer Owner
2. Contract Number
3. District, County, Route, Postmile
4. Tape (CD) number and total - i.e. (6 of 12)
5. Date(s) of CCTV

Payment

Full compensation for television inspection, regardless of the number of times performed, shall be considered as included in the contract price paid per meter for clay sewer pipe and no additional compensation will be allowed therefor.

10-1.667 PRECAST CONCRETE PIPE SEWER MANHOLE

Precast concrete pipe sewer manhole shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications.

207-17 PVC PLASTIC PIPE.

207-17.1 General. This subsection applies to the requirements for unplasticized PVC plastic pipe for sanitary sewers, storm drains, and house connection sewers. Pipe, fittings, couplings, and joints shall conform to the requirements listed in Table 207-17.1 (A), except as otherwise modified by the Plans or the Specifications.

TABLE 207-17.1 A

Nominal Size		ASTM	Wall Thickness Min.
mm	Inches		
100-375	(4 - 15)	D 3034	SDR 35
450-750	(18 - 30)	F 679	"T-1" only

Joints for sanitary sewers, except house connection sewers, shall be gasketed joints.

207-17.2 Manufacturing Requirements.

207-17.2.1 Identification Marks. All pipe, fittings, and couplings shall be clearly marked at intervals not to exceed 5 feet as follows:

- 1) Nominal pipe diameter.
- 2) PVC cell classification.
- 3) Company, plant, shift, ASTM, SDR, and date designation.
- 4) Service designation or legend.

For fittings and couplings, the SDR designation is not required.

207-17.2.2 Cell Classification. Pipe shall be made of PVC plastic having a cell classification of 12454 or 13364, as defined in ASTM D 1784. The fittings shall be made of PVC plastic having a cell classification of 12454, or 13343. PVC compounds of other cell classifications shall be in conformance with 207-17.5. Additives and fillers, including but not limited to stabilizers, antioxidants, lubricants, colorants, etc., shall not exceed 10 parts by weight per 100 of PVC resin in the compound.

207-17.3 Joining Systems.

207-17.3.1 General. All pipe shall have a home mark on the spigot end to indicate proper penetration when the joint is made.

The socket and spigot configurations for the fittings and couplings shall be compatible to those used for the pipe.

207-17.3.2 Elastomeric Gasket Joints. Pipe with gasketed joints shall be manufactured with a socket configuration which will prevent improper installation of the gasket and will ensure that the gasket remains in place during the joint operation. The gasket shall be manufactured from a synthetic elastomer and shall conform to the requirements of 208-1.2 and 208-4.

207-17.3.3 Solvent Cement Joints. Pipe with solvent cement joints shall be joined with PVC cement conforming to ASTM D 2564.

207-17.3.4 Injection Sealed Joints. Pipe with injection sealed joints shall be sealed with a PVC adhesive compound. The compound shall conform to the requirements of ASTM D 2564 and shall have a minimum viscosity of 50 Pascal-second. The internal diameter of the socket shall be uniform with a locking taper at the base and an outer seal ring attached to the end. The socket shall have an injection port to inject the adhesive and an exhaust port on the opposite side to allow air to escape from the annular space.

207-17.4 Test Requirements.

207-17.4.1 General. Pipe, fittings, and couplings shall meet the requirements of the section titled "Requirements" of ASTM D 3033, D 3034, or F 679 ("T-1" wall only). During production of the pipe, the manufacturer shall perform the specified tests for each pipe marking. A certification by the manufacturer indicating compliance with specification requirements shall be delivered with the pipe.

The certification shall include the test result data. The PVC compound shall also meet the the resistance requirements of 207-17.5.

207-17.4.2 Acceptance. The basis for acceptance will be the inspection of pipe, fittings, and couplings; the tests specified in 207-17.4.1; and compliance with the Specifications. When the pipe is delivered to the Work site, the Engineer may require additional testing to determine conformance with the requirements of pipe flattening, impact resistance, pipe stiffness, and extrusion quality. Installation time shall conform to 207-15.7.

207-17.4.3 Selection of Test Pipe. When testing is required by the Engineer, one test pipe shall be selected at random by the Engineer from each 370 m (1,200 feet) or fraction thereof of one test pipe per lot. - A lot shall be defined as pipe having the same identification marking. The Length of specimen for each selected pipe shall be a minimum of 2.4 m (8 feet).

207-17.5 Chemical Resistance and Physical Testing. PVC shall be tested in accordance with 2112 and conform to Table 207-17.5(A).

TABLE 207-17.5 (A)

Property	ASTM TEST Method	VALUE (Initial and After 112-Day Exposure)		
		Cell Classification		
		12454	13343	13364
Tensile Strength (Yield), MPa (psi), min.	D 638	48.3 (7000)	41.4 (6000)	49.4(6000)
Impact Strength Jlm (Ft.-lbs.lin.) of notch, min.	D 256 Method A Size 12.7 mm x 3.17 mm x 63.5 mm	35 (0.65)	80 (1.5)	80(1.5)
Weight Change % Unconditioned Conditioned	D 543	± 1.5 max ± 1.0 max	± 1.5 max ± 1.0 max	± 1.5 max ± 1.0 max

207-17.6 Installation and Field Inspection. Pipe shall be bedded in accordance with 306-1.2.13. Backfill shall conform to 306-1.3. Field inspection shall conform to 306-1.2.12,

SECTION 10-4. SEWERS

10-4.01 GENERAL

This work shall consist of removing and abandoning existing sewer facilities and constructing new sewer facilities completely relocated in accordance with these special provisions and as directed by the Engineer.

All work and materials shall conform to the details shown on the plans, the Standard Specifications, and the Standard

The sewers are owned and operated by The Orange County Sanitation District. The Contractor shall notify the Engineer 2 working days before work is begun on any existing sewer facility.

10-4.02 MAINTENANCE OF FLOWS

The existing Orange County Sanitation District sewer system shall continue to collect all incoming wastewater at all times. All work included in these special provisions shall be performed in such a manner that all wastewater flow from existing buildings and residences be maintained at all times except for short periods of shut down as specified elsewhere in these special provisions. A temporary shut down of wastewater flow from existing buildings may be allowed if the Contractor submits a detailed schedule including dates, times of day for the stoppage and the specific buildings affected, to the Engineers for review and approval 30 days prior to the proposed shut down. A shut down shall not exceed two continuous hours. If approved by the Engineer, the Contractor shall notify the Owner and residents of each affected building 10 working days preceding the shut down of the exact date and times of day. Should the Contractor's sequence of work or method of construction be such that outages of longer duration are necessary, temporary pumping, piping and bypasses as covered in "Temporary Sewer System" of these special provisions, shall be installed and maintained and removed after use by the Contractor at his expense. When temporary facilities are to be utilized, a detailed construction plan and schedule of events, including sizes and capacities of all piping and equipment, shall be submitted to the Engineer for review and approval 30 days preceding their proposed use.

10-4.03 EXISTING SEWER FACILITIES

When the new facilities interfere with the existing flow of sewage, the Contractor shall provide satisfactory bypass facilities at his expense as covered in "Temporary Sewer System" of these special provisions. Existing manholes shall be adjusted to grade, removed or abandoned, and existing sewer pipes shall be removed or abandoned, as shown on the plans and in accordance with the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications.

10-4.04 TEMPORARY SEWER SYSTEM

The Contractor shall provide all necessary equipment, manpower, and resources to provide a safe and reliable temporary sewer system on a 24 hour basis during construction and testing. The temporary sewer shall be designed to divert the entire domestic wastewater flow which can consist of rags, towels, sheets, grease, food waste, fecal material, etc.

The Contractor shall reconnect any active side sewers encountered during replacement of the existing sewer main by the end of each working day.

The Contractor shall be responsible for any damage and cost of repair caused to private or public property from the failure or problems of the temporary sewer system installation or operation. The Contractor shall remove the temporary sewer system at the completion of the project to the satisfaction of the Engineer.

10-4.05 PIPING AND APPURTENANCES

CONTRACTOR SUBMITTALS

A. Manufacturer's Data. Complete with material grade, and class for all pipe, fittings, and couplings and for all joints, and appurtenances and such other data as requested by the Engineer shall be submitted for approval. Detailed catalog and engineering data sheets shall be submitted for all components such as flexible couplings, rubber gaskets, and joints, and a proposed schedule for delivering and installing the piping shall be included. Expansion joint submittal shall include a leak-proof certificate and expansion joint's preset dimension for each installation.

B. Installation Procedure. The installation drawings shall be supplemented with a set of written procedures for performing the field piping installation. The procedures shall cover in detail the preparation and making of the push-on joints and couplings.

C. Testing Procedures. Procedures for testing the piping, and arrangements for obtaining and disposing of water for the tests shall be fully described. The equipment for testing shall be itemized. Details of bulkheads, flanges, or caps for the testing of the pipe shall be included with the submittals.

D. Manufacturer's warranties and guarantees for materials or equipment as listed in the product data paragraph shall be delivered to the Engineer at the job site prior to acceptance of the contract.

PRODUCT HANDLING, DELIVERY AND STORAGE

A. General. Pipes shall be handled, at all times, with equipment designed to prevent damage to the pipe materials. Pipe shall only be handled with wide canvas or rubber covered slings. Bare cables, chains, hooks, or metal bars shall not come in contact with the pipe. Pipe slings used during handling and tie-down straps used during transit shall be minimum 4-inch wide flat fiber or plastic straps. During transit and storage pipes shall be placed on saddles or on a support system approved by Engineer to prevent damage to barrel and bell.

B. Shipping. During shipment, all chains, cables and hold-down equipment shall be padded where in contact with the pipe.

C. Unloading. Pipes shall be unloaded from trucks using a crane or forklift and slings as described in these special provisions. Dropped or fallen pipe shall not be used.

D. Gaskets shall be stored in containers or wrappers which protect the gaskets from ozone and other atmospheric deterioration. Gaskets, gasket lubricants, bolts, and jointing materials shall be delivered in separate, clearly marked boxes.

PRODUCTS GENERAL

A. General Requirements. All pipe, fittings, couplings, and appurtenant items shall be new, free from defects or contamination, and wherever possible, shall be the standard product of the manufacturer. They shall be furnished in strength or thickness classes as specified or shown. Unless otherwise indicated the size shown shall be the nominal pipe diameter.

B. Length. All pipe shall be furnished in standard lengths, unless indicated otherwise.

10-4.06 MATERIALS

All pipe shall be clearly marked with type, class, and thickness. Lettering shall be legible and permanent under normal conditions of handling and storage. If the quality of the pipe is such that more than 25 percent of any lot delivered to the jobsite becomes subject to rejection, as determined by the Engineer, then the entire lot shall be rejected and removed from jobsite, at the expense of the Contractor.

CONCRETE AND GROUT.--Concrete materials shall conform to the provisions in Section 90, "Portland Cement Concrete," and Section 51, "Concrete Structures," of the Standard Specifications.

A. Grout. Except in high watertable locations, precast concrete manhole rings shall be joined with a minimum thickness of 12.7 mm of portland cement grout.

B. Manhole Bases. Construct manhole bases to the form and dimensions indicated. Bases shall be formed and poured on gravel subbase of the same thickness as the sewer on which it is being built. The portion of the base above the invert elevation of the sewer pipe shall be formed to provide a smooth channel section. The manhole base shall be poured as one monolithic pour.

REINFORCEMENT.--Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications.

MISCELLANEOUS IRON AND STEEL.--Miscellaneous iron and steel items shall conform to the provisions in "Miscellaneous Iron and Steel," of these special provisions.

SEWER MANHOLES.—New manholes for sewers shall be constructed in accordance with the details shown on the plans.

All manhole frame and covers shall be cast iron conforming to ASTM A48, Class 30 and to the details shown on the plans.

Concrete for sewer manhole facilities shall be Class 2 as per Section 90, "Portland Cement Concrete," of the Standard Specifications unless otherwise shown on the plans.

The inside bottoms of existing manholes, where new connections are made, and of new manholes shall be shaped to provide channels conforming to the size and shape of the lower portion of the inlets and outlets of the manholes. The channels shall vary uniformly in size and shape from inlet to outlet.

In no case shall the bell of a pipe be built into the wall of a manhole.

All concrete shall be cured for a period of not less than 10 days after being placed and shall be protected from damage.

The cover or grating of a manhole shall not be grouted to final grade until the final elevation of the pavement, gutter, ditch, or sidewalk in which it is to be placed has been established, and until permission thereafter is given by the Engineer to grout the cover or grating in place. Covers shall be seated properly to prevent rocking.

In the event any pipe enters the manhole through the precast concrete units, the Contractor shall make the necessary cut through the manhole wall and steel mesh. The steel shall be cut flush with the face of the concrete and shall be cut in such a manner that it will not loosen the reinforcement in the manhole wall.

The ends of all pipes shall be trimmed flush with the inside walls.

Rubber gaskets or flexible plastic gaskets may be used in tongue and groove joints of precast units. Joints between precast manhole units used for sanitary sewers shall be rubber gasketed. All other joints and all openings cut through the walls shall be grouted and watertight.

If gaskets are used, handling of the precast units after the gasket has been affixed shall be done carefully to avoid disturbing or damaging the gasket or contaminating it with foreign material. Care shall be exercised to attain proper alignment before the joints are entirely forced home. During insertion of the tongue or spigot, the units shall be partially supported to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned.

Rigid pipes connecting to sanitary sewer manholes shall be provided with a flexible joint at a distance from the face of the manhole of not more than 1 1/2 times the nominal pipe diameter or 457.2 mm, whichever is greater.

Backfilling around the work will not be allowed until the concrete or mortar has thoroughly set.

Catch basin, grate inlet, and drop inlet connections to the sewer shall be so placed that the connecting pipe may be easily rodded over its entire length. After the connections are made, the Contractor shall rod all inlet and outlet pipes. All connections that cannot be successfully rodded shall be removed and new connections made.

Backfilling of manholes shall be done in accordance with the provisions of Section 19, "Earthwork," of the Standard Specifications.

Manholes shall be constructed on a compacted or undisturbed level foundation. A grout pad shall be placed to attain full bearing for precast units if deemed necessary by the Engineer. Upon final acceptance of the work, manholes and other drainage structures shall be open, clean, and free draining.

When connecting a sewer pipe to an existing manhole, the connection shall be in accordance with the requirements for new construction. Special care shall be taken not to damage (crack) the concrete manhole base. If the contractor damages the concrete base, as determined by the Engineer, the contractor shall at his own expense remove and discard the damaged concrete base and form a new concrete base in accordance with the requirements for new construction.

All manhole rings, tops, and cones shall be reinforced designed for AASHTO H-20 highway loading, and shall conform to the standard plans, the requirements of ASTM C-478, and the following requirements:

A. Rings. All manhole rings shall be centrifugally spun or compactly vibrated in forms.

B. Tops. All manhole tops and cones shall be compactly vibrated in forms.

C. Gasket Seals. Where installed in high watertable locations gasket seals shall be provided at mating joints of precast concrete sections. Size gaskets to suit joint dimensions and surface conditions to assure watertight completed installation. Use either compressible closed-cell neoprene rods with compatible bonding agent or non-bituminous joint sealing compressible gaskets.

Precast concrete sections shall be inspected when delivered to the job site. Cracked or defective sections shall be rejected and removed from the job site. Precast materials such as the Eccentric Cone, and Riser Sections shall conform to ASTM C478. The cone and riser sections shall have Rubber Gasketed Joints conforming to ASTM C443. Manhole waterstops shall be manufactured of elastomeric plastic. The waterstops shall be corrosion, acid and alkali resistant and suitable for use in wastewater. The waterstop shall be used when grouting sewer line penetrations of existing manholes or installation in new manholes as shown on the plans.

WATERTIGHT CAULKING.--Watertight caulking for pipe penetrations occurring in precast manhole assemblies, shall be polyurethane sealant meeting or exceeding requirements of Standard Specifications Polyurethane Sealant contained in Section 51-1.12F(3) Materials and Installation; (a) type A and AL seal, of the Standard Specifications for flow-type sealant, and like material having equal characteristics which also provides non-sag properties for use in overhead or sloping joints.

A. Back-Up Performed Joint Filler. Use closed cell polyethylene foam or equal impervious, compatible, compressible foam material recommended for retaining sealant depth in expansion joints while curing. Use no bitumen or oil saturated material.

B. Bond Breakers, where required, shall be polyethylene tape or equal as recommended by sealant manufacturer to prevent adherence of sealant to back-up material.

PENETRATIONS.--Pipes penetrating precast structures shall be cast-in-place, or grouted in place with non-shrink grout. Tightly caulk cold joints between pipe and grout or pipe and concrete at the interior (waterbearing) surface with specified material to provide a leak-free installation when complete.

TRACER TAPE.-- The pipe shall be marked with warning tape. Warning tape shall be 150 mm wide, green plastic coated metallic tape with the words "CAUTION BURIED SEWER LINE BELOW" printed on each side. The tape shall be a minimum of 0.14 mm thick and have an aluminum foil center. Minimum tensile strength shall be 35 Mpa.

10-4.07 EXCAVATION AND BACKFILL

Excavation and backfill shall conform to the provisions in Sections 7-1.11, "Preservation of Property, and 19-3, "Structure Excavation and Backfill," of the Standard Specifications and these special provisions. Pipeline construction shall be coordinated with the roadway earthwork to prevent damage to the pipeline. Where roadway excavation and embankment work may damage pipeline, Contractor shall prepare the rough pavement subgrade before installing the pipeline.

The pipe shall be installed in a trench excavated to the lines and grades shown on the plans and designated by the Engineer. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. The width of the trench shall not be less than 500 millimeter nor more than 900 millimeter greater than the outside diameter of the barrel of the pipe to be laid therein. Where shoring is required, this width shall be increased by the thickness of the shoring.

Pipe may be laid out in open trenches or in sections of open trenches connected by tunnels, as permitted by the Engineer.

Suitable excavation shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustment to line and grade shall be made by scraping away or filling in with sand, gravel, or granular material under the barrel of the pipe, and not by wedging or blocking.

Excavate to approximate bottoms and trim to lines and elevations in a manner specified under Embedment. Embedment starts at final trimmed trench elevation and ends at 305 millimeter above the top of the pipe or component. Backfill starts 300 millimeter above pipe or component. Use manual methods of compaction of embedment and backfill materials in areas adjacent to buried construction and utilities to avoid damage or unscheduled service interruption. Limit trench width or embankment conditions to preclude excessive earth loads on installed piping system.

All supports required by the Trench Excavation Safety Plans shall be removed after construction is completed, unless otherwise directed by the Engineer, and shall be withdrawn in a manner that will prevent the caving of the sides of the excavation. All openings caused by the removal of supports shall be filled with suitable material properly compacted.

Trim rough trench to subgrade and provide embedment as indicated on the plans for full width of the trench. Shape bedding to provide full length barrel support and to prevent point loading at pipe joints. Carefully place bedding under pipe haunches. No ponding and jetting shall be allowed.

Hand-grade base to proper grade ahead of pipe laying. Base shall provide a firm, unyielding support along entire pipe length. Grade the top of the base to the bottom of the pipe ahead of pipe laying for the full width of the trench.

Excavate bell holes at each joint to permit proper assembly and inspection of entire joint.

Particular attention must be given to the area of the pipe bedding from the flow line to the centerline of the pipe to ensure that firm support is obtained to prevent any lateral movement of the pipe during the final backfilling of the pipe zone.

Backfill the area of the pipe bedding from the bottom of the trench to the springline of the pipe with trench bedding material. The material around the pipe shall be placed in 10.2-mm layers and thoroughly tamped with approved tamping sticks supplemented by "walking in" and slicing with a shovel. Backfill the area of the pipe zone from the springline to a point 305 mm above the top outside surface of the barrel of the pipe with trench bedding and backfill material as shown on the plans.

10-4.08 PIPE INSTALLATION

Prior to lowering pipe and fittings into trench, clean and visually inspect for apparent defects. Remove defective pipe from the site promptly. Pipe shall be protected against impact shocks during handling and shall not be allowed to free fall. Pipe damaged before placement shall not be used, and shall be replaced by new pipe. Carefully lower all pipe, fittings, etc. into the trench with suitable tools or equipment in such a manner as to prevent damage to the pipe, lining, coating, fitting or other appurtenances. Prior to and during laying of pipe, maintain excavations dry and clear of water and extraneous materials.

Install piping in accordance with the requirements of the pipe manufacturer procedures and these special provisions. The interior of pipe, fittings, and couplings shall be clean and free from contamination when installed and effective means shall be taken to prevent the entrance of foreign matter during progress of the work.

Prior to installation, accurately determine all dimensions essential to the correct location of the pipe, or to the avoidance of obstructions or conflict with other improvements, Make all required changes from the nominal locations shown on the plans and obtain Engineer's approval of the changes.

Unless otherwise authorized by the Engineer, the laying of the pipe in finished trenches shall be commenced at the lowest point of the project, with the spigot ends abutting and pointing in the direction of the flow. The joints shall be carefully centered so that when laid to proper grade and alignment as designated on the plans, they will form a sewer with a uniform invert.

All pipes and fittings shall be laid accurately to the lines and grades given by the Engineer, with joints closed and even, abutting all around. Special care shall be taken that there is no sagging of the spigot end in the hub and that a true surface is given to the invert throughout the entire length of the sewer.

In order to relieve the bell of the load and provide ample space for making the joints, the foundation for the pipe shall be free of all grade irregularities and bell holes shall be provided for all sizes of pipe. Care should be taken not to disturb the joints already laid.

Where existing sewer pipe is embedded in an underground concrete structure, provide joints within the specified distances of exterior surface of the structure as shown on the plans, capable of absorbing movement without leakage.

If any previous length of pipe is moved or disturbed so as to break any joint, the joint shall be repaired or pipe replaced as determined by the Engineer.

Whenever the work ceases for any reason, the end of the pipe shall be securely closed with a tight fitting plug or cover to prevent the admission of foreign matter. Plugs shall be commercially manufactured products. Do not remove plugs unless or until the trench is dry.

All joints shall be cleaned and then sealed with the type of materials specified or required by the Engineer. Sealing materials shall be sufficiently protected from the air and sun to prevent deterioration.

The new main sewer alignments shall be marked with tracer tape 0.61 m below finished grade, centered above the pipe. The wording on the tape shall be carefully placed to prevent tearing or damaging the tape.

The pipe shall be laid in a trench excavated to the lines and grades designated on the plans and as directed by the Engineer. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. When bell-end pipe is used, suitable excavation shall be made so the bell portion of the pipe will not bear on the bottom of the trench. All adjustment to line and grade shall be made by scraping away or filling in with bedding (Sand equivalent of 30) under the body of the pipe, and not by wedging or blocking. Trenches shall not be left open farther than 60 m in advance of pipe laying operations or 60 m to the rear thereof, unless otherwise permitted by the Engineer.

Pipe may be laid in open trenches or in sections of open trenches connected by tunnels, as permitted by the Engineer. The length of the tunnel shall not exceed the depth of cut, except that if the depth of the cut is over 6.10 meters, the pipe may be laid in a continuous tunnel. Tunnels shall be driven from shafts at the locations of manholes or at other locations approved by the Engineer. Tunnels shall have a height of not less than above the top of the sewer to allow proper workmanship. When bell-end pipe is used, suitable excavation shall be made so the bell portion of the pipe will not bear on the bottom of the tunnel. Continuous tunnels shall be completely backfilled as soon as the sewer pipe is laid and the joint material has properly set. The backfilling may be done by air-blown methods provided the required compaction as specified in Section 19-3.06, "Structure Backfill," of the Standard Specifications is obtained, or it shall be rammed with proper tools until compacted to the required amount.

All supports required by the Trench Excavation Safety Plans shall be removed after construction is completed, unless otherwise directed by the Engineer, and shall be withdrawn in a manner that will prevent the caving of the sides of the excavation. All openings caused by the removal of supports shall be filled with suitable material properly compacted.

Install PVC pipe in accordance with plans. Over excavate the trench for PVC pipe to a depth 300mm below the bottom of the pipe, the proper grade with bedding material, and tamp thoroughly. After Pipe is laid, backfill the trench with sand to 300mm above top of the pipe.

10-4.09 FLUSHING WORK

Provide temporary and permanent piping, equipment, and materials required for flushing work. Coordinate cleaning of connections to existing systems with the Engineer.

If equipment and piping systems are not properly cleaned and flushed, pay for resultant damage, necessary cleaning and flushing of systems to which connection was made, and subsequent inspection at no additional cost to the State.

Clean out settled debris and dirt in the manholes after the flushing operation.

Dispose of flushing water per governing codes and regulations and as directed by the Engineer. The Contractor shall provide the necessary equipment and manpower to properly dispose of the flushing water as directed by the Engineer.

10-4.10 CLEANING GRAVITY LINES

All new sanitary sewer lines and at least 150 m downstream to the closest manhole shall be cleaned by means of a pneumatic sewer cleaning ball and/or hydroflushing as directed by the Engineer. The sewer ball shall be of the Wayne type or approved equal. The sewer ball shall be the appropriate size to fit flush with the inside diameter of the sewer main to be cleaned. The cleaning ball shall be introduced into the sewer at the uppermost manhole and passed down grade by a line with a sufficient head of water to carry the ball slowly along the inside of the pipe. Where sewer balls will not pass through the sewer, the cleaning ball shall be removed and the obstruction removed.

All cleaning to be coordinated and approved with Orange County Sanitation District (OCSD).

The Contractor shall be required to remove all debris collected during the cleaning operation.

After cleaning the sewer main the Contractor shall thread a 6.35 mm nylon rope through the pipeline from manhole to manhole. Three (3) meters of slack shall be left in each manhole and the rope shall be securely attached to the manhole.

SANITARY SEWER SYSTEM TESTING

THE REQUIREMENT

The Contractor shall furnish all tools, equipment, materials, and supplies and shall perform all labor required to complete the work as indicated on the Plans and specified herein.

This section covers the performance of all pipeline flushing and testing, complete, for sanitary sewer system piping as specified herein and in accordance with the requirements of the Contract Documents.

REFERENCE SPECIFICATIONS, CODES AND STANDARDS

Comply with the applicable reference specifications as specified in the General Requirements.

Comply with the current provisions of the following Standard.

Standard Specifications SSPWC Section 306-1.4, Testing Pipelines.

CONTRACT SUBMITTALS

Submittals shall be made in accordance with the General Requirements.

The Contractor shall submit in writing all proposed plans for testing, and for water conveyance, control and disposal. The Contractor shall also submit written notice 48 hours in advance of the proposed testing schedule for review and concurrence of the Engineer.

GENERAL

Temporary valves, plugs, bulkheads, and other air pressure testing and water control equipment and materials shall be provided by the Contractor subject to the Engineer's review. No materials shall be used which will be injurious to pipeline structure and future function. Air test gages shall be laboratory-calibrated annually and shall be recalibrated by a certified laboratory at the Contractor's expense prior to the leakage test, only if required by the Engineer

Unless otherwise specified, the Contractor shall furnish and pay for water for testing.

All pipeline trenches shall be backfilled and compacted prior to testing of pipe.

Release of water from pipelines, after testing has been completed, shall be performed as reviewed by the Engineer.

All testing operations shall be performed in the presence of the Engineer.

TESTING OF PIPELINE

General: All gravity sewer pipes shall be tested for exfiltration and/or infiltration and deflection, as specified. All manholes shall be tested for leakage. Manholes shall be tested prior to backfill placement, whereas all pipe shall be backfilled and compacted prior to testing. All leakage tests of sanitary sewer systems shall be in conformance with SSPWC Section 306-1.4. For pressure sewers (force main) tests, the water pressure shall be measured at the lowest point of the pipeline section being tested.

Water Exfiltration Test shall be in conformance with SSPWC Section 306-1.4.2.

Water Infiltration Test shall be in conformance with SSPWC Section 306-1.4.3. Unless otherwise specified, infiltration will be measured by the Contractor using measuring devices approved by the Engineer.

Air Pressure Test shall be in conformance with SSPWC Section 306-1.4.4.

At the Contractor option, joints may be air tested individually, joint by joint, with the use of specialized equipment. The Contractor shall submit its joint testing procedure for the Engineer's review and approval prior to testing. Prior to each test, the pipe at the joint shall be wetted with water. The maximum test pressure shall be 3.0 psi. The minimum allowable pressure drop shall be 1.0 psi over a 30-second test period.

Water Pressure Test shall be in conformance with SSPWC Section 306-1.4.5.

Deflection Test: All flexible and semi-rigid main line pipe shall be tested in accordance with SSPWC Sections 306-1.2.12 and 306-1.2.13 for deflection, joint displacement, or any other obstruction by passing a rigid mandrel through the pipe by hand, not less than 30 days after completion of the trench backfill, but prior to permanent resurfacing. The mandrel shall be a full circle, solid cylinder, or a rigid, non-adjustable, odd-numbered leg (9 leg minimum) steel cylinder, accepted by the Engineer as to design and manufacture. The circular cross section of the mandrel shall have a diameter of at least 95 percent of the specified average inside diameter of the pipe and the minimum length of the circular portion of the mandrel shall be equal to the nominal diameter of the pipe. Obstructions encountered by the mandrel shall be corrected by the Contractor.

TESTING OF MANHOLES

All sewer manholes shall be vacuum-tested per ASTM C-1224 for leakage after installation, but prior to being backfilled. Prior to hydrostatic testing, all manholes shall be visually inspected for leaks. All leaks or cracks shall be repaired by the Contractor, prior to vacuum testing, to the satisfaction of the Engineer. All pipes entering the manhole shall be sealed at a point outside the manhole walls so as to include testing of the pipe/manhole joints. The Contractor shall then be required to make all necessary repairs and retest the manhole. The exterior of the manhole shall be inspected during this period for visible evidence of leakage.

Manholes and appurtenances shall be as watertight and free from infiltration as possible. Any evidence of leakage shall be repaired to the satisfaction of the Engineer at the expense of the Contractor.

When, in the Engineer's opinion, the groundwater table is too low to permit visual detection of leaks, project manholes shall be hydrostatically tested.

All costs of testing manholes for water-tightness shall be included in the appropriate contract unit price.

10-4.13 MEASUREMENT

Sewer work performed will be designated in the Engineer's Estimate by size, type, or thickness.

The length of the various types of sewer pipes to be paid for by the meter will be the slope length designated by the Engineer. Pipe placed in excess of the length designated will not be paid for, unless pipes are cut to fit structure. When pipes are cut to fit a structure, the quantity to be paid for will be the length of pipe placed before cutting, measured in 0.6 meter increments. Pipe bends, wyes, tees and other branches will be measured by the linear meter for the sizes of pipes involved. Bends will be measured along center lines. Wyes, tees and other branches will be measured along center lines to the point of intersections.

Quantities of sewer manholes will be determined as units from actual count.

Manhole frames and covers will be measured as miscellaneous iron and steel as provided in Section 75, "Miscellaneous Metal," of the Standard Specifications.

10-4.14 PAYMENT

The contract prices paid per meter for the various sizes and types of sewer pipe; the contract price paid per kilogram for miscellaneous iron and steel for frames and covers; and the contract unit price for concrete sewer manhole shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the sewer facilities, complete in place, as shown on the plans, and as specified in the specifications and these special provisions, and as directed by the Engineer.

Full compensation for concrete used in constructing manhole bases involved in constructing the sewer facility, as shown on the plans and as directed by the Engineer, shall be considered as included in the contract prices paid for the various items of sewer work involved and no separate payment will be made therefor.

Full compensation for all structure excavation, structure backfill, imported bedding material placement, bar reinforcement, providing temporary sewer system, capping open ends of pipe, joining of pipe to other pipe or structure, shaping bottoms of existing and new manholes, remodeling manhole bases, utility support and protective work operations required to accommodate or safeguard public traffic, testing sewer piping, flushing, and cleaning the sewer line, furnishing and disposing of water used for testing and flushing work and cleaning gravity lines and all other incidental work and material required to construct the sewer system and conforming to the requirements of this section and these special provisions, shall be considered as included in the contract prices paid for the various contract items of sewer work and no additional compensation will be allowed therefore.

ENGINEER'S ESTIMATE
12-056214

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
81	260201	CLASS 2 AGGREGATE BASE	M3	4330		
82	390102	ASPHALT CONCRETE (TYPE A)	TONN	24 500		
83	390108	ASPHALT CONCRETE BASE (TYPE A)	TONN	23 100		
84	394048	PLACE ASPHALT CONCRETE DIKE (TYPE E)	M	1460		
85	394049	PLACE ASPHALT CONCRETE DIKE (TYPE F)	M	38		
86	490566	FURNISH STEEL PILING (HP 360 X 132)	M	4340		
87 (S)	490567	DRIVE STEEL PILE (HP 360 X 132)	EA	284		
88 (S)	490655	400 MM CAST-IN-DRILLED-HOLE CONCRETE PILING	M	790		
89 (S)	490656	450 MM CAST-IN-DRILLED-HOLE CONCRETE PILING	M	495		
90 (S)	038953	1220 MM CAST-IN-DRILLED-HOLE CONCRETE	M	9		
91 (S)	500001	PRESTRESSING CAST-IN-PLACE CONCRETE	LS	LUMP SUM	LUMP SUM	
92 (S)	500050	TIEBACK ANCHOR	EA	103		
93 (F)	040271	STRUCTURAL CONCRETE, ANCHOR SLAB	M3	235		
94 (F)	510050	STRUCTURAL CONCRETE	M3	780		
95 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	M3	600		
96 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	M3	3530		
97 (S)	038954	STRUCTURAL CONCRETE (TRAFFIC SIGNAL)	M3	46		
98 (F)	510060	STRUCTURAL CONCRETE, RETAINING WALL	M3	502.2		
99 (F)	510072	STRUCTURAL CONCRETE, BARRIER SLAB	M3	940		
100 (F)	510088	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N MODIFIED)	M3	220		

ENGINEER'S ESTIMATE**12-056214**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
101 (F)	510220	CLASS 3 CONCRETE (BACKFILL)	M3	490		
102 (F)	510413	CLASS 1 CONCRETE (BOX CULVERT)	M3	132.4		
103 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	M3	196.3		
104	510524	MINOR CONCRETE (SOUND WALL)	M3	60		
105 (F)	511064	FRACTURED RIB TEXTURE	M2	2500		
106	511127	FURNISH DECK OVERLAY (CONCRETE)	M3	50		
107 (F)	511128	PLACE DECK OVERLAY (CONCRETE)	M2	370		
108 (S-F)	518002	SOUND WALL (MASONRY BLOCK)	M2	5902		
109	518025	FOOTING (SOUND WALL)	M3	9		
110 (S-F)	518201	MASONRY BLOCK WALL	M2	42		
111 (S-F)	038955	INSTALL METAL SOUND WALL	M2	220		
112 (S)	519144	JOINT SEAL (MR 50 MM)	M	90		
113 (S-F)	040272	BAR REINFORCING STEEL, ANCHOR SLAB	KG	13 800		
114 (S-F)	520101	BAR REINFORCING STEEL	KG	68 900		
115 (S-F)	520102	BAR REINFORCING STEEL (BRIDGE)	KG	614 000		
116 (S)	038956	BAR REINFORCING STEEL (TRAFFIC SIGNAL)	KG	1700		
117 (S-F)	520107	BAR REINFORCING STEEL (BOX CULVERT)	KG	17 968		
118 (S-F)	530100	SHOTCRETE	M3	60		
119 (F)	560218	FURNISH SIGN STRUCTURE (TRUSS)	KG	10 400		
120 (S-F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	KG	10 400		

ENGINEER'S ESTIMATE
12-056214

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
141	705227	900 MM CONCRETE FLARED END SECTION	EA	2		
142	038959	TEMPORARY 600 MM CONCRETE FLARED END SECTION	EA	3		
143	707244	900 MM PRECAST CONCRETE PIPE MANHOLE	M	5		
144	721024	ROCK SLOPE PROTECTION (1/4T, METHOD B)	M3	76		
145 (F)	040273	SLOPE PAVING (SPLIT FACE PAVERS)	M2	730		
146	729010	ROCK SLOPE PROTECTION FABRIC	M2	160		
147	731504	MINOR CONCRETE (CURB AND GUTTER)	M3	170		
148	731516	MINOR CONCRETE (DRIVEWAY)	M3	15		
149 (F)	731517	MINOR CONCRETE (GUTTER)	M	263		
150	731521	MINOR CONCRETE (SIDEWALK)	M3	340		
151	731531	MINOR CONCRETE (RED BRICK PATTERN)	M2	150		
152	731535	MINOR CONCRETE (BUS PAD)	M3	65		
153	731623	MINOR CONCRETE (CURB RAMP)	M3	10		
154	038960	MINOR CONCRETE (STAIRWAY)	M3	16		
155 (F)	750001	MISCELLANEOUS IRON AND STEEL	KG	10 632		
156 (S-F)	750505	BRIDGE DECK DRAINAGE SYSTEM	KG	2600		
157 (S)	800391	CHAIN LINK FENCE (TYPE CL-1.8)	M	1840		
158 (S)	802590	1.8 M CHAIN LINK GATE (TYPE CL-1.8)	EA	1		
159	820107	DELINEATOR (CLASS 1)	EA	38		
160	820118	GUARD RAILING DELINEATOR	EA	21		

ENGINEER'S ESTIMATE
12-056214

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
181 (S)	840563	200 MM THERMOPLASTIC TRAFFIC STRIPE	M	1750		
182 (S)	840564	200 MM THERMOPLASTIC TRAFFIC STRIPE (BROKEN 3.66 M - 0.92 M)	M	240		
183 (S)	840567	100 MM THERMOPLASTIC TRAFFIC STRIPE (BROKEN 1.83 M - 0.30 M)	M	310		
184 (S)	840570	100 MM THERMOPLASTIC TRAFFIC STRIPE (BROKEN 10.98 M - 3.66 M)	M	4850		
185 (S)	840571	100 MM THERMOPLASTIC TRAFFIC STRIPE (BROKEN 5.18 M - 2.14 M)	M	570		
186 (S)	850101	PAVEMENT MARKER (NON-REFLECTIVE)	EA	4770		
187 (S)	850111	PAVEMENT MARKER (RETROREFLECTIVE)	EA	1570		
188 (S)	860150	SIGNAL AND LIGHTING (TEMPORARY)	LS	LUMP SUM	LUMP SUM	
189 (S)	038965	SIGNAL AND LIGHTING (REMOVE)	LS	LUMP SUM	LUMP SUM	
190 (S)	860251	SIGNAL AND LIGHTING (LOCATION 1)	LS	LUMP SUM	LUMP SUM	
191 (S)	860252	SIGNAL AND LIGHTING (LOCATION 2)	LS	LUMP SUM	LUMP SUM	
192 (S)	860253	SIGNAL AND LIGHTING (LOCATION 3)	LS	LUMP SUM	LUMP SUM	
193 (S)	860401	LIGHTING	LS	LUMP SUM	LUMP SUM	
194 (S)	860501	SIGN ILLUMINATION	LS	LUMP SUM	LUMP SUM	
195	860792	COMMUNICATION CONDUIT (BRIDGE)	M	910		
196	860796	SPRINKLER CONTROL CONDUIT (BRIDGE)	M	110		
197 (S)	860797	ELECTRIC SERVICE (IRRIGATION)	LS	LUMP SUM	LUMP SUM	
198 (S)	860930	TRAFFIC MONITORING STATION	LS	LUMP SUM	LUMP SUM	
199	BLANK					
200	150241	ABANDON SEWER PIPE	M	96		

ENGINEER'S ESTIMATE
12-056214

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
201	150224	ABANDON SEWER MANHOLE	EA	1		
202	150824	REMOVE SEWER MANHOLE	EA	2		
203	150841	REMOVE SEWER PIPE	M	74		
204	490570	FURNISH STEEL PILING (HP 360 X 174)	M	466		
205 (S)	490571	DRIVE STEEL PILING (HP 360 X 174)	EA	37		
206	010444	300 MM PVC SEWER PIPE	M	180		
207	010445	1525 MM SEWER MANHOLE	M	11		
208	010446	1825 MM SEWER MANHOLE	M	16		
209	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

TOTAL BID: _____