

STANDARD NOTES AND SPECIFICATIONS

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CITY OF FOUNTAIN VALLEY- PUBLIC WORKS

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PUBLIC WORKS STANDARD NOTES



MARK B. LEWIS
Director of Public Works/City Engineer
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CITY OF FOUNTAIN VALLEY

SPECIAL NOTES

Inspection

Inspection by the soils engineer, geotechnical engineer, or engineering geologist shall be performed during all filling and compacting operations to verify that the fill operations were performed in accordance with the soils report on file for the project and the accepted standards and specifications. Soils engineer shall certify compaction of all pad elevations to the City of Fountain Valley.

Seasonal Limitations

No fill materials shall be placed, spread, or rolled during unfavorable weather conditions. When work is interrupted by heavy rains, fill operations shall not be resumed until the field tests by the soils engineer, geotechnical engineer, or engineering geologist indicate that the moisture content and density of the fill are as previously specified.

Private Engineer's Notice to Contractor

The existence and location of any underground utilities or structures shown in these plans are obtained by a search of available records, and to the best of our knowledge, there are not existing utilities except those shown on these plans. The contractor is required to take all precautionary measures to protect the utilities shown, and any other lines or structures not shown on these plans, and is responsible for the protection of and any damage to these lines or structures.

The construction contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project, including safety of all persons and property. This requirement shall apply continuously and not be limited to normal working hours. The construction contractor shall defend, indemnify, and hold harmless the City, its employees, elected officials and agents from any and all liability, real or alleged, in connection with the performance of work on this project.

The contractor shall be responsible to report discrepancies in plans and/or field conditions immediately to the design engineer for resolution prior to construction and shall be responsible for discrepancies not so reported and resolved.

GENERAL NOTES

Applicable Provisions

All applicable provisions of the Building Code and the Standard Specification for Public Works Construction, hereinafter referred to as the “Green Book”, the most recent edition, as adopted by the City of Fountain Valley, shall be complied with during all grading and paving operations.

Soils Investigation

The contractor is hereby notified that a soils investigation was performed by_____. All recommendations made by the soils engineer, geotechnical engineer, engineering geologist or the site engineer shall be complied with, and the contractor is required to review the soils investigation report to familiarize himself/herself with the job site conditions.

Existing Asphalt Concrete

The onsite existing asphaltic concrete paving shall be demolished and disposed of in an approved manner. If approved in advance by the soils engineer, geotechnical engineer, engineering geologist or the site engineer, and the Fountain Valley Public Works Inspector, the asphaltic concrete may be used to produce miscellaneous base material to be used below the new paving section, in the parking areas only.

Earthwork Quantities

Earthwork quantities are estimated for permit purposes only. The grading contractor shall inspect the grading plan and calculate quantities for bid purposes.

Inspection Schedule

The following inspection schedule (as suggested by the Uniform Building Code), subject to modification by the City of Fountain Valley, is presented herein as a guideline for the contractor to follow:

Excavation and Fill Inspection

The permittee or his agent shall notify the Public Works Inspector a minimum of 24 hours before the grading operation is ready for each of the following operations:

1. Initial Inspection: When the permittee is ready to begin work, but before any grading or brushing is started.
2. Toe Inspection: After the natural ground is exposed and prepared to receive fill, but before any fill is placed.

3. Excavation Inspection: After the excavation is started, but before the vertical depth of the excavation exceeds ten feet.
4. Fill Inspection: After the fill emplacement is started but before the vertical height of the lifts exceed ten feet.
5. Drainage Device Inspection: After forms and pipe are in place, but before any concrete is placed.
6. Rough Grading: When all rough grading has been completed.
7. Final: When all work, including installation of all drainage structures and other protective devices, has been completed and the as-graded plan and required reports have been submitted.

Dimensions and Elevations

All dimensions shown hereon shall be verified by the grading contractor. The building layout shall be in accordance with approved grading, site and architectural plans. The engineer of record for the rough and/or precise grading plan shall provide rough and/or precise grading certificates to the City prior to final approval of the grading operations.

Dust Control

The grading contractor shall maintain dust control at all times.

Final Clean Up

Only Rainbow Disposal will be allowed to provide construction bins for rubbish disposal within the City of Fountain Valley.

As Builts

Contractor shall maintain and be required to submit "As Built" plans to the City prior to receiving final inspection and approval. All "As Built" changes shall be maintained on one master copy and approved and initialed by the City Project Inspector prior to implementation in the field. The final "As Built" plans shall be submitted on 24" x 36" mylar and digitally in an AutoCAD format (contact the City's Engineering Department for AutoCAD version required).

STANDARD GRADING NOTES

1. All work shall be done in accordance with the grading code of the City of Fountain Valley, the Uniform Building Code, "The Standard Specifications for Public Work Construction," hereinafter referred to as "Green Book", the most recent edition, and special requirements of the permit.
2. No grading shall be started without first notifying the Public Works Inspector and obtaining the required permits.
3. The grading contractor shall notify the Public Works Inspector for inspection and obtain approval of the completed grading.
4. The Design Engineer shall submit to the City Engineer a Final Grading Certificate in accordance with City requirements. The Final Grading Certificate shall be submitted to the City at the completion of the grading operation and prior to issuance of a Certificate of Occupancy.
5. All rough grade pads shall be constructed 5' minimum outside of the buildings.
6. Cut slopes shall be no steeper than 2' horizontal to 1' vertical.
7. Fill slopes shall be no steeper than 2' horizontal to 1' vertical and shall have not less than 90% compaction to the finished surface.
8. Fills shall be compacted throughout to 90% density, as determined by A.S.T.M. Standard D1557 and certified by a soils engineer, geotechnical engineer, or engineering geologist.
9. Dust shall be controlled by daily watering.
10. Sanitary facilities shall be maintained on the site.
11. Subgrade shall be prepared prior to the casting of concrete slabs to the satisfaction of the soils engineer and the public works inspector.
12. Elevations shown in parentheses and dashed contour lines are existing.
13. Clear and remove all deleterious vegetation, such as trees, logs, roots, brush, grass, weeds, and other objectionable material prior to commencing grading.
14. All materials removed shall be taken from the building site and disposed of in a lawful manner by the contractor.
15. Areas over which fills are to be placed shall first be scarified to provide a bond between the existing ground and the material to be deposited thereon.

16. Fill materials shall be placed in horizontal layers such that the compacted thickness of each layer does not exceed 8 inches.
17. At the time of compaction, the moisture content of the fill material shall be such that the specified relative compaction will be obtained and fill will be firm, hard, and unyielding. Subgrade shall be compacted to 90% relative compaction.
18. If wet clay or expansive, organic soil is encountered, it shall be removed to a sufficient depth and area that when suitable material is imported and substituted for that material which was removed, 90% relative compaction of the subgrade can be obtained.
19. Subgrade shall be prepared such that it does not vary by more than 0.10 foot from the specified grade or cross-section.

STANDARD PAVING NOTES

1. Aggregate base shall be deposited on the construction site in such quantity that its compacted thickness will be within 0.02 foot of the plan grade or cross-section.
2. A compactive effort shall be applied until 95% relative compaction of the aggregate base is achieved.
3. Before any asphalt is laid, a **Thermoplastic Polymer Modified High Performance Seal – Bonding Agent** (“trackless” tack) shall be placed prior to the placement of the asphalt concrete material.

General:

This shall consist of a bituminous surface pavement seal for tacking HPS-BA to bituminous surface for stress relieving membrane systems. The Tack shall be composed of a blend of elastic polymer modified asphalt and thermoplastics resins. The material shall be applied at 325-425 Fahrenheit with a distributor truck at typical application rates of 0.15-0.25 gal/s.y. The exact amount will be determined by surface conditions.

4. Private Development: Asphalt concrete shall be placed in accordance with the Green Book Specifications and the project’s Pavement Report.

Residential Development: Asphalt concrete pavement shall be placed on the prepared aggregate base by means of self propelled mechanical spreading and finishing machine. Placement of lifts shall be in accordance with the Green Book Specifications. A minimum of two (2) lifts shall be placed. The finish surface shall be a ½” mix and a minimum thickness of 1 ½”. The final lift shall not be placed until completion of all site work.

5. At the time of delivery to the site of the work, the temperature of the AC mixture shall not be lower than 275 degrees Fahrenheit nor higher than 350 degrees Fahrenheit, the lower limit to be approached in warm weather and the higher in cold weather. All asphalt to be PG 64-16.
6. Areas of asphalt concrete inaccessible to compaction by power roller or abutting concrete pavement, shall be compacted by use of vibrating compactors or other mechanical means.
7. Areas of asphalt accessible to compaction equipment shall be rolled with a roller weighing at least twelve tons.
8. If pneumatic rollers are used for either breakdown or intermediate rolling, the roller shall weigh 12 to 15 tons, with tires inflated to 90 psi.

9. Number of rollers on project shall be sufficient to accommodate satisfactory compaction.
10. Initial rolling shall commence longitudinally at the lower elevations, such as flow lines, and proceed, parallel to such lines, toward the higher elevations. Rollers shall not cross flowlines at any angle other than 90 degrees thereto. Initial rolling shall be started as soon as possible after the material has been spread, without causing excessive checking and shall consist of at least two full coverages with the drive wheel.
11. Finish rolling shall be started after the pavement has cooled sufficiently to permit removal of the roller marks and shall be continued in whatever direction is required to produce a dense, thoroughly compacted pavement, free of roller marks and showing no significant movement under the wheels of the roller.
12. The pavement surface, when completed, shall be smooth, dense, well-bonded, and of uniform texture and appearance. All areas shall drain freely. Flow lines shall be free of depressions which permit water to stand.
13. The contractor shall clean up the job site prior to acceptance of the work. All dirt, soil, and debris of any nature shall be removed and the entire site shall present a clean, neat appearance. There shall be no storage of materials or equipment allowed within the dedicated street right-of-way.
14. ARHM shall comply with all requirements set forth in standard specifications for Public Works Construction "Green Book". The finish surface shall have a minimum thickness of 2".
15. In situations when a paving job requires the reconstruction of curb and gutter, the curb and gutter shall be cast a minimum of 72 hours in advance of asphalt replacement.

WATER GENERAL NOTES

1. All utility installations shall conform to most recent edition of The Standard Specifications for Public Works Construction (“Green Book”) and the City of Fountain Valley Public Works Standard Plans on file in the City Engineers office, or on the City website.
2. All materials shall conform to the latest revision of AWWA Standards.
3. All water connections and water supplied equipment shall conform to the California Code of Regulations, Title 17 and related references and to the City of Fountain Valley Municipal Code 14.16.080 pertaining to cross connection. For information, contact the Water Quality Technician in the Utilities Division of the Public Works Department.
4. Elevation and Utility Conflict: All large development, industrial, commercial, residential installing new water system, water mains, hydrant laterals, services and meters shall be planned and graded so as not to conflict with other utilities. Due to sewer and storm drain fall, it is the contractor responsibility to, prior to submitting of plans; determine all utilities (Water, Gas, Electrical, Sewer, Storm Drain, Communication, etc.) elevations and potential conflicts prior to plan submittal so as to determine any conflict. Elevations shall be determined prior to construction and elevation conflicts of water line with other utilities should be avoided in order to eliminate the need for siphons and inverts prior to construction.
5. Designed in the plans and/or prior to any construction all water service lines shall be perpendicular to the center line of the water main and the meter connection they serve. The contractor shall ascertain the correctness of water service location(s) with the development. Any deviation from this in the plan stage or during construction shall require approval by the City’s Utilities Manager or Water Supervisor.
6. Contractor shall expose all joint / connection points to the existing water system for verification of location, pipe material, elevation and diameter before construction.
7. Grade stakes are to be set every 50 feet for water lines and every 25 feet for sewer lines.
8. All water lengths are calculated on the horizontal distance along the centerline of the water main.
9. Fire hydrants are to be installed and operational prior to delivery of combustible materials to the project site.

10. No facility shall be backfilled until inspected by the City Inspector. All pipe, fittings, and valves shall be properly bedded with sand and compacted in multiple lifts to a minimum cover of 12" of sand.
11. Water mains and appurtenances shall be installed prior to paving.
12. Contractor shall adjust valve boxes to grade after completion of paving. All valve risers shall be clean and free of debris.
13. All plastic pipes, sizes 4"–12", shall be C-900 Polyvinyl Chloride (PVC), Class 200 DR 14. The pipe must be in compliance with AWWA Standard No. C-900 latest version. All plastic pipes, sizes 14"–18", shall be C-905 Polyvinyl Chloride (PVC) C 235 DR 18 and must be in compliance with AWWA Standard No. C-905 latest version.
14. Installation of C-900 Polyvinyl Chloride: (PVC) pipe shall be in compliance with AWWA, Manual No. M23. A metallic type detectable marking tape (ie; Type III by Lineguard, Inc. or approved equivalent) shall be placed one (1) foot above water mains, fire hydrant and fire service mains.
15. Shutdown of existing waterlines to facilitate the connection of new facilities shall be coordinated with the City of Fountain Valley Water Department within 48 hours prior to the start of construction. Shutdowns are limited to Monday through Thursday.
16. All water mains shall be installed with 36" minimum cover to top of pipe.
17. Provide 12" clearance between pipes at crossings. (or concrete encase the sewer or reclaimed water lines).
18. See Public Works Water Standard Specifications and Plans for service connections on C-900 or C-905 Polyvinyl Chloride (PVC) pipe. All service connections on asbestos cement pipe to have bronze double strap saddles at mainline.
19. Flare type fittings shall be used for all copper connections.
20. Tapping Tee's: Taps 3" or larger shall require installation of "TEE" with flanged outlet lateral no less than 6" to accommodate 6" valve and valve assembly installed a minimum of 3 ft. from any collar or fitting for plastic pipe and 6 ft. minimum for asbestos\ cement pipe.
21. All hot taps for service connections (1" - 2") to the City water main shall be a minimum of two (2) feet from any collar, joint or fitting.

22. 6" valve minimum required in system: All buried gate valves installed in this system for 3" and above applications shall be no less than 6" and can then be reduced after valve to meet application needs and or sizes. No 4" or below gate valves are allowed to be buried below surface grade.
23. All iron fittings shall be cement mortar lined and coated and conform to AWWA Standards C110 or C153.
24. All push on fittings and valves shall be restrained to the pipe with Uniflange Series T-1300C restrainers or approved equivalent.
25. All bolts installed underground shall be 316 Stainless Steel and coated with 3M tar coated #EC-244, Bitumastic 50 type coatings, and wrapped in 6 mil plastic sheeting and secured with 10 mil tape.
26. All bolts used for 1 ½" and above meter flange joining shall be Electrodeposited and Zinc coated.
27. C-900/C-905 Polyvinyl Chloride (PVC) pipelines, service taps, service lines, angle meter stops shall be pressure tested at minimum of 175 psi for a period of two (2) hours in conformance with AWWA Manual No. M23. All water used to pressure test shall pass through a metered device and witnessed by FV Inspector with read, and pressure recorded at start and end of test.
28. Before being placed in service, all water mains shall be disinfected with Chlorine Gas or Calcium Hypochlorite Tablets (5g tablets attached by a food grade adhesive) in accordance with AWWA Standard No.651-05 or its latest revision. Water samples shall be taken for bacteriological analysis (Coliform Test & Standard Plate Count (HPC) by a state of California Health Department Certified Laboratory. Sample location(s) will be determined by the City of Fountain Valley Water Department. Two (2) consecutive sets of samples, taken at least 24 hours apart, shall be collected from the new main. Each pass or fail result shall be forwarded or e-mailed to the City Inspector.
29. Contractor shall be responsible for incorporating and maintaining Best Management Practices (BMP's) in the dewatering, flushing and de-chlorination of water mains in compliance with the California Regional Water Quality Control Board NPDES (National Pollutant Discharge Elimination System) Regulations.
30. All fire hydrants installed in single family (R-1) developments shall have 4 ¼" openings. All other developments shall have 5 ¼" openings. See City Specifications and Plans for Water Appurtenances Manual for installation requirements.

31. All fire hydrants shall be a minimum of 3' from any permanent structure, per section 508.5.5 of the California Fire Code and a minimum of 15' from any commercial or industrial main arterial street drive approach/ apron.
32. Breakaway bolts are required on all fire hydrants.
33. One meter per residential consumer: Legislation requires a single domestic meter is provided and services each residential single family home as well as a single meter for each individual unit in multi-family development as well as a dedicated single meter for landscape irrigation purposes. Commercial and industrial development may utilize one meter to service both domestic and irrigation use with required back flow protection per city standard.
34. Water meters shall be purchased from the City of Fountain Valley. Large Development requiring \$10,000.00 or more are purchased by the developer. Meters purchased by the developer shall meet Fountain Valley specifications. All meter boxes placed in hardscape\ concrete areas shall be concrete meter boxes. No composite or fiber boxes allowed in hardscape\ concrete.
35. Meter boxes and meter lids for all meters shall be as specified in the Standard Specifications and Plans for Water Appurtenances Manual for meter installation.
36. Meter boxes are to be set with 6" minimum deep washed pea gravel.
37. A bypass shall be installed on all three (3) inch or larger meter installations. For bypass installation requirements, see Standard Specifications and Fountain Valley Standard No. 707.
38. Water service banks\manifolds for multiple dwellings, multi-family, commercial or industrial units of 4 or more services connection shall conform to standard plan no. 706-2. No multi meter copper manifolds are allowed. Spacing between service taps shall be spaced, whether individual or paired and depending on size of meter service, so that service lines are perpendicular to water main for the full length of the new service line, as per Fountain Valley standard plan no. 706-2.
39. Contractor shall maintain and submit "As Built" plans to the City prior to filing the Notice of Completion. All "As Built" changes shall be maintained on one master copy and approved and initialed by the City Project Inspector prior to implementation in the field. Two (2) sets of the final "As Built" plans shall be submitted on 24" x 36" mylar and digitally in an AutoCAD format (contact the City's Engineering Department for AutoCAD version required).
40. Contractor performing actual work on the City of Fountain Valley water lines or appurtenances **must** have a C-34 Pipeline Contractors License or a Class A General Engineering Contractors License. Any deviation must be approved by the Utilities Manager.

41. Interruption of Water Service: No valve or other control on the existing system shall be operated for any purpose by the contractor. All consumers affected by such operation shall be given a written notice letter by the contractor 48 hours before the expected water outage and probable time water will be restored. The notice letter shall be given to Fountain Valley Water Dept. for content approval at least 5 days before it is distributed.
42. Abandoning Structures: Where ever existing pipes, culverts, or conduits are cut and abandoned their open ends shall be securely closed by a solid mechanical cap, a wall of concrete not less than 6" thick or as directed by F.V. Inspector.
43. Separation of Water and Sanitary Sewers: To prevent the contamination of public water supplies from sanitary sewer the basic separation standards set forth by California Department of Public Health shall be required. The standards set forth, contained in Section 64630, Title 22, California Administrative Code specify:
- Parallel Construction: The horizontal distances between pressure water mains and sewer lines shall be at least 10'.
 - Perpendicular Construction: (Crossing) Pressure water mains shall be at least one foot above sanitary sewer lines where lines cross.
 - Separation distances: Shall be measured from the nearest edges of the facilities (i.e., from outside edge of water main to outside edge of sewer line or manhole.)
 - Common trench: Water mains and sewer lines must not be installed in the same trench. Any deviation from these requirements must be reviewed by F.V. inspector.
44. Shoring: All trench excavation shall be adequately protected to provide a safe working condition, and protection to adjacent facilities and structures. The contractor shall comply with all rules regulations and orders of the Division of Industrial Safety of the State of California.
45. **REQUIREMENTS FOR RESIDENTIAL FIRE SERVICE PROTECTION** TO MEET FOUNTAIN VALLEY MUNICIPAL CODE, TITLE 17 FIRE PREVENTION, CHAPTER 17.903.2 FIRE SPRINKLER SYSTEM REQUIRED, and CALIFORNIA CODE SECTION 903.2.

ADDITIONALLY FOUNTAIN VALLEY WATER GENERAL NOTES, SPECIFICATIONS AND STANDARDS APPLY.

ALL RESIDENCE MEETING THE REQUIRMENTS FOR FIRE SERVICE SYSTEM PROTECTION (TITLE 17 FIRE PREVENTION) WILL BE REQUIRED TO HAVE EXISTING, OR INSTALL, A 1" SERVICE AND 1" METER PER F.V. STD #702-1, F.V. STD #706-1 AND F.V. STD #728.

Field verification by the F.V. Engineering and/or Utilities Department will determine existing service and meter size. Service and meter size will be noted on the first set plan check outlining the requirements and responsibilities. The second plan set will need to detail any applicable requirements.

- A. If the existing copper service between the F.V. water main and meter is 1" AND the angle meter stop (AMS) at the meter is 1" x 1" the only requirement will be a 1" meter to be purchased from the City. If a 1" meter exists, then only a meter account will need to be established.

- B. If the existing copper service between the F.V. water main and meter is 1" BUT the AMS is a 1" x 3/4" , then it will be required to replace the AMS with a 1" x 1" AMS per F.V. STD #706-1. City Utilities Dept. will shut down the water main to accommodate the replacement of the AMS. Notification will be required to provide coordination and a 48 hour advance notice with City Inspector, F.V. Utilities Dept. and affected services for a water main shut down Monday thru Thursday between the hours of 9:00am and 3:00pm. A new 1" meter will be purchased from the City, and the old/existing meter must be returned to the City.

- C. If the existing copper service between the F.V. water main and meter is 3/4", then that service would need to be abandoned per F.V. STD #702-2, the old meter returned to the City and a new service would need to be installed per F.V. STD #702-1 and F.V. STD 706-1. All applicable F.V. General Notes and Specifications apply.
 - a. If it is determined upon exposure for abandonment that the corporation stop is not secured to the F.V. water main by a tapping saddle, and is screwed directly into asbestos cement pipe (ACP), abandonment per F.V. STD #702-4 will apply, as well as, coordination and a 48 hour advance notice with City Inspector, F.V. Utilities Dept. and affected services for a water main shut down Monday thru Thursday between the hours of 9:00am and 3:00pm. City will re-pressurize the line and check for leaks.

Nos. 2 and 3 will require any contractor performing actual work on City of Fountain Valley water lines or appurtenances to have a C-34 Pipeline Contractors License or a Class A General Engineering Contractors License and incorporate and maintain Best Management Practices (BMP's) and NPDES regulations.

46. For F.V. median projects involving irrigation supply water, the following shall apply: If there are existing services not being utilized for irrigation purposes, they shall be abandoned at the main as per STD. # 702-2 or as requested by the Utilities Dept. (or) all existing water service supply assets, whether they are utilized or not, MUST be maintained and or installed per F.V. STD. #706-1. For service supply laterals left in place, but not being utilized, the meter may be left out. If the service is being utilized, the city will furnish the meter.

If the size and location of the median is altered or moved and an existing angle meter stop and meter box do not fall within the median boundaries, it is the contractor's responsibility to see that the existing service is shortened or lengthened to fall within the boundaries of the median. They are NOT to be stubbed out in streets or roadways.

This method and these requirements apply to all service connections, whether domestic or irrigation.

SEWER GENERAL NOTES

1. All utility installations shall conform to the The Standard Specifications for Public Work Construction, hereinafter referred to as “Green Book”, and the City of Fountain Valley Public Works Standard Plans, on file in the City Engineer’s office.
2. The contractor shall obtain a City permit for all work done in the public right-of-way.
3. The contractor shall expose all joint points of the existing sewer system for verification of location and elevation before construction.
4. Contractor shall verify the horizontal and vertical location of all utility crossings before commencing work.
5. All sewer lengths are calculated on horizontal distance along the centerline of the sewer.
6. Grade stakes shall be set a minimum of every 25 feet.
7. Bedding material shall be No. 4 crushed rock or other material as specified by City Engineer of Fountain Valley.
8. All pipe joints and fittings shall be mechanical-compression joints, manufactured in accordance with A.S.T.M. C425-60T of an approved type.
9. All sewer frames and covers shall be left 6” below subgrade. Sewer contractors shall raise the manhole frame and cover to finish grade upon completion of surfacing.
10. Contractor shall maintain and be required to submit “As Built” plans to the City prior to receiving final inspection and approval. All “As Built” changes shall be maintained on one master copy and approved and initialed by the City Project Inspector prior to implementation in the field. The final “As Built” plans shall be submitted on 24” x 36” mylar and digitally in an AutoCAD format (contact the City’s Engineering Department for AutoCAD version required).
11. Contractor shall provide a continuous motion television inspection on all new sewer mains constructed. At least 1/3 of all joints shall be television inspected for the full circumference of the pipe joint. Contractor shall supply to the City a DVD of the television inspection and a written Field Log Report showing exact location of inspection and the condition of the sewer line, manholes, cleanouts, etc. Contractor shall submit the DVD and Field Log Report prior to acceptance of the sewer improvements or issuance of the Certificate of Occupancy.

CITY OF FOUNTAIN VALLEY- PUBLIC WORKS

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PUBLIC WORKS LIGHTING STANDARDS



MARK B. LEWIS
Director of Public Woks/City Engineer
R.C.E. 49335

CITY OF FOUNTAIN VALLEY

LIGHTING STANDARDS

MAJOR HIGHWAYS – 104' CURB TO CURB – 16,000 HPSV

Brookhurst, Warner, Harbor

Lights to be placed on both sides of the street – Spacing at 220± feet – Alternate lights on opposite side of the street so average distance is 110±.

PRIMARY HIGHWAYS- 84' CURB TO CURB- 9,500 HPSV

Garfield, Talbert, Edinger, Magnolia, Euclid

Lights to be placed on both sides of the street–Spacing at 220± feet– Alternate lights on opposite sides of the street so average distance is 110± feet.

SECONDARY HIGHWAYS – 64' CURB TO CURB- 16,000 HPSV

Ellis, Slater, Heil, Newland, Bushard, Ward, Newhope, Lilac

Lights to be placed on one side of the street at 220± foot spacing. If lights are alternated on opposite sides of the street, spacing between lights shall be maintained at 220± feet.

ALTERNATE INTERSECTIONS

Lights to be placed on all four corners in conjunction with traffic signal installations. See intersection lighting standards for signalized intersections.

SUBDIVISION STREETS & INDUSTRIAL AREA – SPACING 180± FEET

- A. Intersections – 5,800 HPSV
- B. All other – 5,000 HPSV

The following is the numbering system being used for the high-pressure sodium vapor lights:

5=	3,300 Lumen
7=	5,800 Lumen
10=	9,500 Lumen
15=	16,000 Lumen
20=	22,000 Lumen
25=	25,000 Lumen

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PUBLIC WORKS WATER STANDARD SPECIFICATIONS



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CITY OF FOUNTAIN VALLEY
WATER STANDARD SPECIFICATIONS

Plastic Pipe

All plastic pipes shall be C-900, Class 200(DR.14) for pipe sizes 4” through 12”and C905, Class 235(DR 18) for pipe sizes 14” through 18” Polyvinyl Chloride (PVC), Pressure Pipe unless otherwise stated on drawings. The pipe must be in compliance with AWWA Standard No. C-900 and C905 latest revisions. The pipe must conform to the following OD dimensions:

<u>PIPE SIZE</u>	<u>AVERAGE OD (in)</u>
4”	4 .80
6”	6 .90
8”	9 .05
10”	11.10
12”	13.20
14”	15.30
16”	17.40
18”	19.50

Pipe shall have Electrometric-gasket bell ends.

Pipe fittings shall be push on mortar lined ductile iron conforming to AWWA Standards No’s: C-153, C-110 and C-104 latest revisions. All pipe fittings shall be restrained.

"Transitional" rubber seal rings must be used with all 8-inch or larger push on fittings.

Hot taps 3/4-inch thru 2-inches shall utilize C-900/C-905 tapping saddles only, installed a minimum of 2 feet from any collar or fitting.

Allowed Tapping Saddles:

- Jones, J-965, J-996
- Ford, S-70 and S-90 or style 202BS
- Mueller, H-13440 to H-13444
- Romac 101BS, 202BS

NOTE: Direct taps will not be allowed.

Taps 6 inches and larger shall require installation of “TEE” and valve assembly installed a minimum of 3 feet from any collar or fitting per standards **No’s 705-1 thru 705-3.**

Installation of plastic pipe shall be in compliance with City Standard Plans and AWWA Manual No. M23. In addition, detectable marking tape, Type III, (as manufactured by Lineguard, Inc. or approved equal) shall be installed 1 foot above water mains, all service lines, detector check and fire hydrant mains.

Asbestos/Cement Pipe

All work with existing asbestos/cement pipe shall be in compliance with City Standard Plans, AWWA Standard C-603-05 and all applicable OSHA requirements. In addition, detectable marking tape, type III (as manufactured by Lineguard, Inc.) shall be installed 1 foot above all water mains, service lines, detector check and fire hydrant mains.

Applications to existing asbestos/cement pipes already in the ground shall utilize the following pipe fittings and shall be ring tight mortar line ductile iron conforming to AWWA Standard Nos. C-110 and C-104, latest revisions.

Hot Taps 3/4-inch thru 2-inches shall utilize bronze double strap tapping saddles only, installed a minimum of 2 feet from any collar or fitting.

Allowed Tapping Saddles:

- Jones, J979
- Ford, 202B
- Mueller, H-16123 to H-16137
- Romac 101BS, 202BS

NOTE: Direct taps will not be allowed.

Hot taps 6 inches and larger shall require installation of tee and valve assembly or utilize a mechanical joint tapping sleeve (must be approved by City's Utilities Manager) installed a minimum of 6 feet from any collar or fitting.

Allowed Tapping Sleeves:

- Ford, Fast 1275 to 2020, for 12 inches and larger taps
- Mueller, H619
- Waterous, Series 800A
- Romac Industries, Style SST & SST III, 316 Stainless Steel Tapping Sleeve with stainless steel flange
- Smith-Blair, 665 Stainless Steel Tapping Sleeve with stainless steel flange

Steel Pipe

Steel cylinder pipe shall be manufactured in accordance with AWWA Standard No. C-200 latest revision. The pipe shall have an interior and exterior lining of centrifugally spun mortar, minimum thickness of 1/2-inch, that conforms to AWWA Standard No. C-205 latest revision. The pipe shall be installed in accordance with City Standard Plans and AWWA Manual No. MII. All field welding shall conform to AWWA Standard No. C-206 latest revision. Field application of cement-mortar lining shall conform to AWWA standard C-602 latest revision.

NOTE: Any contracted welding activity must be approved by the City's Utilities Manager before actual welding may commence.

The following contractors are authorized to hot tap or weld on City steel pipe water mains. Any additional contractor wishing to complete this scope of work shall submit letter of application for approval to the City's Utilities Manager two (2) weeks prior to starting work.

- DOTY BROTHERS CONSTRUCTION CO.
- T.E. ROBERTS INCORPORATED
- ENGINEERED SYSTEMS & CONSTRUCTION, INC.
- KOPPEL CO.
- IFT, INC.
- PAULUS ENGINEERING, INC.
- ADAMS PIPE LINE TAPPING
- WELLS TAPPING SERVICE
- W.A. RASIC CONSTRUCTION

Ductile Iron Pipe

Ductile iron pipe shall conform to AWWA standard No. C-150/A21.50 and C151/A21.51 latest revisions. The pipe shall have an interior lining of centrifugally spun mortar that conforms to AWWA Standard No. C-104, latest revision. The pipe shall be installed in accordance with City Standard Plans and AWWA Standard No. C-600, latest revision.

Couplings (straight or transition)

Approved couplings:

1. ROMAC Style XR501 Extended range.
2. FORD – Style FC2W “Ultra – Flex”, FC2 Series
3. SMITH BLAIR – Style 461 & Style 462 “Quantrum”, Style 501
4. CLOW - Style 3501
5. POWERSEAL – Style 3501 or approved equivalent

Fittings

Fittings for plastic pipe -see plastic pipe Page No.1.

All flanges and fittings for steel pipe shall conform to AWWA Standards C-207 and C-208 respectively, and their latest revisions. The flanges and fittings shall be mortar lined inside and out in accordance with AWWA Standard No. C-205.

All fittings for ductile iron pipe shall conform to AWWA Standard No. C-110/A21.10 and C153/A21.53. The fittings shall be mortar lined inside in accordance with AWWA Standard No. C-205. All pipe fittings shall be restrained.

Service Connections

3/4-inch thru 2-inch service connections shall be installed in accordance with City Standard Plans. All fittings, corporation stops, couplings, saddles and other service connection appurtenances shall conform to AWWA Standard No. C-800 and shall be red brass conforming to NSF/ANSI61. All service lines shall be copper pipe, Type K, conforming to NSF/ANSI61.

6-inch thru 12-inch service connections shall be installed in accordance with City Standard Plans. All fittings and appurtenances shall conform to AWWA Standard No. C-800 unless otherwise stated.

NOTE: The following Contractors are authorized to hot tap or weld on City water mains. Any additional contractor wishing to complete this scope of work shall submit letter of application for approval to the City's Utilities Manager two (2) weeks prior to starting work.

- DOTY BROTHERS CONSTRUCTION CO.
- T.E. ROBERTS INCORPORATED
- ENGINEERED SYSTEMS & CONSTRUCTION, INC.
- KOPPEL CO.
- IFT, INC.
- PAULUS ENGINEERING, INC.
- ADAMS PIPE LINE TAPPING
- WELLS TAPPING SERVICE
- W.A. RASIC CONSTRUCTION

Valves

Resilient Wedge Valves:

All valves shall be resilient wedge type that conform to AWWA Standard No. C-509 and C-515 latest revisions. All fastener bolts and nuts must be 316 stainless steel. Each valve must be epoxy coated in accordance with AWWA Standard No. C-550.

All valves shall have a 2-inch square operating nut mechanically attached to the stem, unless otherwise shown on Standard Plan.

Valve ends shall accommodate the type of piping used. For use with C-900 PVC pipe larger than 8 inches, transitional rubber seal rings must be used.

Any valve installed more than 5 feet below grade level shall have an extension securely installed on the operating nut. The top of the extension shall be no more than 12 inches below finished grade. Valves shall be restrained to pipe utilizing restrainers for C-900 or ductile iron pipe.

At all 3-way crossings, "Tee", or water mains, two (2) valves (minimum) are required, unless otherwise stated on plans.

At all "Tee" tie-in locations, fire hydrant, hot tap, detector check, etc., one (1) valve is required on this tie-in main, unless otherwise stated on plans.

All valves and bolts shall be cleaned of all dirt, rust, and grease and coated, with 3M, EC-244, Bitumastic 50 coatings and wrapped with 6 mil visqueen protective sheeting, then secured with 10 mil tape. All valve bonnet and packing gland bolts shall be checked for tightness and meet manufacturers specifications at installation.

Valve Boxes shall be Brooks 4TT or J & R Concrete Products 4T or approved equal. Boxes shall be complete with cast-iron cover, marked "Water"

Valve Riser Pipe shall be 6-inch min. PVC Sch 40 pipe.

Approved valves are:

- Waterous, Series 500
- Mueller, Series A-2360
- M&H
- CLOW
- Mueller Series A-2473 (OS & Y)

Butterfly Valves:

All butterfly valves shall be rubber seated and conform to AWWA Standard No. C-504, latest revision. All fasteners, bolts and nuts must be 316 stainless steel. Each valve must be epoxy coated in accordance with AWWA Standard No. C-550, latest revision.

Approved valves are:

- Pratt, Groundhog -M & H, 450
- Mueller, Lineseal III
- M&H 450

Fire Hydrants

All dry barrel type fire hydrants shall conform to AWWA Standard No. C-502. Each type of fire hydrant must be installed according to manufacturer's specifications and City Standard Plans and shall have two – 2 ½" nozzles and one - 4" pumper nozzle.

All drain openings must be plugged before installation. All hydrants must be painted white with Rustoleum, Fire Hydrant Enamel- No.202483 or approved equal. All hydrant nozzle caps shall be cast iron.

In residential areas, all hydrants shall have a valve opening of 4 1/4-inch and spaced a maximum of 300 feet apart. All other development, the valve opening shall be 5 1/4-inch and spaced a maximum of 300 feet apart unless otherwise stated on plans.

Dry Barrel Fire Hydrants shall be used on all arterial and industrial roadways and be one of the following approved models:

- Iowa
- Mueller, Modern Centurion, only.

All Wet Barrel Fire Hydrants shall conform to AWWA Standard No. C503 latest revision. Fire Hydrant must be installed according to manufacturer's specification, City Standard Plans, and shall have one 2 1/2" nozzle and one 4" pumper nozzle. Approved Wet Barrel Fire Hydrants: Jones 4040D, Clow Model 850. All hydrant nozzle caps shall be cast iron. All hydrants shall be 6 bolt pattern, bolt holes are 3/4".

Domestic and Irrigation Backflow Protection

At any domestic or irrigation service where there is an actual or potential connection between the City's water system and any source or system containing any substance that is not considered potable or safe, the potential for back pressure exists or any domestic service with a fixture exceeding 20 feet above a water main shall require a Reduced Pressure Principle Device (RPPD). This device shall be approved by the University of Southern California (USC) "Foundation for Cross Connection Control and Hydraulic Research". This device is to be installed, maintained and tested yearly at owner's expense.

Fire Service Connection

All Double Check Detector Assemblies (DCDA) must be installed in accordance with City Standard Plans. Each assembly must have a Sensus iPerl bypass water meter (cubic feet register) plumbed according to Standard Plan. All devices shall be tested and certified at the time of installation by an Orange County Health Department Certified Backflow Prevention Device Tester.

All devices shall be painted red and have the OS&Y valves chained and locked in the open position with an approved breakaway or snap type lock per Fire Department requirements.

Approved Detector Check Valves:

Any Double Check Detector Assemblies (DCDA) that conform to the Standards of and are approved by the University of Southern California (USC) "Foundation for Cross Connection Control and Hydraulic Research".

Meter Fasteners

All fasteners, bolts and nuts securing 1 ½” and above Omni water meters in meter boxes or vaults shall be electrodeposited coated with zinc. Only 1 ½” and 2” Omni meters will require stainless steel washers against the meter flange face.

Fasteners

All buried below ground fasteners, bolts, nuts, T-bolts, anchor bolts, tire pods and screws shall be Type 316 stainless steel. Threads shall be coated with an antiseize and lubricating compound with graphite prior to installation. (Lawson Products Inc., “Lubri-temp”, Lube-master “lok-cease”, Tri-Pac blue 2000 coating system, or approved equivalent.)

All the above must be coated with 3M EC-244 or Bitumastic 50 coatings, wrapped in 6 mil visqueen protective sheeting, and secured with 10 mil tape.

ALL FASTENERS ARE THE RESPONSIBILITY OF THE CONTRACTOR

Restrainers

Pipe restrainers shall be utilized on all fittings and valves.

Allowed Pipe Restrainers:

Uniflange (Ford Meter Box Co.) - Series T-1300C

Star Pipe Products - Series 1000C

Sigma Corp. - PV-LOK Series PVM-C

Water Meters

All water meters, including Sensus Flex Net antenna and radio housing unit shall be purchased from and issued by the City. All fire service Double Check Detector Assembly by-pass meters, Sensus Flex Net antennas, radio housings and mounting brackets shall also be purchased from and issued by the City and then installed per Fountain Valley Standards Nos. 716-1 or 716-2. For fire service by-pass meters, the size of water meter shall be equivalent to by-pass piping size and installed in accordance with City Standard Plans. The minimum size shall be 5/8- inch. All antenna wiring shall be bundled and secured to by-pass piping by zip tie(s).

<u>SIZE</u>	<u>LAYING LENGTH</u>	<u>FLOW RANGE. GPM</u>	<u>MAX. CONTINUOUS FLOW GPM</u>
3/4"	9"	2 to 30	15
1"	10 3/4"	3 to 50	25
1 1/2"	13"	5 to 100	50
2"	17"	8 to 160	80
3"	17"	4 to 320	160
4"	20"	6 to 500	250
6"	24"	10 to 1,000	500

All water meters shall be "Sensus" Iperl or Omni (cubic feet register) unless otherwise stated on the Standard Plan. Each meter shall conform to AWWA Standards C-700, and C-702, latest revisions and conform to AWWA Standard No. C-708, latest revision.

Meter Boxes

Meter boxes shall be Old Castle, J & R Concrete, Southwest, Brooks, Eisel, or approved equal as stated in City Standard Plans.

Boxes constructed of Fiber Glass/Polymer are acceptable except in traffic areas, poured concrete and/or hardscape applications.

Each meter box must be installed over a 6-inch thick bed of clean pea gravel. The box shall be centered over the water meter so as the meter register is directly over the reading lid of the meter box and so that the box does not interfere with the operation of the angle meter stop or outlet ball valve, (insert or reading lid with "Sensus" Flex-Net probe hole required) on all meter box covers, for 3", 4" and 6" meter installations.

Meter Box Lids\Covers

All concrete or concrete polymer lids and inserts are required to be stamped "Water" and shall be constructed with a recessed circle and hole to receive Sensus Flex-Net antenna and radio housings. Meter lids subject to vehicular traffic shall be traffic rated at 20k or manufacturers equal. Steel lids are acceptable, except in areas where foot traffic is present and shall have a 2 1/8" Diameter hole cut into the steel to receive Sensus Flex antenna and radio housing. Contractor/ Developer will install Sensus Flex-Net antenna and radio housing purchased from the city. With meter and meter box in place, lids shall sit flush in meter box; antenna and radio housing shall not contact or interfere with the meter, valves or sides of the meter box.

Backflow Devices

All backflow devices shall conform to the Standards of and be approved by the "State Water Resources Control Board" and the "Foundation for Cross Connection Control and Hydraulic Research" (University of Southern California) or their latest revision.

The City's Utilities Manager shall determine the size and type of device. The devices shall be installed according to City Standard Plans. City owned and maintained devices shall be "Febco" Master series 860RP or equivalent.

The owner, developer, or contractor shall be responsible for the testing and certification of all devices at the time of installation. Annual certification by an Orange County Health Department Certified Backflow Prevention Device Tester shall be the responsibility of the owner.

On newly installed backflow prevention devices, a copy of certification shall be submitted to the public works inspector prior to final approval. There shall be no connections between the meter and backflow.

Coatings

All metallic fittings and appurtenances shall be coated with 3M EC-244 or Bitumastic 50 coating, wrapped in 6 mil visqueen protective sheeting, and secured with 10 mil tape.

Pressure and leakage Test of C-900 Pipe

Tests shall conform to AWWA Manual No. M23. The main shall be tested at a minimum of 175 psi for a period of 2 hours, during this time the allowable leakage rate is:

<u>PIPE SIZE</u>	<u>LEAKAGE PER 1.000 FT. OF PIPE</u>
6"	.57 gal/hr
8"	.76 gal/hr
10"	.96 gal/hr
12"	1.15 gal/hr

Water meters, backflow devices or fire service detector checks (DCDA) shall not be subjected to pressure tests.

Contractor is responsible for providing all necessary pumps, pipe fittings and connections including back flow protection and metering devices in order to pressurize new line.

The Fountain Valley Inspector shall witness and monitor pressure test, noting pressure and meter read at beginning and end of test.

Disinfection

Disinfection shall conform to AWWA Standard C-651.

Step A:

The new main shall be flushed at a rate of not less than 2.5 ft/sec. (see following chart)

<u>PIPE SIZE</u>	<u>GPM</u>
4"	100
6"	220
8"	390
10"	610
12"	880

The main shall be flushed until all debris and air have been removed.

Step B:

Chlorine shall be fed into the water at a continuous rate until a dosage of 50 ppm (mg/l) minimum is reached throughout the entire main and allowed to stand for 24 hours.

Step C:

After the 24 hour holding period, the "free chlorine residual" shall not be less than 10 ppm (mg/l). The main shall be flushed until the "free residual chlorine" concentration in the water leaving the main is no higher than 1 ppm (mg/l) throughout the entire main.

Step D:

Sample for Bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate by a "State of California Health Department Certified Laboratory" and tested within 4 hours of collection. Two consecutive sets of samples, taken at least 24 hours apart, shall be collected from the new main. At least one set of samples shall be collected from every 1,200 ft. of new main, plus one set from the end of the line and at least one set from each branch. A Coliform Test and a Hetrotrophic Plate Count (HPC) shall be performed on the samples. If the results of the samples are reported as absence (Coliform Test) and less than 100 (Heterotrophic Plate Count), the main may be placed into service upon authorization of the city water department.

NOTE: If the initial disinfection fails to produce satisfactory samples, Steps A thru D shall be repeated until satisfactory results are obtained.

All disinfection and flushing process shall be conducted in the presence of a certified laboratory. A certificate of compliance with the above process must be submitted to the public works department prior of final sign off.

Main Repair and Tie-in Disinfection

Swabbing and flushing:

The following should be considered used at a minimum during tie-ins and flushing.

a) Swabbing with hypochlorite solution

1. The interior of all pipe and fittings used in making tie-ins or repairs shall be swabbed with 5% hypochlorite solution before installation.

b) Flushing:

1. Thorough flushing shall be started as soon as repairs are completed and shall continue until discolored water or highly chlorinated water is completely eliminated.

Special Note:

Contractor shall be responsible for incorporating Best Management Practices (BMP) in the de-watering, flushing and de-chlorination of water mains in compliance with the California Regional Water Quality Control Board NPDES (National Pollutant Discharge Elimination System) regulations.

CITY OF FOUNTAIN VALLEY- PUBLIC WORKS

10200 SLATER AVENUE FOUNTAIN VALLEY, CA 92708-4736 (714) 593-4433, FAX: (714) 593-4554

PUBLIC WORKS TRAFFIC CONTROL STANDARD NOTES



MARK B. LEWIS
Director of Public Works/City Engineer
R.C.E. 49335

PUBLIC WORKS TRAFFIC CONTROL STANDARD NOTES

1. These standard notes and plans shall not relieve the contractor of the responsibility for jobsite conditions during the course of construction or maintenance work including safety of all persons, vehicles, and property.
2. All work, materials, practices, and principles shall comply with the Caltrans Standard Plans and Specifications latest edition, Manual of Uniform Traffic Control Devices latest edition, the Manual on Uniform Traffic Control Devices California Supplement latest edition, and the Work Area Traffic Control Handbook (WATCH) latest edition.
3. The Caltrans Standard Plans and Specifications latest edition, Caltrans Manual of Traffic Controls for Construction and Maintenance Work Zones latest edition, the Manual on Uniform Traffic Control Devices latest edition, and the Work Area Traffic Control Handbook (WATCH) latest edition, shall take precedence in the event of any question regarding the content of these standards.
4. No deviations or exceptions from these standard notes or plans within the WATCH shall be allowed without prior approval from the City Engineer.
5. Construction or maintenance activity in the roadway or affecting the public right-of-way shall be limited to the hours between 8:30 a.m. and 4:00 p.m. No temporary traffic devices shall be placed in the roadway until after 8:30 a.m. and shall be completely removed by 4:00 p.m. All excavation areas shall be completely covered with steel plates with a non-skid surface or temporarily backfilled and surfaced such that all lanes of traffic are restored and fully accessible to the public at the end of each day unless otherwise authorized.
6. Cones and delineators shall generally be placed on existing lane lines, except as necessary for lane closure tapers.
7. All striping and markings shall conform to the State of California Standard Plans and Specifications and the Manual on Uniform Traffic Control Devices latest edition.
8. All conflicting striping, markings, and legends shall be completely removed by an approved method prior to any change in the traffic pattern.
9. All existing signing shall be protected in place and free from obstructed view for traffic. In the event that existing signing is contradictory to temporary signing for construction, the contractor shall either completely cover the existing signing or

remove the signing and supporting posts entirely and replace the complete installation with new signing and supports at the conclusion of construction activities.

10. The contractor shall provide access to all adjacent properties at all times except as necessary for construction activities in the immediate vicinity of the work area.
11. Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to the public and abutting property owners.
12. The contractor shall have all signs, delineators, barricades, etc., properly installed prior to construction.
13. The contractor shall be responsible for maintaining, at all times, all signs, delineators, barricades, etc., to ensure proper flow and safety of traffic.
14. The contractor shall utilize flag men during work hours as required and as deemed necessary by the City to assist in maintaining safe traffic flow. Flag operations shall be pursuant to the WATCH latest edition.
15. The contractor shall be required to replace striping and legends to their original condition after completion of construction.
16. Barricades shall be used in addition to rubber guide posts as required by these standard plans and at the direction of the City, when they are intended to provide additional emphasis in areas where workers are present.
17. C27 "Open Trench" shall be used in conjunction with Type II Barricades during construction and nighttime closures as applicable.
18. When street closure is approved, the contractor shall notify the Police Department, the Fire Department, the local transit district (OCTA), and affected residents and businesses at least one week in advance of the closure.
19. All residential street access restricted by construction or maintenance activities shall be restored at the end of each working day unless otherwise approved by the City Engineer.
20. Temporary "No Stopping" zones shall be posted on 100' centers as necessary during construction operations. When a temporary "No Stopping" zone on a street is approved by the City Engineer, the contractor shall notify the Police Department and post "Tow Away, Temporary No Stopping" at least three (3) working days in advance. The duration of the temporary parking restriction shall be indicated on the signs.

21. When signal timing and/or signal modifications are necessary before or during the construction and it is approved by the City Engineer, the contractor shall notify the City by calling (714) 593-4433 at least three (3) working days in advance of the work to be done in order to coordinate the changes. The contractor shall provide personnel and the equipment to make the signal modifications and City shall make signal timing changes. All modifications resulting from the traffic control shall be restored by the contractor when the work is complete.
22. Contractor shall replace all traffic detection devices, signing, striping, markings, and legends damaged during construction to the satisfaction of the City Engineer.
23. Traffic control plans prepared by a registered traffic engineer or registered civil engineer in the State of California may be required if the complexity of the construction and its corresponding traffic control exceed the content of these standards.
24. These traffic control standard notes and the WATCH manual latest edition shall be used for traffic control in the work area during construction activities. Additional traffic controls, traffic signs, and/or barricades may be necessary or required in the field. The contractor shall be responsible for the placement of any additional devices necessary to assure safety to the public at all times during construction.