RESOLUTION NO. 2011-27

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ROHNERT PARK ADOPTING REVISED MANUAL OF STANDARD, DETAILS AND SPECIFICATIONS FOR WATER, STREETS AND ROADWAY SYSTEMS

WHEREAS, the City Council of the City of Rohnert Park adopted the "Manual of Standards, Details and Specifications" (the "Standards") on January 10, 2006 by Resolution No. 2006-19;

WHEREAS, the City Council of the City of Rohnert Park adopted the Bicycle Parking Standards adding to the Standards on November 28, 2006 by Resolution No. 2006-275;

WHEREAS, the City Council of the City of Rohnert Park adopted the Revised Sewer Standards on January 26, 2010 by Resolution No. 2010-08;

WHEREAS, materials and methods for construction have improved significantly;

WHEREAS, City Staff and the Professional Engineering community propose updating the Standards; and

WHEREAS, updating and improving the Standards will ensure that new construction is of the highest quality, therefore minimizing maintenance costs.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Rohnert Park that it does hereby adopt the revised Manual of Standard, Details and Specifications for the Water, Streets and Roadway systems in substantially similar form as attached hereto and incorporated herein as Exhibit A and further described as follows;

1. Volume 1, Chapter 1, Water Design Standards as shown on the attached revisions
2. Volume 1, Chapter 4, Street & Roadway Design Standards as shown on the attached revisions
3. Volume 2, Chapter 1, Water Detail Drawings as shown on the attached revisions
4. Volume 2, Chapter 4, Street & Roadway Detail Drawings as shown on the attached revisions
5. Volume 3, Construction Specifications, as shown on the attached revisions.

BE IT FURTHER RESOLVED that the City Clerk is hereby authorized and directed to keep on file the revised Water, Streets and Roadway Standards dated as of March 2011 in the Manual of Standards, Details and Specifications on behalf of the City of Rohnert Park.

DULY AND REGULARLY ADOPTED this 22nd day of March, 2011.

ATTEST: **CITY OF ROHNERT PARK**

City Clerk Mayor

AHANOTU: AYE	**CALLINAN: AYE**	**MACKENZIE: AYE**	**STAFFORD: AYE**	**BELFORTE: AYE**
AYES: (5)	**NOES: (0)**	**ABSENT: (0)**	**ABSTAIN: (0)**	

JH-S:05-d

City of Rohnert Park

Proposed Design Standards

City of Rohnert Park

Water
Design Standards

WATER DESIGN STANDARDS
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Volume 1

Design Standards

WATER DESIGN STANDARDS

I. PURPOSE

To provide guidelines for the design of water utilities projects and thereby reduce the time required for processing the plans. These guidelines do not include, but may reference, additional conditions which may be promulgated by all other pertinent ordinances, codes, and official policy set forth by the Utilities Department or other departments of the City of Rohnert Park or other government agencies. These guidelines establish minimum acceptable design criteria. More stringent requirements may be imposed by the City Engineer based on specific project conditions.

Portions of these standards apply to fire systems, both public and private, and are intended as general reference to aid in the design of the public water system. Final designs are subject to approval of the Fire Department.

It is the responsibility of the design engineer to initiate written requests to the City Engineer for approval of any design concepts that differ from these criteria, verify additional requirements imposed, perform any necessary calculations or studies, and resolve specific design problems with the appropriate agency, department or division.

II. REQUIREMENTS FOR IMPROVEMENT PLANS AND SUBDIVISION MAPS

A. Provide a detailed utility plan showing onsite and offsite public and private water and fire protection systems, including mains, services, hydrants, and all other required appurtenances, and their connections to existing City-maintained water facilities. Show the location, type, and diameter of public and private water mains. Reference any existing fire hydrants within 300 feet of the project boundary. Show any wells existing or to be abandoned. When a separate irrigation service is necessary, an irrigation plan is required per Section X. ~~– X~~ N. of these standards. (See Section XI for submittal of plans for private fire systems.)

B. Annotate the local agency information sheet of the Subdivision Map with any information that is needed to notify property owners of requirements for connection to the City water system. These include, but are not limited to:

1. payment of fees prior to issuance of Building Permits,
2. lots requiring pressure regulating valves or booster pumps,
3. backflow protection,
4. public water access requirements, such as gates or access roads.

The appropriate information may be obtained from Public Works and Engineering.

C. Miscellaneous specific items required on improvement plans are indicated throughout these Standards.

D. Before combustible materials may be delivered, stored or constructed on site, fire flow and access must be provided and approved by the Fire Department per current City Fire Code. In addition, public and/or private fire hydrants must be installed, flushed, tested, and operational. This information must be included on all improvement plans. Provide any necessary calculations with the submittal of improvement plans or with the Tentative Map submittal to demonstrate adequate fire flows are available.

III. WATER MAINS - GENERAL

A. Public water mains may not be designed outside the street right-of-way without City Engineer approval.

B. In general, publicly maintained water systems will be designed only where they serve multiple ownership lots and where appropriate access for maintenance can be provided.

C. Water mains installed at a slope of 15% or greater will be designed with restrained joints. The Design Engineer must provide adequate drainage measures to protect the trench from erosion.

D. Water mains installed outside of any roadway, called "cross-country mains," must be Ductile Iron Pipe and will have suitable access. In general, cross-country mains must be isolated with valves in the public right-of-way and must be identified with blue locating posts (Carsonite 492 CW-112 or approved equal) at approximate 500-foot intervals, at any angle point, and at the entrance to an easement. ~~Stakes~~ Identifying posts should have vandal-proof metal bottoms. Access requirements as established in Section XIV of the Sewer System Design Standards may be imposed on a project based on site conditions.

E. For system reliability, to minimize pipe size, and to minimize the number of people affected by a system shutdown, either for domestic or fire protection purposes, no more than 100 residential units may be served by a single-feed water system, providing it is hydraulically adequate. Where more than 100 units are to be served, a dual-feed (or "looping") public water system must be designed to provide a secondary source of water to the project. Onsite private fire requirements, such as dual fire services and looping mains, will be determined by the Fire Department for residential and nonresidential developments.

F. For purposes of leak detection and maintenance access, no reinforced concrete may be designed over publicly maintained water facilities. Unreinforced concrete will be allowed under special circumstances such as crosswalks.

G. Extent of water main improvements will be as follows:
   1. Any offsite water main improvements needed to serve the project must be shown on the improvement plans, including upgrades to existing mains that may be required as a result of a flow analysis or modeling effort.
   2. In general, water mains must be designed to cross the full property frontage or to the limits of the street improvements, whichever is greater.

H. Streets with both water and sewer mains must be at least 20 feet wide, face-of-curb to face-of-curb. Streets with only a water or sewer main must be at least ~~16~~20 feet wide. ~~No water or sewer mains may be installed in alleys.~~

IV. MATERIALS

A. Service laterals will be polyvinyl chloride (PVC), Polyethylene (PE), or Ductile Iron Pipe (DIP) per applicable City Standards.

B. 8-inch ~~and~~ to 12-inch public water mains and ~~4-inch~~6-inch to 12-inch private fire mains will be Polyvinyl Chloride (PVC) Pressure Class 150, DR18 per AWWA Standard C900, minimum or Ductile Iron Pipe Pressure Class 350 per AWWA Standard C151 minimum. Where the normal mainline static pressure exceeds 100 psi, Ductile Iron Pipe or PVC Pressure Class 200, DR14 must be used.

C. 16-inch diameter water mains will be Ductile Iron Pipe per AWWA Standard C151, or as shown on plans and specifications. Where the normal mainline static pressure exceeds 100 psi, AWWA Standard C905, DR18 with a pressure rating of 235 psi or Ductile Iron Pipe must be used.

D. 20-inch diameter and larger water mains will be ~~concrete cylinder pipe,~~ wrapped AWWA C200 welded steel ~~pipe, or Ductile Iron Pipe.~~pipe.

E. Asbestos cement pipe will not be allowed under any circumstances.

V. CONNECTION TO AN EXISTING PUBLIC WATER MAIN

A. Indicate a "hot tap" for connection of service laterals ~~2~~4-inch~~2 inch~~ in diameter and smaller.

B. Indicate connection of pipes ~~4-inch~~6-inch to 12-inch in diameter with a hot tap or a cut-in tee in conformance with the provisions of the Water System Construction Standard Specifications Section 99-1.20. Hot taps will be allowed only when no main line valves are required.

C. Design a cut-in tee if additional valves are required on the existing main. If the new main/lateral is larger than the existing main, the tee and main/lateral valve will be the size of the existing main unless it is hydraulically necessary to increase

the tee and valve to the size of the new main/lateral. Cut-in tee should not be closer than 2 feet from a joint on existing pipelines.

D. Tie-ins to the existing City water system must be inspected by a Public Works Inspector and the improvement plans must be so annotated.

E. Size-on-size taps are not allowed, except with specific approval of the City Engineer. Hot taps shall be two nominal sizes smaller than the main.

F. In most major streets, or where the street surface is less than five years old, installation methods other than open cutting may be required. The City Engineer as appropriate will determine the requirements based on the condition of the existing street.

VI. ALIGNMENT

A. Horizontal

1. Alignment will be in accordance with the provisions of Standard 871.
2. The minimum allowable radius of curvature for an 8-inch water main is 250 feet and for a 12-inch water main is 350 feet (or manufacturer's recommended minimum radius, whichever is greater). In situations such as streets that have smaller radius curves, the water system will be designed in straight segments parallel to the sewer or storm drain system so that future locating is simplified.
3. Conform to the ~~State of~~ California Department of Public Health ~~Services~~ Drinking Water-Related Regulations found in the California Code of Regulations, Title 17 and Title 22. http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Lawbook.aspx~~Health Services "Guidance Criteria for the Separation of Water Mains and Non-Potable Pipelines" (See Appendix "A").~~ for the Separation of Water Mains and Non-Potable Pipelines, **§64572. Water Main Separation.**~~.~~
4. The minimum horizontal separation between water mains and storm drains monuments, gas, electrical, and telephone lines ~~untreated sewage pipes, storm drain pipes will be~~is 4 feet clear except at crossings.
5. The minimum clear horizontal separation from a metallic pipeline with an induced current or from an anode field will be 5 feet. Where the new water main will be in proximity to an anode field, special design will be required for approval by the City Engineer.
6. All public water mains must be designed a minimum 5 feet from all structures, such as manholes or drop inlets. Provide a minimum of 3 feet from the lip of gutter for service connections and repairs. Water mains will be designed a minimum of 5 feet from the edge of easements.
7. All water main trenches that are parallel to and deeper than the footing of any adjacent structure must be designed at least forty-five (45) degrees from the footing as required in the Uniform Plumbing Code. Any

exceptions must be approved in writing by the City Engineer. (See City Std. 517)

8. Where dual water mains are designed, a minimum 5 feet clear horizontal separation will be maintained.

9. In general, water main crossings over or under other underground facilities will be designed as close as 90º to that facility as possible. Crossings of less than 45º ~~will only be approved when no other design is possible~~are not allowed.

B. Vertical

1. ~~1. Generally, provide a minimum of 6 inches of vertical separation from storm drains or other underground utilities such as telephone, cable TV, gas, or electric conduit. When the minimum cannot be maintained, plans will indicate installation of felt expansion material, styrofoam, or equivalent between facilities. Other measures, such as the use of concrete encasement, controlled density backfill, or ductile iron pipe may be submitted for approval of the City Engineer. The absolute minimum separation between water and other underground facilities, except sewer mains will be 0.1 foot.~~

2. ~~2.~~ Conform to the ~~State of~~ California Department of Public Health ~~Services~~ Drinking Water-Related Regulations found in the California Code of Regulations, Title 17 and Title 22. http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Lawbook.aspx~~"Guidance Criteria~~ for the Separation of Water Mains and Non-Potable Pipelines, **§64572. Water Main Separation** ~~." (See Appendix "A")~~.

2.~~3.~~ Where dual water mains are designed, a minimum 1-foot clear vertical separation will be maintained.

VII. MAIN SIZING CRITERIA

A. A hydraulic analysis is required for all water system design projects. The hydraulic analysis shall be used to verify flow demands and pressure availability for the proposed project. The analysis shall also demonstrate the effect the proposed project will have on the existing distribution system. The hydraulic analysis shall include, as a minimum, the following:

1. Under peak hour demands (excluding fire demands), the water distribution system shall maintain pressures above 40 psi.

2. Under peak hour~~maximum day~~ demand plus fire demands, the water system shall maintain pressures above 20 psi. Hydrant flow test data (static pressure, residual pressure and flow) used for design shall be reduced by 10 percent. ~~when testing is done from November 1 to April 1.~~

3. ~~Water system layouts shall be designed to minimize dead ends.~~ Looping of water lines ~~is a standard practice~~shall be used in design to ~~eliminate~~avoid dead-~~end ends.~~-end water lines.

4. Velocity in any pipe line shall not exceed 10 fps under any condition.

5. Head losses in any pipe line shall not exceed 20 psi per 1,000 feet of pipe line.
6. Provide a separate hydraulic analysis for each phase of the project to confirm adequate system design.

B. Allowable nominal sizes for public water mains are 8-inch, 12-inch, and 16-inch. Mains larger than 16-inch must have specific approval of the City Engineer.

C. Public water mains must be sized to meet minimum Fire Code requirements in addition to domestic and irrigation demands. Private fire protection mains must be sized to meet minimum Fire Code requirements (see Section XII for fire flow requirements).

D. The minimum new public main size is 8 inches. New public mains serving commercial, industrial and/or multi-family residential developments greater than two units, must be a minimum of 12 inches. Existing mains that will serve such proposed uses must be upgraded as needed to meet the current Fire Code.

E. Analysis and design of water systems will be based upon the criteria listed in the City's Water System Master Plan where applicable. The City Engineer may require increased pipe size for overall system benefit. When the project is required to provide larger water mains than needed for the development, the applicant may apply to the City for oversize reimbursement.

VIII. MAIN/LATERAL COVER

A. Cover is the distance from the top of the pipe to final finished grade measured directly over the pipe.

B. Typically, the minimum standard depths of cover for public water mains and private fire protection mains are:

Pipe Size	~~4-inch~~6-inch	~~6-inch~~8-inch	~~8-inch~~	~~10-inch~~	12-inch	16-inch or Larger
Cover (in.)	36-inch	36-inch	~~36-inch~~	~~40-inch~~	44-inch	48-inch

C. Where minimum cover is less than standard or greater than 8 feet, special permission from the City Engineer is required. Show mains with nonstandard cover in a profile on the Improvement Plans or Encroachment Permit applications. Where cover is less than the standard, Pressure Class 350 Ductile Iron Pipe is required. (A two-sack sand slurry mix or Control Density Fill (CDF) shall be used in paved sections where trenching within existing streets is being performed.)

D. Under no condition will cover be less than 24 inches.

~~D. Where standard cover cannot be maintained, such as at the crossing of a water main with a sewer main or any other utility line, either an undercrossing or overcrossing will be chosen based upon the evaluation by the Developer's Engineer. Evaluation will include the need for higher class pipe, use of controlled density backfill as pipe encasement, ability to meet California "Guidance Criteria for the Separation of Water Mains and Non-Potable Pipelines" and the resulting need for air/vacuum release valves. This evaluation will be submitted to the City Engineer for review.~~

E. The minimum cover for service laterals will be as shown on the appropriate City Standard Plan. Where service laterals have conflicts with other facilities, a detail or profile must be shown on the plans, or the plans must be sufficiently annotated to give clear direction for the installation.

F. When designing a cut-in tee for a service or main connection that is larger than the existing main, the new assembly must be shown at a depth sufficient to allow the valves to remain below the street subgrade, which may necessitate lowering the existing main.

IX. VALVING

A. Valving at intersections will be in accordance with the provisions of Standard 871. A minimum of three (3) mainline valves are required for “T” intersections and four (4) valves are required for cross intersections.

B. All hydrants must be on separately valved sections of the public main, including fire lines serving private hydrants.

C. Any water main which does not have a fire hydrant or lateral connection will have valves designed at approximately 1,000 foot intervals or as required by the City Engineer. Valves shall be spaced so that not more than two fire hydrants are out of service at one time.

D. Water main valves must be designed outside of concrete areas wherever possible to facilitate repairs.

X. SERVICE LATERALS AND METERS FOR DOMESTIC AND IRRIGATION SERVICE

A. Developments shall be provided City domestic and/or irrigation water service via water meters located at the frontage of a public street.

B. Design meter boxes out of traveled ways and a minimum of 10 feet from street trees whenever possible. On narrow lots, the minimum separation between meter boxes and street trees shall be 6 feet.

C. Base any required hydraulic calculations for the water meter and service lateral sizes on criteria from AWWA Manual M22 and submit to the City Engineer for approval.

D. The maximum velocity in domestic, irrigation, fire line, or combination water service laterals from the main to the meter is 15 feet per second.

E. Maintain a minimum 5 feet horizontal separation between water and sewer laterals.

F. Meter manifolds other than those shown in various City Detail Drawings will be detailed on the plans and approved by the City Engineer.

G. Residential (single units).

1. Each lot must be separately metered.
2. A standard ~~1-inch~~1-1/2-inch dual water service lateral is preferred when practical to serve two single-family residential lots, providing each lot is less than 1/2 acre. Otherwise, provide an individual 1-inch service lateral for a 1-inch meter for each lot.
3. ~~Provide a 1-inch service lateral with a 1-inch meter for any lot greater than 1/2 acre.~~
4. ~~4.~~ 3. Each lot with fire service to be served by a 1-inch minimum or 1-1/2-inch service per Std. 863A.

H. Residential with second unit (as defined in the City Zoning Code Section ~~20-03.111~~17.04.030 Second Dwelling or Residential Unit~~Article 6~~), two SFDs on one lot, and Duplexes.

1. Each unit must be served by separate meters.
2. If a new second unit is constructed and the total water flow for both units exceeds the capacity and allowable velocity of an existing service lateral, based on the criteria established in AWWA Manual M22, the service lateral must be upsized. Otherwise, the existing lateral may be utilized.
3. If the primary unit and the second unit are to be constructed at the same time, design a 1-inch minimum service lateral for the site.
4. The appropriate service lateral must be shown on the Public Improvement Plans and/or Encroachment Permit submitted for approval.

I. Multi-Family Residential (3 or more units)

1. For triplexes or lots with three units, condominiums, or town homes, individual meters are required for each unit.

2. For multi-family developments of 4-99 units, whether rental units or separate ownership units, design for individual meters for each unit or master meters with submeters on each unit.
3. For complexes of 100 units or more, metering will be designed as in (2) above, except that at least two metered connections are required if the project is to be master-metered.
4. See Section X.~~- X O~~X ~~-~~N. for irrigation meter requirements for any landscaped or common areas.

All meters must be within public right-of-way or easements and multiple meters will be clustered where possible.

J. Mobile Home Parks
1. Mobile home parks that have rental spaces shall have a master meter (two master meters if more than 100 spaces) or each unit may have an individual meter. Parks with individually-owned lots must have individual meters. When master meters are used, the mobile home park owner shall sub-meter to the tenants at their own expense, and must~~providing they~~ comply with PUC Requirements.
2. Individual City meters must be clustered and located within the public right-of-way or easement.
3. See Section X.~~- X~~N. for common area irrigation meter requirements.

K. Mixed residential and commercial uses must have separate meters.

L. Commercial
1. See Section X.~~-~~ N.~~X N~~ below for irrigation requirements.
2. A minimum ~~1-inch~~2-inch domestic service lateral is required for commercial use, unless water use calculations show a smaller meter will accurately register the usage.
3. Critical uses such as hospitals, jails, elderly care facilities, and others as determined by the City Engineer, require at least two separate water services for domestic use that must be connected to separately valved sections of the public water main.

M. Combination Services for Private Fire Service with Domestic and/or Irrigation Service
1. Only 6-inch, 8-inch and 12-inch combination service laterals are allowed.
2. The combination service lateral must equal or exceed the size of the required fire line and must be hydraulically sized to provide adequately combined domestic, irrigation, and fire flows without exceeding allowable velocity of 15 feet per second.
3. A minimum 8-inch combination service lateral is required for lots with unknown commercial, multi-family, industrial and shopping centers uses where onsite hydrants are not likely to be required for development.

4. A minimum 12-inch combination service lateral is required for lots with unknown commercial, multi-family, industrial or shopping center uses where onsite hydrants are likely to be required for development.

N. Irrigation

1. Provide separate irrigation meters for landscaped areas of all commercial or multi-family uses.
2. Provide separate irrigation meters for common areas of all condominium, town home, PUD, apartment complexes, and mobile home parks.
3. Provide reduced pressure backflow devices for all irrigation services. Backflow devices must be specified on the irrigation plan and must conform to City Standard (see notes) and current USC Approved List of Devices.
4. Sizing of irrigation meters will be determined by the design professional subject to approval by City Engineer. Irrigation meter size will be determined by the maximum flow required at the meter and will be based on AWWA criteria for meter sizing. Along with landscape and irrigation plans, the applicant must submit the planned square footage of planted areas and categories of plants to be used as selected from the following:
   a. High water use plants: turf, annuals, and container plants;
   b. Moderate water use plants: ornamental trees, shrubs ground covers, and perennials primarily irrigated by sprinklers. (Note that there may be some use of drip or bubblers in this category but not a predominance.)
   c. Low water use plants: drought tolerant plants recognized as having a plant factor of 0.3 or less and irrigated primarily through drip emitters.
5. Irrigation systems shall be constructed with purple pipe and fixtures.

XI. PUBLIC IMPROVEMENTS FOR PRIVATE FIRE SYSTEMS

A. Design plans showing private fire systems must be submitted to the appropriate Fire and/or Building jurisdiction for approval and may be included with the Public Improvement Plans for the project.

B. Generally, the lateral size must be designed the same size or larger than the size required for the fire sprinkler system and/or the private hydrant system. **Caution** - onsite fire system design may necessitate changes to pre-approved public improvements. The hydraulic calculations for laterals serving private fire systems ~~will~~shall be based on the required fire flow ~~or the~~per City fire ~~sprinkler demand, whichever is greater, combined with the peak domestic flow.~~code.

C. All private fire systems that only serve onsite hydrants require above-ground approved backflow device double check valves in accordance with Standard 880. Below-grade devices such as detector checks or backflow devices are not approved.

D. Double-check detector backflow assemblies are required for:
1. All connections serving commercial fire sprinkler systems; or
2. Any property with multiple fire service connections; or
3. Any fire line connections to properties with auxiliary water supply.
4. Private on site fire hydrants.

E. Reduced-pressure detectors are required for:
1. Any fire suppression system using chemical additives such as antifreeze or fire suppressants; or
2. Any building where a~~n~~ potential ~~extreme~~ hazard to the potable water system exists, as determined by the City Engineer.

F. For one- and two-family detached (duplex) residential fire sprinkler systems:
~~1. Where a multipurpose system circulates water for fire sprinklers and domestic supply, no backflow device is required.~~
~~2. Where the fire system does not circulate water with the domestic supply, double check~~ 1. ~~Detector check backflow assemblies are required to protect the public water supply by either of the two methods~~Services shall be designed in conformance with and as shown on City Standard 863A, shall be 1-inch minimum~~863B~~~~A~~ and must be located in the public right-of-way or the P.U.E. adjacent to the ~~right-of-way.~~right-of-way, when required.
~~3.~~2. Where a fire sprinkler system is to be installed in a ~~one- or two~~single-family residential~~two-family~~ dwelling, design the service lateral from the street main to the water meter and the water meter to be 1-inch minimum. Larger size service laterals and meters may be permitted where hydraulic calculations indicate the need.

G. The location of any Fire Department connection must be approved by the Fire Department.

H. Critical uses such as hospitals, jails, elderly care facilities, and others as determined by the City Engineer and/or the Fire Marshal, require at least two fire line service connections to separately valved sections of the public water main, so that service can be maintained in the event of a main line or service lateral shutdown.

XII. FIRE HYDRANTS

A. Design of hydrant locations must meet the Fire Code requirements and be approved by the Fire Department for logistics and by Public Works Utility Services for maintainability.

B. Each hydrant must be on a separately valved main line section.

C. Whenever possible, locate hydrants near street intersections.

D. If it is not possible to locate near an intersection, locate the hydrant near a property line or where it will minimize interference with property use.

E. Locate hydrants a minimum of 10 feet from roll down of driveways for commercial or multi-family sites and 5 feet from edge of single family detached residential driveway.

F. On streets with raised medians or with four or more travel lanes, design hydrants on alternate sides of the street per current City Fire Code. Each side of the street will be considered independently relative to hydrant placement per subsections XII-G below.

G. Residential property with one or two dwelling units per lot - Typical locations
1. Design hydrants with a maximum of 500 feet spacing, or as approved by the Fire Department.
2. Generally, design hydrants at intersections and then evenly distribute hydrants throughout the project.
3. No one or two family dwellings may be more than 250 feet from the nearest hydrant.

H. Commercial, Industrial, and Multi-family (3 or more units) per lot - Typical locations
1. Generally, design hydrants at intersections or driveway entrances and then evenly distribute hydrants throughout the project.
2. No portion of the exterior wall of the facility or building may be more than 150 feet from the nearest hydrant as measured by an approved route around the building per the City Fire Code.

I. Minimum fire flow required at all hydrants:
1. Fire flow as specified in the following subsections is defined as the amount of water supply available in the water main nearest the flowing hydrant with 20 psi residual pressure.
2. Single and two family residential uses require 1,500 gallons per minute flow, except as in subsection ~~L~~I. ~~4~~. of this section below.
3. The required fire flows for schools, commercial, industrial, and multi-family residential (3 or more units) uses will be based on the City Fire Code. The water system will be designed so that 1,500 gpm is available from the hydraulically most demanding hydrant and the remaining flow required is available at the next most demanding hydrant(s), up to a maximum of 1,500 gpm per hydrant.
4. Fire flow requirements are under the jurisdiction of the Fire Department. The guidelines given above are general. Actual flow requirements must be verified with the Fire Department prior to submittal of plans. Calculations may be required by the Fire Department to verify the adequacy of the

proposed design. Mitigation measures may be required by the Fire Department if the minimum fire flow requirements cannot be met for a specific project.

5. The minimum hydrant lateral size is 6 inches and shall not exceed 50-feet in length without specific written approval of the City Engineer.

XIII. BACKFLOW PREVENTION ASSEMBLIES (EXCEPT FOR FIRE LINES)

A. Backflow prevention assemblies are required to be designed in accordance with State of California Title 17 and current City of Rohnert Park, Backflow Regulations.

B. All backflow prevention assemblies must be listed on the latest revision of the approved USC Foundation for Cross-Connection Control and Hydraulic Research list. Additionally lists of approved backflow prevention devices may be obtained by consultants from the California Department of Public Health, see the following web-site http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Publications.aspx.

C. Design backflow prevention assemblies as near as possible to the water meter as shown on Standards. Refer to Rohnert Park Standards 869 & 876.

D. Backflow preventers will be designed in accordance with Appendix "BA." For uses not listed contact Public Works Utilities or Water Quality.

XIV. PRESSURE

A. To obtain water system data for these calculations, contact Public Works Utility Services.Fire Division at (707) 584-2641. A fee will be imposed if flow testing is required.

B. Mainline

1. The maximinimum allowable static pressure in the system is 2080 psi. The maximum minimum allowable residual pressure in the system is 8020 psi.
2. The maximum allowable pressure in a high-level zone is calculated by assuming the reservoir full. In the Aqueduct zone or other reduced pressure zones, calculate the pressure by using the high setting of the pressure regulating valve at the nearest aqueduct connection or system regulator.
3. The minimum allowable pressure in a high level zone is calculated by assuming the reservoir drawn down 10 feet from the high water level. In the Aqueduct zone or other reduced-pressure zones, use the low setting of the pressure regulating valve at the nearest aqueduct connection or system regulator.

C. Domestic service

1. The minimum allowable pressure is 20 psi measured at the meter. If pressure measured at any faucet is less than 35 psi, a pressure booster system is required.
2. If service pressure measured at any faucet exceeds 80 psi, a private pressure regulating device is required.

XV. SPECIALTY VALVES AND WATER SAMPLING STATIONS

A. Specific locations will be reviewed for each project by the City Engineer and Public Works Utility Services.

B. Air release and vacuum relief valves are required at substantial high points in the system such as over a hilltop or at the upper end of a dead end main.

C. Design pressure reducing valves to maintain overall system balance and to maintain service pressure levels within the parameters established within these system design standards.

D. Typically surge or pressure relief valves are to be located near the low points of any high level pressure zone where discharge may be directed to an approved disposal system.

E. Water sampling stations are required to provide representative sampling within each pressure zone. At a minimum, eight water sample stations are required in each pressure zone, one at each reservoir, at pump stations, and dead ends.

F. Fire hydrants shall be used in lieu of blow-off valves at dead ends. Blow-off assemblies in other locations are allowed.

XVI. EASEMENTS

A. A Public Water System easement must be dedicated to the City ~~be provided~~ over any public water system when it is designed to be installed outside a public right-of-way.

B. ~~The easement must be a minimum of 15 feet wide~~ centered on the pipe. ~~if it only contains a water main. When there are other facilities in the area additional easement width is required. or~~Provide ~~2~~10 ~~or 20 feet minimum wideth for each facility centered on pipes, for two or more facilities~~wide ~~if it contains another facility, such as sewer, storm drain, or other utility. The easement will be dedicated as a "p~~Public ~~wWater System"public water easement" if it contains water only. It will be dedicated as a "public utilities easement" if it contains other facilities as well.~~

B. The easement must be a minimum of 15 feet wide. The pipe shall be centered within the easement. Where more than one utility is in an easement, the minimum width shall be increased to a minimum of 20 feet. Additional width may be required by the City Engineer. The easement will be dedicated as a Public Water System easement if it contains water only. It will be dedicated as a public utilities easement if it contains other facilities as well.

C. Easements must be configured to encompass all publicly maintained appurtenances, such as water service laterals, meters and fire hydrants and will be generally centered over the facility. Separate access easements may be required depending on site conditions. When water mains are to be installed along a property line the easement will be wholly contained on one parcel.

D. All property restrictions placed as a result of dedication of easements will be so noted on the Subdivision Map, or on the Easement Deed if the easement is not dedicated as part of a subdivision. Required notes are:

1. No structures may encroach on, above or below the surface of the ground in any public water easement. This includes footing of foundations or eaves from the roof of any adjacent structure, pools, ponds or outbuildings on slabs or foundations. Decks, sheds, or other structures which may be easily removed for maintenance of the water system may be allowed at the discretion of the City Engineer.
2. No trees may be planted in a public water easement without first obtaining approval of the City Engineer. Trees may be allowed to the extent that damage to the water system does not occur from root intrusion and adequate access can be provided for maintenance and repair vehicles.

XVII. ABANDONMENT OF WATER MAINS AND SERVICES

A. Any existing water mains and service laterals that will not be used must be abandoned and must be shown on the Improvement Plans with appropriate notation.

B. For all abandoned water services up to and including 2-inch, annotate to remove the valve and saddle and install a full circle clamp on main under Engineering Department/City inspection.

C. ~~C.~~ For flanged, tapping tees or mechanical joint tees up to and including 2-inch, annotate the Improvement Plans to remove the valve and install a blind flange or mechanical joint plug under Engineering Department/City inspection.

~~D~~D. For all abandoned water services greater than 2-inch annotate on the plans to remove tee, ~~For push-on tees, the tee,~~ valve and concrete thrust block ~~must be removed~~ and the main repaired with approved pipe and suitable couplings. under Engineering Department/City inspection ~~, and so noted on the Improvement Plans.~~

~~E~~E. Valve boxes for abandoned valves must be removed and so noted on the Improvement Plans.

~~F~~F. Abandoned mains, valves and risers located within any street structural section or within any new trench must be shown on the Improvement Plans to be removed.

~~G~~G. Show all ~~12-inch~~8-inch ~~diameter and larger~~ water mains to be abandoned within the public right-of-way as removed or broken every 50 feet and filled with sand slurry pursuant to~~.~~ ~~(~~City Standard 507~~)~~.

~~H~~H. Show all pipes 4 inches and over to be abandoned as removed or plugged every 50 feet.

~~H.~~ I. Where a fire hydrant is to be abandoned, note that the hydrant barrel, break off riser, and check valve are to be removed, the bury is to be capped or plugged, and the lateral abandoned at main as stated above. Abandonment of fire hydrants must be approved by the Fire Department.

~~**Appendix "A"**~~
~~**Guidance Memo No. 2003-02: Guidance Criteria for the Separation of Water Mains and Non-Potable Pipelines**~~

Appendix "A"

BACKFLOW DEVICE REQUIREMENTS

APPLICATION	TYPE OF ASSEMBLY
Auto Sales, Painting, Repair, Radiator work	RP
Auxiliary Water Supply (Contaminated Wells, etc.)	RP
Barber Shops	RP
Blood Banks	RP
Boiler Systems (any)	RP
Buildings with Booster Systems	RP
Buildings with 3 or more Stories or with fixtures 30 feet above the service	RP
Buildings with Sewage Ejectors	RP
Buildings with Storage Tanks	RP
Homes with Sewage Lift Stations	RP
Car Wash	RP
Camp Grounds / Trailer Parks	RP
Cement, concrete, Sand & Gravel Plants	RP
Chemical Storage or Processing Facilities	RP
Dairy or Cold Storage	RP
Film Processing	RP
Fire Systems - Business/Residential (sprinklers with or without hydrants~~)~~ or private hydrants)	DC w/Det.Ck.
Fire Systems - w/Sprinkler in Hazardous Locations	RP
Gas Stations	RP
Gray Water System	RP
Heating & Air Conditioning (Using Water)	RP
Hospital or Medical Facility (any) Convalescent or Long Term Care	RP
Irrigation Systems	RP
Irrigation System w/Chemical Feed	RP
Laboratories (Commercial or Research)	RP
Laundry or Dry Cleaner	RP
Manufacturing or Processing (with Toxic Chemicals)	RP
Medical or Dental Facility (any)	RP
Mobile Home Park	DC w/Det. Ck./RP
Ornamental Pools, Ponds or Fountains	RP
Painting Auto Shops	RP
Printing Shops	RP
Radiator Shops (all)	RP
Radioactive Materials	RP
Restaurant	RP
Restricted or Classified Facilities	RP
Schools	RP
Sewage or Storm Drain Facilities	RP

APPLICATION	TYPE OF ASSEMBLY
Steam Cleaning Equipment (any type)	RP
Steam Generation	RP
Swimming Pools (Public and Commercial)	RP
Tank Trucks or Spray Rigs	RP
Veterinary Clinics	RP
Warehousing & Storage	RP
KEY: RP = Reduced Pressure DC w/Det. Ck. = Double Check w/Detector Check	

Appendix “A”

City of Rohnert Park

Streets and Roadway Design Standards

STREETS AND ROADWAY DESIGN STANDARDS
TABLE OF CONTENTS

Volume 1

Design Standards

STREETS AND ROADWAY DESIGN STANDARDS

I. DEFINITIONS

"Alley" means any street contained in the private property or in a common owned parcel or easement(s), used primarily for vehicular service access to the back or side of residential properties, and for which normal building setbacks may not or do not apply.

~~**"Accessway"** is a private primary access to more than four residential units and less than eight with no through traffic.~~

~~**"Arterial/Regional Streets"** (includes Parkways and Boulevards) shall have the primary purpose of conducting large volumes of through traffic with minimal access and connect town centers to the greater region. Arterial/Regional streets may be 2- to 4-lane. Side frontage streets parallel to arterials may be considered on a case-by-case basis by the City Engineer.~~

"Avenue" is a transitional street connecting residential neighborhoods to commercial centers, shopping centers, and other neighborhoods.

"Bike lane" means those on-street bikeways which are part of the normal street section and provide marked bike lanes which delineate the separate rights-of-way assigned to bicyclists and motorists.

"Bike path" means a separate, off-street bike path which is not part of the normal street section.

"Boulevard" is a regional street that provides multi-lane access to commercial and mixed use land designations. Boulevards have medians and bike lanes.

"City Engineer" shall be a civil engineer registered by the State of California and shall be designated by the City Manager to discharge those duties prescribed hereinafter to be performed by the City Engineer.

~~**"Collector/Transitional Street"** (includes Avenues and Main Streets) shall have the primary purpose of intercepting traffic from intersecting local streets and handling traffic to the nearest arterial/regional street or intercepting traffic from one collector street and handling traffic to another collector street. It shall serve as an access to abutting properties. Collector/Transitional streets connect residential neighborhoods to commercial centers and service commercial districts~~.

"Cul-de-sac street" shall have the primary purpose of serving abutting land use and connecting to the nearest appropriate local street. It is a minor street with only one outlet.

"Curb cut" shall mean an opening or depression in the street curb installed and intended for pedestrian or vehicular use. Curb cuts shall be measured across the "flat bottom" width of the opening or depression.

"Development" means and includes, but is not limited to, the subdivision of land, the construction of new structures or buildings, and changes or renovations to existing structures or buildings and the attendant construction of improvements, either of public or private nature, for which approval by the City of Rohnert Park is required prior to commencement.

"Driveway" For the purposes of single-family detached housing, "driveway" means a way for vehicular traffic providing access to four or fewer lots or units over a common parcel or easement(s), and necessary service and emergency vehicles, but from which the general public may be excluded, and which are not maintained by a public agency. Driveways shall meet all provisions of the California Fire Code, as adopted by the City, with respect to Fire Department access where such serve as Fire Department access.

"Industrial Street" shall be public and private streets located within industrial areas as defined on the current City zoning map or roadways that primarily serve large trucks transiting to and from retail centers.

"Lane" is a public or private access to 10 residential units or less (see City Std. 200C).

"Local streets" means a street that provides access to individual sites. ~~On-street parking is required.~~ Local streets include Minor Streets, Neighborhood Streets, Lanes, Alleys, Utility Access Roads, Trails, ~~Accessways,~~ Loop Streets and Cul-de-sac Streets. On street parking is required on Minor Streets and Neighborhood Streets.

"Loop street" shall be a one-way street providing access to a very limited number of residential houses. Use is extremely limited (see City Std. 200B).

"Main street" provides access to neighborhood commercial and mixed use districts.

"Major Arterial" means a street whose primary purpose is to facilitate movement of heavy traffic between major residential areas, or major residential areas and commercial areas with minimal access. Major Arterial streets may consist of 2-, 4-, or 6-lanes. Intersections with local streets are permitted, provided that they are right-turn-only and at least 200 feet apart, or that they include a left-turn pocket. ~~*This provision is intended to maximize access between neighborhoods, particularly between the University District and the SSU campus along the Rohnert Park Expressway.*~~ Driveways are generally not permitted. Driveways are permitted to major traffic generators, provided they are right-turn-only. A deceleration lane must be provided for each driveway. *Major traffic generators include areas designated for Regional Commercial, Office, Mixed Use, and High Density Residential uses.* No on-street parking is allowed. Major Arterial streets include Parkways.~~**"Major street"** (equivalent to Regional Streets, typically a Boulevard or Parkway) shall mean a street whose primary purpose is to facility movement of heavy traffic between major residential areas or major residential areas and commercial areas. Access is very limited.~~

"Minor Arterial" means to provide circulation between neighborhoods, activity centers, and highways and other regional routes. Also provides circulation in rural and open space areas. Intersections with local streets are permitted, provided that they are right-turn-only and at least

200 feet apart, or that they include a left-turn pocket. *This provision is intended to maximize access between neighborhoods.* Driveways are permitted, provided they are right-turn-only and at least 100 feet apart. A deceleration lane must be provided for each driveway. No on-street parking is allowed. Minor Arterial streets include Parkways.

"Major Collector" means to provide circulation within and between neighborhoods. Driveways are permitted, provided they are right-turn-only and at least 50 feet apart, or that they include a left-turn pocket. No on-street parking is allowed. Major Collector includes Boulevards.

"Minor Collector" means to provide circulation within and between neighborhoods. Minor Collector streets shall have the primary purpose of intercepting traffic from intersecting local streets and handling traffic to the nearest arterial/regional street or intercepting traffic from one collector street and handling traffic to another collector street. It shall serve as an access to abutting properties. Minor Collector streets connect residential neighborhoods to commercial centers and service commercial districts. On-street parking is required on both sides of each segment of a one-way couplet. Minor Collector streets include Avenues, Main Streets, and Industrial Streets.

~~**"Major Arterial"** means a street whose primary purpose is to facilitate movement of large traffic volumes between major residential areas, or major residential areas and commercial areas and connect town centers with minimal access onto the arterial. Major Arterial streets may consist of 2, 4, or 6 lanes. Intersections with local streets are permitted, provided that they are right-turn-only and at least 200 feet apart, or that they include a left-turn pocket. Driveways are generally not permitted. Driveways are permitted to major traffic generators, provided they are right-turn-only. A deceleration lane must be provided for each driveway. No on-street parking is allowed. Major Arterial streets include Boulevards and Parkways~~

~~**"Minor Arterial"** means a street whose primary purpose is to provide circulation between neighborhoods, activity centers, and highways and other regional routes. Also provides circulation in rural and open space areas. Intersections with local streets are permitted, provided that they are right-turn-only and at least 200 feet apart, or that they include a left-turn pocket. A deceleration lane must be provided for each driveway. No on-street parking is allowed. Minor Arterial streets include Parkways.~~

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"Minor street" shall have the primary purpose of serving abutting land use and handling traffic to the nearest collector street.
~~**"Minor street"** shall have themeans a street whose primary purpose of is to serveing abutting land use and handling traffic to the nearest collector street.~~

"Neighborhood street" shall have the primary purpose of providing access to small residential areas and shall specifically not be used for through traffic. The various streets within this designation are the one-way loop street, the lane, and the neighborhood street.

~~**"Walkway/Trail (mixed use)"** shall mean a public or private paved or rock-surfaced path, excluding sidewalks, for the use of pedestrians, bicycles and horses.~~

~~**"Walkway/Trail (pedestrian)"** shall mean a public or private paved or rock-surfaced path, excluding sidewalks, for the use of pedestrians.~~

"Parkway" is a connection between towns or through a natural area and are not designed to accommodate adjoining development.

"Private street" means a way for vehicular traffic providing access to lots or units over a common parcel or private easement, primarily by the owners or occupants of the common parcel, and necessary service and emergency vehicles, but from which the general public may be excluded, and which are not maintained by a public agency.

Such streets may be designed and constructed to different standards than public streets in the following areas: surface treatment, street lighting hardware, signing, and entry islands. Private streets should not connect two or more public streets (except when necessary for internal circulation or emergency vehicle access) and shall be designed and constructed to the standards of public streets in terms of minimum width (may be reduced when meeting specific criteria – see City Std. 200A through L) structural section, curb, gutter, sidewalk, and all other aspects not specifically referenced above. No City enforcement of "no parking" signs or other such regulatory signs shall be provided for such streets. Access shall be through a standard curb cut.

"Public street" means a way for vehicular traffic, whether designated as a local, transitional, regional/major thoroughfare, freeway, or other designation, which is improved to City standards, dedicated for general public use and maintained by a public agency. ~~The term "street" shall include alleys as defined above.~~

"Public way" shall mean any street, channel, viaduct, subway, tunnel, bridge, easement, right-of-way or other way in which a public agency has a right of use.

"Regional Streets" (equivalent to Arterial or Major Streets; includes Parkways and Boulevards). See "Arterial/Regional Streets."

"Sidewalk" shall mean a Portland Cement Concrete (PCC) surfaced area for pedestrian usage located within the public or private street right-of-way or sidewalk easement and included as a standard element of a street section.

"Street" shall include avenues, highways, lanes, alleys, crossings or intersections and courts which have been dedicated and accepted according to the law or which have been in common and undisputed use by the public for a period of not less than five years next preceding, or which have been dedicated to a semi-public use.

"Street right-of-way width" shall mean the shortest distance between the lines delineating the public right-of-way of a street.

"Street width" shall mean the distance between the curb faces of a street or edge of pavement where a curb face may be omitted by approval of the City Engineer.

"Transitional Streets" (equivalent to Collector Streets) connect residential neighborhoods to commercial centers and service commercial districts. Streets in this category are the Avenue and the Main Street.

"Walkway/Trail (mixed use)" shall mean a public or private paved or rock-surfaced path, excluding sidewalks, for the use of pedestrians, bicycles and horses.

"Walkway/Trail (pedestrian)" shall mean a public or private paved or rock-surfaced path, excluding sidewalks, for the use of pedestrians.

~~I.~~II. GENERAL

A. For purposes of street layout and design, streets shall be classified as:

Major Arterial
~~Boulevard~~
1. Parkway

Minor Arterial
1. Parkway

Major Collector
1. Boulevard

Minor Collector
1. Avenue
2. Main Streets
3. Industrial

Local
1. Minor Street
2. Neighborhood Street
3. Lanes
4. Alleys
5. Utility Access Road, Trails
~~Accessway~~
6. Loop Street
~~Cul-de-sac Street~~~~**Regional**~~
~~1. Parkways/Boulevards/Major Streets~~
~~2. Industrial Streets~~
~~**Transitional**~~
~~3. Main Streets, Avenues~~
~~**Local**~~
~~4. Minor~~
~~5. Neighborhood~~
~~6. Lanes~~
~~7. Alleys~~
~~8. Utility Access Roads, Trails~~

B. Street design standards shall be used for the design and construction of all private and public streets.

C. Deviations from these standards may be granted by approval of the City Engineer.

D. The standards are considered minimum and do not preclude the use of a higher standard.

E. Reference Appendix D: City amended California Fire Code. Two entrances required for the following:
   a. Building exceeding 62,000-square-foot area
   b. 30 units or more

F. No half streets will be allowed.

~~II.~~III. STREET DESIGNS

A. Geometric Standard Cross Sections

Item	Minimum Width/Length	Street Classification
Center median	16 feet	Parkway
	16 feet	Boulevard
	16 feet	Avenue
Travel lane	14 feet	Industrial
	11 feet	Parkway, Boulevard
	~~9~~10 feet	Avenue, Main and Minor Street
	~~9~~10 feet	Neighborhood Street
	12 feet (two-way)	Lane
Parking lane or shoulder	~~10~~ 8 feet	Industrial
	8 feet	All others except Neighborhood Street
	6 feet	Neighborhood Street
Curb lane (no Parking or Bike lane)	2 feet increase to curb face	Local streets
	1 foot increase to curb face	All other streets
Bike lane	5 feet	All streets
Divider between frontage road and paralleling road	8 feet, curb to curb	All streets
Left turn lanes: Double Single Two-Way	 Two 1~~2~~1-foot lanes 10 feet 14 feet	 All streets where required All streets All streets
Right turn lanes	1~~2~~0 feet	All streets
Curb radius for cul-de-sac	~~45~~ 48 feet (w/parking and no island)	Cul-de-sac
	~~45~~ 48 feet (no parking and with an island)	Cul-de-sac
	~~45~~ 48 feet (no parking and no	Cul-de-sac

	island)	
Note: An island in a cul-de-sac (other than those shown in Standard Drawings, when proposed, will require review and approval by the City Engineer, who shall determine the use of the correct turning radius, compliance with required access for emergency vehicles, and any other required design criteria.		
Maximum length from projected curb or edge of pavement line of intersecting street to center of turnaround	500 feet (or as approved by the City Engineer)	Cul-de-sac
Length of streets allowed with no Fire Department-approved turnaround	150 feet from the projected curb or edge of pavement line of the cross street to end of dead-end street	All streets
Planter strip ~~(consistent with space requirements of master street tree plan)~~	10 feet (consistent with space requirements of master street tree plan)	Parkway All streets other than Parkway.
Sidewalk	5 feet	All Local Streets (*see Lane note below), Avenue
	6 feet	Parkway, Boulevard
Sidewalks – contiguous with tree wells (where permitted or required per Standards)	10 feet	Main streets – required on both sides (widen at obstructing locations to provide 4.5-foot minimum clear sidewalk)
Sidewalks – contiguous	5 feet	All streets in PD, one-way loop streets, as approved by Planning Commission – required on both sides (widen at obstructing locations to provide 4-foot minimum clear sidewalk)
Sidewalk – meandering (where permitted by Standards)	5 feet	Where applicable
Sidewalk easement	To back of sidewalk	All streets where applicable
Public utility easement	5 feet behind right-of-way	All streets where required
*Lane requires sidewalk for 5 or more homes, one side minimum. Note: Sidewalk one side as approved by Planning Commission.		

B. Access to Public Right-of-Way – Curb Cuts

1. Each vehicular passageway to any parking or loading facility to or across a public right-of-way shall comply with the following requirements:
   a. Curb cuts shall be a maximum of 41 feet in width for non-residential uses, except as otherwise approved by Conditional Use Permit. Minimum of 12 feet for one-way, 24 feet for two-way.
   b. Driveway widths, within residential areas, shall be a minimum of 12 feet in width for single driveways, a minimum of 16 feet for double or triple driveways up to a maximum of 24 feet, except as otherwise approved by Conditional Use Permit.
   c. Wherever feasible, curb cuts serving adjacent uses shall be combined to minimize the number of entrances onto a public right-of-way on any block. No curb cut is allowed when it is less than 6 feet from an existing curb cut.
   d. Only one curb cut may be installed for any parking or loading facility, except that one or more additional curb cuts may be allowed if the City Engineer determines that each additional curb cut is necessary for the efficient operation of the facility and will not significantly reduce street capacity and traffic safety. Twenty feet top to top on the curb island is required between driveways on a single parcel.
   e. Any curb cut in a residential area on a corner lot shall be located at the farthest point possible from the curb return and outside of the sight vision triangle.
   f. In commercial/industrial area, a minimum of 200 feet required separation between driveway and the intersection of two arterial and/or collector streets.
   g. Except as otherwise approved by the City Engineer, curb cuts for any circular or "through" driveway must meet the following requirements:
      (1) The curb cuts for such driveway shall be at least 20 feet apart top to top and a minimum of 5 feet from the side property line.
      (2) The combined width of the curb cuts shall not exceed 50% of the lot frontage.

~~III.~~IV. STREET ALIGNMENT

A. Street alignment shall generally conform to the circulation element of the City's General Plan. Streets shall be aligned with adjacent existing streets by continuations of the centerlines thereof, or by adjustment by curves, and shall be laid out for the most advantageous development of the entire area.

1. Minimum centerline horizontal curve radii shall be as follows:

~~**Regional**~~

a. Parkway.....500 feet
b. Boulevard.....500 feet

~~**Industrial Streets**~~

c. Industrial Street.....300 feet

~~Transitional~~

d. Main Streets .....300 feet

e. Avenues.....300 feet

~~Local~~

f. Minor Street .....150 feet

g. Neighborhood Street .....100 feet

h. Lane.....90 feet

i. Alley.....40 feet

2. Lesser radii may be used only when sufficient evidence is presented to the City Engineer to show that radii described above are not practicable. Any deviations require specific City Engineer's approval.

3. Superelevations are required on curves for the design of all major streets and for any other street with a design speed above 25 miles per hour.

B. Where necessary to give access to or permit satisfactory future subdivision of adjoining land, streets shall extend to the boundary of the property and resulting dead-end streets greater than 150 feet (measured from the projected curb or edge of pavement line of the cross street) shall have a temporary turnaround.

~~IV.~~V. STREET GRADES

A. All street grades shown on improvement plans shall refer to the NGVD 1929 benchmarks as accepted by the City of Rohnert Park.

1. All ~~Major/~~Arterial~~/Regional~~ and Industrial Streets shall have no grade rate in excess of 6%.

2. Collector~~/Transitional, Minor, and Cul-de-sac~~ and Local Streets shall have no grade rate in excess of 10%.

3. Minimum grade rate for all streets shall be 0.5%; 1% for curves equal to or less than 100 feet radius.

4. The grade of the pavement surface across an intersection shall not be more than 4%.

5. The gradient of each street entering an intersection shall not be more than 4% within a distance of 25 feet from the near curb line of the crossing street.

7. Vertical parabolic curves shall be used to connect grade profiles where the algebraic difference in grade rates exceeds 1% (does not apply at intersecting streets). The length of vertical curve required shall be determined by the following:

	Minimum Stopping Sight Distance	Minimum Length of Curve
Regional/Major and Industrial Streets	350 feet	200 feet
Transitional/Collector	200 feet	100 feet

Streets		
Local Streets	100 feet	100 feet

8. Minimum cross-slope for all streets shall be 2%. Maximum cross-slopes shall be 5% (offset crown may require tilt section, minimum 2% cross-slope).
9. Maximum cross-slopes in cul-de-sac bulbs shall be 5%.

~~V.~~VI. INTERSECTIONS

A. All streets entering upon any given street shall have their centerlines directly opposite each other or separated by at least 200 feet.

B. All streets shall intersect at right angles, or along radial lines when the intersection is within a curve, and shall have at least 50 feet of centerline tangent adjacent to the intersection.

C. Curb return radii:

	Industrial	35 feet
~~Regional:~~	Boulevard, Parkway	~~35~~ 20 feet
~~Transitional:~~	Main Street, Avenue	~~25~~ 20 feet
~~Local:~~	Minor	20 feet
	Neighborhood Street, Lane	20 feet

At all intersections, the curb return radius to be utilized will be determined by the highest street classification ~~(e.g., a local-regional street intersection will require 35-foot radius).~~

A 15 feet radius is allowed on Local Roads with parking on both streets. The street frontage area 15 feet on either side of the curb return shall be properly marked "No Parking".

~~VI.~~VII. TYPICAL SECTIONS

A. Typical sections for the improvement of streets and alleys shall be shown on the improvement plans. Curb and gutter sections, curb return radii, parking strip widths, and sidewalk widths may be modified where these improvements have been constructed in a portion of a block to other than the typical sections shown. However, any modifications require the specific approval of the City Engineer.

B. Typical sections are shown in Volume II standards 200. Landscape strips are required on Parkways. Landscape strips are encouraged on Boulevards. Landscape strips are allowed on other roadways as approved by the City Engineer. The minimum width of a Parkway Landscape strip is 10 feet.

Landscape strips on other roadways shall be consistent with the Street Tree Table and Section XI.

~~VII.~~VIII. PAVEMENT DESIGN

Design of the structural section for all streets shall be in accordance with the following criteria:

A. Design pavement per Caltrans Highway Design Manual Chapter 610 and 630 using a 20 year design life.

B. Traffic Index

1. ~~1.~~ Street classification shall be determined by the City Engineer.
2. ~~2.~~ For Major Arterial and Industrial streets with high truck volumes, the City Engineer may increase the minimum T.I. to 11.0. ~~In no instance will the T.I. be less than the following or as determined by the City Engineer~~

~~:~~

3. In no instance will the T.I. be less than the following:

Major Arterial and Industrial a minimum T.I. of ~~12.0~~10.0
Major ~~Collector and~~Collector and Minor Arterial a minimum T.I. of 10.0
Minor Collector a minimum T.I. of 8.0
Local (excludes roads w/commercial traffic/busses) a minimum T.I. of 7.0

~~A. Traffic Index~~

~~1. Street classification shall be determined by the City Engineer.~~
~~2. In no instance will the T.I. be less than the following or as determined by the City Engineer:~~

~~Regional/Major and Industrial a minimum T.I. of 9.0~~
~~Transitional/Collector a minimum T.I. of 8.0~~
~~All Other Streets a minimum T.I. of 7.0~~

~~3~~4. For all street design, use Chart No. 2 (3 sheets), "Structural Design Chart for Flexible Pavements."

~~B~~C. Soils Reports

1. Resistance "R" Values
   a. A qualified Soils Engineer shall obtain sufficient soils samples within the proposed street construction to permit determination of the "R" Value of the various materials which lie immediately under the planned structural section. The cost of sampling and testing shall be at the owner's expense.

b. The basement soil shall be tested according to California Test 301 "Method for Determination of the Resistance 'R' Value of Treated and Untreated Bases, Sub-bases, and Basement Soils by the Stabilometer" in use by the California Department of Transportation, Transportation Laboratory. Design of the structural section for a particular street will normally be based on the lowest "R" Value material encountered.

c. If the engineer elects to utilize an "R" Value of 5, then "R" Value tests will not be required.

d. The owner's soil engineer shall submit to the City a Materials Report showing the location and elevation of sampling points, "R" Value data, and Expansion Index Tests. The owner's soils engineer may be required to make a field survey of soil conditions when rough subgrade has been cut to verify data presented in the Materials Report. The cost of any additional sampling and testing shall be at the owner's expense.

2. ~~Active~~ Expansive Soils

a. Irrespective of the "R" Value used, an Expansion Index Test shall be required.

b. A soil will be classified as expansive unless the Expansion Index is less than 50 as measured by ASTM D 4829.~~the Uniform Building Code Standard 29-2, "Expansion Index Test.~~ In addition, soils meeting all four of the following provisions shall be considered expansive.

1. Plasticity Index (PI) of 15 or greater, determined in accordance with ASTM D 4319.
2. More than 10 percent of the soil particles pass a No. 200 sieve (75 pm), determined in accordance with ASTM D 422.
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D 422.
4. Expansion Index greater than 20, determined in accordance with ASTM D 4829.

c. All expansive soils shall be lime treated based on site specific tests and in conformance with the recommendations of a geotechnical engineer.

~~b. A soil will be classified as active if the Expansion Index is 50 or greater as measured by the Uniform Building Code Standard 29-2, "Expansion Index Test."~~

~~c. The design of all streets must include measures such as cut-off walls to prevent pavement structure damage required unless shown soils are not active. The structural section required, in some cases, may be governed by the expansion-shrinkage properties of the soil rather than traffic and soil-bearing criteria.~~

c. Lime treatment shall be a minimum of 18 inches thick and extend to the edge of the back of the curb at a minimum.

~~C~~D. Gravel Equivalents

1. Structural sections are to be determined from Chart No. 2 utilizing traffic indexes and known basement soil "R" Values. Gravel equivalents are to be converted into structural sections using gravel equivalent factors (Gf) for the various construction materials as shown on Chart No. 2.
2. All streets shall have a safety factor included in the design. Structural sections using aggregate base shall have the gravel equivalent of the asphalt concrete layer increased by 0.2 feet.
3. ~~In no instance shall a structural section be less than as follows:~~

~~Regional/Major and Industrial Streets~~	~~0.50 feet asphalt concrete~~
	~~0.80 feet Class II aggregate base~~
~~Transitional/Collector Streets~~	~~0.42 feet asphalt concrete~~
	~~0.75 feet Class II aggregate base~~
~~Local Streets~~	~~0.33 feet asphalt concrete~~
	~~0.75 feet Class II aggregate base~~

E. Other Design Considerations

1. For roadway section design the maximum R-value of lime treated soils will be 40.
2. The structural section required, in some cases, may be governed by the expansion-shrinkage properties of the soil rather than traffic and soil-bearing criteria.
1. ~~The design of all streets must include cut-off walls. Cut off walk shall be placed at the back of curb where landscape strips are provided. Cuto ff walls shall be placed at the back of sidewalk where the sidewalk is contiguous to the road. Cut off walls shall extend to a depth of 36 inches.~~
3. The design of all streets must include moisture barriers designed by a geotechnical engineer and shown on improvement plans. Acceptable moisture barriers include:
    a. Horizontal moisture barrier of lime treated soil extending to the outside edge of a sidewalk that is contiguous to the roadway. (no planter strip between roadway and sidewalk)
    b. A vertical moisture barrier consisting of plastic sheeting (10 mil minimum) lining a joint trench under a sidewalk.
    c. A vertical moisture barrier consisting of plastic sheeting (10 mil minimum) lining the side of a bioretention planter strip.
    d. A moisture barrier as shown in STD-264. This moisture barrier shall be placed at the back of curb where landscape strips are provided and at the back of sidewalk where the sidewalk is contiguous to the road. Cut off walls shall extend to a depth of 6 inches below the aggregate base.

F. Minimum Structural Section: In no instance shall the asphalt thickness in a structural section be less than as follows:

Major Arterial and Industrial Streets	0.50 feet asphalt concrete
Major Collector and Minor Arterial Streets	0.50 feet asphalt concrete
Minor Collector Streets	0.42 feet asphalt concrete
Local Streets	0.42 feet asphalt concrete

G. Improvement Plan Notation

1. All improvement plans shall include the design "R" Value, Expansion Index, and the Traffic Index. This information shall be included in the typical section or in a note or table on the same sheet as the typical sections.

~~D. Improvement Plan Notation~~

~~1. All improvement plans shall include the design "R" Value, Expansion Index, and the Traffic Index. This information shall be included in the typical section or in a note or table on the same sheet as the typical sections.~~

~~VIII.~~IX. REQUIREMENTS FOR EMERGENCY ACCESS DURING CONSTRUCTION

A. Subgrade Conditions

Summer April 1 – September 30	Excavated and drained subgrade
Winter October 1 – March 31	6 inches Class II AB and fabric

	~~Good~~	~~Poor~~
~~Summer April 1 – September 30~~	~~Excavated and drained subgrade~~	~~Excavated and drained subgrade~~
~~Winter October 1 – March 31~~	~~6 inches Class II AB~~	~~6 inches Class II AB and fabric~~

1. For structures with a ridge line of at least 35 feet above adjacent rough fire access grade, or for structures with three or more stories, 50,000 square feet, 1.5 inches of asphalt base over 4 inches of aggregate base shall be provided in all proposed and approved fire access areas.
2. Winter conditions shall take effect and be enforced by the City Engineer on October 1. The City Engineer shall have the authority to move this date up to as early as September 1, depending on the particular season's rainfall and projections.

3. Subgrade defined as native soil at bottom of street section (base and paving), excavated to the approximate lines and grades shown on the project grading plan, and provided with a discharge for collected water, as approved by the City Engineer.
4. Base shall be Class II aggregate base or alternative recommended by the soils engineer and approved by the City Engineer.
5. Poor subgrade is defined as "R" Value of 10 or less.
6. Base shall be placed only on an unyielding excavated and drained subgrade, and to be compacted to at least 90% relative compaction.
7. Fabric to be a ground stabilization fabric such as Mirafi 600X or equivalent.

X. COMPLETION OF ROADWAYS

A. Plans shall include a note requiring a slurry seal on all streets in a development or public project. All roadways shall be slurry sealed after completion of all roadway infrastructure and prior to the last certificate of occupancy or acceptance of the project. Any subdivision improvement bond shall include this requirement.
B. Striping and marking may be masked for the application of this slurry seal.
C. Slurry seal shall carry a warranty covering a period of two years.

XI. STREET TREES

A. Acceptable street trees are listed in the Table Street Tree List. Only trees listed for use in streets shall be used in street planter strips or medians.

B. No tree shall be placed in a planter strip more narrow than the dimension listed. The minimum distance from any paved surface shall be half the minimum planter strip dimension. Root barriers are required between all planters and paving. Trees placed behind a sidewalk shall be a minimum of 5 feet behind the sidewalk.

C. No tree shall be placed in a tree well that is smaller than the dimension listed. Trees shall be centered within a planter strip. Where planters strips vary in size due to meandering sidewalks the most narrow planter strip dimension in 20 feet either side of the tree shall govern.

D. Only trees listed for use along streets shall be placed adjacent to streets and walkways. Trees listed for use in parking areas only shall not be used along streets.

E. All trees shall be a minimum of 12 feet high and have a minimum trunk diameter of 1 inch in a 15 gallon can or larger.

F. Tree Stakes shall be 2 inch in diameter and 10 foot long copper naphthenate treated lodgepole pine stakes driven 30 inches into the ground.

STRUCTURAL DESIGN CHART
FOR FLEXIBLE PAVEMENTS

EQUATION:

G.E. = 0.0032 (T.I.)(100 − R)

G.E. = GRAVEL EQUIVALENT
T.I. = TRAFFIC INDEX
R. = RESISTANCE VALUE

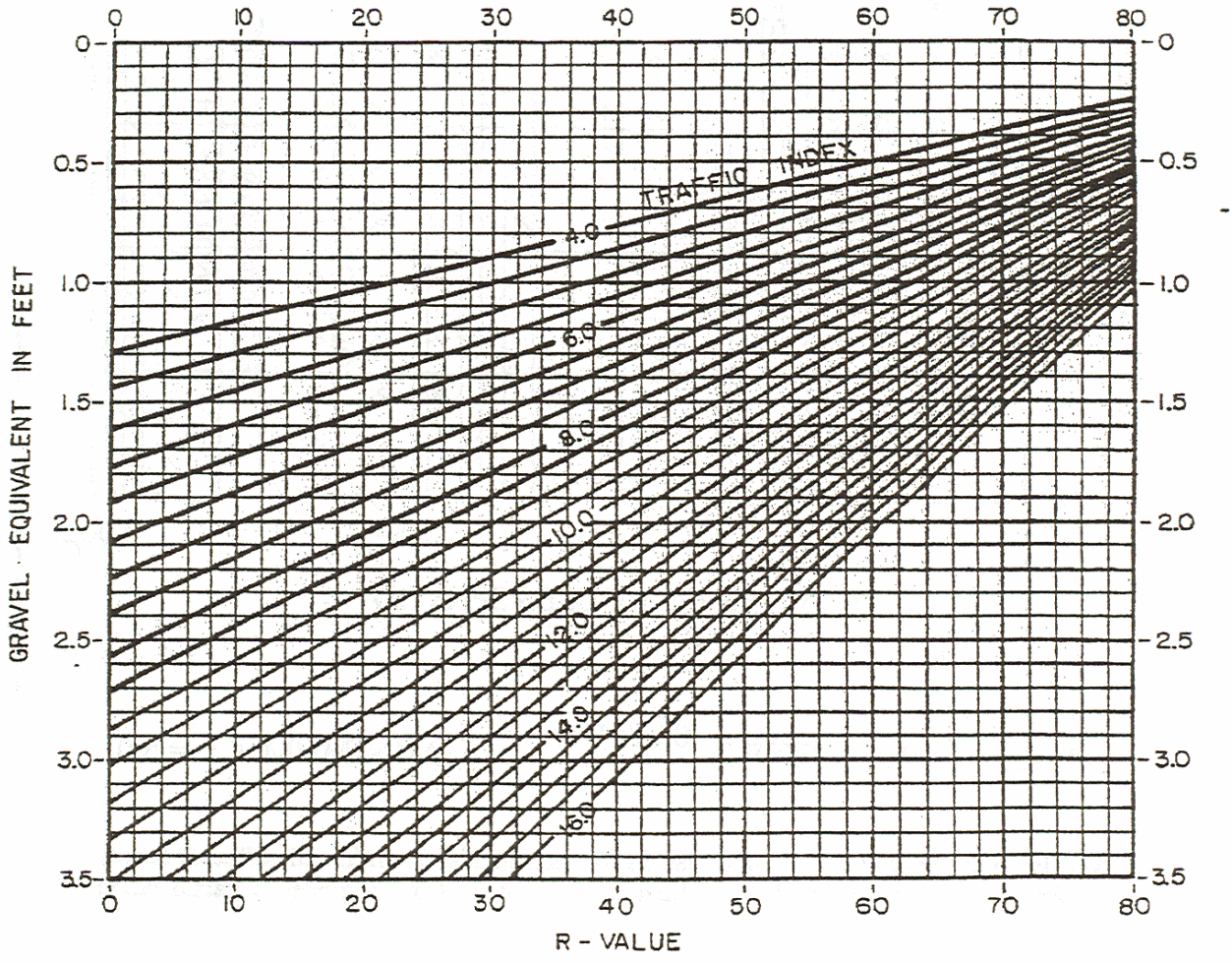


CHART 2.
Structual Design Chart for Flexible Pavements
(1 of 3)

Table 635.1B

Gravel Equivalence Needed for Deflection Reduction

Percent Reduction In Deflection (PRD or PRM) [1]	GE (in feet) For HMA Overlay Design	Percent Reduction In Deflection (PRD or PRM) [1]	GE (in feet) For HMA Overlay Design
5	0.02	46	0.55
6	0.02	47	0.57
7	0.02	48	0.59
8	0.02	49	0.61
9	0.03	50	0.63
10	0.03	51	0.66
11	0.04	52	0.68
12	0.05	53	0.70
13	0.05	54	0.72
14	0.06	55	0.74
15	0.07	56	0.76
16	0.08	57	0.79
17	0.09	58	0.81
18	0.09	59	0.83
19	0.10	60	0.85
20	0.11	61	0.87
21	0.12	62	0.89
22	0.14	63	0.91
23	0.15	64	0.94
24	0.16	65	0.96
25	0.18	66	0.98
26	0.19	67	1.00
27	0.20	68	1.02
28	0.21	69	1.04
29	0.23	70	1.06
30	0.24	71	1.09
31	0.26	72	1.11
32	0.28	73	1.13
33	0.29	74	1.15
34	0.31	75	1.17
35	0.33	76	1.19
36	0.35	77	1.22
37	0.37	78	1.24
38	0.38	79	1.26
39	0.40	80	1.28
40	0.42	81	1.30
41	0.44	82	1.32
42	0.46	83	1.34
43	0.48	84	1.37
44	0.51	85	1.39
45	0.53	86	1.41

Note: (1) PRD is Percent Reduction in Deflection at the surface.
PRM is Percent Reduction in deflection at the Milled depth.

Chart No. 2
Page 2 of 3

GRAVEL EQUIVALENT FACTORS

MATERIAL	GRAVEL EQUIVALENT FACTOR (Gf)
Lean Concrete Base (LCB)	1.9
Class A Cement Treated Base (CTB)	1.7
Asphalt Treated Permeable Material (ATPM)	1.4
Open Graded Asphalt Concrete (OGAC)	1.4
Class B Cement Treated Base (CTB)	1.2
Asphalt Treated Base	1.2
Soil Cement	1.2
Aggregate Base	1.1
Aggregate Subbase	1.0
Lime Treated Base (LTB)	0.9 + (unconfined compressive strength in psi ÷ 1000)

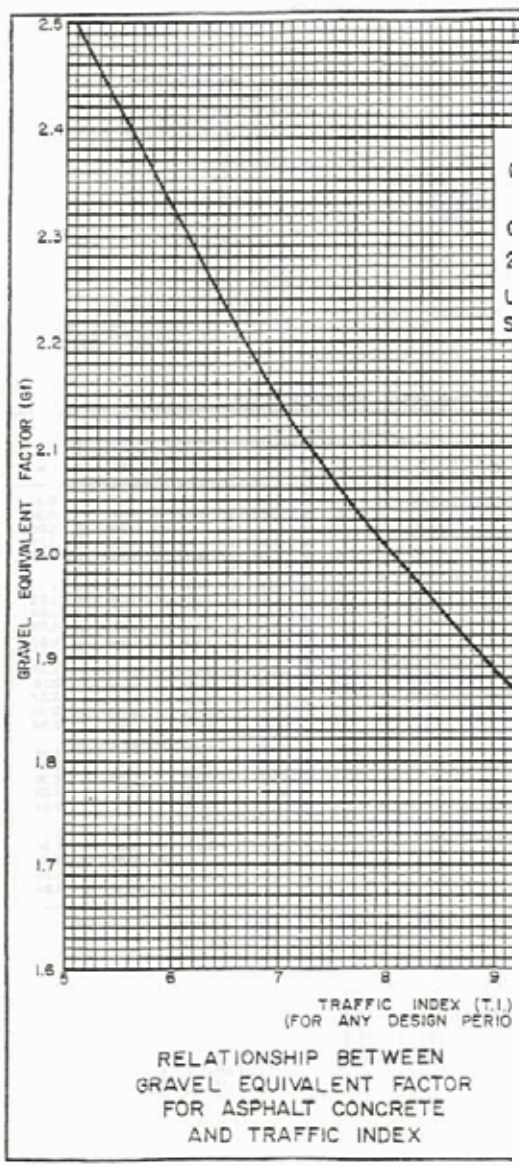
Gravel Equivalents of Full Depth Asphalt Concrete

AC Thickness (Ft.)	Traffic Index *								
	6	7	8	9	10	11	12	13	14
0.55	1.30	1.20	1.12	1.05	1.00	0.95	0.92	0.87	0.85
0.60	1.44	1.33	1.24	1.17	1.10	1.06	1.02	0.97	0.94
0.65	1.60	1.48	1.38	1.30	1.23	1.17	1.13	1.08	1.05
0.70	1.79	1.65	1.54	1.45	1.37	1.31	1.26	1.20	1.17
0.75	1.97	1.82	1.70	1.60	1.52	1.45	1.39	1.33	1.29
0.80	.....	1.99	1.86	1.75	1.66	1.59	1.53	1.46	1.41
0.85	.....	2.14	2.00	1.88	1.78	1.70	1.64	1.56	1.52
0.90	.....	2.31	2.17	2.04	1.93	1.84	1.77	1.69	1.64
0.95	.....	.....	2.35	2.21	2.09	2.00	1.92	1.83	1.78
1.00	.....	.....	2.51	2.36	2.23	2.13	2.05	1.96	1.90
1.05	.....	.....	2.67	2.51	2.38	2.27	2.18	2.08	2.02
1.10	.....	.....	.....	2.68	2.54	2.42	2.33	2.22	2.16
1.15	.....	.....	.....	2.83	2.68	2.56	2.46	2.35	2.38
1.20	.....	.....	.....	.....	2.82	2.70	2.59	2.48	2.40
1.25	.....	.....	.....	.....	2.98	2.85	2.74	2.62	2.54
1.30	.....	.....	.....	.....	3.15	3.00	2.89	2.76	2.68
1.35	.....	.....	.....	.....	.....	3.16	3.03	2.90	2.81
1.40	.....	.....	.....	.....	.....	3.31	3.18	3.04	2.95
1.45	.....	.....	.....	.....	.....	3.47	3.33	3.18	3.09
1.50	.....	.....	.....	.....	.....	.....	3.48	3.32	3.22
1.55	.....	.....	.....	.....	.....	.....	3.62	3.46	3.36
1.60	.....	.....	.....	.....	.....	.....	3.77	3.61	3.50
1.65	.....	.....	.....	.....	.....	.....	.....	3.76	3.65
1.70	.....	.....	.....	.....	.....	.....	.....	3.90	3.78
1.75	.....	.....	.....	.....	.....	.....	.....	4.06	3.94

* Safety Factor of 0.10 to be added to total GE before entering TI Column.

R-value :		
Class B CTB = 80	AB = 78	ASB Class 1 = 60
		ASB Class 2 = 50
		ASB Class 3 = 40
		ASB Class 4 = 50

CHART 2.
(3 of 3)



RELATIONSHIP BETWEEN
GRAVEL EQUIVALENT FACTOR
FOR ASPHALT CONCRETE
AND TRAFFIC INDEX

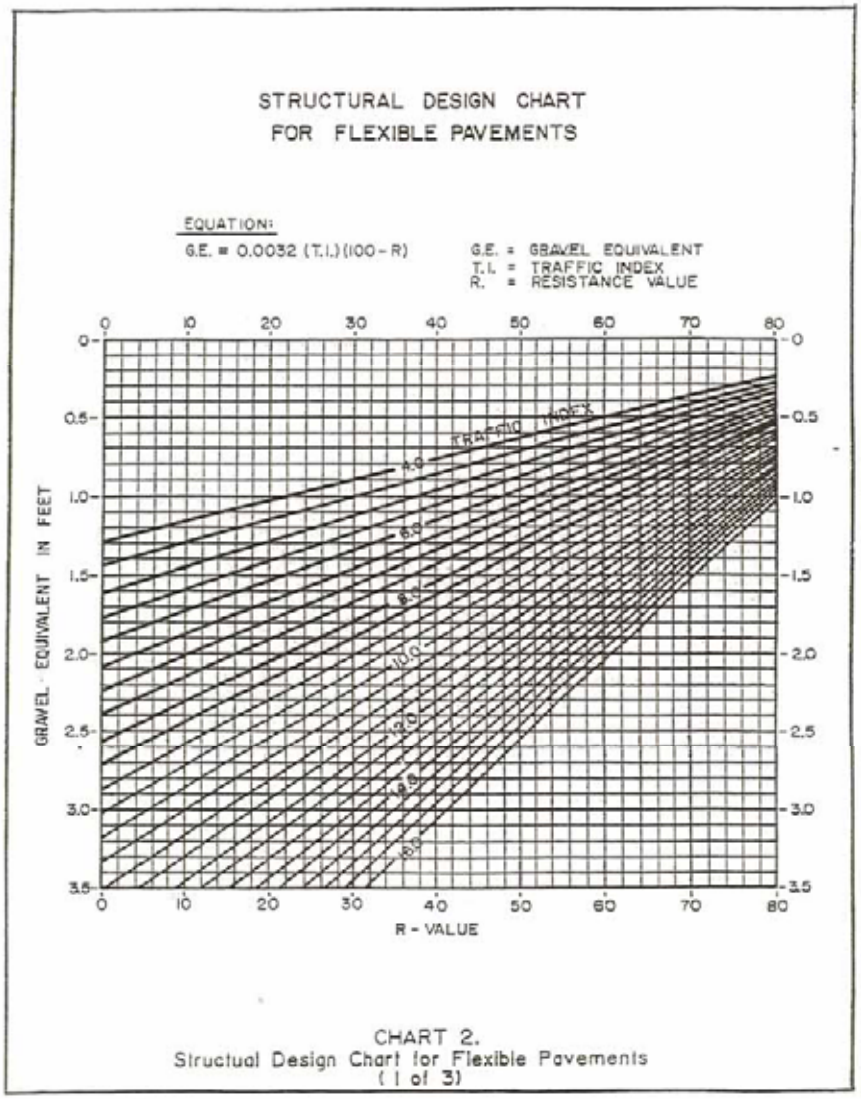


CHART 2.
Structual Design Chart for Flexible Pavements
(1 of 3)

~~**Street Trees**~~

~~Acceptable street trees are listed in the Table Street Tree List. Only trees listed for use in streets shall be used in street planter strips or medians.~~

~~No tree shall be placed in a planter strip more narrow than the dimension listed. The minimum distance from any paved surface shall be half the minimum planter strip dimension. Root barriers are required between all planters and paving. Trees placed behind a sidewalk shall be a minimum of 5 feet behind the sidewalk.~~

~~No tree shall be placed in a tree well that is smaller than the dimensiond listed. Trees shall be centered within a planter strip. Where planters strips vary in size due to meandering sidewalks the most narrow planter strip dimension in 20 feet either side of the tree shall govern.~~

~~Only trees listed for use along streets shall be placed adjacent to streets and walkways. Trees listed for use in parking areas only shall not be used along streets.~~

~~All trees shall be a minimum of 8 feet high and have a minimum trunk diameter of 1 inch in a 15 gallon can or larger.~~

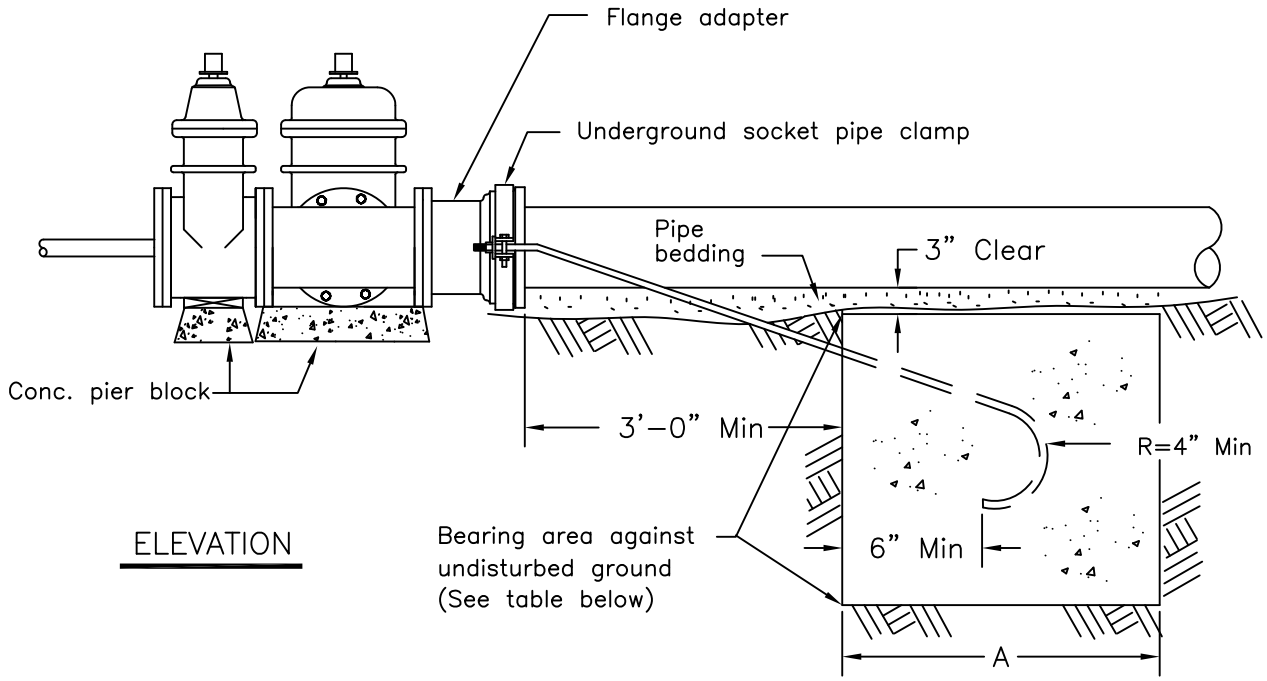
~~Tree Stakes shall be 2 inch in diameter and 10 foot long copper naphthenate treated lodgepole pine stakes driven 30 inches into the~~

Botanical Name	Common Name	Size	Crown Diameter	Evergreen	Flowering	Drought Resistant	Growth Rate	Street Tree	Parking Lot	Well	Landscape Strips	Medians	Spacing	Comments
Acer Buergeranum	*Trident Maple*	M	20				M	X		4'x4'	6'		30'	Native to China. Small tree with a height of 20-25 feet. Adaptable to urban conditions. Good tree for tight locations and under utility lines. Displays a nice red or orange fall color.
Acer Campestre	*Hedge Maple*	S	30				M	X	X	No	10'		34'	*
Acer Freemanii	*Maple, "Autumn Blaze"*	M	30				F	X	X	No	10'		35'	
Acer Palmatum	*Japanese Maple*	M	20		X		S	X		4'x4'	10'		30'	
Acer Platanoides	*Norway maple, Easy Street Maple, "Ezestre"*	M	20				M		X	4'x4'	10'		30'	*
Acer Rubrum	*Maple, "October Glory"*	M	30				M	X	No	No	10'		35'	*
Acer Truncatum x Plat.	*Pacific/Norwegian*	M	25				M		X	No	10'		30'	*
Arbutus Undeo	*Sunset Maple Strawberry Tree, "Marina"*	S	20		X		M	X		4'x4'	10'		30'	*
Brachychiton Populneus	*Bottle Tree*	M	25	X	X		M	X		No	10'		30'	*
Carpinus Betulus	*European Hornbeam*	M	25				M	X			10'		30'	*
Catalpa x Chitalpa Teshkentensis	*Chitalpa*	S	20		X		F		X	4'x4'	10'			*
Cedrus Deodara	*Deodar Cedar*	L	30	X		Y	M	X		No	10'	16'	40'	
Celtis Australis	*European Hackberry*	L	35				M	X	X	6'x6'	8'	16'	40'	Mediterranean native. The Asian woolly aphid is a new pest as of summer 2002. Do not plant in areas where aphid drip would be a problem. Until recently this tree has been free of problems. A good large growing shade tree well adapted for urban use. This is a large tree that can reach 70'. No fall color. Prefers more water than K. paniculata
Cercidium x "Desert Museum"	*Desert Museum Palo Verde*	M	25	X		X	M		X					
Cercis Reniformis	*Redbud, "Oklahoma"*	S	20		X		M	X		4'x4'	10'		30'	*
Chilopsis Linearis	*Desert Willow*	S	20		X	X	M	X		4'x4'	6'			
Cornus Controversa	*Giant Dogwood*	M	30				S		X					
Diospyros Virginiana	*Persimmon (male clones)*	M	20				M		X					
Ginkgo Biloba	*Ginkgo, "Autumn Gold" (male clones)*	L	30				S	X	X	4.5'x4.5'	6'		30'	Native to China but once grew world wide. Great street trees with great fall color. Leaves turn gold and drop all at once. They work well around hardscape, are adaptable to urban conditions and there are not currently any disease or pest problems.
Koelreuteria Elegans	*Formosan*	M	25				M		X					

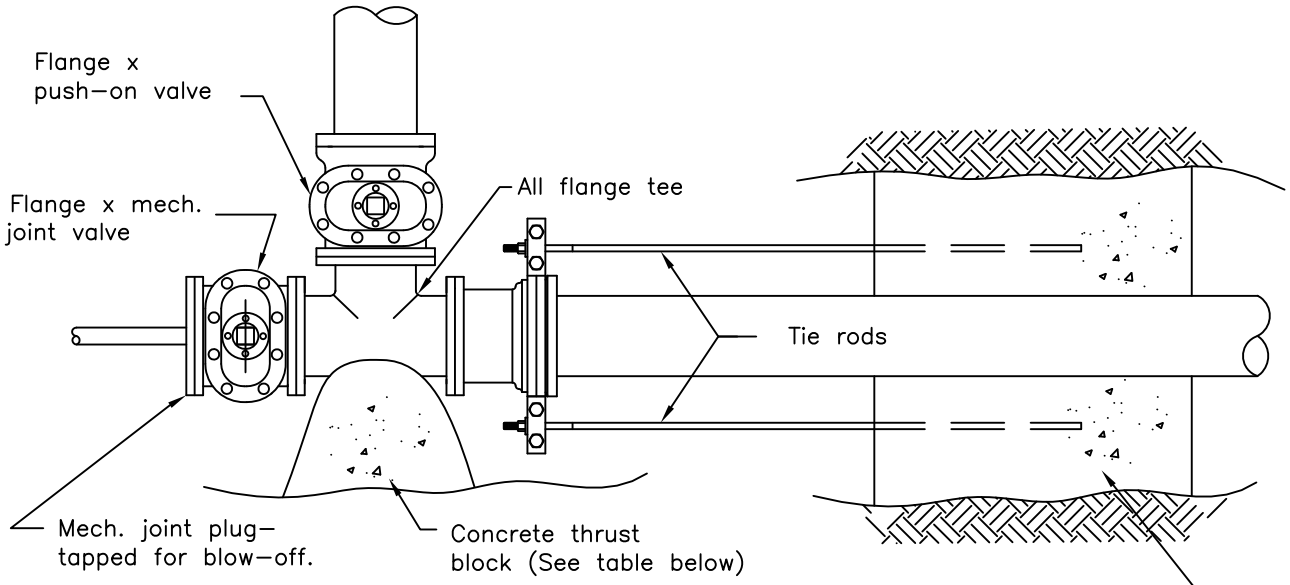
~~ground.~~

Botanical Name	Common Name	Size	Crown Diameter	Evergreen	Flowering	Drought Resistant	Growth Rate	Street Tree	Parking Lot	Well	Landscape Strips	Medians	Spacing	Comments
Koelreuteria Paniculata	*Flame Tree / Flamegold Goldenrain Tree*	M	30		X	X	M	X		4.5'x4.5'	6'		30'	Native to China. This is a small, slow growing tree around 25' that flowers in the summer. Avoid planting in litter sensitive areas. This tree is drought tolerant. Good under utility lines. High water needs. Does poorly in heavy clay or compacted soils.
Lagerstroemia Indica	*Crape Myrtle*	S				X		X		4'x4'	5.5'		30'	Native to China. Showy summer flowers. Different cultivars have flower colors red, pink and white. Good as a multi-trunk and standard form. Good tree for tight spots and utility lines. Use mildew resistant hybrids Lagerstroemia x fauriei cultivars typically with Indian names, such as 'Tuscarora'.
Laurus Nobilis	*Grecian Laurel*	S	25	X			M	X		4'x4'	10'			*
Liriodendron Tulipifera	*Tulip Tree*	L	30		X		F	X		5'x5'	10'	16'	40'	Native to the Eastern USA. A large, fast growing tree that flowers in late spring. Aphids can be a problem but all in all a good street tree.
Malus Arnoldiana	*Arnold Crabapple*	S	20		X		M	X		4'x4'	10'			*
Metasequoia Glyptostroboides	*Dawn Redwood*	M	25				M		X					
Olea Europaea	*Fruitless Olive, "Swan Hill"*	M	25	X		X	S	X		4'x4'	8'	16'	40'	
Pinus Canariensis	*Canary Island Pine*	L	30	X		X	F	X		No	8'	16'	40'	
Pistacia Chinensis	*Chinese Pistache - Fruitless Varieties Only, "Keith Davey" (male clones) Chinese Pistache - Fruitless Varieties Only, "Pearl Street", "Red Push" (male clones)*	L	30				M	X	X	4.5'x4.5'	6'		30'	Native to China. This is a medium to large growing shade tree. Height is generally around 40' but can reach 50'. It's a great street tree that is well behaved around concrete. The fall color is great. This tree does not like soggy, poorly drained soils.
Prosopis Alba	*"Colombia" Colorado Mesquite, "Colorado"*	M	25	X		X	M		X					
Prunus	*Cherry, "Cascade Snow"*	S	20		X		M		X					
Prunus Cerasifera	*Plum, "Thundercloud"*	S	20		X		F		X					Large shrub, good screen; not typically a street tree; produces fruit
Quercus Agrifolia	*Coast Live Oak*	L	35	X		X	M	X	X	No	10'	16'	40'	Native to California. Evergreen of variable size 40'-70' and equal in width. Smooth, dark gray bark and dark green leaves that are glossy on the surface. This tree does not like to be over watered and likes areas without turf.
Quercus Buckleyi	*Texas Red Oak*	L	35			X	M	X		No	10'	16'		

Botanical Name	Common Name	Size	Crown Diameter	Evergreen	Flowering	Drought Resistant	Growth Rate	Street Tree	Parking Lot	Well	Landscape Strips	Medians	Spacing	Comments
Quercus Frainetto	*Forest Green Oak*	L	35			X	M	X	X	No	10'	16'	40'	This is an upright growing, vigorous oak with a strong central leader. Drought resistant and adaptable, its glossy deep green foliage and strong symmetrical shape make it one of the best looking trees all summer.
Quercus Ilex	*Holly Oak*	L	35	X			M		X					May produce fruit. 'Krauter Vesuvius' is fruitless
Quercus Lobata	*Valley Oak*	L	35			X	M	X	X	No	10'	16'	40'	Native to California. This is a large drought tolerant deciduous tree. It is considered to be the monarch of the oak species. This tree can reach 70' or greater with an equal spread. Does not like to be over watered.
Quercus Robur	*English Oak*	L	35				M	X		No	10'	16'	40'	Native to eastern USA. Medium to large tree can reach 70'. Leaves are matte dark green and has a wonderful red fall color. Deep rooted.
Quercus Shumardii	*Shumard Red Oak*	L	35			X	M	X		5'x5'	8'		40'	Native to eastern USA. Medium to large tree can reach 70'. Tolerates urban conditions. Has a dependable fall color in orange and reds.
Quercus Shumardii	*Shumard Red Oak*	L	35			X	M	X		5'x5'	8'		40'	Native to eastern USA. Medium to large tree can reach 70'. Tolerates urban conditions. Has a dependable fall color in orange and reds.
Quercus Suber	*Cork Oak*	L	35	X		X	M	X	X	5'x5'	8'		40'	Native to the western Mediterranean and North Africa. Evergreen tree of moderate growth rate to 70'. Trunk and main limbs covered with thick, corky bark which add a lot of interest. Leaves are shiny dark green.
Quercus Virginiana	*Southern Live Oak*	L	35	X			M		X					Native to southern coast plains in the US. Large growing evergreen tree with waxy dark green leaves. This is a moderate to fast grower that handles turf well.
Quercus Wislizenii	*Interior Live Oak*	L	35	X		X	M	X		5'x5'	8'	16'	40'	Native to interior California and southern Oregon. An evergreen tree of medium size up to 50'. Wide-spreading branches with attractive green foliage.
Robinia Ambigua	*Locust: "Purple robe"*	L	30		X	X	F	X				16'		
Sapium Sebiferum	*Chinese Tallow*	L	30				F		X		6'			
Sequoia Sempervirens	*Coast Redwood*	L	25	X			F							



ELEVATION



PLAN

MINIMUM DIMENSIONS				
PIPE SIZE	TIE RODS	HARNESS BLOCK*	A	THRUST BLOCK**
6"	5/8"	4 Sq. Ft.	2'	4 Sq. Ft.
8"	3/4"	7 Sq. Ft.	3'	7 Sq. Ft.
12"	1–1/8"	15 Sq. Ft.	3'	15 Sq. Ft.
OVER 12" BY DESIGN ENGINEER				

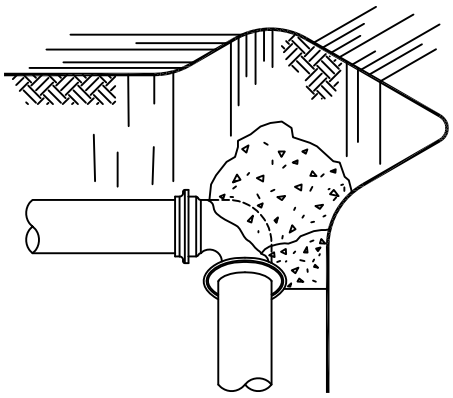
* Bearing area below grade of pipe against undisturbed ground.

** Bearing area against undisturbed ground.

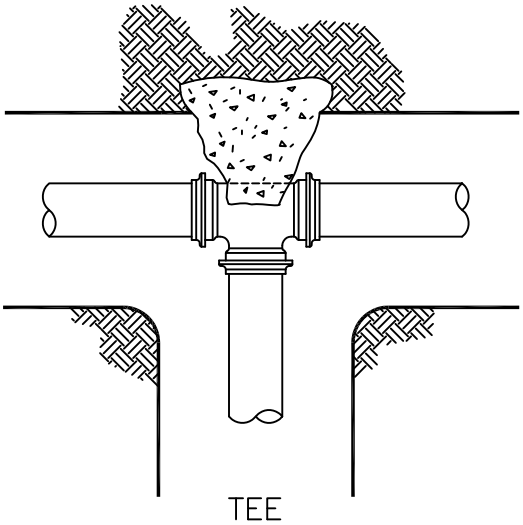
CITY OF ROHNERT PARK

HARNESS INSTALLATION FOR FLANGE FITTINGS

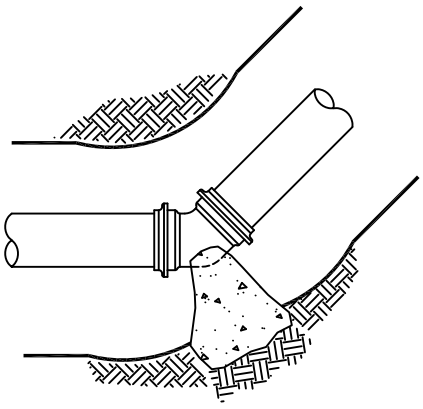
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 851



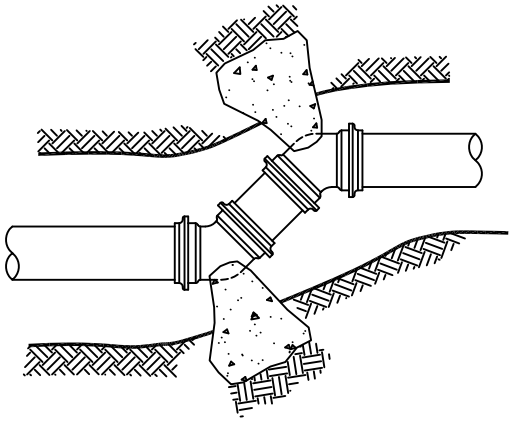
BEND
TYPICAL CONC. BLOCKING
SHOWN IN PERSPECTIVE.



TEE



TYPICAL BEND



OFFSET

NOTES:

1. To use this standard, a geotechnical engineer shall confirm the soil bearing capacity or a value of 1000 P.S.F. shall be used.
2. Safe bearing load of soil for horizontal thrust shall not be exceeded.
3. Concrete blocking, cast–in–place, to extend from bells of fittings to undisturbed soil and entire bearing area must be against undisturbed soil.
4. In using the Thrust Blocking Table below, the Design Engineer shall specify thrust blocking requirements for all other soil bearing conditions.
5. For plugged leg(s) of tee or cross use harness type blocking as shown on STD. 852 and concrete blocking indicated in table below.
6. Restrained joint pipe may be substituted, with calculations, in lieu of thrust blocks.

MIN. REQ'D BEARING AREA IN SQ. FT. PER 100 P.S.I. TEST PRESSURE*					
PIPE SIZE	SOIL BEARING CAPACITY(PSF)	TEES & DEAD ENDS	90° BENDS	45° BENDS	22–1/2° BENDS
6"	1000	4	6	3	2
8"	1000	7	10	5	3
12"	1000	16	22	12	6

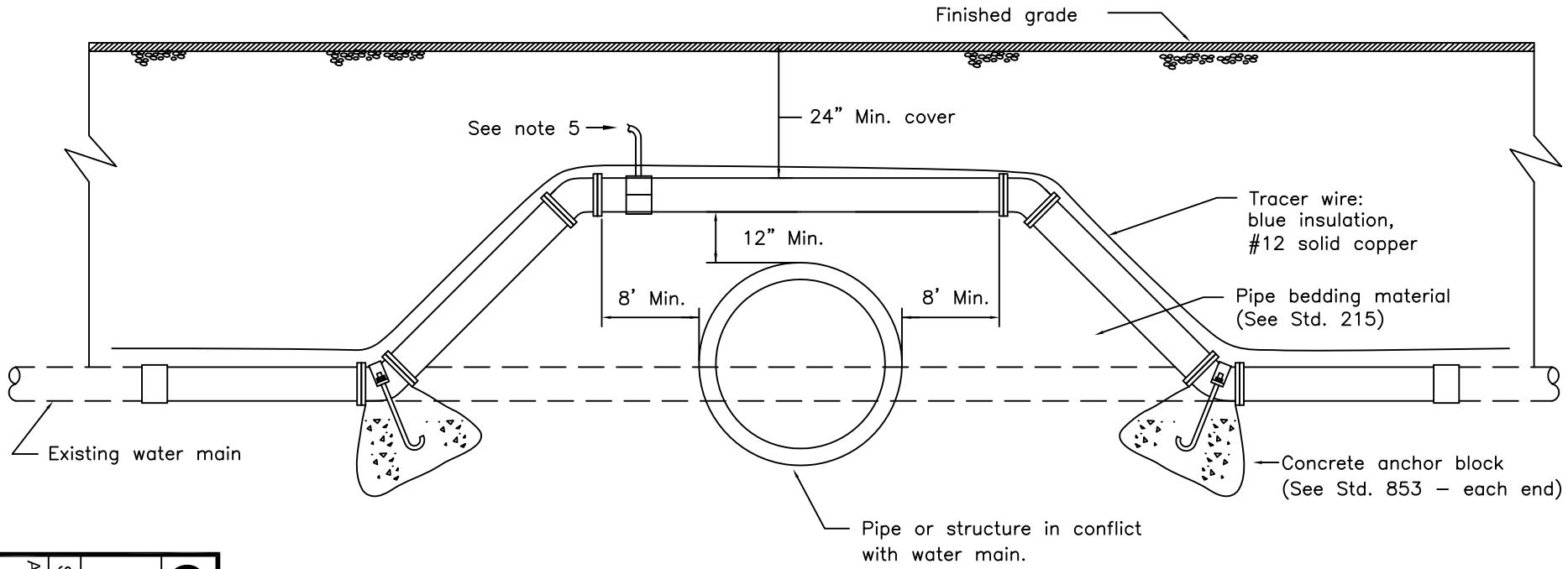
* MULTIPLY NO. IN TABLE BY TEST PRESSURE & DIVIDE BY 100

For pipes greater than 12", Design Engineer must submit calculations to size concrete thrust blocks.

CITY OF ROHNERT PARK

CONCRETE THRUST BLOCKS FOR HORIZONTAL BENDS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 854



CITY OF ROHNERT PARK

WATER MAIN OVER STRUCTURE

SCALE: NONE

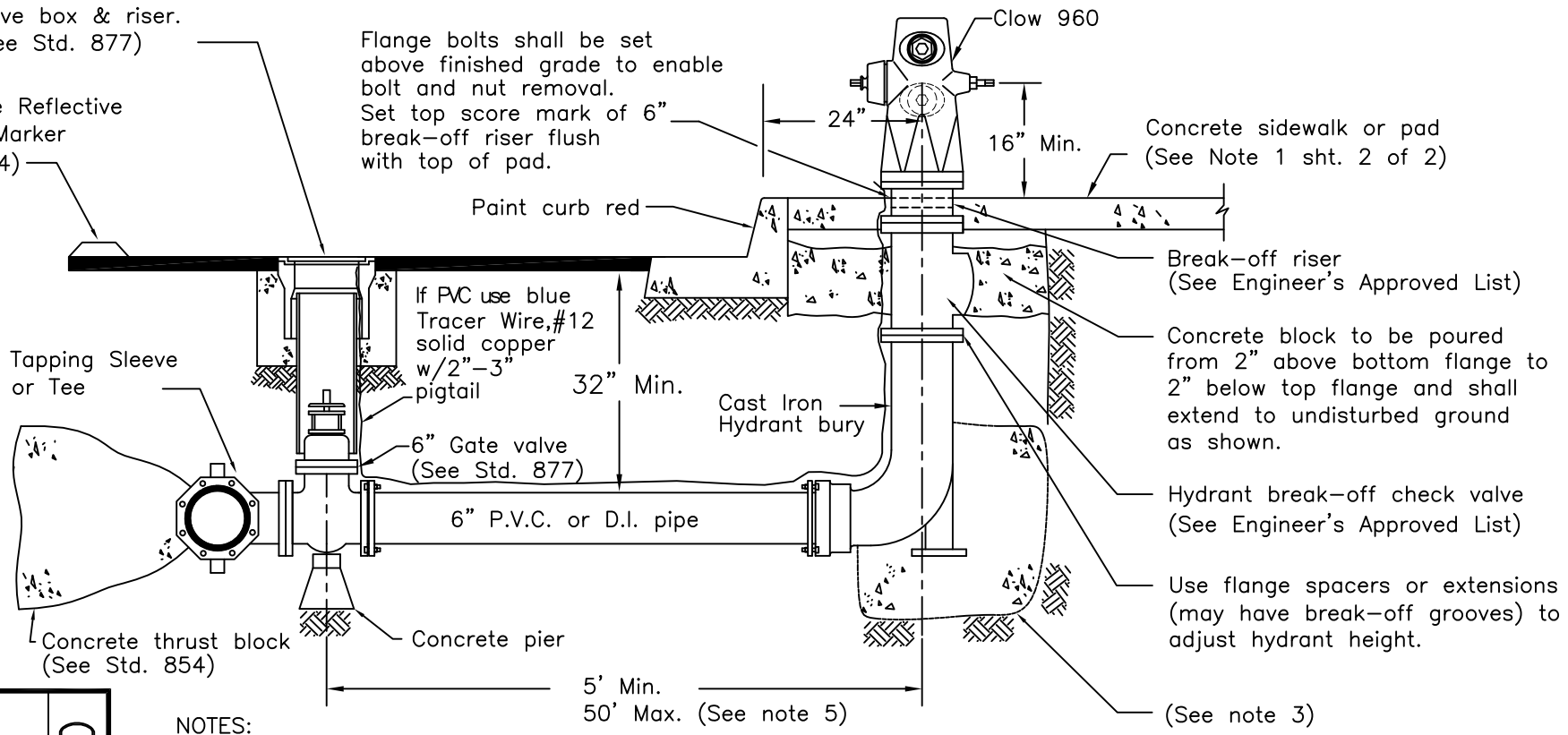
DATE: OCTOBER 2010

Approved:

STD. - 856

NOTES:

1. All pipe and fittings shall be ductile iron & shall be wrapped in polyethylene per City of Rohnert Park Std. Construction Specifications found in section 71 (71–1.02C) sewer.
2. Only mechanical joint fittings with restrained joints shall be used.
3. All bends shall be 45° or 22–1/2° fittings. – No 90° bends allowed.
4. To be used only at the direct approval of the City Engineer
5. Install air and vacuum/air release valve at high point per Std. 883.
6. Installation must comply with CHD standards.



NOTES:

1. Residential and commercial fire hydrants have two 2–1/2" & one 4–1/2" outlets.
2. Paint fire hydrant in accordance with AWWA Standard Specification C503.
   The finished paint color shall be Rustoleum Product, body–Silver Shield Aluminum, top and outlet caps– Safety Blue. All damaged paint surfaces shall be corrected by touch up prior to acceptance.
3. Restrained joints are required for all new construction from gate valve to hydrant bury. Thrust blocks are only required where existing services are being modified and restrained joints are not used.
4. Blue reflective pavement markers should be placed 6 inches from the centerline stripe, or approximate center of the pavement where there is no centerline stripe, on the side nearest the fire hydrant.
5. If hydrant lateral length exceeds 50 feet, contact City Engineer's office for approval.

APPROVED HYDRANTS

(See Engineer's Approved List)

CITY OF ROHNERT PARK

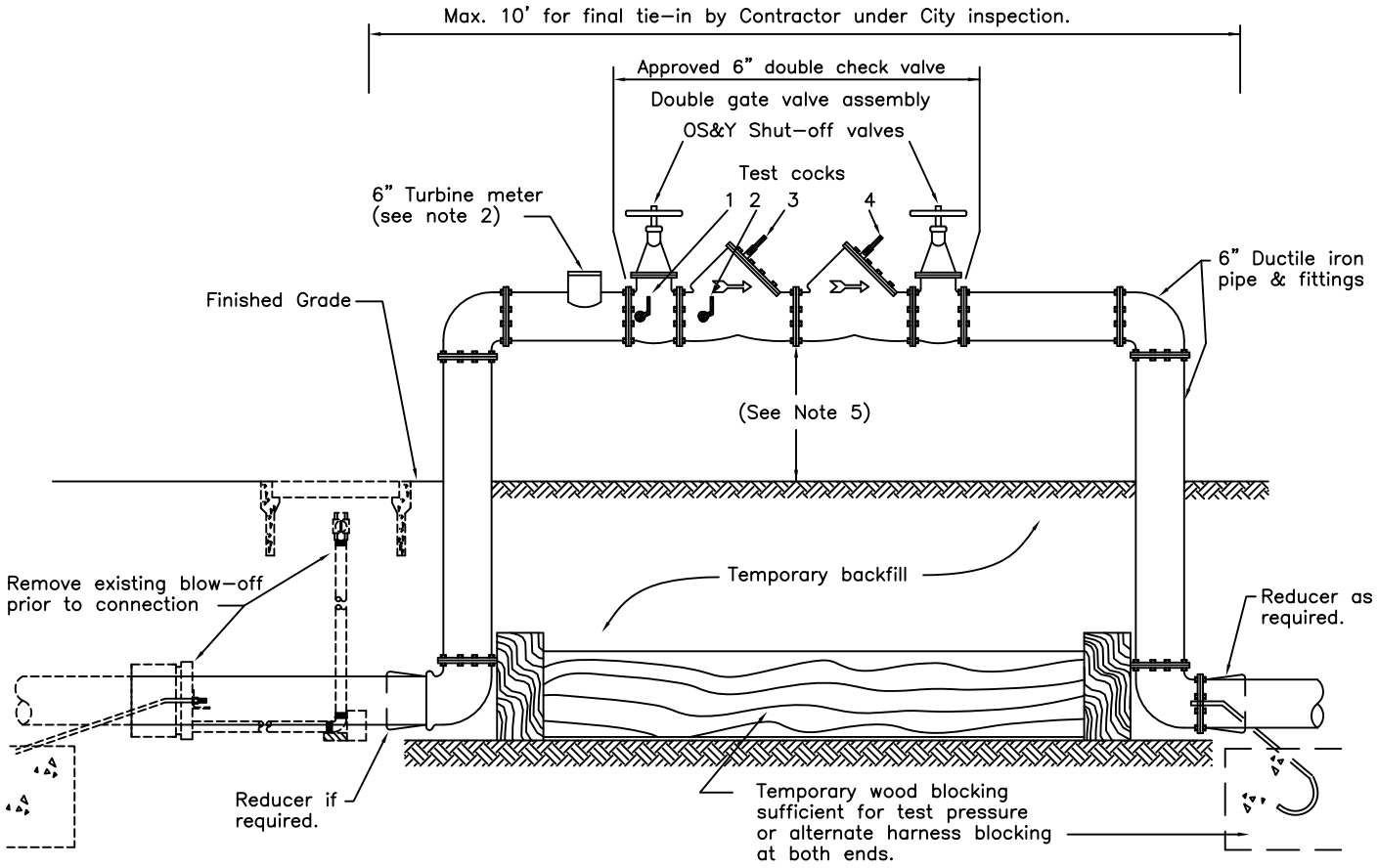
FIRE HYDRANT and LATERAL

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 857



NOTES:

1. This assembly shall be installed when combustible materials will be stored or constructed on–site prior to acceptance of the on–site water main by the City. Fire flow & access must be satisfactory to the City Fire Department.

2. The Contractor shall furnish the meter and have the meter and double check valve tested and certified on–site prior to activating the system. The contractor is responsible for any fees and charges incurred.

3. The Contractor shall make final tie–in under the inspection of a City Public Works inspector. Inspection fees must be paid prior to scheduling tie–in.

4. Meters to be gallon reading type only.

5. Clearance to be 12" min. above finished grade or 6" above the inundation level, whichever is higher.

6. Fire lines shall be flushed per City Standard Specifications and adequate fire flow provided prior to combustible materials being stored or construction beginning on site.

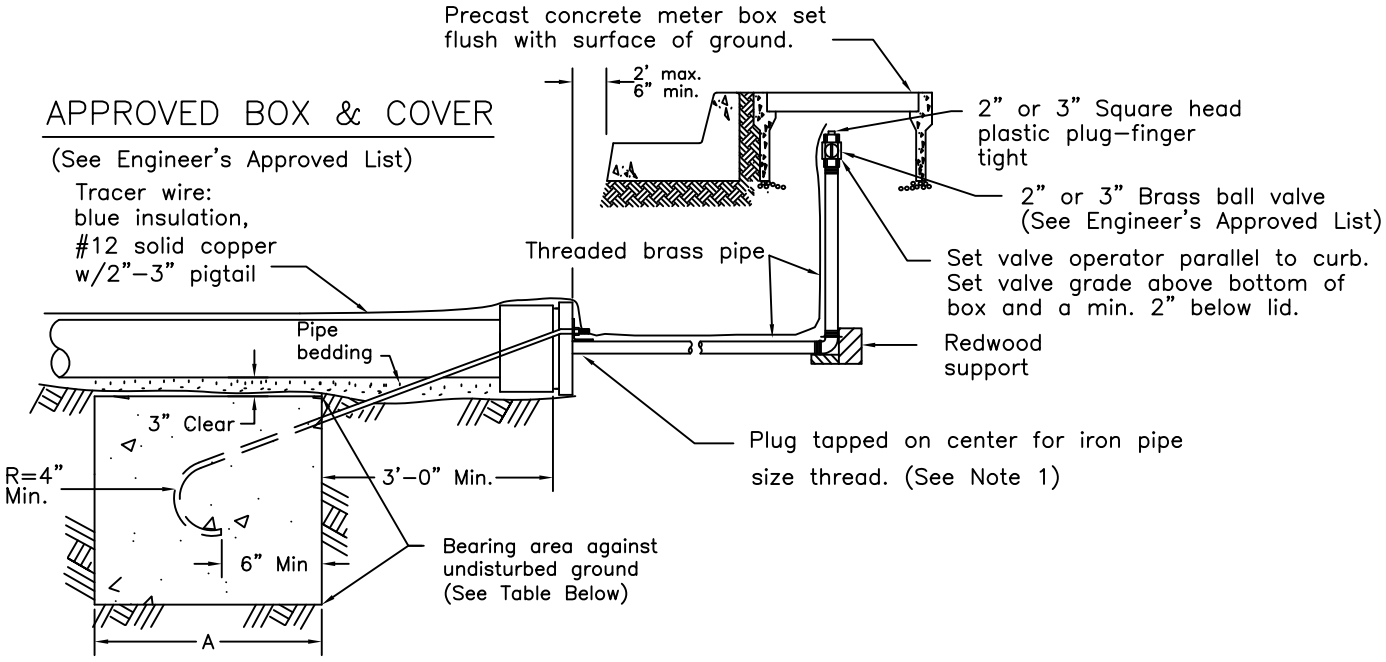
7. The meter shall be installed with proper lengths of pipe both upstream and down stream of the meter. See manufacturers specifications for determining pipe length(s).

8. A Utility Billing account shall be opened with City prior to flowing water through meter.

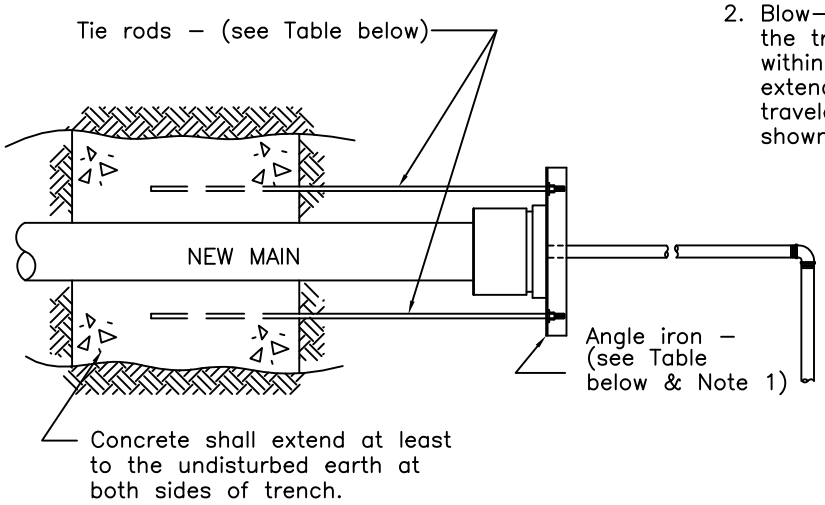
CITY OF ROHNERT PARK

TEMPORARY METERED CONNECTION WHEN FIRE FLOW IS REQUIRED

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 860



ELEVATION



PLAN

NOTES

1. For 6" & 8" mains, M.J. plugs or caps with dilly lugs and 2" center tap may be used in lieu of angle iron. Install angle iron off–center to accomodate center tap.

2. Blow–off shall not be installed within the traveled way. If main ends within street area, blow–off to be extended to area outside of traveled way and installed as shown above.

MINIMUM DIMENSIONS					
PIPE SIZE	TIE RODS	ANGLE IRON	BEARING AREA	A	SIZE B.O.
6"	5/8"	3"x3"x1/4" *	4 Sq. Ft.	2'	2"
8"	3/4"	3 1/2"x3"x1/4"*	7 Sq. Ft.	3'	2"
12"	1–1/8"	4"x3"x1/2"	15 Sq. Ft.	3'	3"
OVER 12"	BY THE DESIGN ENGINEER				3"

* (see note 1)

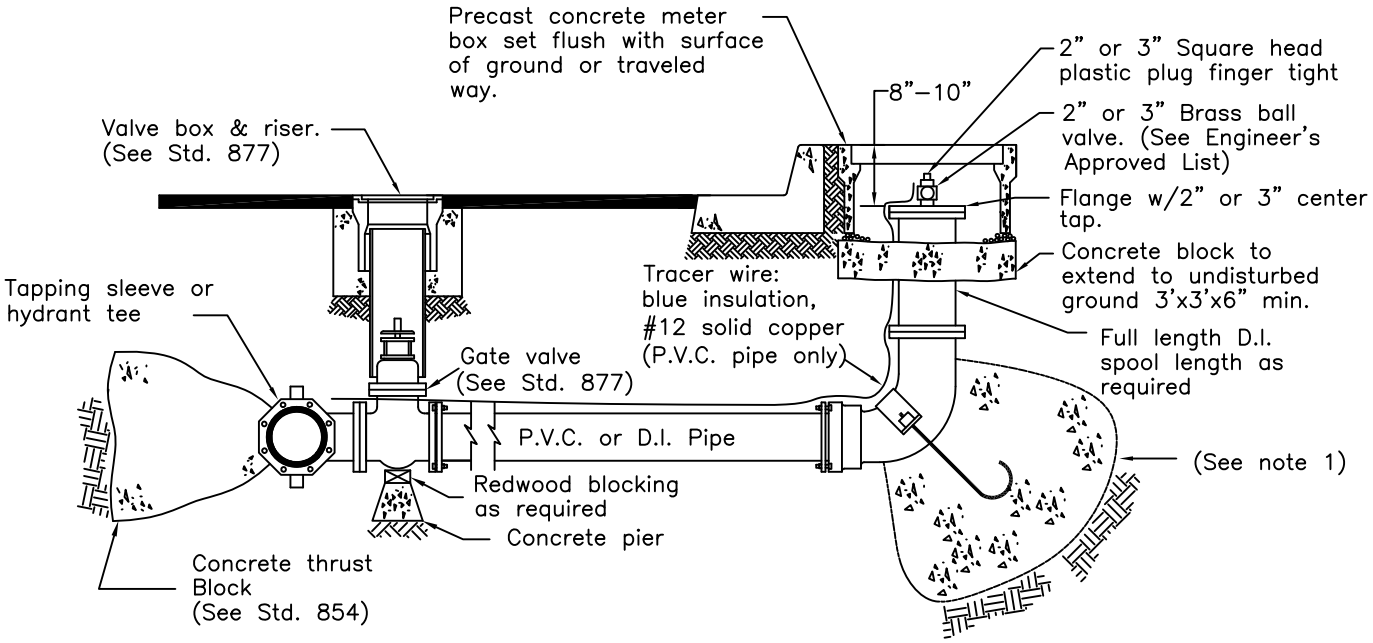
CITY OF ROHNERT PARK

BLOW-OFF with HARNESS

SCALE: NONE | DATE: OCTOBER 2010

Approved:

STD. - 861

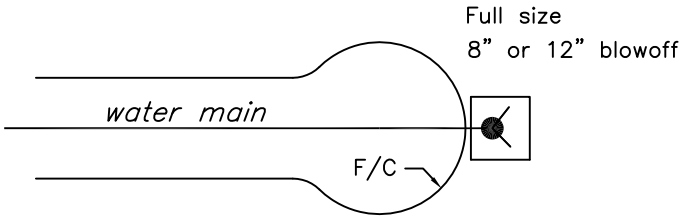


Approved Box & Cover

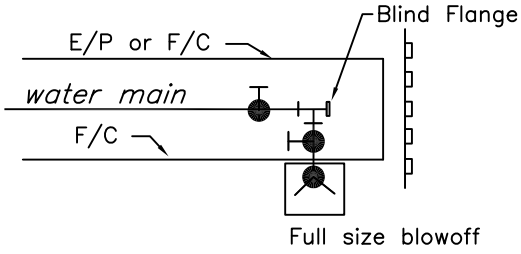
(See Engineer's Approved List)

NOTES

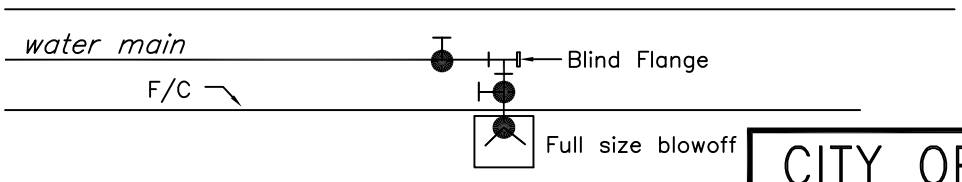
1. Restrained joints are required for all new construction from gate valve to 90° bend. Thrust blocks are only required where existing services are being modified and restrained joints are not used.
2. Blowoff piping to be the same size as the main.



Cul–de–Sac



Deadend Street

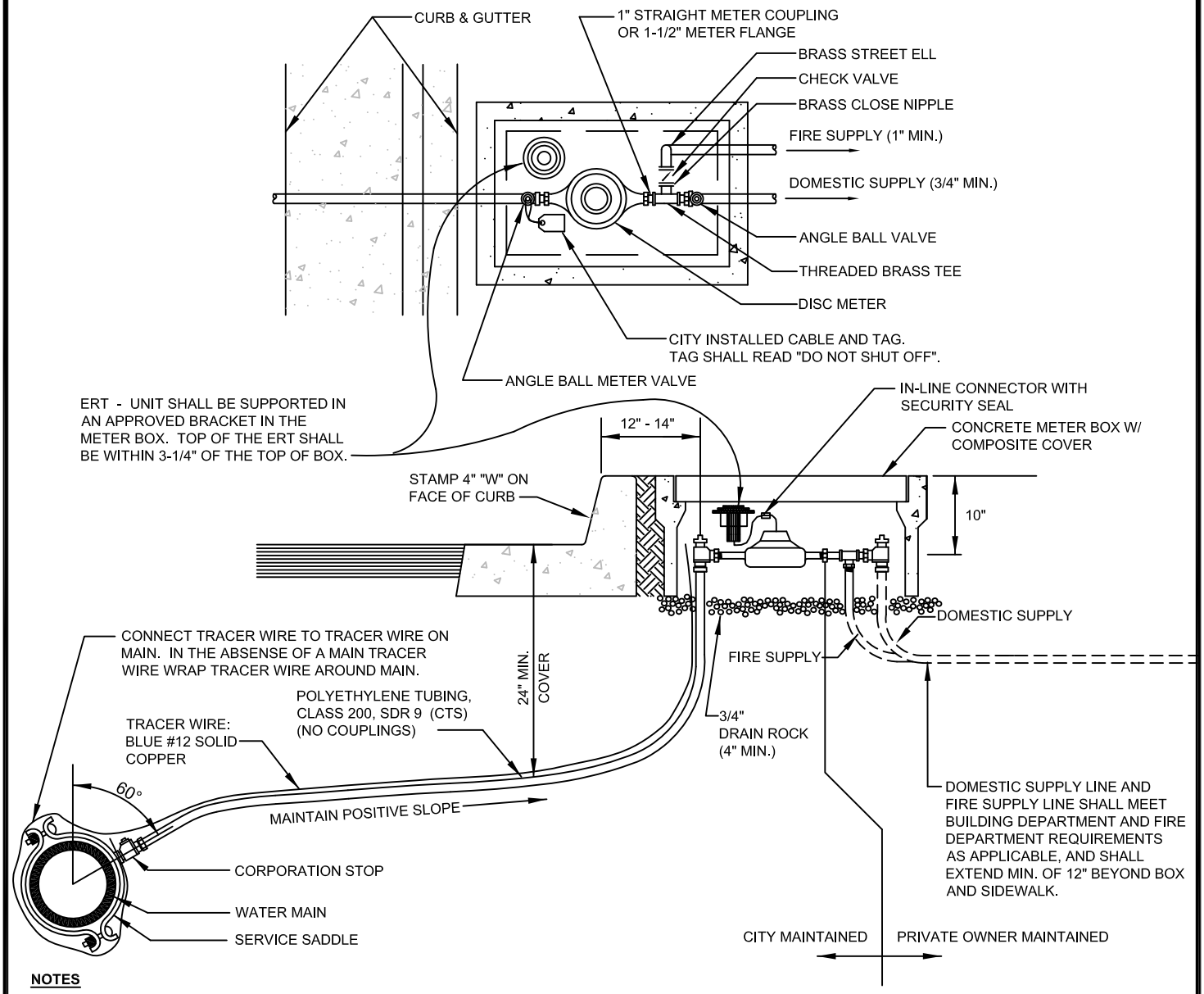


Thru–Street

CITY OF ROHNERT PARK

FULL SIZE BLOW-OFF

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 862



NOTES

1. THIS STANDARD APPLIES TO COMMERCIAL AND RESIDENTIAL SERVICES WHICH WHICH REQUIRE OR PROVIDE FIRE SPRINKLER SERVICE .
2. SET METER BOX COVER FLUSH WITH FINISHED SURFACE. THE ADDRESS MUST BE CLEARLY MARKED ON TOP OF THE METER BOX WITH PERMANENT MARKER BEFORE CITY WILL ACTIVATE SERVICE.
3. OLD METER TO BE DELIVERED TO CORP. YARD OF PUBLIC WORKS DEPT. FOR FINAL READING. METER SHALL BE FURNISHED AND SET BY CONTRACTOR. PROVIDE ERT AND TRANSMITTING REGISTER WITH 5' LEAD.
4. SERVICE LATERAL AND BUILDING SUPPLY LINES SHALL BE INSTALLED UNDER BOX, KNOCKOUTS SHALL NOT BE USED AND BE GROUTED.
5. WATER SERVICE TO BE LOCATED IN MIDDLE THIRD OF LOT AND OUTSIDE OF DRIVEWAY APPROACH UNLESS OTHERWISE NOTED ON PLANS.
6. SERVICE LATERAL BEDDING (PEA GRAVEL) SHALL BE PLACED PRIOR TO INSTALLATION OF POLYETHYLENE TUBING.
7. REFER TO CITY WATER STANDARDS FOR CONSTRUCTION STANDARDS, SPECIFICATIONS AND ENGINEERS LIST OF APPROVED MATERIALS..
8. HYDRAULIC CALCULATIONS SHALL BE PROVIDED IN ACCORDANCE WITH NFPA 13D. HYDRANT FLOW DATA SHALL BE BASED ON ACTUAL HYDRANT FLOW TEST DATA AS PROVIDED BY THE CITY FIRE DEPARTMENT. CALCULATIONS ARE SUBJECT TO FIRE SERVICES DIVISION APPROVAL.
9. SERVICE LATERALS OF 1-1/2" (MINIMUM) SIZE SHALL BE REQUIRED FOR DUAL METER INSTALLATIONS.
10. ALL COMPRESSION FITTINGS SHALL HAVE STAINLESS STEEL INSERTS.
11. NO FENCING SHALL BE INSTALL BETWEEN STREET AND METER BOX.
12. THE METER SHALL BE INSTALLED WITH PROPER LENGTHS OF PIPE BOTH UPSTREAM AND DOWN STREAM OF THE METER SEE MANUFACTURERS SPECIFICATIONS FOR DETERMINING PIPE LENGTH(S).
13. A UTILITY BILLING ACCOUNT SHALL BE OPENED WITH CITY PRIOR TO FLOWING WATER THROUGH METER.

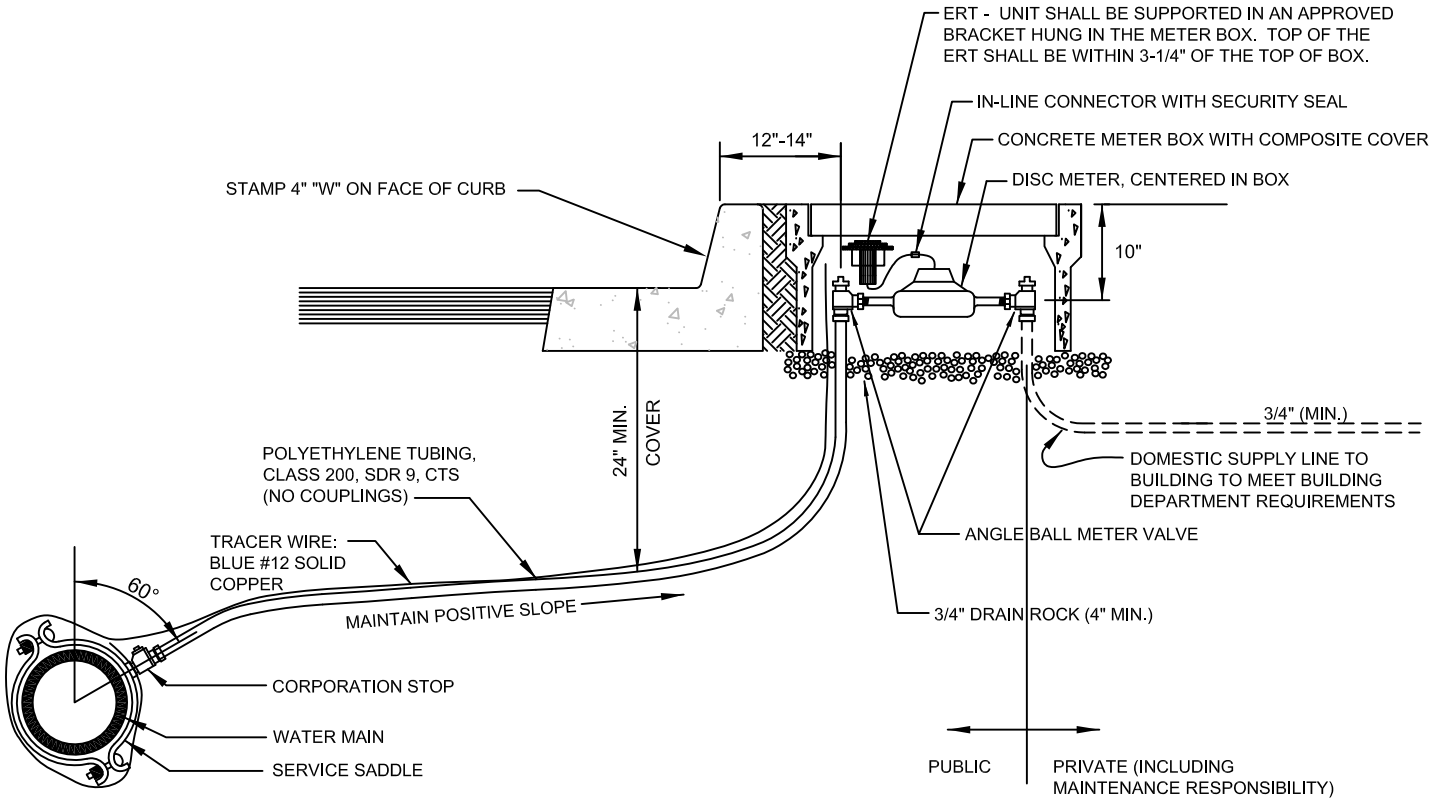
RETROFIT NOTES

1. *PROVIDE HYDRAULIC CALCULATIONS VERIFYING AVAILABLE PRESSURE AND FLOW PRIOR TO MODIFICATIONS FOR FIRE SERVICE RETROFITS.*
2. *A SEPARATE FIRE SERVICE SHALL BE INSTALLED (PER OTHER CITY STANDARDS) WHEN CALCULATIONS SHOW FIRE*

CITY OF ROHNERT PARK

WATER SERVICE W/ FIRE SYSTEM SUPPLY - 1" & 1-1/2" DISC METERS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 863A



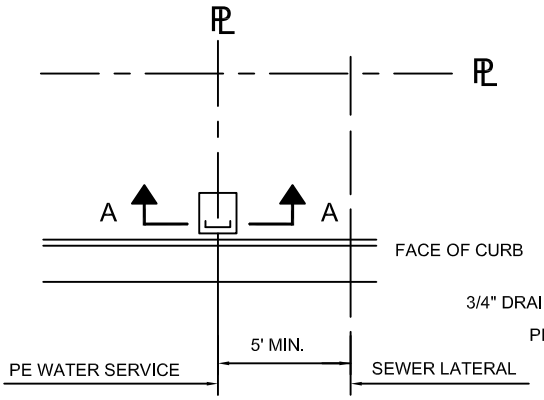
NOTES

1. THIS STANDARD APPLIES TO COMMERCIAL OR RESIDENTIAL SERVICES WHICH HAVE A SEPARATE FIRE SPRINKLER SYSTEM.
2. SET METER BOX COVER FLUSH WITH FINISHED SURFACE. THE ADDRESS MUST BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER BEFORE CITY WILL ACTIVATE SERVICE.
3. METER SHALL BE FURNISHED AND SET BY CONTRACTOR. PROVIDE ERT AND TRANSMITTING REGISTER WITH 5' LEAD.
4. SERVICE LATERAL AND BUILDING SUPPLY LINES SHALL BE INSTALLED UNDER BOX; KNOCKOUTS SHALL NOT BE USED. KNOCKOUTS SHALL BE GROUTED
5. WATER SERVICE TO BE LOCATED IN MIDDLE THIRD OF LOT AND OUTSIDE OF DRIVEWAY APPROACH UNLESS OTHERWISE NOTED ON PLANS.
6. SERVICE LATERAL BEDDING (PEA GRAVEL) SHALL BE PLACED PRIOR TO INSTALLATION OF POLYETHYLENE TUBING.
7. REFER TO CITY WATER STANDARDS FOR CONSTRUCTION STANDARDS, SPECIFICATIONS AND ENGINEER'S LIST OF APPROVED MATERIALS.
8. SERVICE LATERALS SHALL BE AT LEAST ONE SIZE LARGER THAN THE LARGEST METER BEING INSTALLED FOR DUAL SERVICE INSTALLATIONS.
9. ALL COMPRESSION FITTINGS SHALL HAVE STAINLESS STEEL INSERTS.
10. CONNECT SERVICE TRACER WIRE TO THE TRACER WIRE ON THE MAIN, IN ABSENCE OF TRACER WIRE ON THE MAIN WRAP TRACER WIRE AROUND MAIN.
11. NO FENCING SHALL BE INSTALLED BETWEEN STREET AND METER BOX.
12. THE METER SHALL BE INSTALLED WITH PROPER LENGTHS OF PIPE BOTH UPSTREAM AND DOWN STREAM OF THE METER SEE MANUFACTURERS SPECIFICATIONS FOR DETERMINING PIPE LENGTH(S).
13. A UTILITY BILLING ACCOUNT SHALL BE OPENED WITH CITY PRIOR TO FLOWING WATER THROUGH METER.

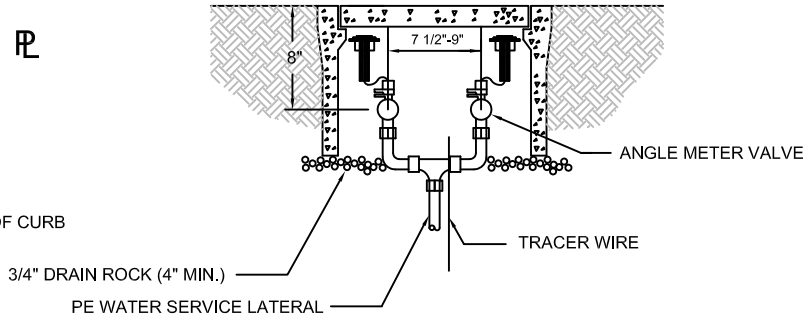
CITY OF ROHNERT PARK

WATER SERVICE
5/8" X 3/4", 1" & 1-1/2" DISC METERS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 863B

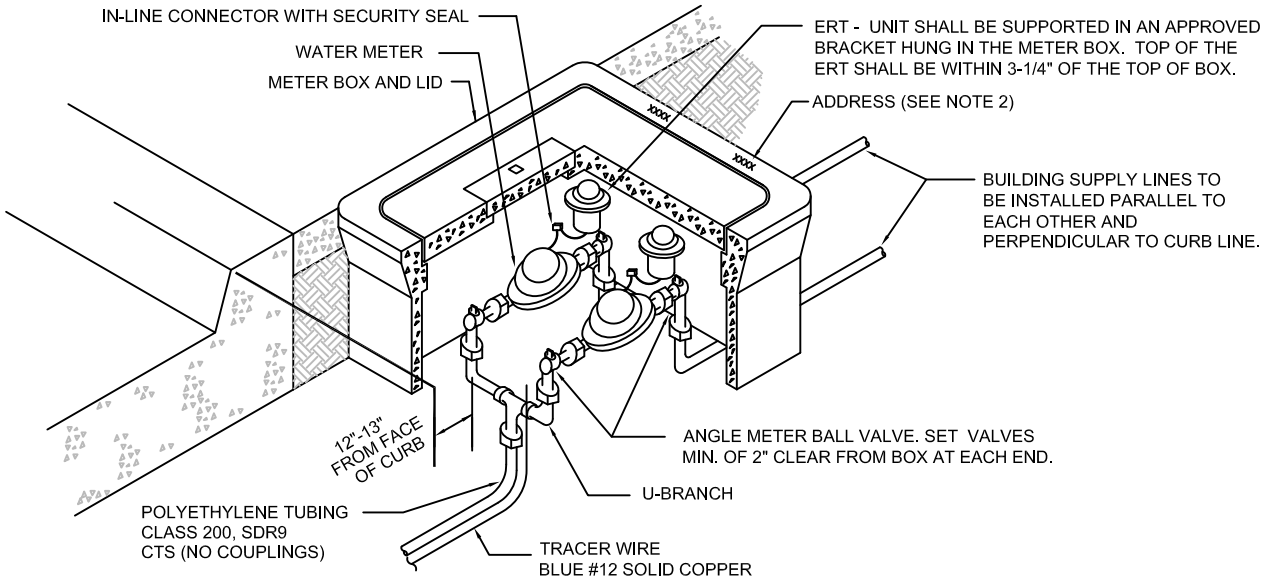


PLAN VIEW



SECTION A-A

SINGLE METER BOX INSTALLATION FOR DUAL 3/4" OR 1" MANIFOLD



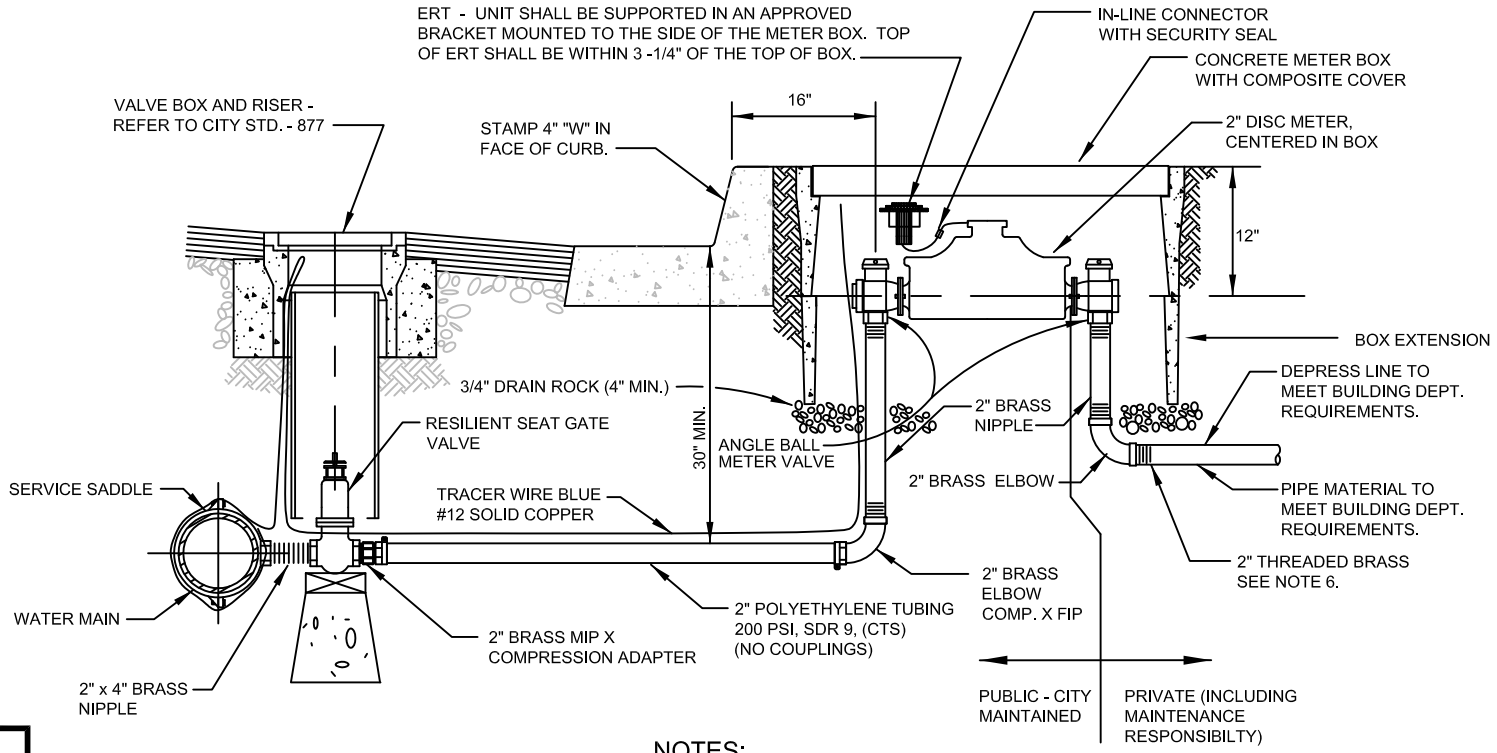
NOTES

1. THIS STANDARD APPLIES TO COMMERCIAL SERVICES WITH A SEPARATE FIRE SERVICE OR RESIDENTIAL SERVICES WITHOUT A FIRE SPRINKLER SYSTEM.
2. SET METER BOX COVER FLUSH WITH FINISHED SURFACE. THE ADDRESS MUST BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER BEFORE CITY WILL ACTIVATE SERVICE.
3. METER SHALL BE FURNISHED AND SET BY CONTRACTOR. PROVIDE ERT AND TRANSMITTING REGISTER WITH 5' LEAD.
4. SERVICE LATERAL AND BUILDING SUPPLY LINES SHALL BE INSTALLED UNDER BOX; KNOCKOUTS SHALL NOT BE USED. KNOCKOUTS SHALL BE GROUTED. BUILDING SUPPLY LINES SHALL EXTEND 12" BEYOND BOX AND SIDEWALK.
5. WATER SERVICE TO BE LOCATED IN MIDDLE THIRD OF LOT AND OUTSIDE OF DRIVEWAY APPROACH UNLESS OTHERWISE NOTED ON PLANS.
6. SERVICE LATERAL BEDDING (PEA GRAVEL) SHALL BE PLACED PRIOR TO INSTALLATION OF POLYETHYLENE TUBING.
7. REFER TO CITY WATER STANDARDS FOR CONSTRUCTION STANDARDS, SPECIFICATIONS AND ENGINEER'S LIST OF APPROVED MATERIALS.
8. SERVICE LATERALS SHALL BE AT LEAST ONE SIZE LARGER THAN THE LARGEST METER BEING INSTALLED FOR DUAL SERVICE INSTALLATIONS.
9. ALL COMPRESSION FITTINGS SHALL HAVE STAINLESS STEEL INSERTS.
10. CONNECT SERVICE TRACER WIRE TO THE TRACER WIRE ON THE MAIN, IN ABSENCE OF TRACER WIRE ON THE MAIN WRAP TRACER WIRE AROUND MAIN.
11. NO FENCING SHALL BE INSTALLED BETWEEN STREET AND METER BOX.
12. FOR LATERAL INSTALLATION SEE STANDARD 863A.
13. FOR DUAL 1" METERS USE 1 1/2" PE TUBING FOR DUAL 5/8"x3/4" METERS USE 1" PE TUBING.

CITY OF ROHNERT PARK

DUAL WATER SERVICE 5/8" X 3/4" & 1" DISC METERS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 864



NOTES:

1. ALL COMPRESSION FITTINGS SHALL HAVE STAINLESS STEEL INSERTS.
2. METER SHALL BE FURNISHED AND SET BY CONTRACTOR. PROVIDE ERT AND TRANSMITTING REGISTER WITH 5' LEAD.
3. SERVICE LATERAL BEDDING (PEA GRAVEL) SHALL BE PLACED PRIOR TO INSTALLATION OF POLYETHYLENE TUBING.
4. METER BOX SHALL BE SET WITH COVER FLUSH WITH FINISHED SURFACE. THE ADDRESS SHALL BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER BEFORE CITY WILL ACTIVATE SERVICE.
5. SERVICE LATERAL AND BUILDING SUPPLY LINE SHALL BE INSTALLED UNDER BOX, KNOCKOUTS SHALL NOT BE USED. KNOCKOUTS SHALL BE GROUTED.
6. EXTEND BUILDING SERVICE LINE TO A MINIMUM OF EITHER 12" BEYOND BACK OF METER BOX OR 12" BEYOND BACK OF SIDEWALK AND CAP.
7. REFER TO CITY WATER STANDARDS FOR CONSTRUCTION STANDARDS, SPECIFICATIONS AND ENGINEER'S LIST OF APPROVED MATERIALS.
8. NO FENCING SHALL BE INSTALLED BETWEEN STREET AND METER BOX.
9. DISTANCE BETWEEN BOX ENDS AND ANGLE BALL METER VALVES TO BE EQUAL.
10. CONNECT SERVICE TRACER WIRE TO THE TRACER WIRE ON THE MAIN. IN ABSENCE OF MAIN TRACER WIRE, WRAP SERVICE TRACER WIRE AROUND THE MAIN. RUN CONTINUOUS FROM MAIN TO METER BOX WITH LOOPS INTO EACH VALVE BOX.
11. THIS STANDARD APPLIES TO IRRIGATION SERVICES ONLY SERVED OFF CITY OF ROHNERT PARK WATER SYSTEM. REFER TO STD-865B FOR ALL OTHER 2-INCH DOMESTIC WATER SERVICES.

CITY OF ROHNERT PARK

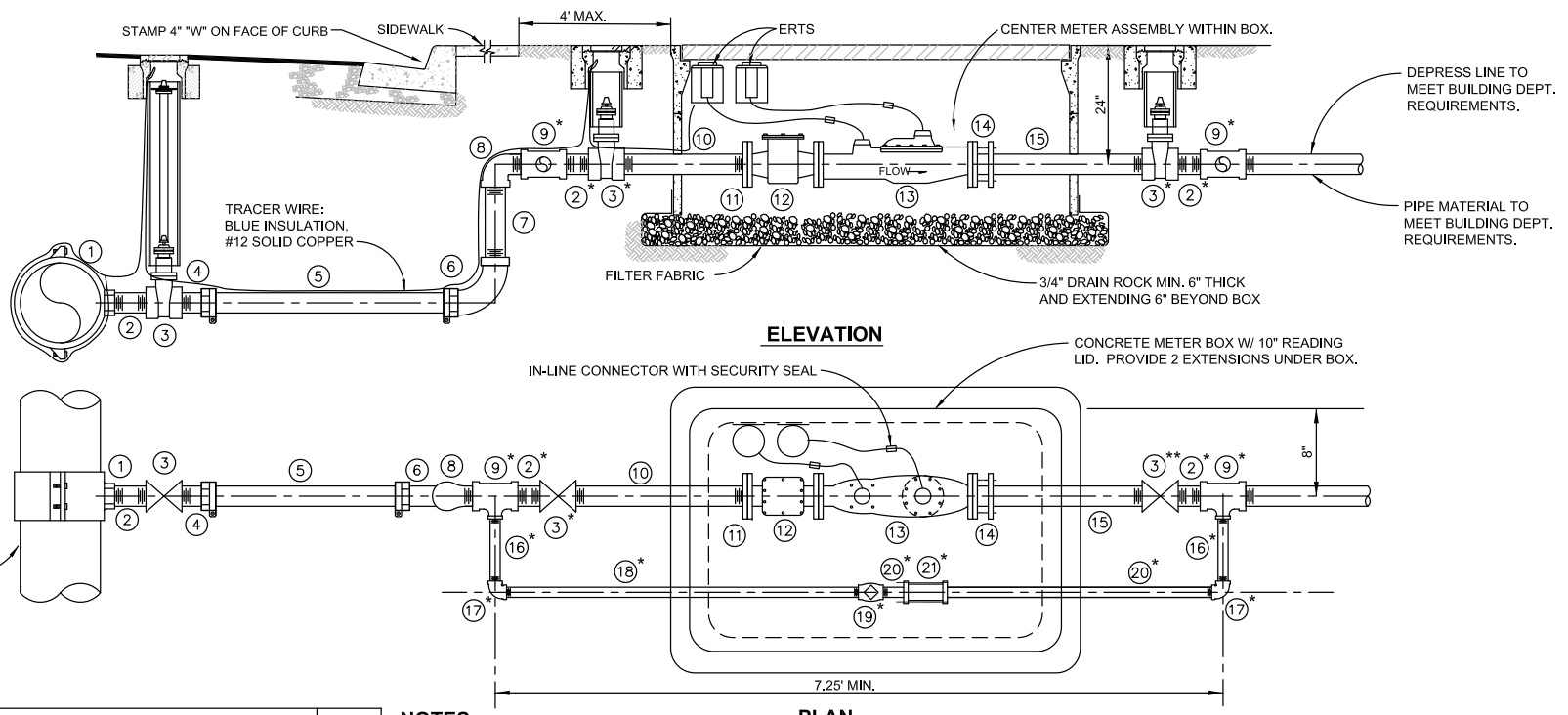
IRRIGATION SERVICE - 2" DISC METER

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 865A



NO.	ITEM DESCRIPTION	QTY.
1	SERVICE SADDLE	1
2	2" X 4" BRASS NIPPLE, THREADED	3
3	2" GATE VALVE, THREADED	3
4	2" BRASS ADAPTER, MIP X COMPRESSION	1
5	2" CTS POLYETHYLENE TUBING, CLASS 200, SDR 9 (NO COUPLINGS)	1
6	2" BRASS ELL, COMP. X THREAD	1
7	2" BRASS PIPE, THREADED (LENGTH AS NECESSARY)	1
8	2" BRASS STREET ELL. (STANDARD ELL FOR NO BYPASS)	1
9	2" X 1" BRASS TEE	2
10	2" X 24" BRASS PIPE, THREADED	1
11	2" - 2 BOLT THREADED METER FLANGE	1
12	2" PLATE STRAINER	1
13	2" COMPOUND METER W/ 2 TRANSMITTING REGISTERS AND 2 ERTS	1
14	2" FLEXIBLE METER COUPLING	1
15	2" BRASS PIPE, THREAD X PE (24" MIN. LENGTH)	1
16	1" X 8" BRASS NIPPLE, THREADED	2
17	1" BRASS ELL, THREADED	2
18	1" BRASS PIPE, THREADED (LENGTH AS NECESSARY)	1
19	1" BRASS BALL VALVE WITH STOPS AND LOCKWINGS	1
20	1" BRASS PIPE, THREADED X PE (LENGTH AS NECESSARY)	2
21	1" 2-BOLT DRESSER	1

NOTES:

1. BYPASS PIPING SHALL BE REQUIRED ON MULTIFAMILY RESIDENTIAL AND COMMERCIAL SERVICES. BYPASS PIPING MAY BE OMITTED ON ALL IRRIGATION SERVICES. WITH APPROVAL OF THE CITY ENGINEER, BYPASS PIPING MAY BE OMITTED ON COMMERCIAL SERVICES SERVING OFFICE OR RETAIL SPACE WITH SEPARATE FIRE SERVICES OR WHERE MULTIPLE DOMESTIC WATER SERVICES SERVE THE PROPERTY.
2. SET METER BOX COVER FLUSH WITH FINISHED SURFACE. THE ADDRESS MUST BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER BEFORE THE CITY WILL ACTIVATE SERVICE.
3. METER ASSEMBLY SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR. PROVIDE ERTS AND TRANSMITTING REGISTERS WITH 5 FT. LEADS.
4. REFER TO CITY STANDARD 877 FOR GATE VALVE INSTALLATION DETAILS. VALVES MAY BE INSTALLED IN SIDEWALK WHERE SPACE LIMITATIONS EXIST.
5. REFER TO CITY WATER STANDARDS FOR CONSTRUCTION STANDARDS, SPECIFICATIONS AND ENGINEER'S LIST OF APPROVED MATERIALS.
6. PIPE OPENINGS IN METER BOX SHALL BE CUT - DO NOT USE HAMMER. PRIOR TO BACKFILLING, PIPE OPENINGS AND BOX JOINTS SHALL BE GROUTED.
7. CONNECT SERVICE TRACER WIRE TO THE TRACER WIRE ON THE MAIN. IN ABSENCE OF MAIN TRACER WIRE, WRAP SERVICE TRACER WIRE AROUND THE MAIN. RUN CONTINUOUS FROM MAIN TO METER BOX WITH LOOPS INTO EACH VALVE BOX.
8. ERTS TO BE MOUNTED IN APPROVED BRACKET ATTACHED TO BOX W/SS ANCHORS. THE TOP OF ERTS SHALL BE NO MORE THAN 3-1/4" BELOW TOP OF BOX.
9. NO FENCING SHALL BE INSTALLED BETWEEN STREET AND METER BOX.
10. ALL COMPRESSION FITTINGS SHALL HAVE STAINLESS STEEL INSERTS.

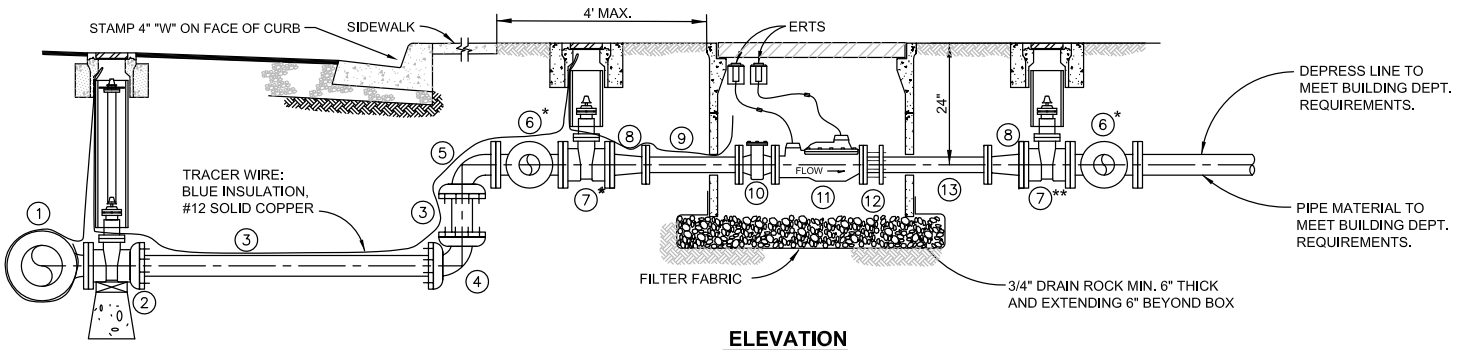
* = OMIT WHEN BYPASS IS NOT REQUIRED.

** = OMIT WHEN BACKFLOW DEVICE IS INSTALLED DOWNSTREAM AND BYPASS IS NOT REQUIRED

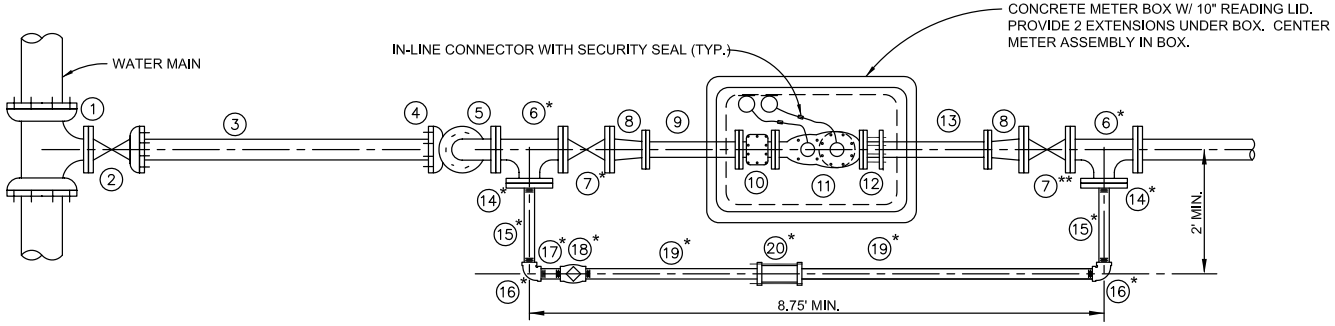
CITY OF ROHNERT PARK

2" COMMERCIAL WATER SERVICE

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 865B



ELEVATION



PLAN

NOTES:

1. BYPASS PIPING SHALL BE REQUIRED ON MULTIFAMILY RESIDENTIAL AND COMMERCIAL SERVICES. BYPASS PIPING MAY BE OMITTED ON ALL IRRIGATION SERVICES. WITH APPROVAL OF THE CITY ENGINEER, BYPASS PIPING MAY BE OMITTED ON COMMERCIAL SERVICES SERVING OFFICE OR RETAIL SPACE WITH SEPARATE FIRE SERVICES OR WHERE MULTIPLE DOMESTIC WATER SERVICES SERVE THE PROPERTY.
2. SET METER BOX COVER FLUSH WITH FINISHED SURFACE. THE ADDRESS MUST BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER BEFORE THE CITY WILL ACTIVATE SERVICE.
3. METER ASSEMBLY SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR. PROVIDE ERTS AND TRANSMITTING REGISTERS WITH 5 FT. LEADS.
4. REFER TO CITY STANDARD 877 FOR GATE VALVE INSTALLATION DETAILS. VALVES MAY BE INSTALLED IN SIDEWALK WHERE SPACE LIMITATIONS EXIST.
5. REFER TO CITY WATER STANDARDS FOR CONSTRUCTION STANDARDS, SPECIFICATIONS AND ENGINEER'S LIST OF APPROVED MATERIALS.
6. PIPE OPENINGS IN METER BOX SHALL BE CUT - DO NOT USE HAMMER. PRIOR TO BACKFILLING, PIPE OPENINGS AND BOX JOINTS SHALL BE GROUTED.
7. CONNECT SERVICE TRACER WIRE TO THE TRACER WIRE ON THE MAIN. IN ABSENCE OF MAIN TRACER WIRE, WRAP SERVICE TRACER WIRE AROUND THE MAIN. RUN CONTINUOUS FROM MAIN TO METER BOX WITH LOOPS INTO EACH VALVE BOX.
8. ERTS TO BE MOUNTED IN APPROVED BRACKET ATTACHED TO BOX W/SS ANCHORS. THE TOP OF ERTS SHALL BE NO MORE THAN 3-1/4" BELOW TOP OF BOX.
9. NO FENCING SHALL BE INSTALLED BETWEEN STREET AND METER BOX.

NO.	ITEM DESCRIPTION	QTY.
1	TEE OR TAPPING TEE W/ 4" FLANGED OUTLET	1
2	4" GATE VALVE, FLG X MJ W/ MEGA-LUG RETAINER GLAND	1
3	4" DIP, PE (LENGTH AS REQUIRED, INTERMEDIATE JOINTS RESTRAINED)	2
4	4" 90° ELL, MJ W/ MEGA-LUG RETAINER GLANDS	1
5	4" 90° ELL, MJ W/ MEGA-LUG RETAINER GLAND X FLG	1
6	4" TEE, FLG	2
7	4" GATE VALVE, FLG	2
8	4" X 3" REDUCER, FLG	2
9	3" DIP SPOOL, FLG (18" MIN. LENGTH)	1
10	3" PLATE STRAINER	1
11	3" COMPOUND METER W/ 2 TRANSMITTING REGISTERS AND 2 ERTS	1
12	3" FCA	1
13	3" DIP, FLG X PE (18" MIN. LENGTH)	1
14	4" COMPANION FLANGE W/ 2" THREADED TAP	2
15	2" BRASS NIPPLE THREADED (18" MIN. LENGTH)	2
16	2" BRASS ELL THREADED	2
17	2" x 4" BRASS NIPPLE THREADED	1
18	2" BRASS BALL VALVE WITH STOPS AND 2" SQUARE OPERATING NUT	1
19	2" BRASS PIPE THREADED X PE (LENGTH AS NECESSARY)	2
20	2" 2-BOLT DRESSER	1

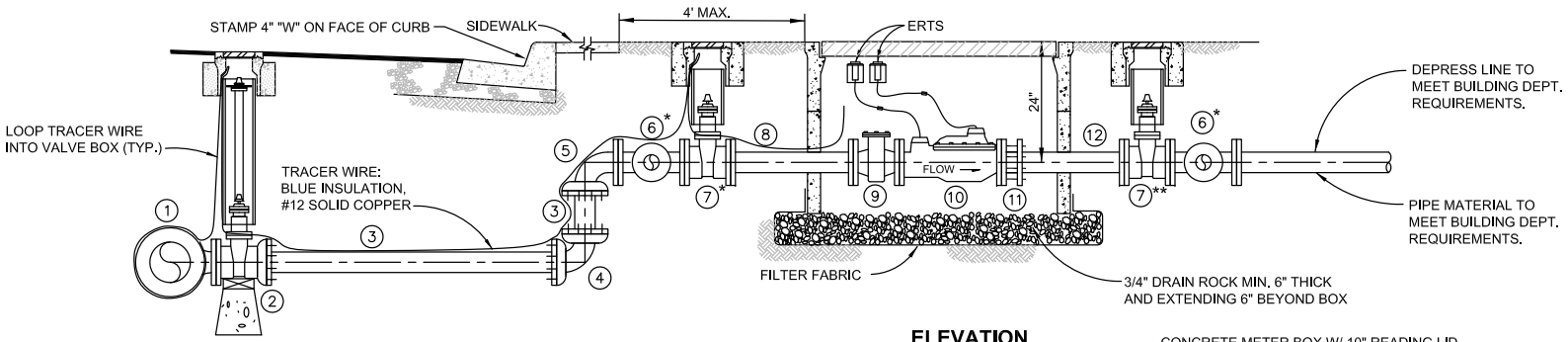
* = OMIT WHEN BYPASS IS NOT REQUIRED.

** = OMIT WHEN BACKFLOW DEVICE IS INSTALLED DOWNSTREAM AND BYPASS IS NOT REQUIRED

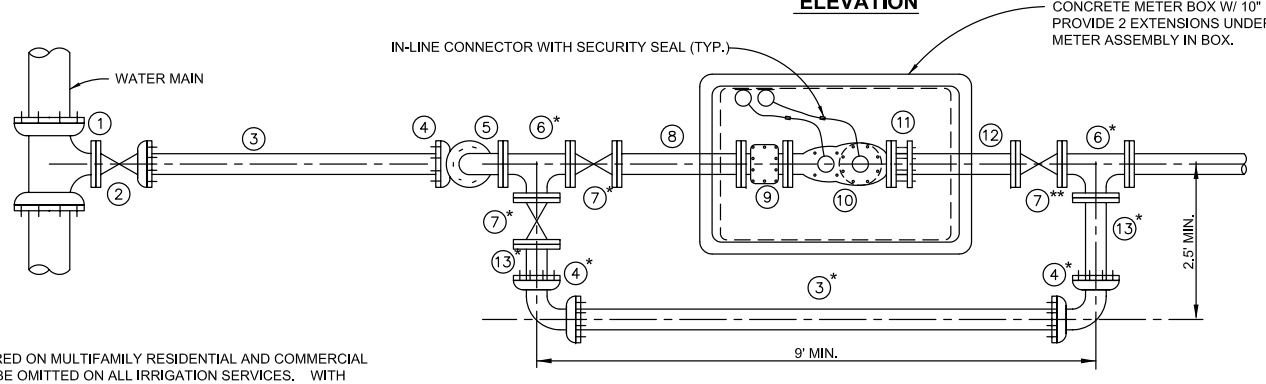
CITY OF ROHNERT PARK

3" COMMERCIAL WATER SERVICE

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 866



ELEVATION



PLAN

NOTES:

1. BYPASS PIPING SHALL BE REQUIRED ON MULTIFAMILY RESIDENTIAL AND COMMERCIAL SERVICES. BYPASS PIPING MAY BE OMITTED ON ALL IRRIGATION SERVICES. WITH APPROVAL OF THE CITY ENGINEER, BYPASS PIPING MAY BE OMITTED ON COMMERCIAL SERVICES SERVING OFFICE OR RETAIL SPACE WITH SEPARATE FIRE SERVICES OR WHERE MULTIPLE DOMESTIC WATER SERVICES SERVE THE PROPERTY.
2. SET METER BOX COVER FLUSH WITH FINISHED SURFACE. THE ADDRESS MUST BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER BEFORE THE CITY WILL ACTIVATE SERVICE.
3. METER ASSEMBLY SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR. PROVIDE ERTS AND TRANSMITTING REGISTERS WITH 5 FT. LEADS.
4. REFER TO CITY STANDARD 877 FOR GATE VALVE INSTALLATION DETAILS. VALVES MAY BE INSTALLED IN SIDEWALK WHERE SPACE LIMITATIONS EXIST.
5. REFER TO CITY WATER STANDARDS FOR CONSTRUCTION STANDARDS, SPECIFICATIONS AND ENGINEER'S LIST OF APPROVED MATERIALS.
6. PIPE OPENINGS IN METER BOX SHALL BE CUT - DO NOT USE HAMMER. PRIOR TO BACKFILLING, PIPE OPENINGS AND BOX JOINTS SHALL BE GROUTED.
7. CONNECT SERVICE TRACER WIRE TO THE TRACER WIRE ON THE MAIN. IN ABSENCE OF MAIN TRACER WIRE, WRAP SERVICE TRACER WIRE AROUND THE MAIN. RUN CONTINUOUS FROM MAIN TO METER BOX WITH LOOPS INTO EACH VALVE BOX.
8. ERTS TO BE MOUNTED IN APPROVED BRACKET ATTACHED TO BOX W/SS ANCHORS. THE TOP OF ERTS SHALL BE NO MORE THAN 3-1/4" BELOW TOP OF BOX.
9. NO FENCING SHALL BE INSTALLED BETWEEN STREET AND METER BOX.

NO.	ITEM DESCRIPTION	QTY.
1	TEE OR TAPPING TEE W/ 4" FLANGED OUTLET	1
2	4" GATE VALVE, FLG X MJ W/ MEGA-LUG RETAINER GLAND	1
3	4" DIP, PE (LENGTH AS REQUIRED, INTERMEDIATE JOINTS RESTRAINED)	2
4	4" 90° ELL, MJ W/ MEGA-LUG RETAINER GLANDS	3
5	4" 90° ELL, MJ W/ MEGA-LUG RETAINER GLAND X FLG	1
6	4" TEE, FLG	2
7	4" GATE VALVE, FLG	3
8	4" DIP SPOOL, FLG (24" MIN. LENGTH)	1
9	4" PLATE STRAINER	1
10	4" COMPOUND METER W/ 2 TRANSMITTING REGISTERS AND 2 ERTS	1
11	4" FCA	1
12	4" DIP, FLG X PE (24" MIN. LENGTH)	1
13	4" DIP, FLG X PE	2

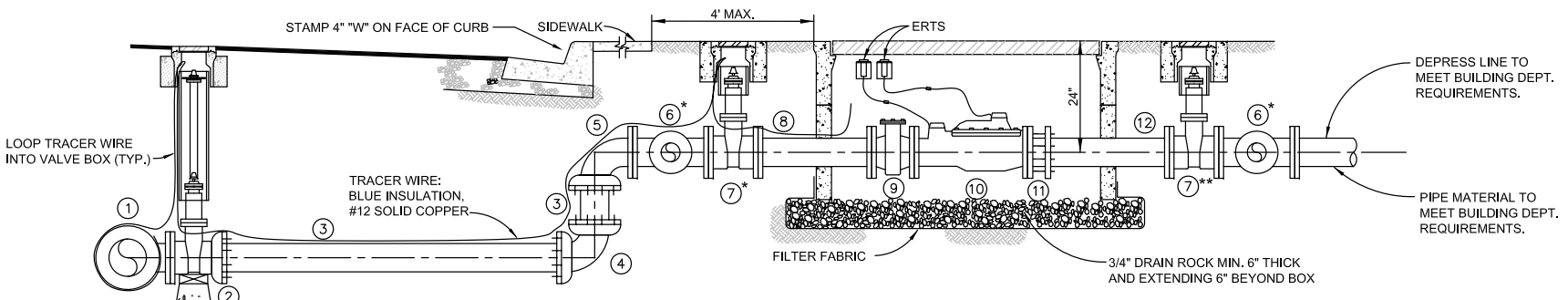
* = OMIT WHEN BYPASS IS NOT REQUIRED.

** = OMIT WHEN BACKFLOW DEVICE IS INSTALLED DOWNSTREAM AND BYPASS IS NOT REQUIRED

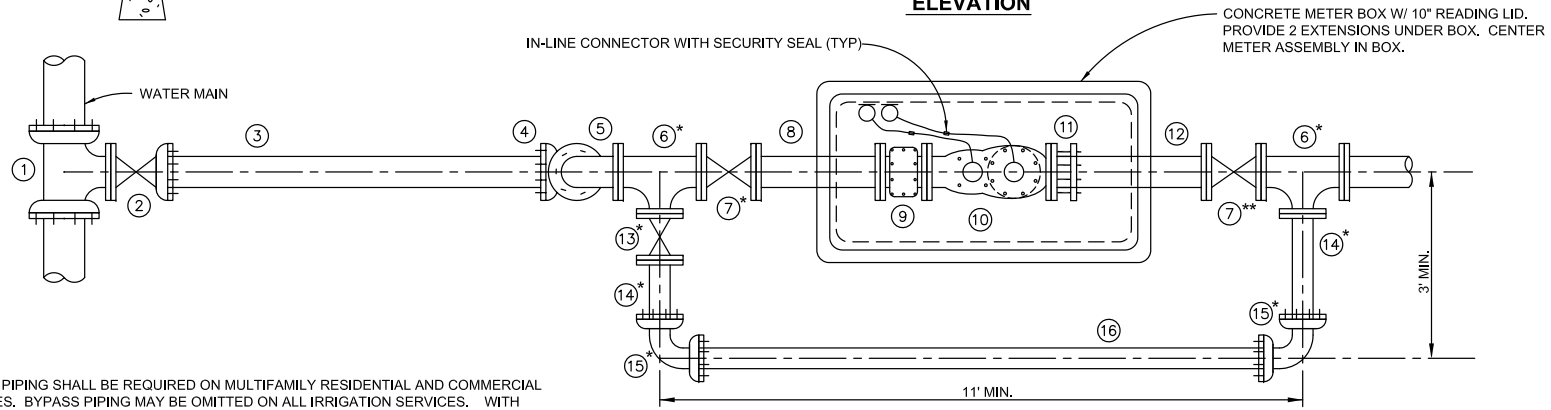
CITY OF ROHNERT PARK

4" COMMERCIAL WATER SERVICE

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 867



ELEVATION



PLAN

NOTES:

1. BYPASS PIPING SHALL BE REQUIRED ON MULTIFAMILY RESIDENTIAL AND COMMERCIAL SERVICES. BYPASS PIPING MAY BE OMITTED ON ALL IRRIGATION SERVICES. WITH APPROVAL OF THE CITY ENGINEER, BYPASS PIPING MAY BE OMITTED ON COMMERCIAL SERVICES SERVING OFFICE OR RETAIL SPACE WITH SEPARATE FIRE SERVICES OR WHERE MULTIPLE DOMESTIC WATER SERVICES SERVE THE PROPERTY.
2. SET METER BOX COVER FLUSH WITH FINISHED SURFACE. THE ADDRESS MUST BE CLEARLY MARKED ON TOP OF METER BOX WITH PERMANENT MARKER BEFORE THE CITY WILL ACTIVATE SERVICE.
3. METER ASSEMBLY SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR. PROVIDE ERTS AND TRANSMITTING REGISTERS WITH 5 FT. LEADS.
4. REFER TO CITY STANDARD 877 FOR GATE VALVE INSTALLATION DETAILS. VALVES MAY BE INSTALLED IN SIDEWALK WHERE SPACE LIMITATIONS EXIST.
5. REFER TO CITY WATER STANDARDS FOR CONSTRUCTION STANDARDS, SPECIFICATIONS AND ENGINEER'S LIST OF APPROVED MATERIALS.
6. PIPE OPENINGS IN METER BOX SHALL BE CUT - DO NOT USE HAMMER. PRIOR TO BACKFILLING, PIPE OPENINGS AND BOX JOINTS SHALL BE GROUTED.
7. CONNECT SERVICE TRACER WIRE TO THE TRACER WIRE ON THE MAIN. IN ABSENCE OF MAIN TRACER WIRE, WRAP SERVICE TRACER WIRE AROUND THE MAIN. RUN CONTINUOUS FROM MAIN TO METER BOX WITH LOOPS INTO EACH VALVE BOX.
8. ERTS TO BE MOUNTED IN APPROVED BRACKET ATTACHED TO BOX W/SS ANCHORS. THE TOP OF ERTS SHALL BE NO MORE THAN 3-1/4" BELOW TOP OF BOX.
9. NO FENCING SHALL BE INSTALLED BETWEEN STREET AND METER BOX.

NO.	ITEM DESCRIPTION	QTY.
1	TEE OR TAPPING TEE W/ 6" FLANGED OUTLET	1
2	6" GATE VALVE, FLG X MJ W/ MEGA-LUG RETAINER GLAND	1
3	6" DIP, PE (LENGTH AS REQUIRED, INTERMEDIATE JOINTS RESTRAINED)	2
4	6" 90° ELL, MJ W/ MEGA-LUG RETAINER GLANDS	1
5	6" 90° ELL, MJ W/ MEGA-LUG RETAINER GLAND X FLG	1
6	6" X 4" TEE, FLG	1
7	6" GATE VALVE, FLG	2
8	6" DIP SPOOL, FLG (30" MIN. LENGTH)	1
9	6" PLATE STRAINER	1
10	6" COMPOUND METER W/ 2 TRANSMITTING REGISTERS AND 2 ERTS	1
11	6" FCA	1
12	6" DIP, FLG X PE (30" MIN. LENGTH)	1
13	4" GATE VALVE, FLG	1
14	4" DIP, FLG X PE (LENGTH AS REQUIRED)	2
15	4" 90° ELL, MJ W/ MEGA-LUG RETAINER GLANDS	2
16	4" DIP, PE (SINGLE PIECE, LENGTH AS REQUIRED)	1

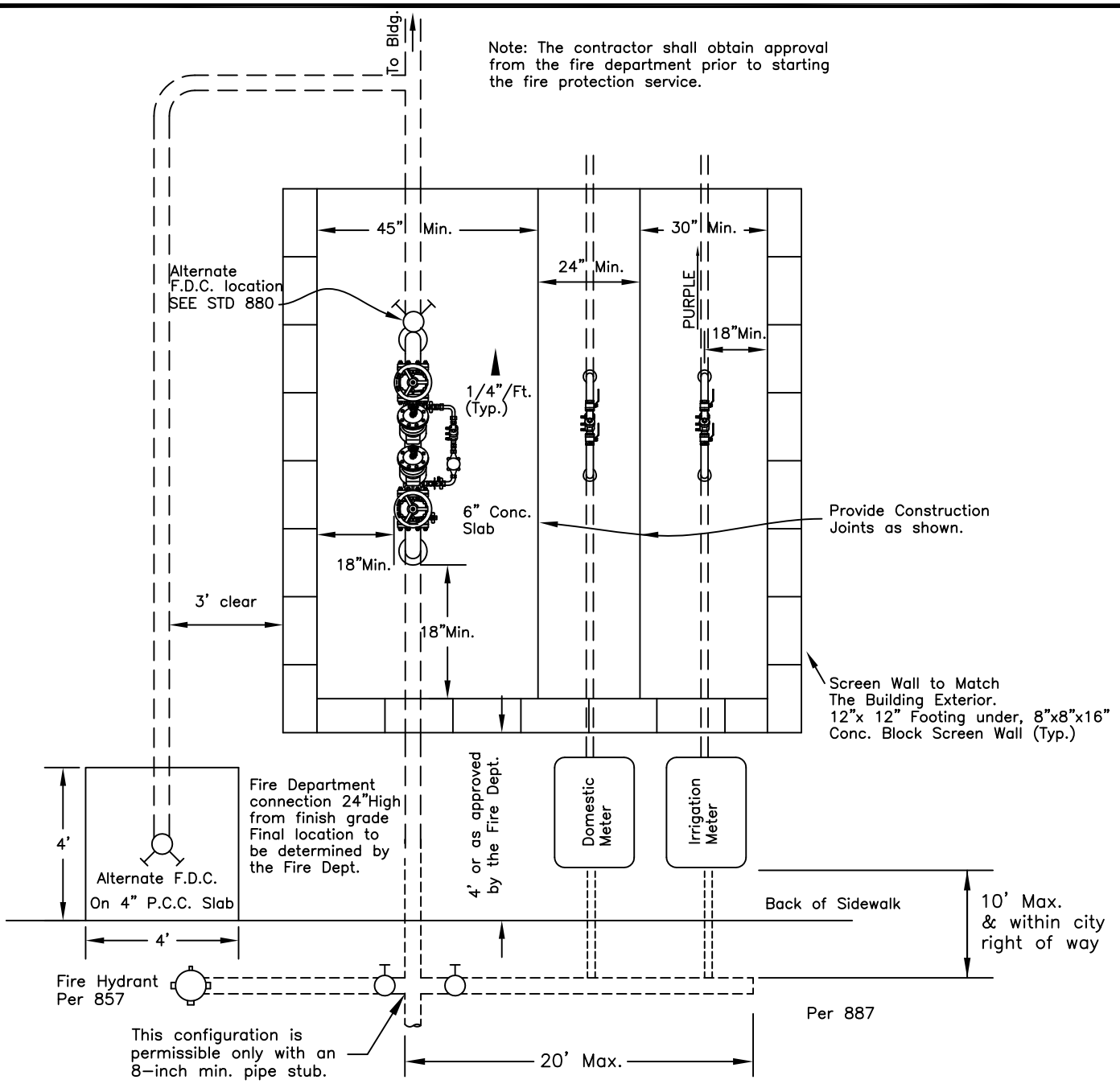
* = OMIT WHEN BYPASS IS NOT REQUIRED.

** = OMIT WHEN BACKFLOW DEVICE IS INSTALLED DOWNSTREAM AND BYPASS IS NOT REQUIRED

CITY OF ROHNERT PARK

6" COMMERCIAL WATER SERVICE

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 868



NOTES:

1. **Fire hydrant shall be located within 50' of the F.D.C or as approved by the Fire Code Official.**
2. The equipment screen shall be located per the site plan. Domestic & irrigation meters shall be installed per std. 863 & 865. The length & width of the screen depends on the size and number of irrigation and domestic water services. top of wall shall not restrict the view of the valve yoke from the street.

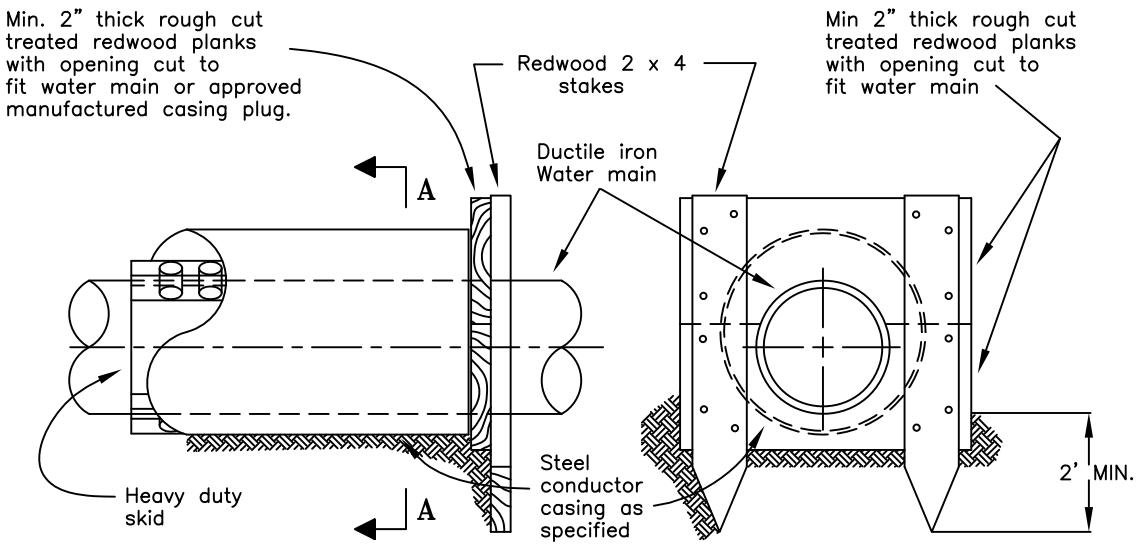
PRIOR TO CONNECTION TO EXISTING CITY WATER SERVICE OR MAIN THE CONTRACTOR SHALL:

a. Install a 2" minimum bridge connection for construction water and testing per std. 859.
b. Pressure test line from point of connection to fire bridge and all domestic lines.
c. Have all backflow assemblies tested by City certified testing contractor. Submit complete installation record and testing record for each assembly to Public Works Dept., 600 Enterprise Drive (forms available at 600 Enterprise Dr.,(707) 588–3300).
d. Have passing results from bacteria testing samples taken by City, call (707) 588–3300 minimum 48 hours prior.
e. All valves shall be hooked up for "Tamper Alarm".
f. Satisfy all Fire Department requirements.
g. The meter shall be installed with proper lengths of pipe both upstream and down stream of the meter see manufacturers specifications for determining pipe length(s).
h. A utility billing account shall be opened with city prior to flowing water through meter.

CITY OF ROHNERT PARK

WATER CONNECTION DETAIL

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 869

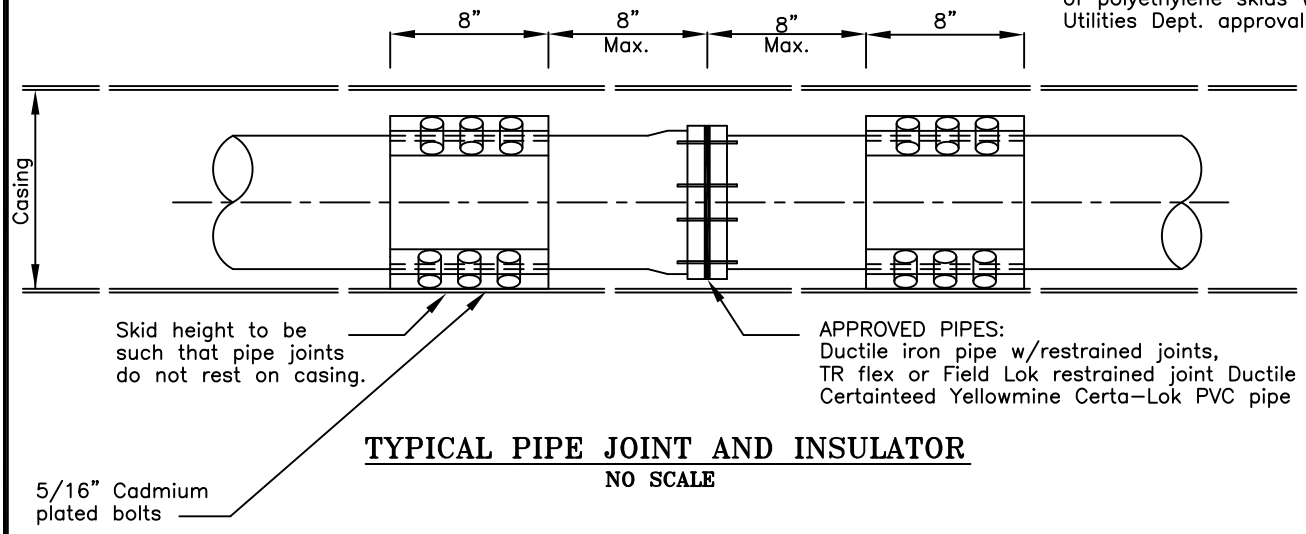


TYPICAL DIRT STOP DETAIL

NO SCALE

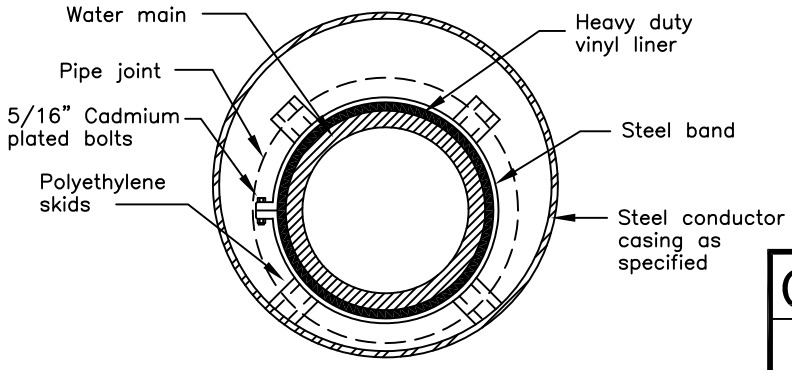
NOTES

1. Install skids per manufacturers specifications.
2. See Engineer's approved list for approved skids.
3. Where conductor casing is existing R.C.P., banded redwood skids may be installed in lieu of polyethylene skids with Utilities Dept. approval.



TYPICAL PIPE JOINT AND INSULATOR

NO SCALE



SECTION "A-A"

NO SCALE

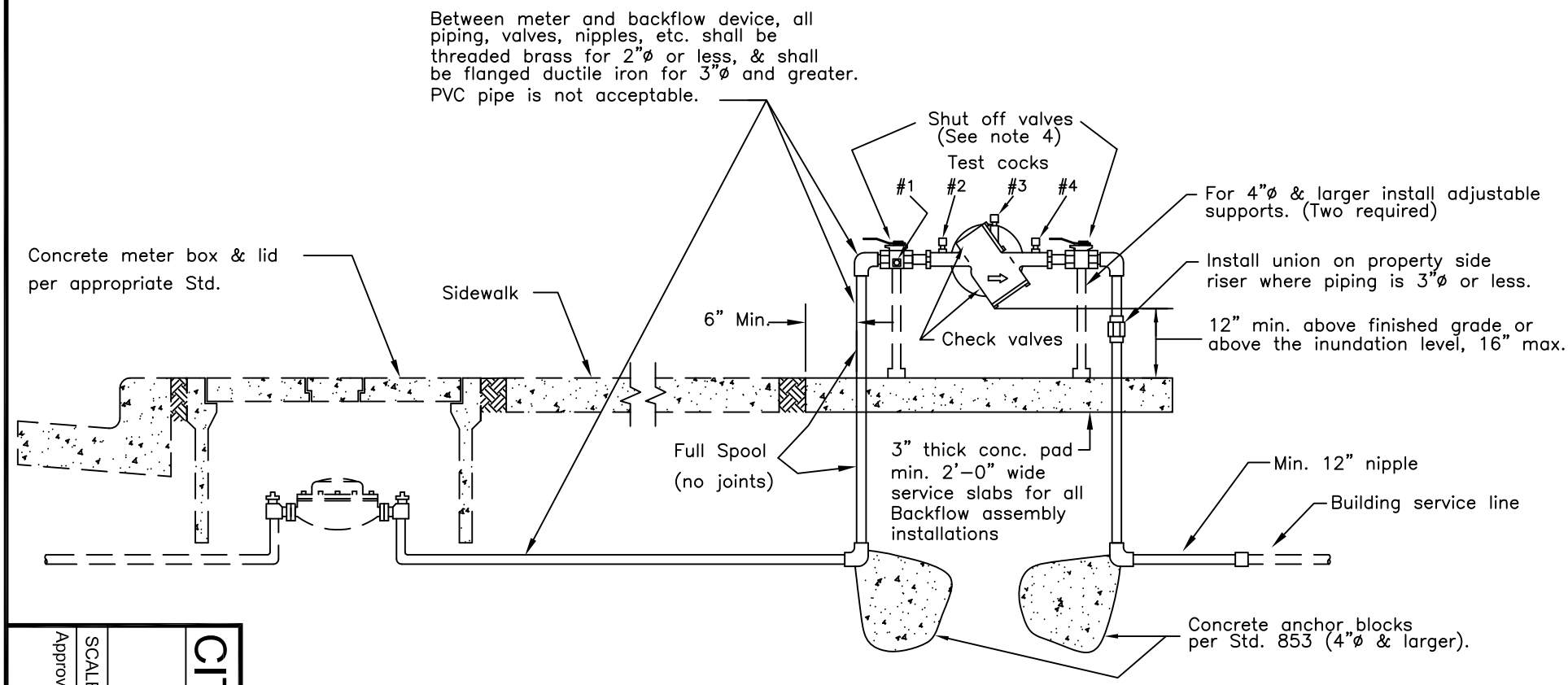
Minimum size casing required
For all approved pipe types

Pipe Size	6"	8"	12"	14"	16"
Casing Size (Inside ø)	16"	18"	24"	24"	30"
Casing Wall Thickness	.375"	.375"	.375"	.375"	.500"

CITY OF ROHNERT PARK

DIRT STOP AND WATER MAIN ENCASEMENT

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 872



1. Reduced pressure type backflow assemblies shall be required as determined by the City Utilities Dept.
2. Approved reduced pressure backflow assemblies shall be as shown on "List of approved backflow prevention devices" (of latest revision) by the University of Southern California Foundation For Cross–Connection Control & Hydraulic Research.
3. Backflow prevention assemblies shall be installed adjacent to and on property side of sidewalk where applicable. Where no sidewalk exists, the assembly shall be installed as close as possible to the water meter location.
4. A valve of the same size as the backflow assembly shall be installed on each side of the backflow prevention assembly. Valves 2"ø & less shall be ball valves, 3"ø & greater shall be resilient seat gate valves.
5. Any cover or screening for the backflow prevention assembly must be approved by the Engineering Dept. prior to installation.
6. The addition of spools must be approved by the City Inspector prior to installation.
7. The piping from the reduced pressure backflow assembly & the reduced pressure backflow device valve assembly itself must be the same size as the meter unless otherwise approved by the Public Works Utilities Services supervisor.

CITY OF ROHNERT PARK

REDUCED PRESSURE BACKFLOW ASSEMBLY

SCALE: NONE

DATE: OCTOBER 2010

Approved:

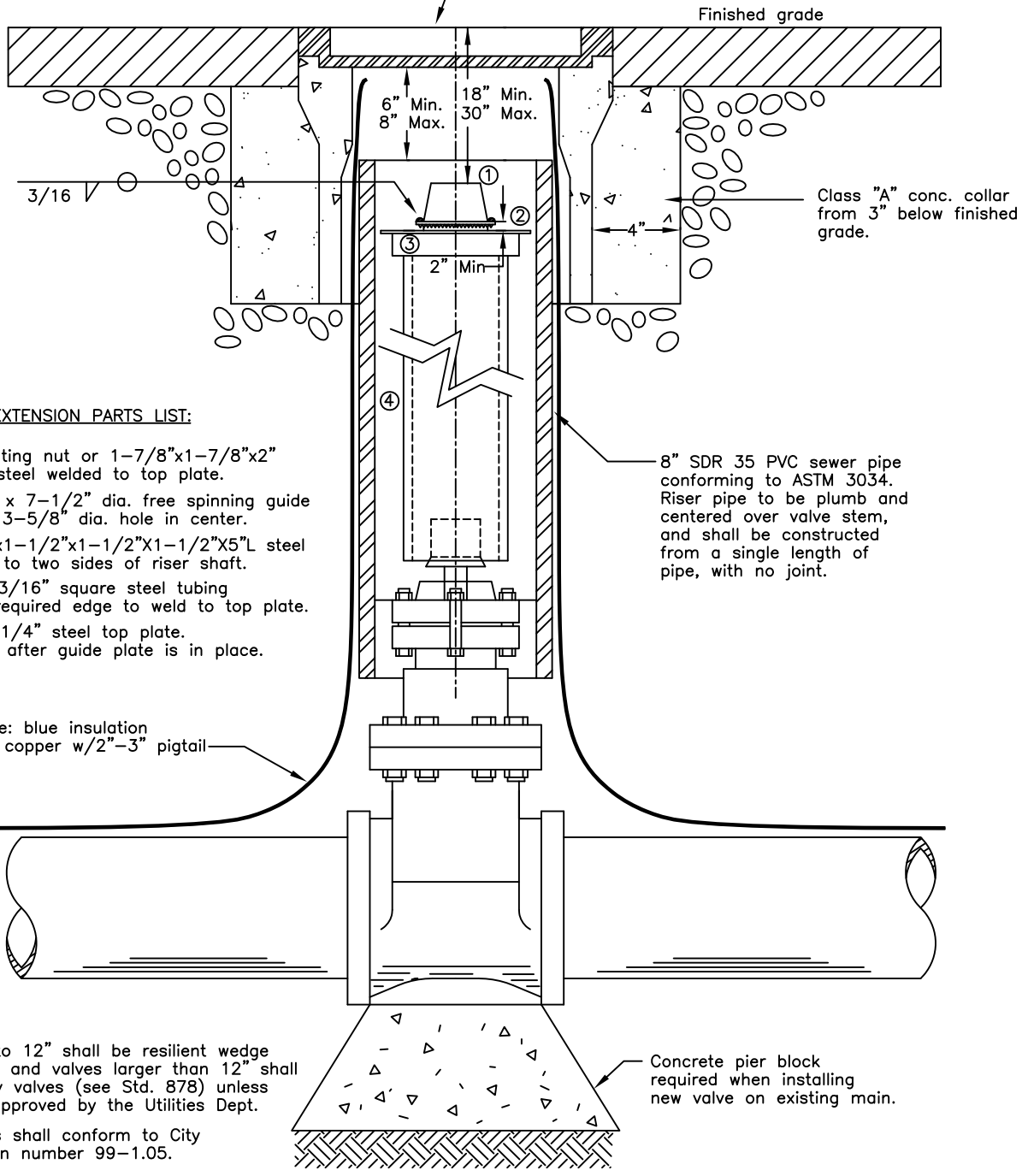
STD. - 876

STEM EXTENSION FABRICATION NOTES:

1. All welds to riser shaft shall be fillet weld all around as specified below.
2. All steel required for riser fabrication shall be structural steel per ASTM A36.

VALVE BOXES:
(See Engineer's approved list)

Precast valve box set flush with street surface with cast iron ring and cover marked "WATER".



VALVE STEM EXTENSION PARTS LIST:

① Valve operating nut or 1–7/8"x1–7/8"x2" high solid steel welded to top plate.
② 3/16" thk. x 7–1/2" dia. free spinning guide plate, with 3–5/8" dia. hole in center.
③ Two 3/16"x1–1/2"x1–1/2"X1–1/2"X5"L steel angle weld to two sides of riser shaft.
④ 2–1/2" x 3/16" square steel tubing length as required edge to weld to top plate.
⑤ 3" x 3" x 1/4" steel top plate. Riser shaft after guide plate is in place.

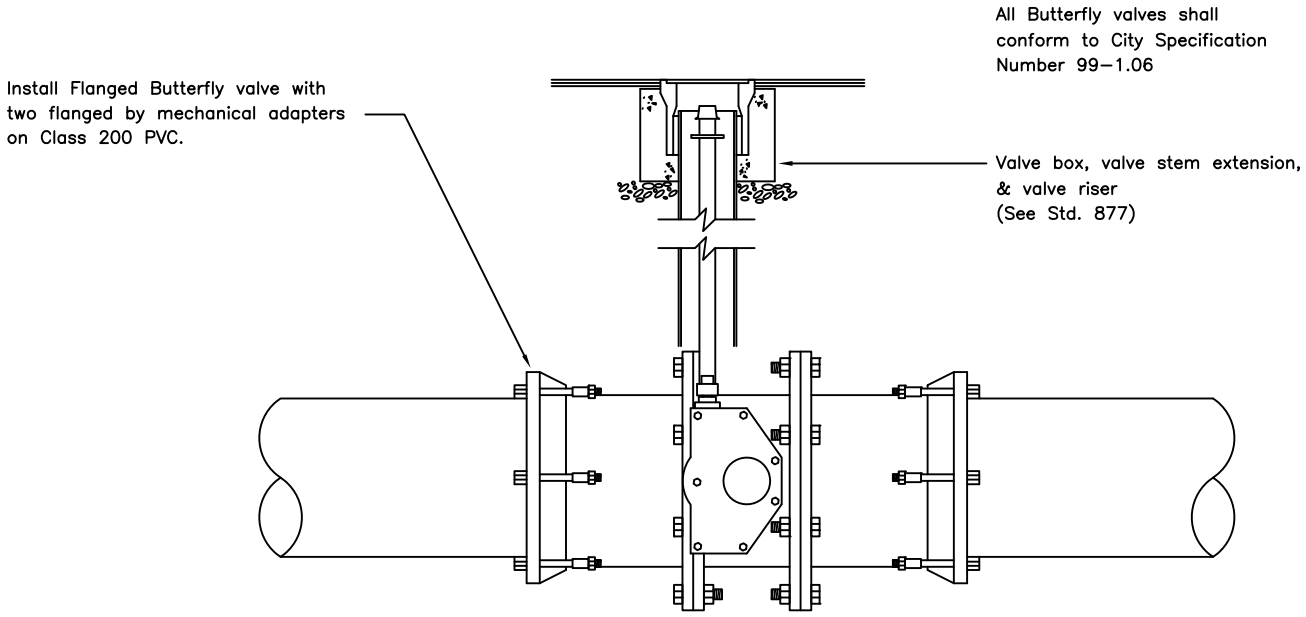
NOTES:

1. Valves 2" to 12" shall be resilient wedge gate valves and valves larger than 12" shall be butterfly valves (see Std. 878) unless otherwise approved by the Utilities Dept.
2. Gate valves shall conform to City Specification number 99–1.05.
3. All external bolts and nuts on valves shall be 304 stainless steel or the entire valve shall be wrapped tightly with polyethylene film held securely with adhesive tape.
4. If valve is installed so that the top of the operating nut is less than 30" below finished grade, the valve stem riser is not required.
5. For installation of butterfly valve and tapping valve, see Std. 878.

CITY OF ROHNERT PARK

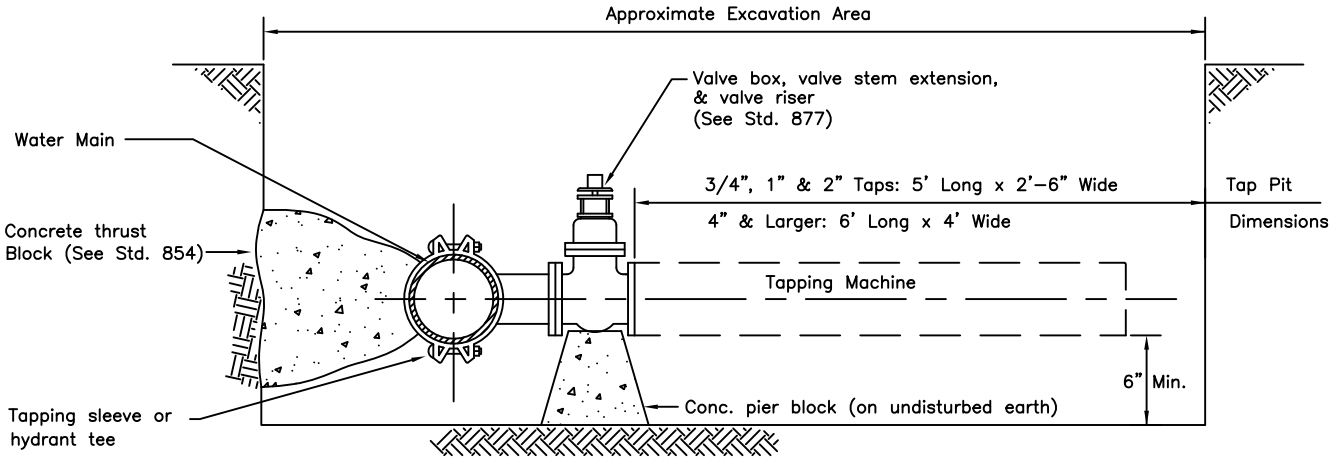
GATE VALVE

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 877



BUTTERFLY VALVE

To be used on pipe larger than 12"



TAPPING SLEEVE & VALVE

To be used on pipe 2" to 12"

TAPPING SLEEVES

(See Engineer's Approved List for Std. 866/867)

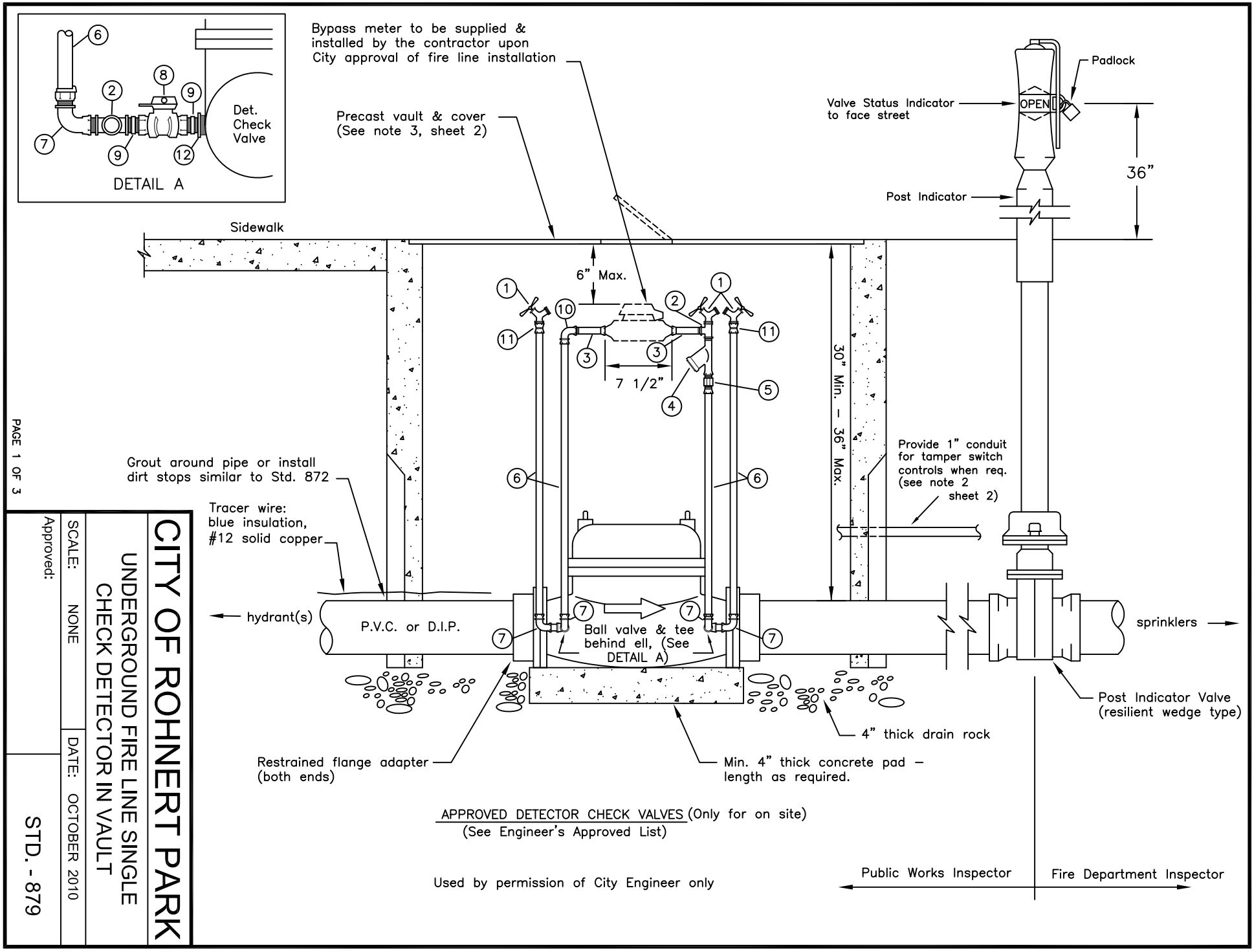
NOTES:

1. All external bolts and nuts on valves shall be 304 stainless steel or the entire valve shall be wrapped tightly with polyethylene film held securely with adhesive tape.
2. Taps shall be made by Contractor.
3. Valves 2" to 12" shall be resilient wedge gate valves and valves larger than 12" shall be butterfly valves unless otherwise approved by the Utilities Dept.

CITY OF ROHNERT PARK

BUTTERFLY VALVE AND TAPPING VALVE

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 878



APPROVED DETECTOR CHECK VALVES (Only for on site)
(See Engineer's Approved List)

Used by permission of City Engineer only

Public Works Inspector

Fire Department Inspector

PAGE 1 OF 3

CITY OF ROHNERT PARK

UNDERGROUND FIRE LINE SINGLE CHECK DETECTOR IN VAULT

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 879

BY-PASS PARTS LIST

NO.	DESCRIPTION	QUANT.	PART SIZE OR MODEL NO.*
1.	HOSE BIB – MIP	3	3/4"
2.	TEE – FIP x FIP x FIP	3	3/4"
3.	SHORT MTR SPUD – 2" L	2	C38 – 23 – 2
4.	STRAIGHT CHK. VALVE – MIP x FIP	1	HS81 – 333
5.	ADAPTER – COMP x MIP	1	C84 – 33
6.	BRASS	VARIES	3/4"
7.	90° ADAPTER – COMP x MIP	4	L84 – 33
8.	STRAIGHT BALL VALVE – FIP x FIP	2	B11 – 33
9.	CLOSE NIPPLE	4	3/4"
10.	90° ADAPTER – COMP x FIP	1	L14 – 33
11.	ADAPTER – COMP x FIP	2	C14 – 33
12.	BUSHING	2	3/4" x VARIES

* FORD MODEL NO's ARE GIVEN. SUBMIT SUBSTITUTIONS FOR APPROVAL.

NOTES:

1. The post indicator valve shall be installed as close as possible to the detector check vault. If a post indicator cannot be installed, an O.S. & Y. valve with locking chain must be installed inside the vault on the property side of the detector check with approval from the City Utilities Department.

2. The installation shall be provided with electronic supervision monitoring when required by the Fire Department.

3. Refer to vault size chart for proper size. Should an O.S. & Y. valve be installed in the vault, the vault size may need to be verified by the Contractor. See the engineer's approved list for approved vaults and covers.

4. All fire line services to the post indicator valve shall be tested by the Fire Services Construction inspection section per City of Rohnert Park Construction Specifications. All on–site fire lines, hydrants, and the P.I.V. shall be tested & inspected by the Fire Dept. per City Fire Code.

5. Double check detector check valve assembly with bypass double check shall be installed where an underground fire suppression system enters private property Installation details shall be approved by the Utilities Dept. prior to installation. (See Std. 880).

6. The fire department connection shall be installed and located as required by the Fire Department.

7. Post indicator valves shall be locked with a break–away lock. The top of the P.I.V. shall not be less than thirty–six inches (36") above finished grade.

8. Use only downstream of double detector check backflow preventer.

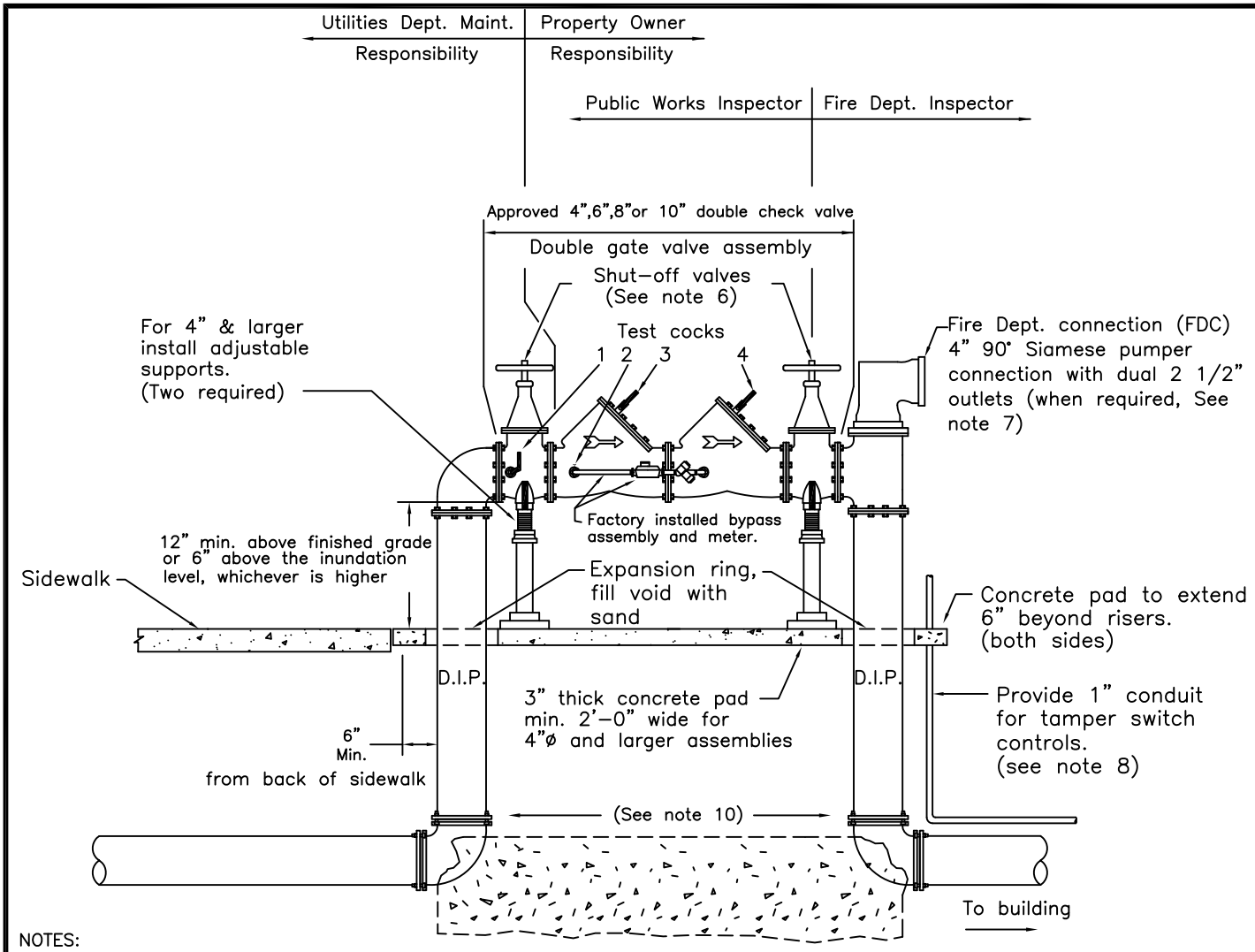
9. Single check valves may only be used in addition to a double detector check valve.

VAULT SIZES		
D.C. SIZE	WIDTH	LENGTH
4"	4'	4'
6"	4'	4'
8"	5'	5'
10"	5'	5'

CITY OF ROHNERT PARK

UNDERGROUND FIRE LINE SINGLE CHECK DETECTOR IN VAULT

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 879



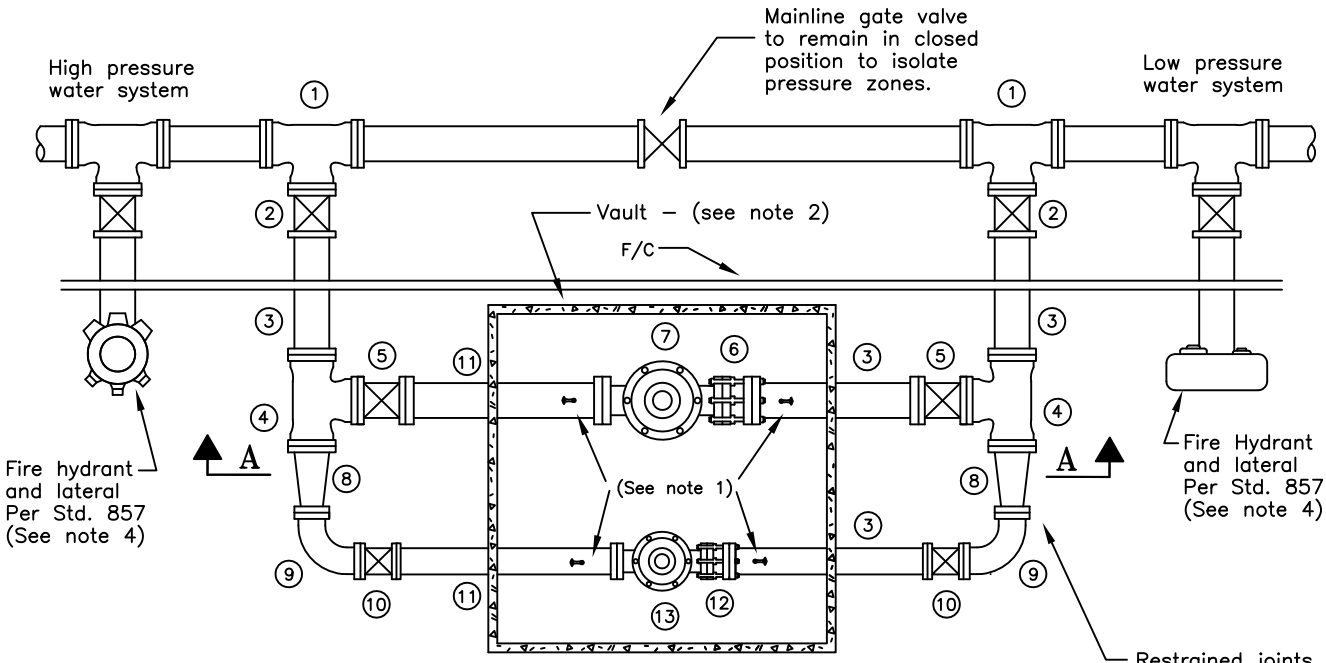
NOTES:

1. This Standard is required for:
   a.) all connections serving commercial fire sprinkler systems.
   b.) any fire line connections to properties with auxiliary water supplies.
   c.) sites with multiple fire line connections to the City water system.
2. Approved double check detector backflow assemblies shall be shown on "List of approved backflow devices" of latest revision, by the University of Southern California Foundation for Cross Connection Control & Hydraulic Research.
3. All test valves shall be fitted with 1/4" female test cocks.
4. Double check detector assembly shall be located as close as possible to the sidewalk or public right–of–way.
5. Any cover or screening for this assembly must have both Fire Department & Engineering Department approval prior to installation.
6. Shut–off valves to be resilient wedge type O.S. & Y and will be chained and padlocked in the open position.
7. Must have specific approval of the Fire Dept. prior to installation. Location to be determined by the Fire Dept.
8. The installation shall be provided with electronic supervision monitoring when required required by the Fire Department.
9. Double check detector shall be the same size as the fire line except when a 12" fire line is required, then a 10" double detector check backflow assembly is required.
10. Restrained joints are required for all new construction from gate valve to 90° ell. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

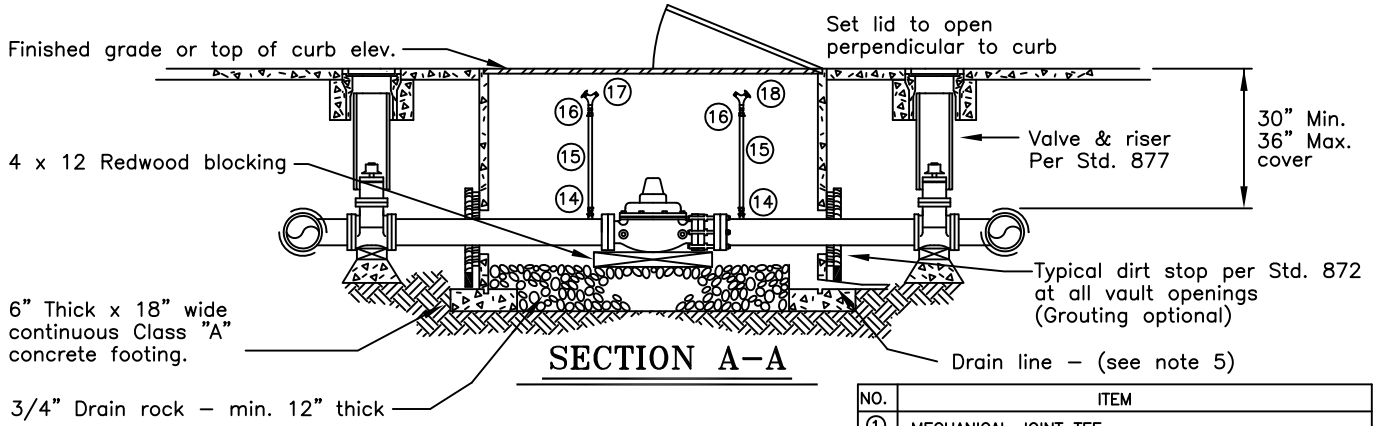
CITY OF ROHNERT PARK

DOUBLE CHECK DETECTOR FIRE LINE BACKFLOW ASSEMBLY

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 880



PLAN VIEW



SECTION A–A

NO.	ITEM
①	MECHANICAL JOINT TEE
②	MECHANICAL JOINT GATE VALVE STD. 877
③	DUCTILE IRON PIPE – FL. X P.E.
④	FLANGED TEE
⑤	FLANGED GATE VALVE STD. 877
⑥	FLANGED COUPLING ADAPTER
⑦	FLANGED P.R.V. – HIGH FLOW
⑧	FLANGED REDUCER
⑨	FLANGED 90° ELL
⑩	FLANGED GATE VALVE STD. 877
⑪	DUCTILE IRON PIPE – FL. X FL.
⑫	FLANGED COUPLING ADAPTER
⑬	FLANGED P.R.V. – LOW FLOW
⑭	3/4" BALLCORP (FORD FB 1000)
⑮	3/4" BRASS
⑯	3/4" COMP. X F.I.P. ADAPTER (FORD C14–33)
⑰	3/4" M.I.P X HOSE BIBB – BRASS
⑱	3/4" M.I.P. TEE WITH TWO (2) 3/4" F.I.P. X H.B.

NOTES:

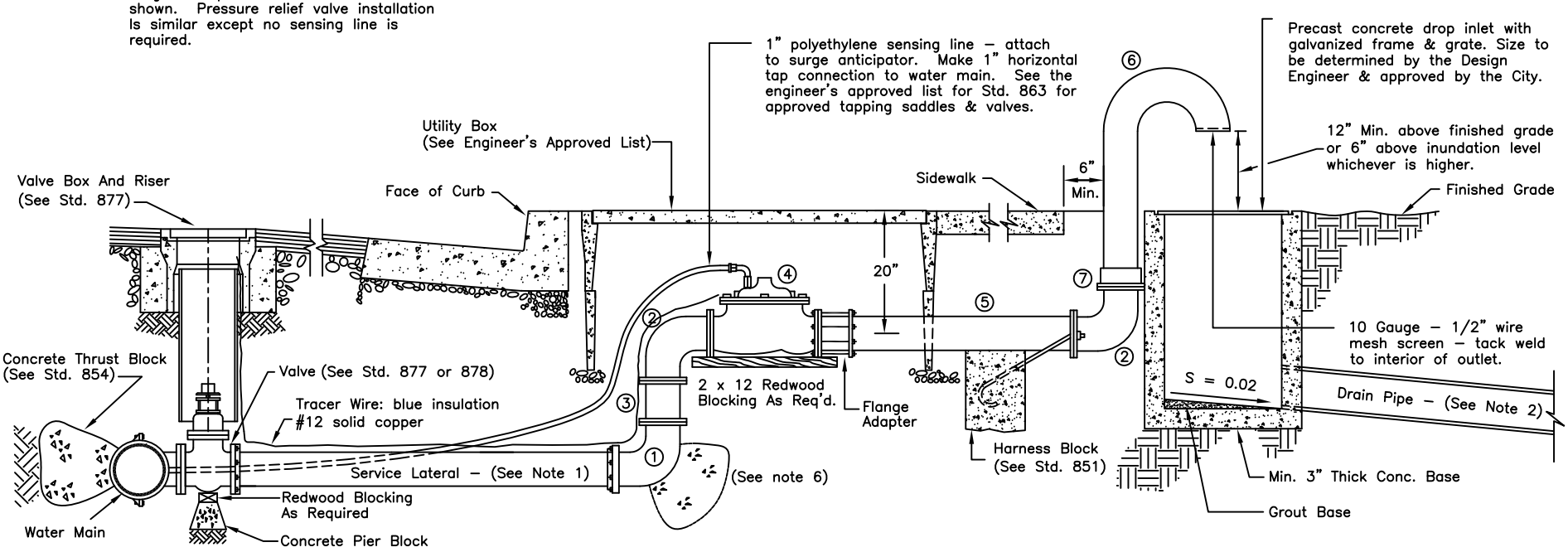
1. Make 3/4" top tap – install risers as shown.
2. See the engineer's approved list for approved vaults and covers.
3. The low flow by–pass (part numbers 8–13) shall be installed unless otherwise approved by the Engineering Dept. and shall be a min. 4" in size. If a single P.R.V. is installed, center in vault and change parts Number 4 to 90° flanged ells, and delete part 5.
4. Install fire hydrants only when required by the Engineering Dept.
5. 2" schedule 40 P.V.C. drain pipe shall be installed from a perforated sump canister to an existing drainage system or to daylight.
6. Valves 18" and larger shall be butterfly valves. Valves 16" and smaller shall be resilient wedge gate valves.
7. All pressure reducing valves to be epoxy fused, inside and outside. (See the engineer's approved list)
8. Restrained joints are required for all new construction from mainline gate valve to vault. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

CITY OF ROHNERT PARK

PRESSURE REDUCING VALVES

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 881

NOTE: Surge anticipator valve installation is shown. Pressure relief valve installation Is similar except no sensing line is required.



PARTS LIST	
NO.	ITEM DESCRIPTION
①	Flange x M.J. 90° – Size As Required
②	C.I. Fl. 90° Ell – Size As Required
③	D.I. Fl. Spool – Length As Required
④	Valve – See Engineer's approved list
⑤	Fl. D.I.P. – Length As Required
⑥	Fabricated Welded Steel Discharge (See Note 4)
⑦	Flange Adapter – Size As Required

NOTES

1. Service lateral pipe shall be either 4" diameter or equal in size to the surge anticipator valve, whichever is greater. The pipe material shall Be Cl. 50 or PC 350 Ductile Iron, unless otherwise shown on the plans. Should the surge anticipator valve be smaller than 4", install a flanged reducer as required on the inlet side of the valve.
2. Discharge water shall drain either to an existing drainage system or to daylight. The Project Engineer shall submit design to the appropriate agencies for approval.
3. All piping & fittings on the discharge side of the surge anticipator valve shall be equivalent in size to the valve.
4. Discharge riser shall be fabricated from standard welded steel pipe. Welding shall conform to AWWA Standard C206. The riser assembly shall be tape coated per AWWA Standard C209.
5. Contact the Public Works Utilities Services Division for specific telemetry requirements which must be met.
6. Restrained joints are required for all new construction from gate valve to lower 90° bend. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

CITY OF ROHNERT PARK

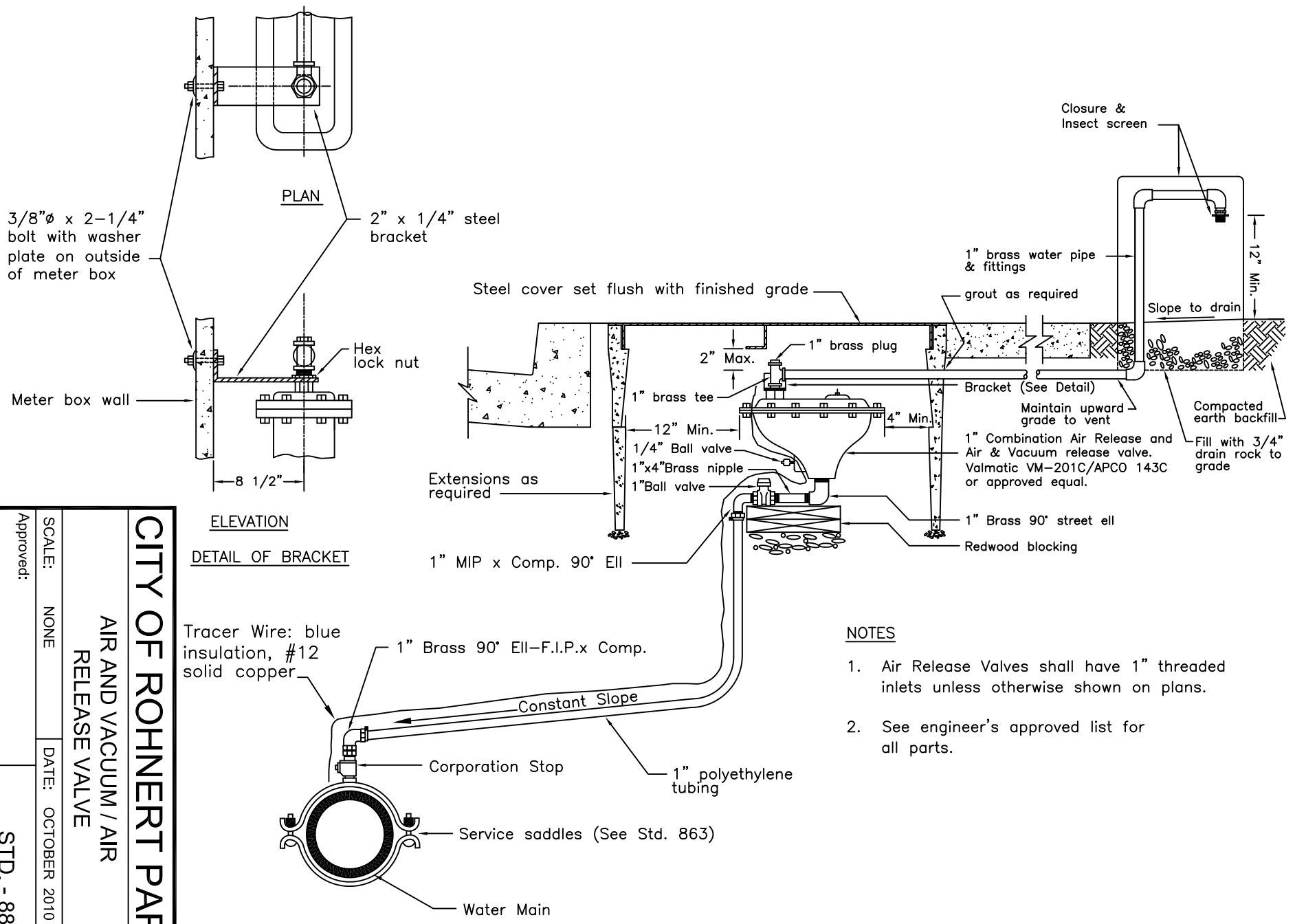
SURGE ANTICIPATOR VALVE or PRESSURE RELIEF VALVE

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 882



NOTES

1. Air Release Valves shall have 1" threaded inlets unless otherwise shown on plans.
2. See engineer's approved list for all parts.

CITY OF ROHNERT PARK

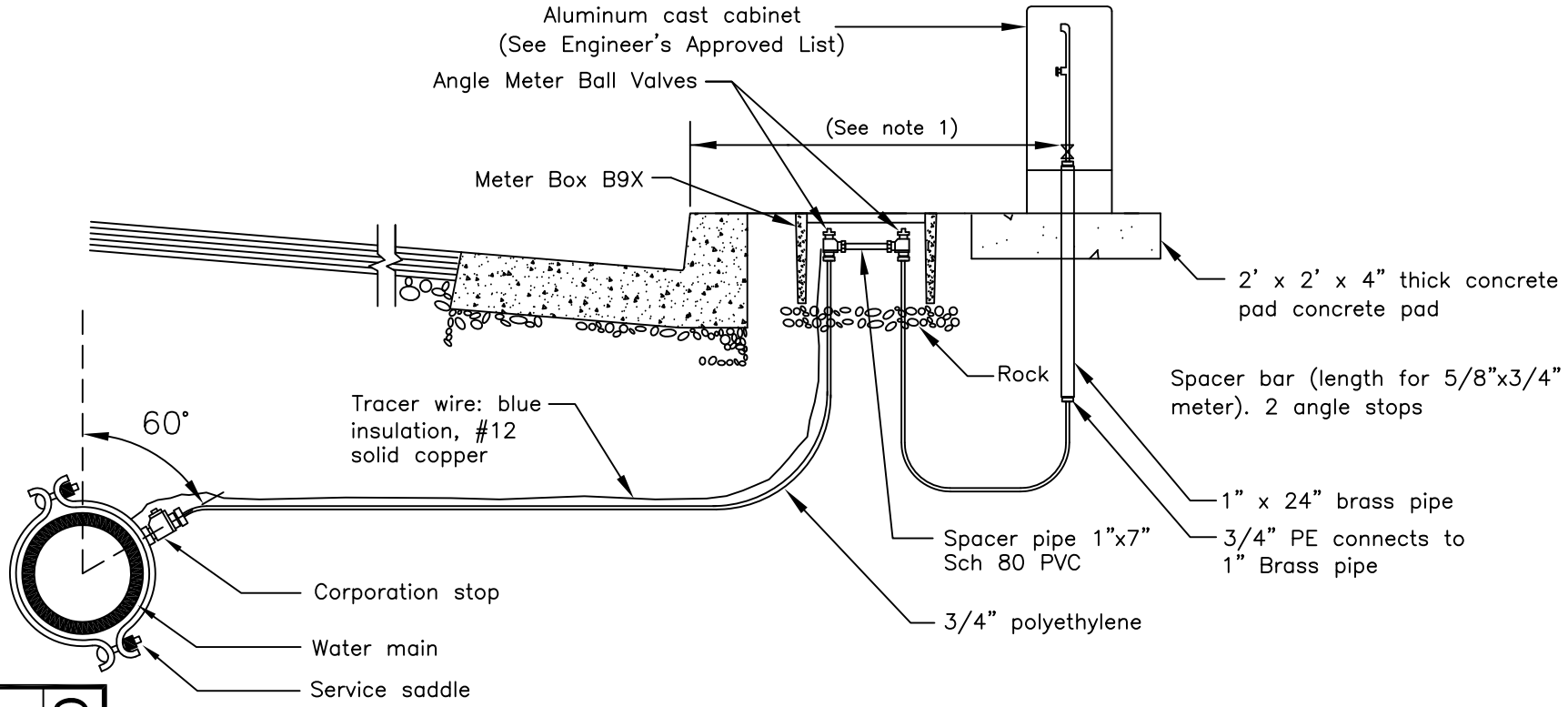
AIR AND VACUUM / AIR RELEASE VALVE

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 883



NOTES:

1. Where planter strip exists, install min. 36" behind F/C – Where sidewalk is contiguous, install 12" behind sidewalk.

APPROVED TAPPING SERVICE SADDLES:

(See Engineer's Approved List for Standard 863)

CITY OF ROHNERT PARK

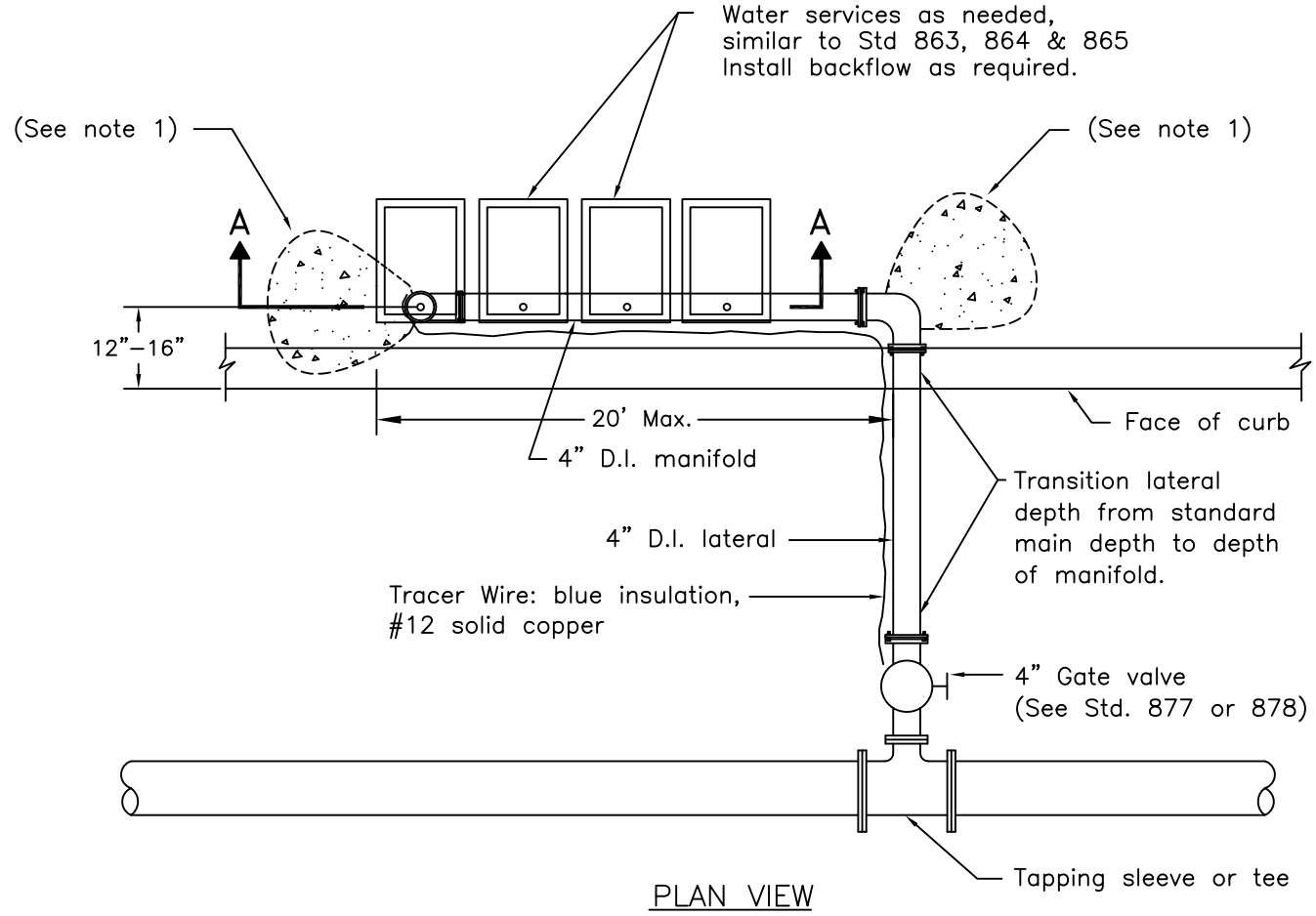
WATER SAMPLING STATION

SCALE: NONE

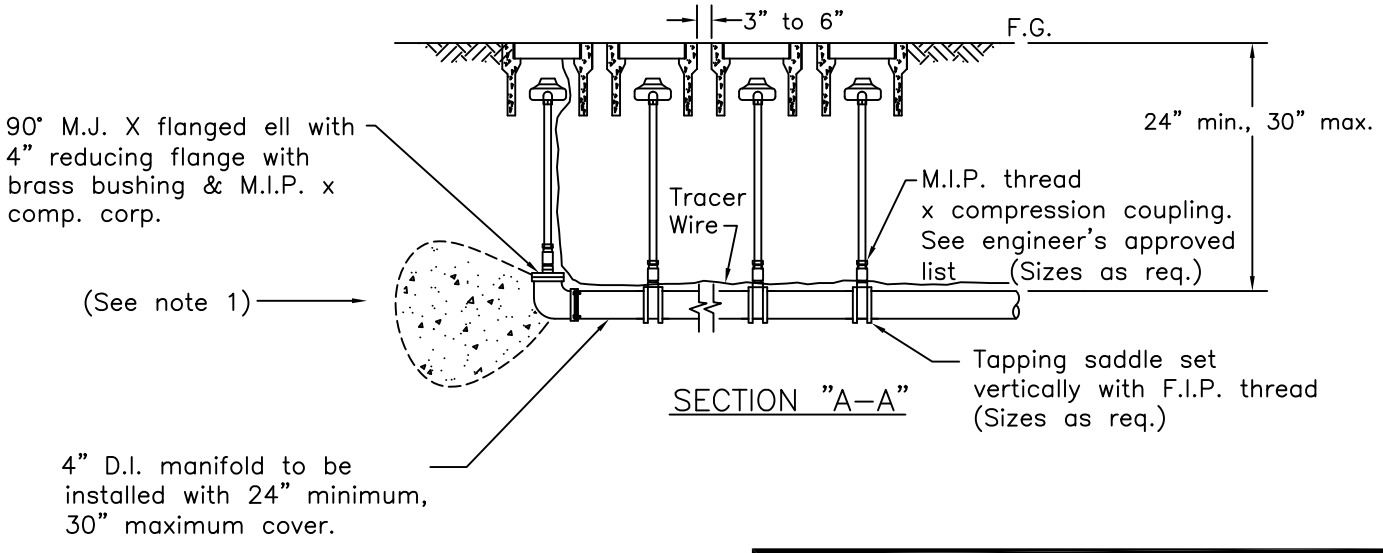
DATE: OCTOBER 2010

Approved:

STD. - 886



PLAN VIEW



SECTION "A–A"

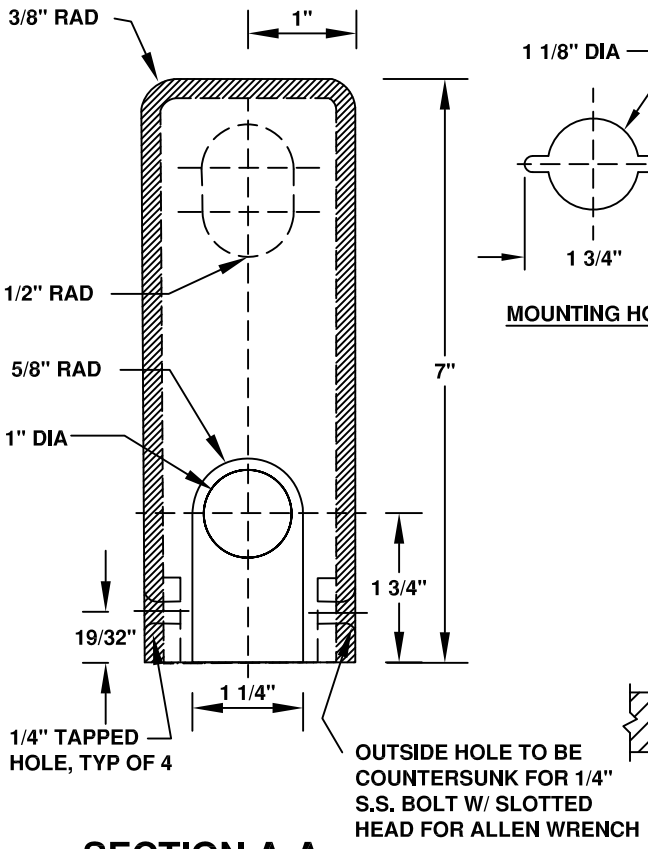
NOTE:

1. Restrained joints are required for all new construction from gate valve to end of 4" manifold. Thrust blocks are only required where existing services are being modified and restrained joints are not used.

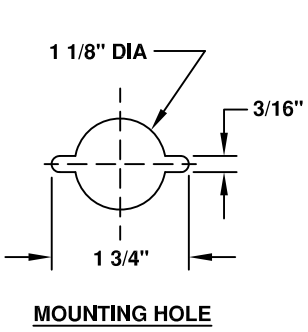
CITY OF ROHNERT PARK

4" DUCTILE IRON MULTI-SERVICE MANIFOLD

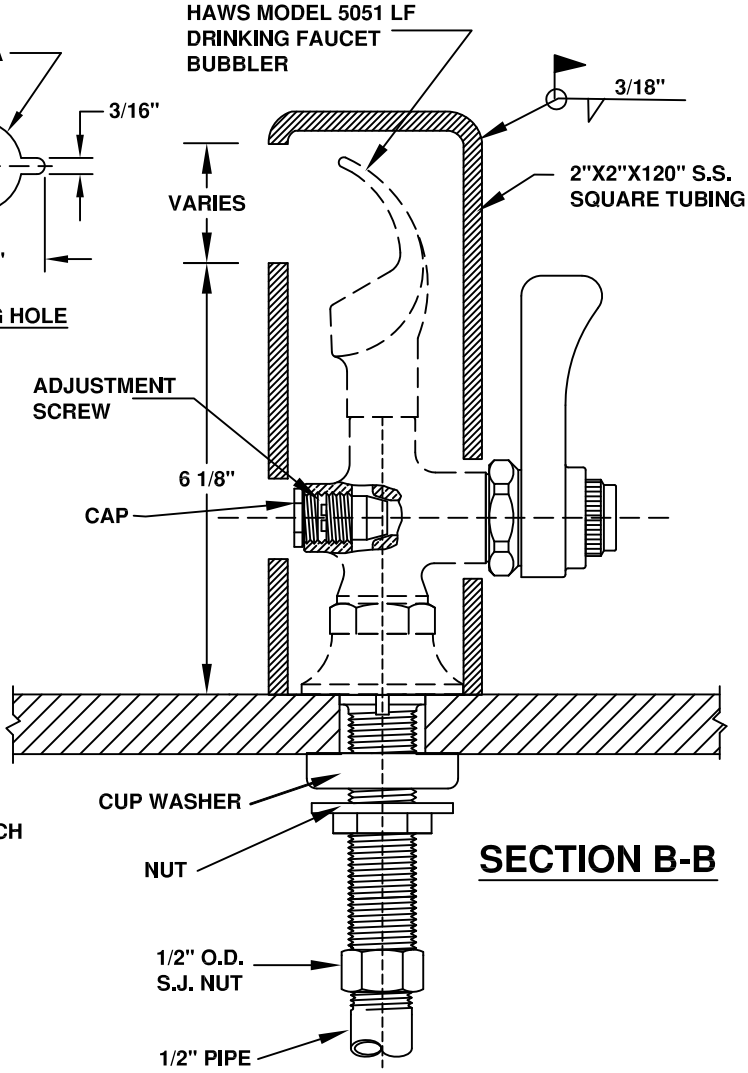
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 887



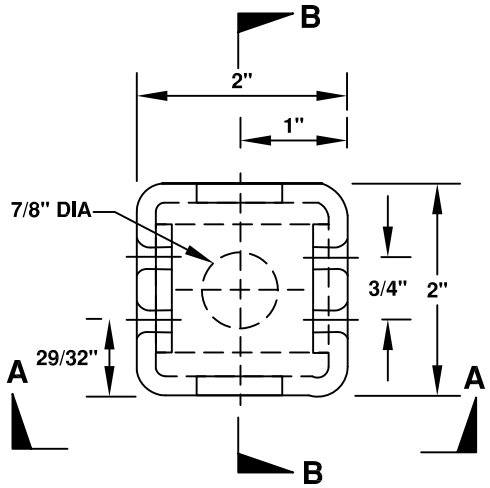
SECTION A-A



MOUNTING HOLE



SECTION B-B



PLAN

CONSTRUCTION NOTES

A. All components of cover and mounting bracket shall be type 316 s.s.

B. All fasteners and piping adapters shall be type 316 s.s.

C. Existing drinking fountains can be adjusted to regulate flow if water will not exit the opening.

D. Field revisions to the cover will be limited to grinding and drilling of the covers to allow flow to exit through the hole in the cover.

E. Prior to fabricating covers, shop drawings shall be submitted for review by the City Engineer.

F. Direction of drinking fountain discharge shall be changed to eliminate direct sprinkler spray.

NOTES

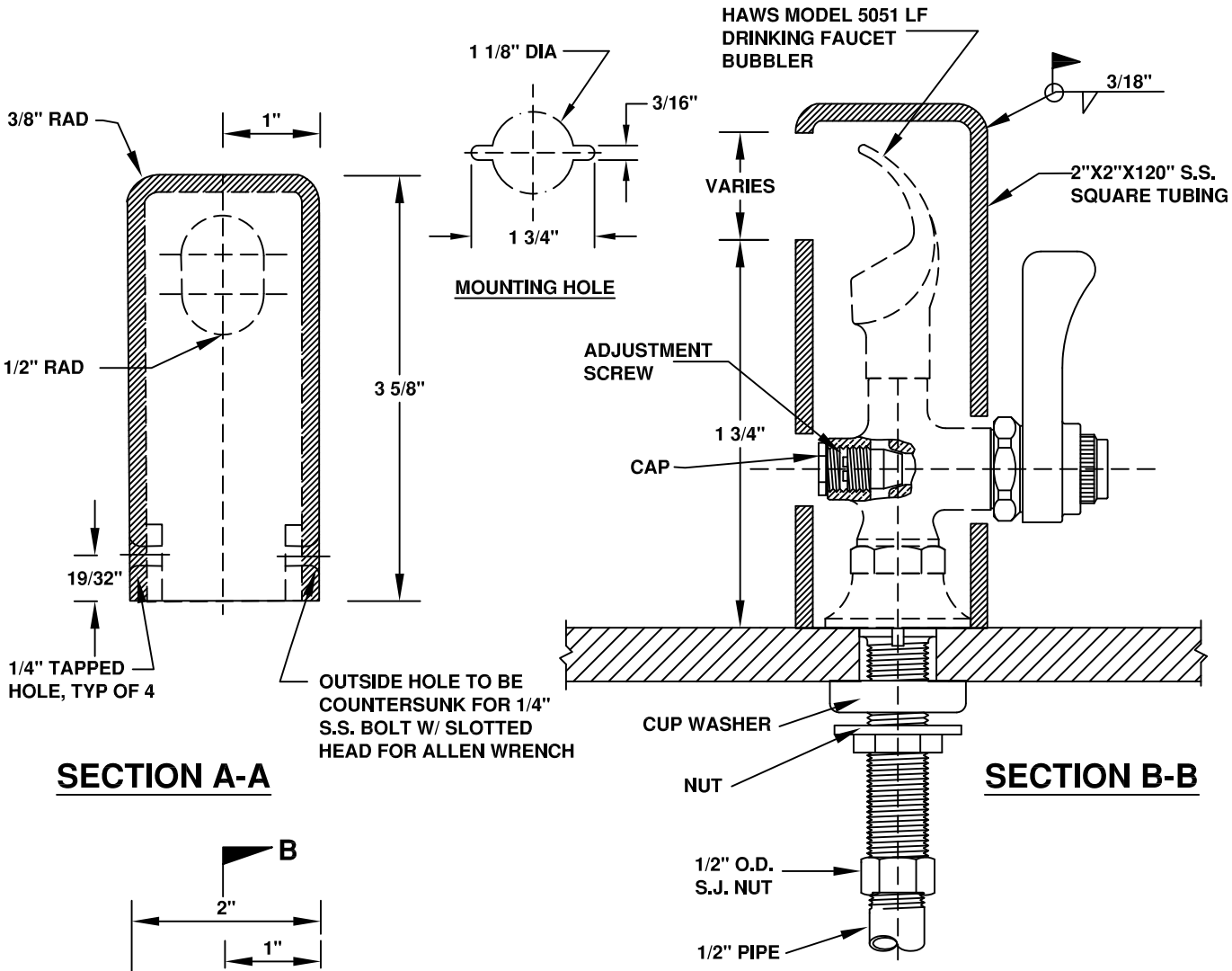
1. Be sure indexing pin is installed and oriented to accommodate the desired mounting

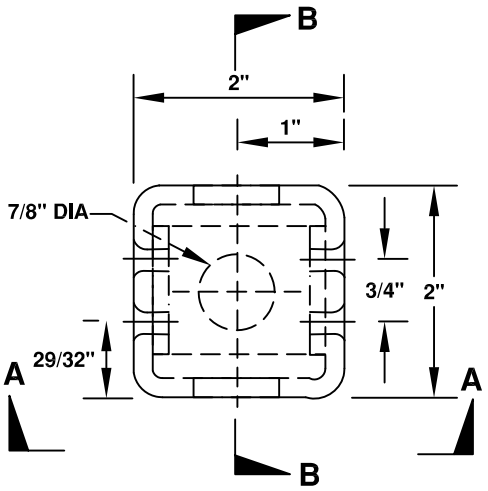
2. To adjust flow, turn adjustment screw counter clockwise to increase flow, and clockwise to decrease flow.

CITY OF ROHNERT PARK

DRINKING FOUNTAIN COVER DETAIL

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 891A





PLAN

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NOTES

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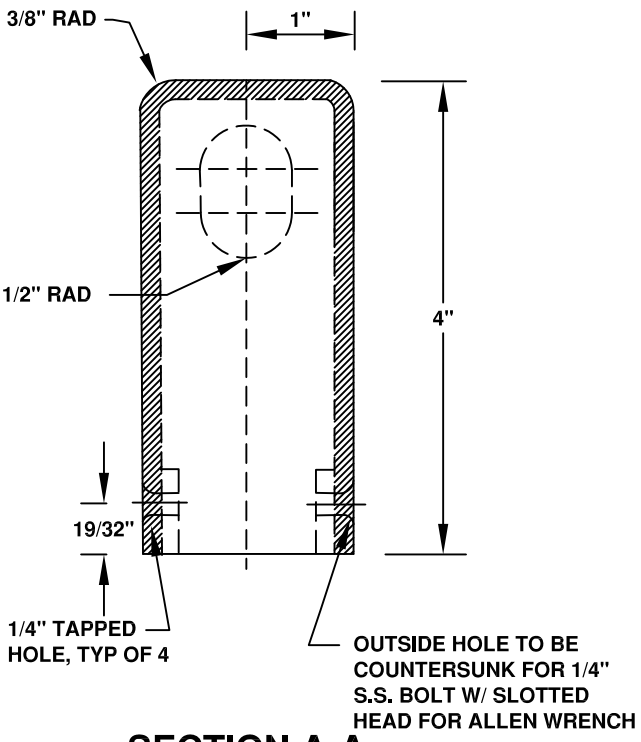
2. To adjust flow, turn adjustment screw counter clockwise to increase flow, and clockwise to decrease flow.

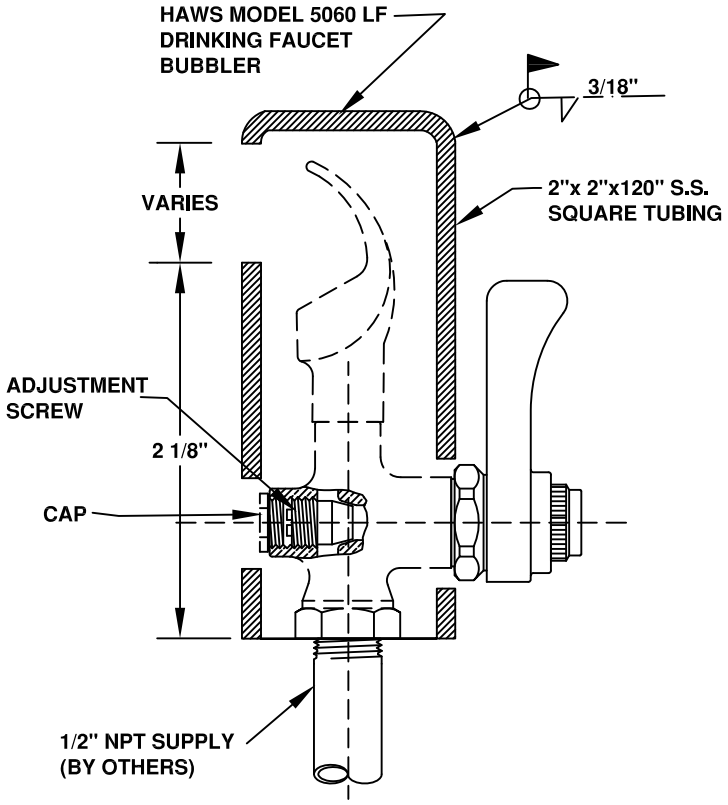
CITY OF ROHNERT PARK

DRINKING FOUNTAIN COVER DETAIL

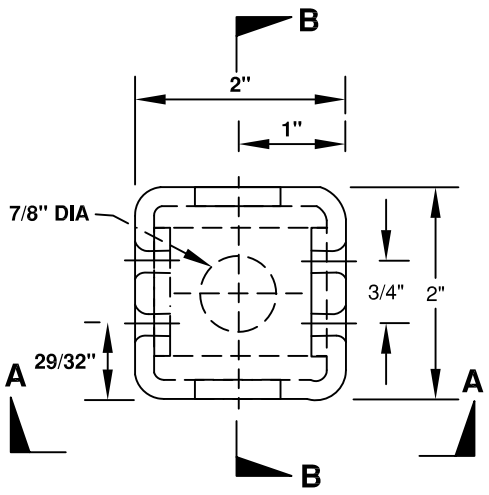
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 891B



SECTION A-A



SECTION B-B



PLAN

CONSTRUCTION NOTES

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B. All fasteners and piping adapters shall be type 316 s.s.

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E. Prior to fabricating covers, shop drawings shall be submitted for review by the City Engineer.

F. Direction of drinking fountain discharge shall be changed to eliminate direct sprinkler spray.

NOTES:

1. To adjust flow, turn adjustment screw counter clockwise to increase flow, and clockwise to decrease flow.

CITY OF ROHNERT PARK

DRINKING FOUNTAIN COVER DETAIL

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 891C

City of Rohnert Park
HIERARCHY

I. Local Streets

20' One Way Street Without Parking	See STD 200 B
Lane	See STD 200 C
Neighborhood Street	See STD 200 D
Minor Street	See STD 200 E

II. Minor Collector

Avenue	See STD 200 F
Main Street	See STD 200 G

III. Industrial Street

Industrial Street	See STD 200 H

IV. Major Collector

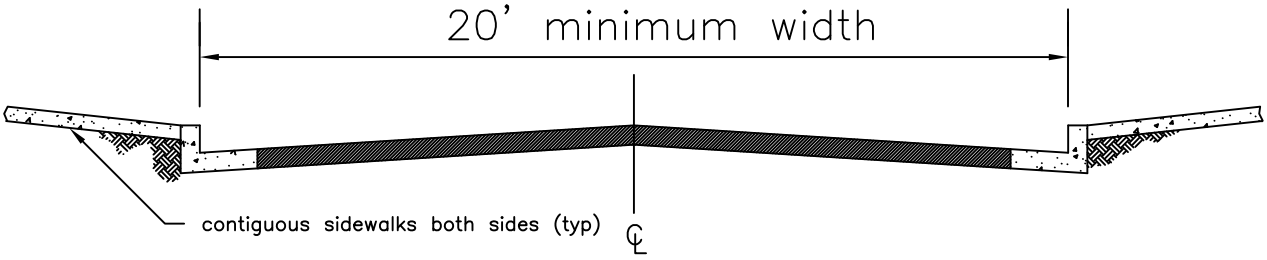
Boulevard	See STD 200 I

V. Arterials

Parkway	See STD 200 J

CITY OF ROHNERT PARK	
STREET HIERARCHY	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 200A

ONE-WAY LOOP STREET WITHOUT PARKING

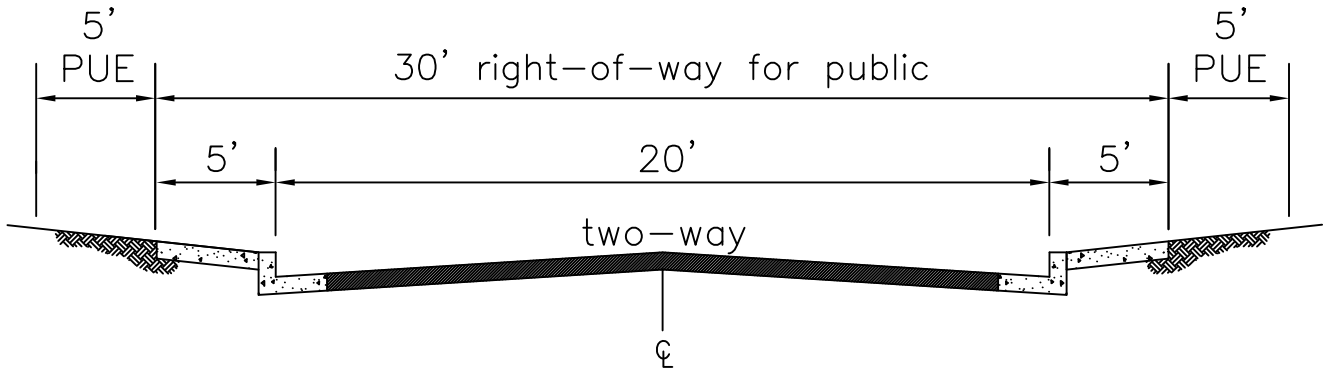


1. Streets are for access to no more than 10 residential units.
2. Street length shall not exceed 200'.
3. Streets shall have contiguous sidewalks on both sides unless otherwise approved
4. 20' Streets shall connect to other streets not less than 36' in width.
5. No flag lots shall connect to 20' streets.
6. Minimum distance of garage face to opposite curb face shall be 42'.
7. Fire hydrants shall be located at each intersection
8. **.Maximum height of building fronting roadway not to exceed 2 stories and/or 21 feet max. roof access point. If this height is exceeded, street width curb to curb must be min. 26' clear, required for aerial fire apparatus.**

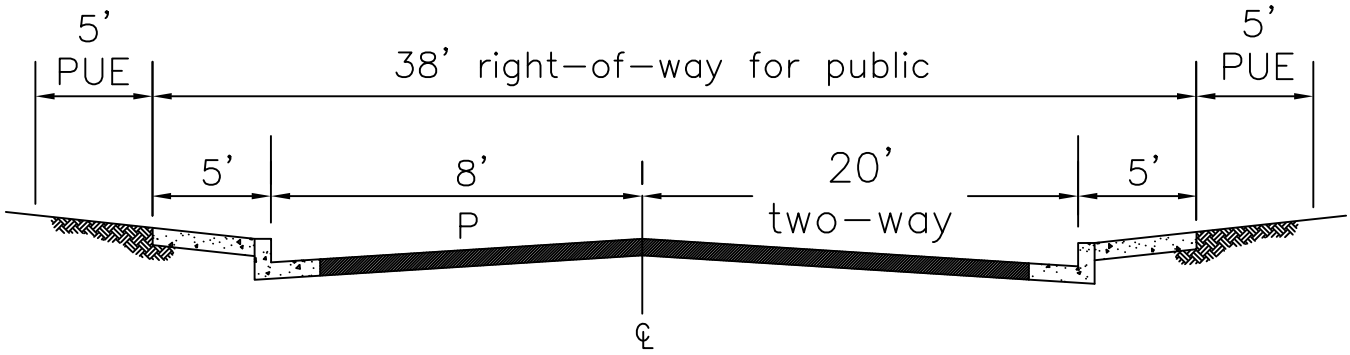
NOTE: THE USE OF THIS STREET WIDTH WILL ROUTINELY IMPOSE SPECIAL UTILITY DESIGN REQUIREMENTS, INCLUDING SPECIAL PIPE REQUIREMENTS FOR WATER AND SEWER IF LESS THAN 10' SEPARATION IS PROPOSED. PROPOSED USE OF THIS STREET ON A TENTATIVE MAP MAY REQUIRE DESIGN DETAIL BEYOND NORMAL SCOPE OF TENTATIVE MAPS.

CITY OF ROHNERT PARK	
20' ONE-WAY STREET WITHOUT PARKING	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 200B

LANE



No Parking



Parking on One Side

1. For through streets, length shall not exceed 300'. No dead end lanes are allowed.
2. Maximum 10 residential units.
3. No parking shall be allowed for the first 30 feet measured from curb return at the intersection.
4. Adequate backup space is required for garage and perpendicular parking.
5. Streets shall contain residential units only.
6. Lanes shall connect to streets that provide minimum 24 feet clear width.
7. If Lane is private, access shall be through a Standard 250 A, C, or D curb cut.
8. Maximum height of building fronting roadway not to exceed 2 stories and/or 21 feet max. height at roof access point. If this height is exceeded, width curb to curb or curb to parking must be 26' clear, required for aerial fire apparatus.

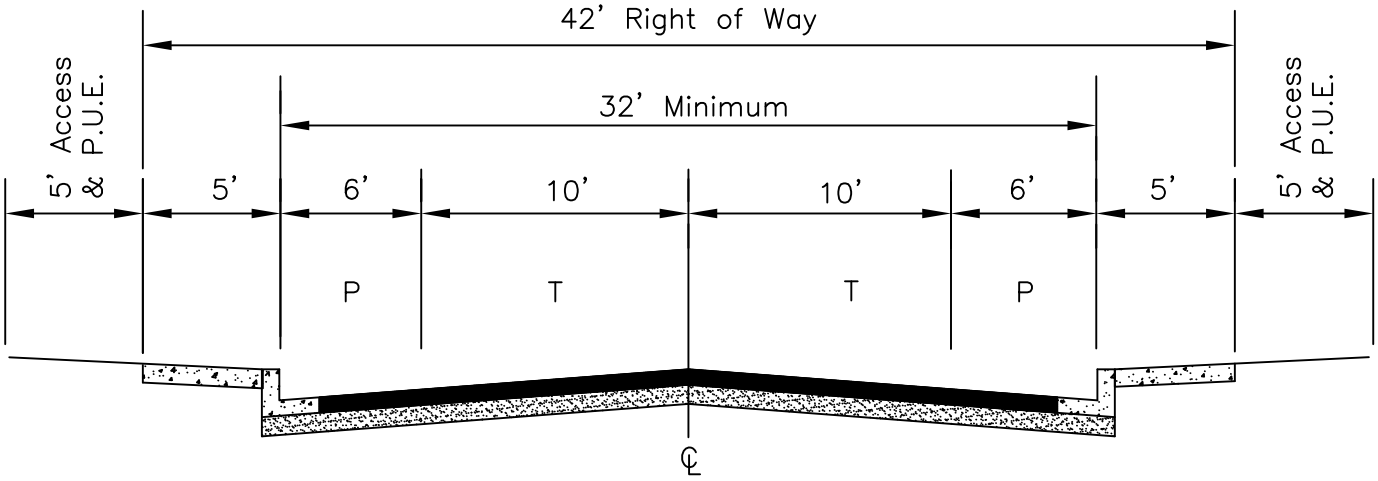
NOTE:

THE USE OF THIS STREET WIDTH WILL ROUTINELY IMPOSE SPECIAL UTILITY DESIGN REQUIREMENTS, INCLUDING SPECIAL PIPE REQUIREMENTS FOR WATER AND SEWER IF LESS THAN 10' SEPARATION IS PROPOSED. PROPOSED USE OF THIS STREET ON A TENTATIVE MAP MAY REQUIRE DESIGN DETAIL BEYOND NORMAL SCOPE OF TENTATIVE MAPS.

CITY OF ROHNERT PARK	
LANE	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 200C

NEIGHBORHOOD STREET

PARKING BOTH SIDES

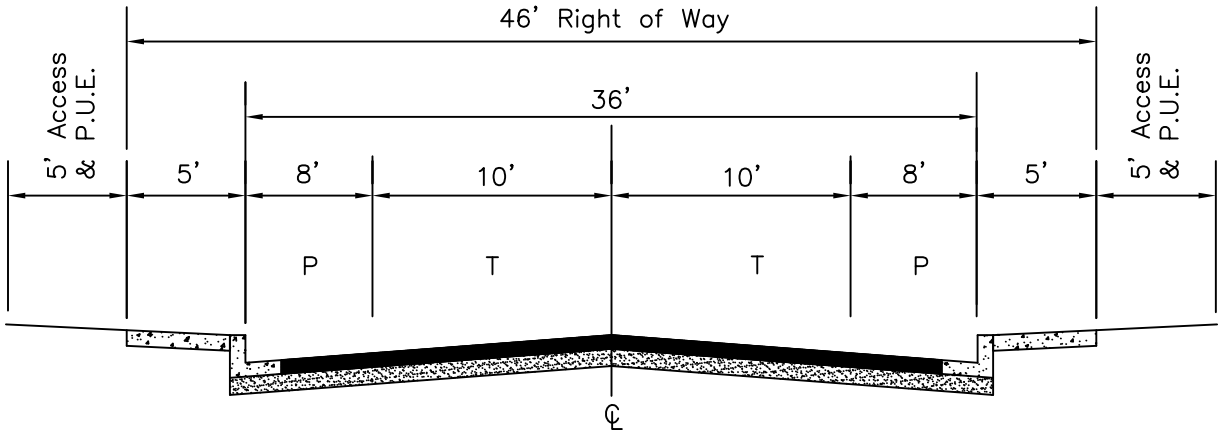


THIS STANDARD MAY BE USED ONLY WHEN ALL OF THE FOLLOWING CONDITIONS ARE MET:

1. Vehicular speeds shall not exceed 25 miles per hour (MPH).
2. Average daily trips (ADT) shall not exceed 1000.
3. Maximum Street length is 1400.
4. Streets shall have access from two directions (no cul–de–sacs).
5. Streets may neck down to 20' at intersections.
6. Streets shall contain residential units only.
7. Sidewalk and curb width is 5 feet.
8. Corners shall have a 20' min. radius.
9. **Maximum height of building fronting roadway not to exceed 2 stories and/or 21 feet max. height at roof access point. If this height is exceeded, the minimum clear width parking to parking must be 26' clear, required for aerial fire apparatus.**

CITY OF ROHNERT PARK	
NEIGHBORHOOD STREET	
SCALE: NONE	DATE: MARCH 2011
Approved:	STD. - 200D

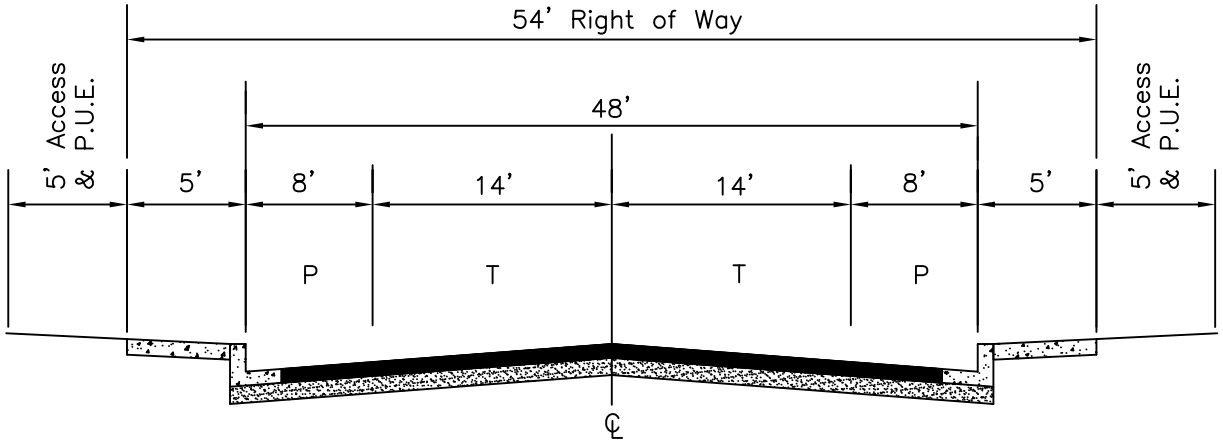
MINOR STREET



1. Travel lanes are increased to 12 feet when they are adjacent to curbs (e.g., curb to curb width is 24 feet for no parking and 30 feet for parking on one side only).
2. Sidewalk and curb width is 5 feet.
3. **Maximum height of building fronting roadway not to exceed 2 stories and/or 21 feet max. height at roof access point. If this height is exceeded, the minimum clear width parking to parking must be 26' clear, required for aerial fire apparatus.**

CITY OF ROHNERT PARK	
MINOR STREET	
SCALE: NONE	DATE: MARCH 2011
Approved:	STD. - 200E

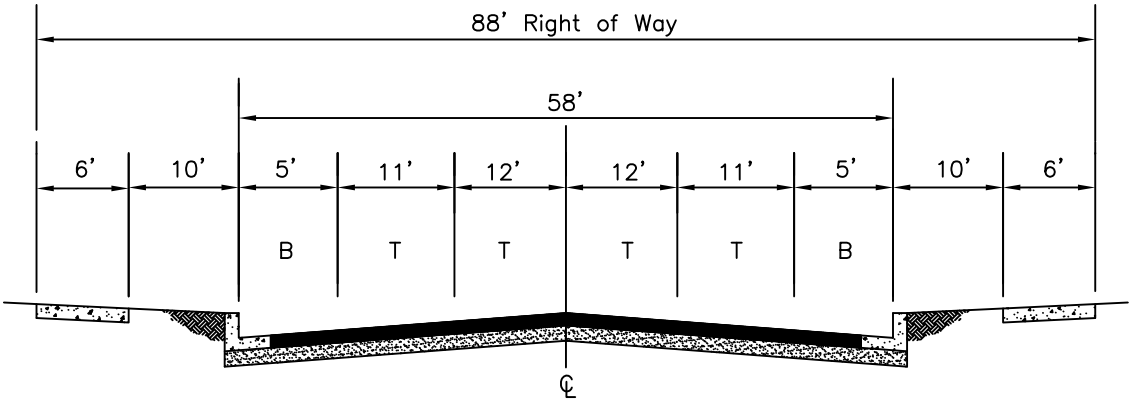
INDUSTRIAL STREET



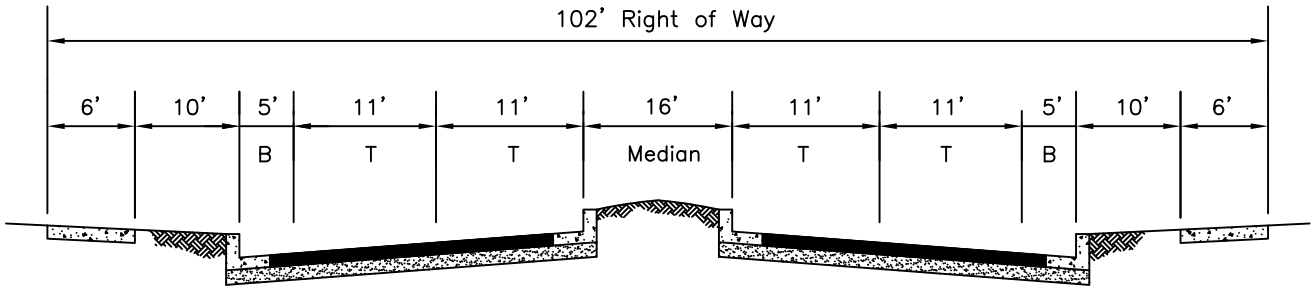
1. Sidewalk and curb width is 5 feet.

CITY OF ROHNERT PARK	
INDUSTRIAL STREET	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 200H

PARKWAY



SHOWN WITH NO MEDIAN

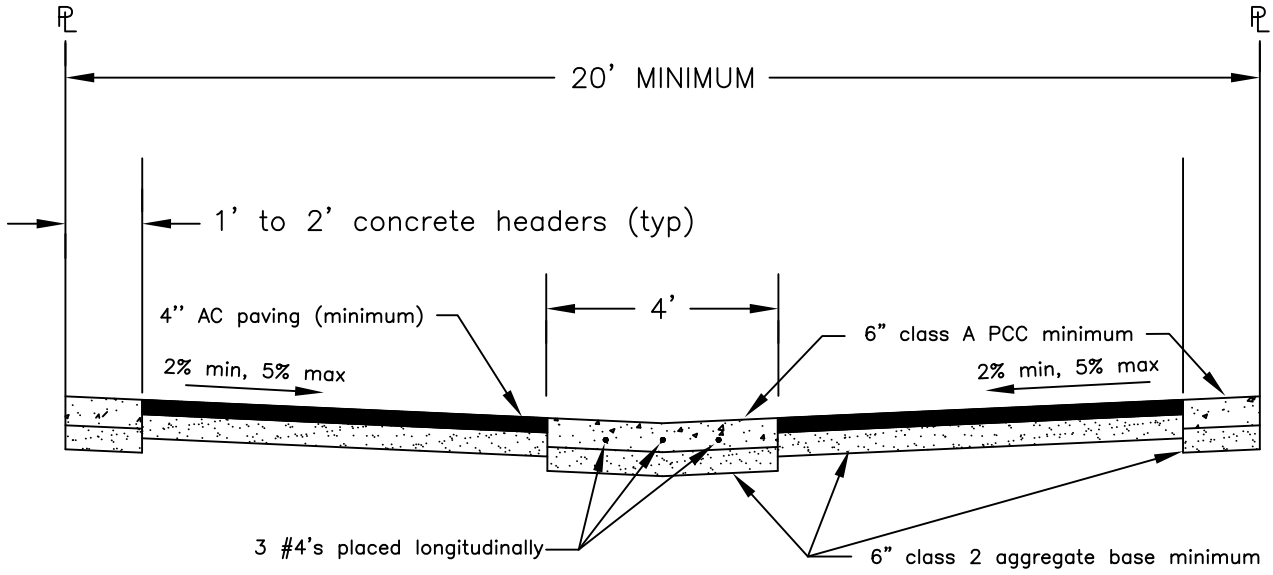


SHOWN WITH 4 LANES, A MEDIAN AND BIKE LANES

1. Travel lanes are 11 feet. The 2 lane configuration with a median is similar to the 4 lane configuration shown above.
2. Sidewalk width is 6 feet and planter strip width is 10 feet measured from face of curb to front of sidewalk.
3. No parking is allowed.

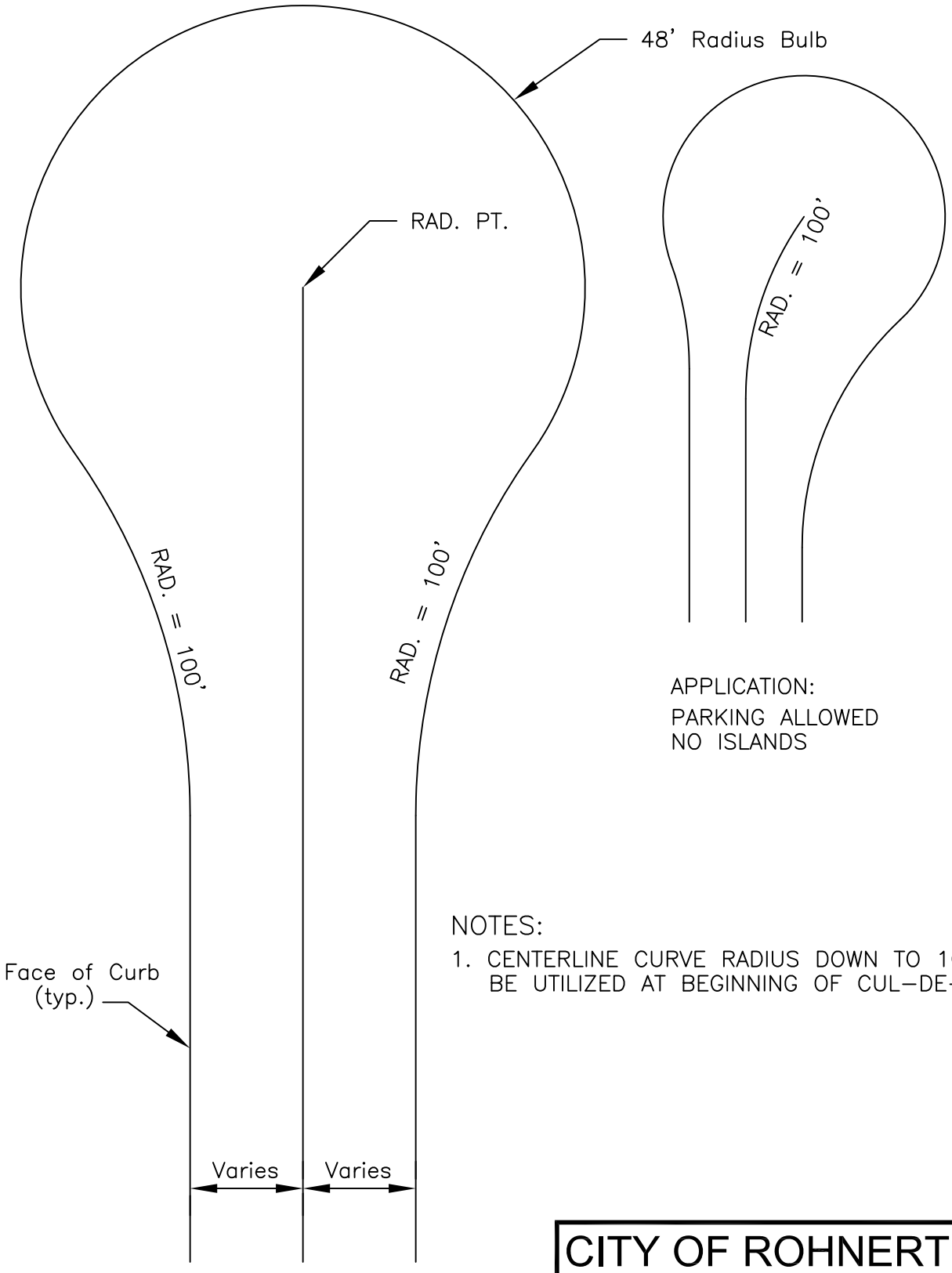
CITY OF ROHNERT PARK	
PARKWAY	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 200J

ALLEY



1. Alley shall be contained within a commonly owned parcel, joint easements, or within private right of way.
2. Alley lighting shall meet the City's minor street requirements for uniformity ratio and minimum maintained foot candle specifications.
3. Access to 20 or more units will require a minimum 24' alley width for 2 way traffic and 20' for one way traffic.
4. No City utilities (water, storm drainage, sewer) may be constructed in the alleys.
5. Access to alleys will be required to be 24 ft wide for 20 ft beyond the intersection (measured from face of curb), tapering to 20 ft.
6. Adequate backup distance shall be provided. NOTE: 16 ft garage openings require a minimum backup distance of 28 ft.
7. Access to alleys from City Streets shall be through a Std 250A curb cut unless otherwise approved by the City Engineer.
8. Minimum horizontal curve radii shall be 200 ft. NOTE: CURVE RADII MAY NEED TO BE INCREASED DUE TO CLOSE PROXIMITY OF GARAGES TO ALLEY.
9. No dead end alleys will be allowed.
10. Alleys are to be used as secondary access only, with parking provided on primary access road.
11. Maximum alley length is 500'.

CITY OF ROHNERT PARK	
ALLEY	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 202



APPLICATION:
PARKING ALLOWED
NO ISLANDS

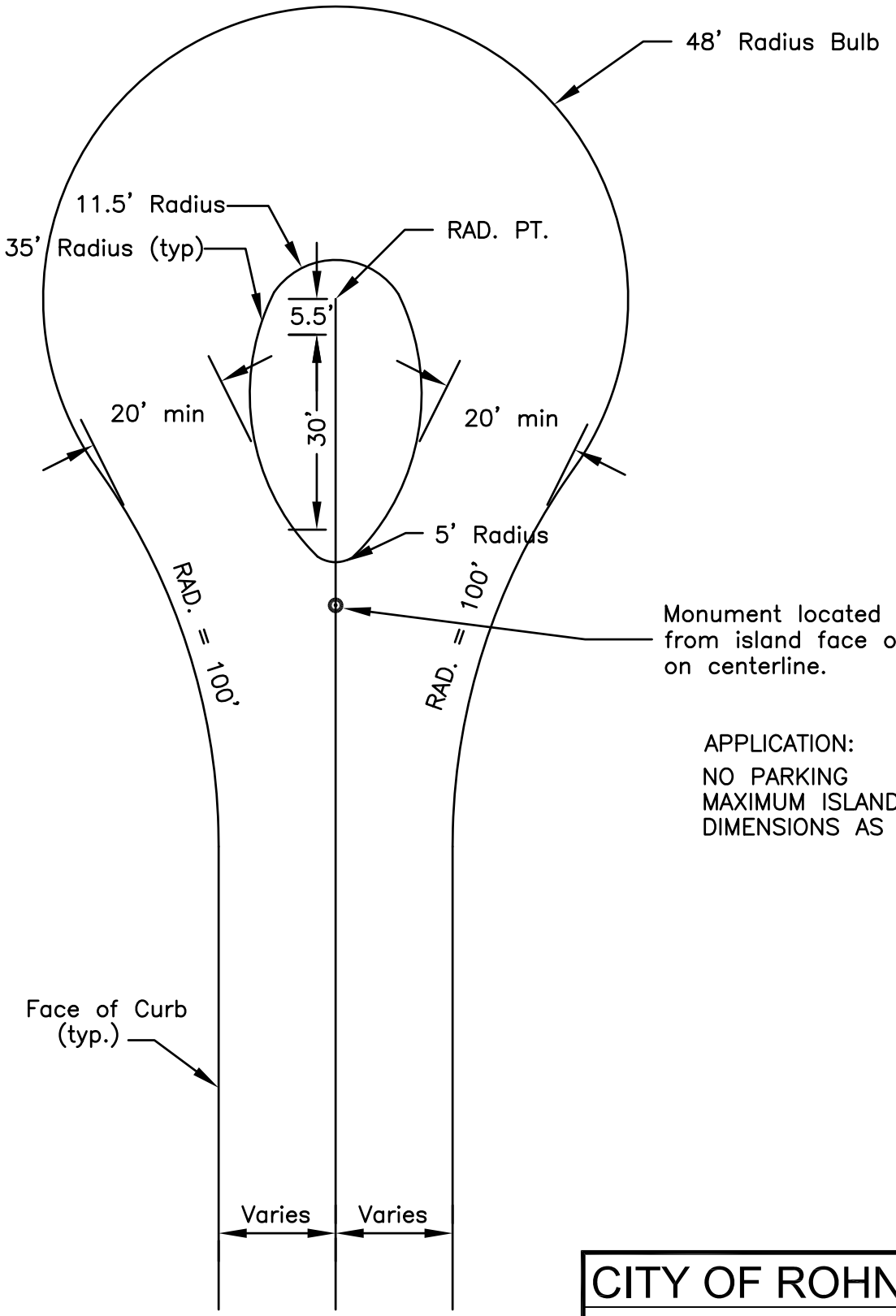
NOTES:

1. CENTERLINE CURVE RADIUS DOWN TO 100' MAY BE UTILIZED AT BEGINNING OF CUL-DE-SAC.

CITY OF ROHNERT PARK

CUL-DE-SAC 48' RADIUS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 203A



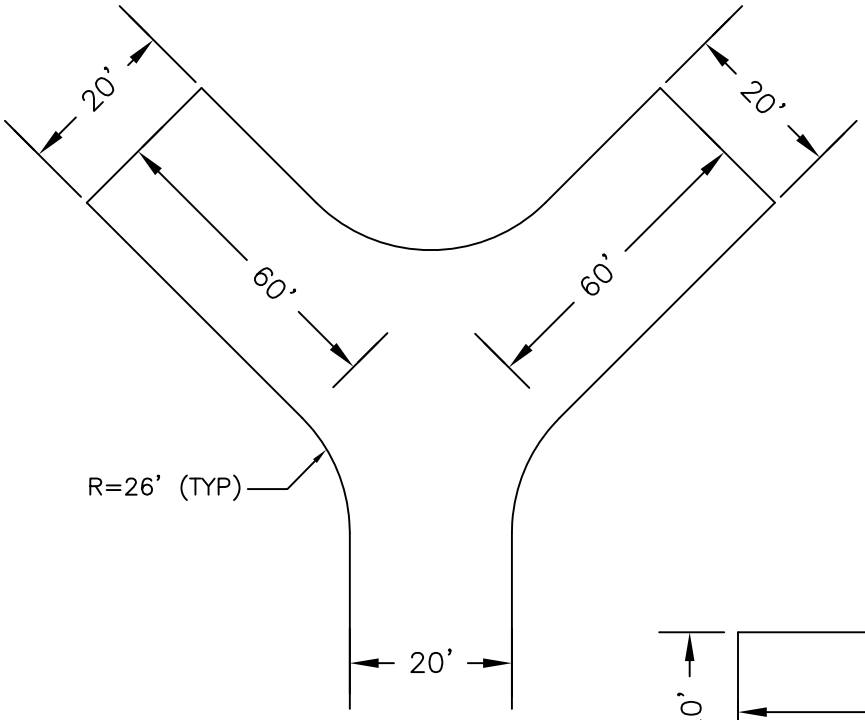
APPLICATION:

NO PARKING
MAXIMUM ISLAND
DIMENSIONS AS SHOWN.

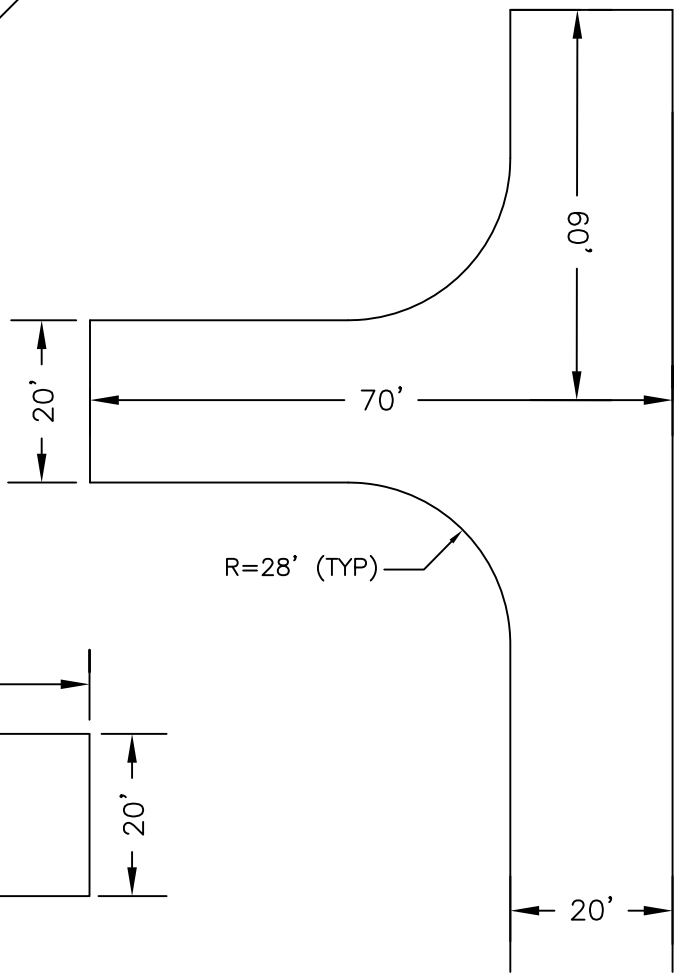
CITY OF ROHNERT PARK

CUL-DE-SAC WITH ISLAND 48' RADIUS

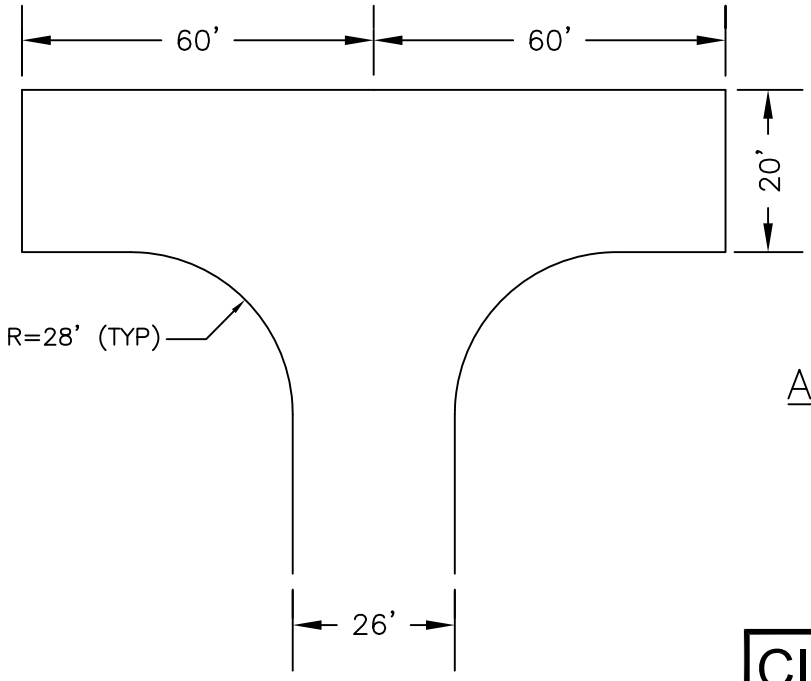
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 203B



60' "Y"



ACCEPTABLE ALTERNATIVE TO 120' HAMMERHEAD

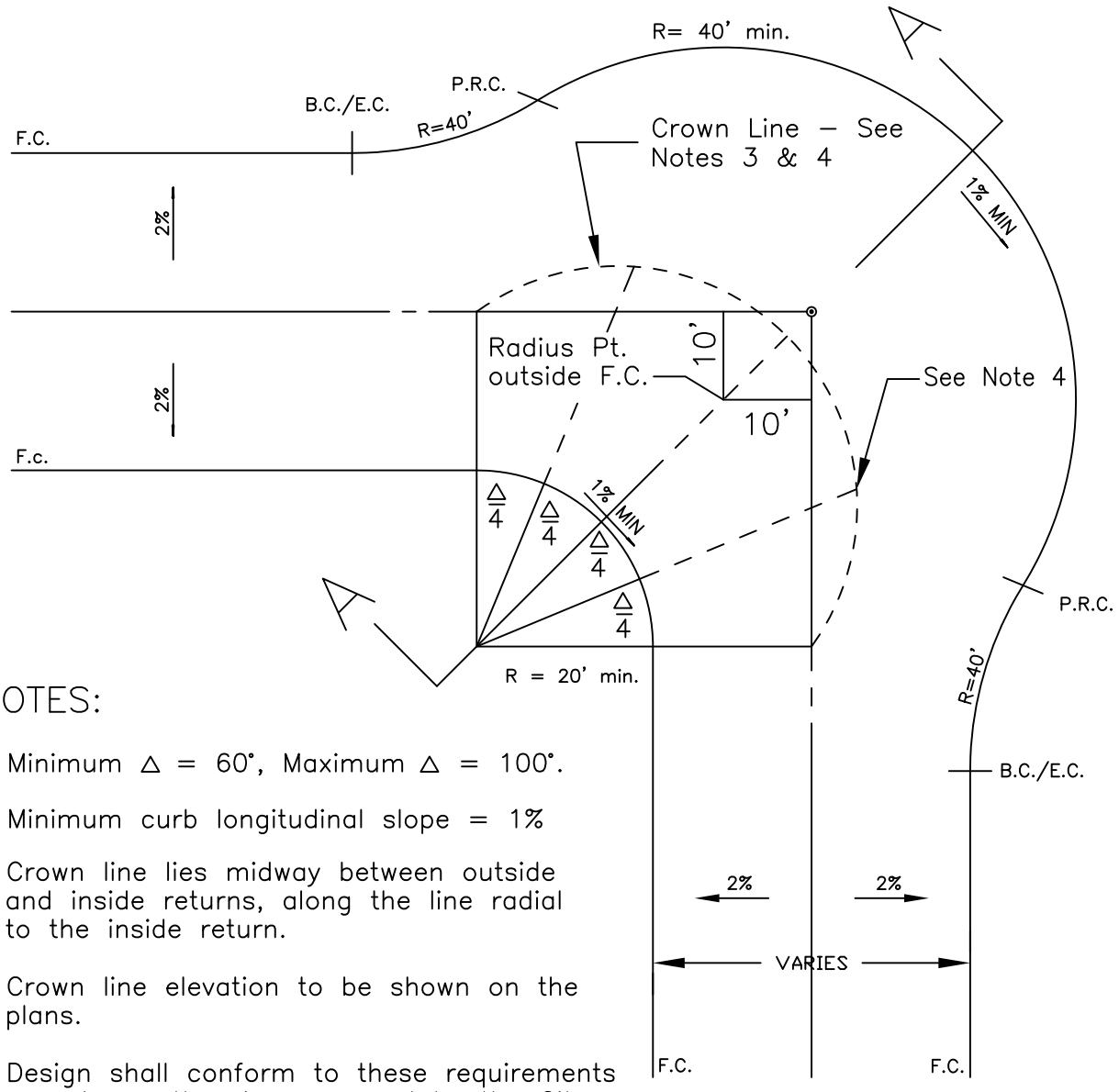


120' HAMMERHEAD

CITY OF ROHNERT PARK

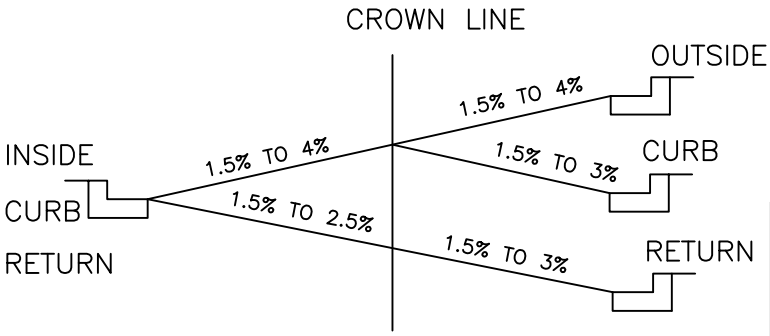
HAMMER HEAD TURN AROUND
PRIVATE DRIVEWAYS ONLY

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 203F



NOTES:

1. Minimum △ = 60°, Maximum △ = 100°.
2. Minimum curb longitudinal slope = 1%
3. Crown line lies midway between outside and inside returns, along the line radial to the inside return.
4. Crown line elevation to be shown on the plans.
5. Design shall conform to these requirements except as otherwise approved by the City Engineer.
6. See City Standard 204B for alternate knuckle designs.

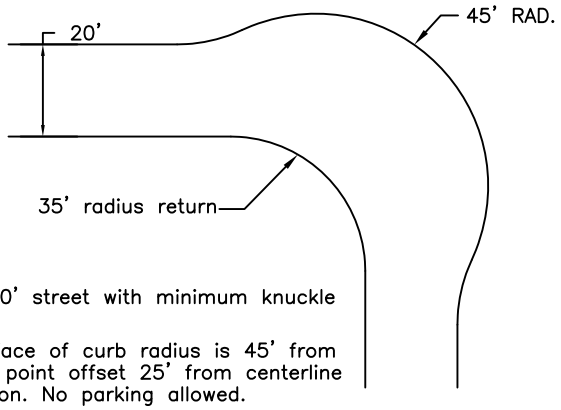


SECTION A–A
MAXIMUM & MINIMUM CROSS SLOPES

CITY OF ROHNERT PARK

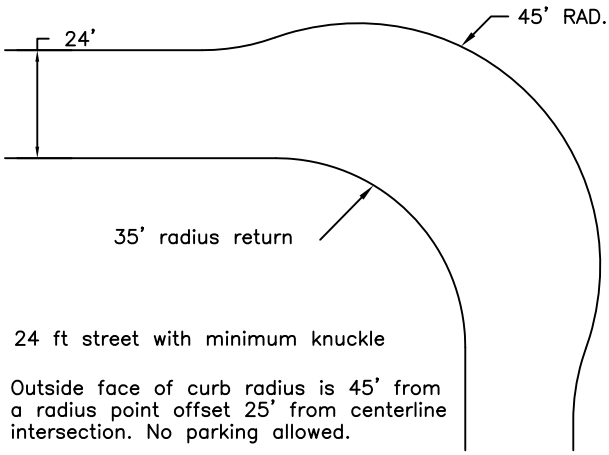
STANDARD KNUCKLE RESIDENTIAL & MINOR STREETS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 204A



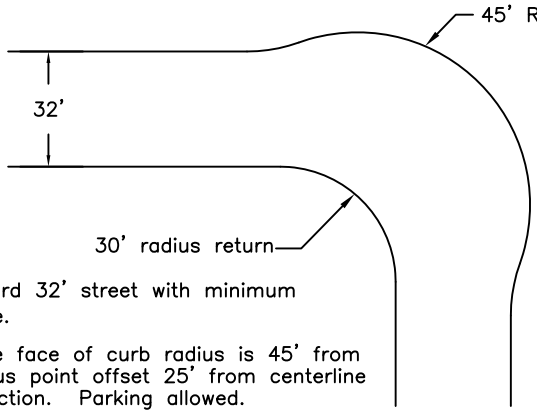
Private 20' street with minimum knuckle

Outside face of curb radius is 45' from a radius point offset 25' from centerline intersection. No parking allowed.



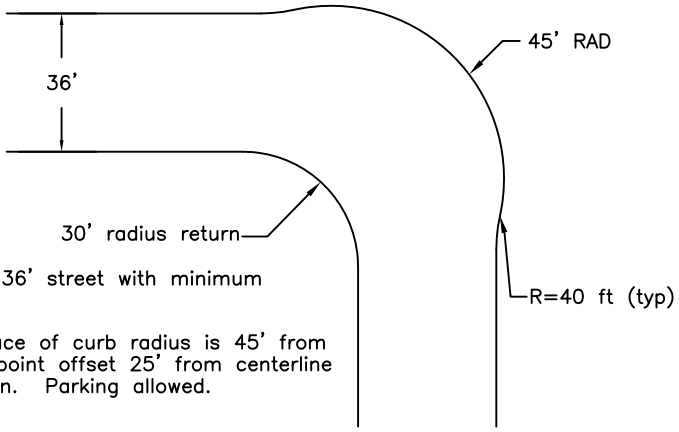
24 ft street with minimum knuckle

Outside face of curb radius is 45' from a radius point offset 25' from centerline intersection. No parking allowed.



Standard 32' street with minimum knuckle.

Outside face of curb radius is 45' from a radius point offset 25' from centerline intersection. Parking allowed.



Standard 36' street with minimum knuckle.

Outside face of curb radius is 45' from a radius point offset 25' from centerline intersection. Parking allowed.

NOTE: Use of these knuckle alternatives (radii offset greater than 10') requires the use of double yellow raised pavement markers following the crown line from the beginning of the outside curve to the end of the outside curve.

CITY OF ROHNERT PARK

KNUCKLE ALTERNATIVES

SCALE: NONE	DATE: OCTOBER 2010
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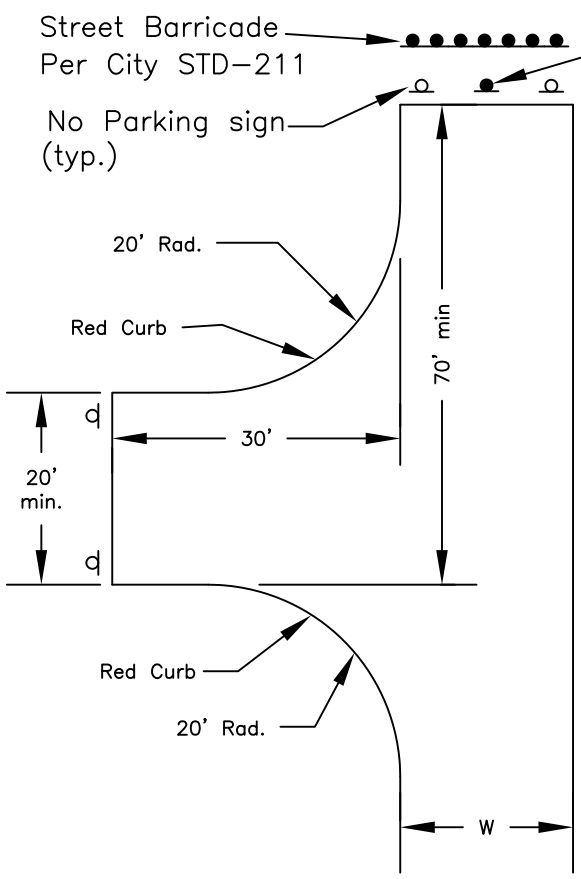
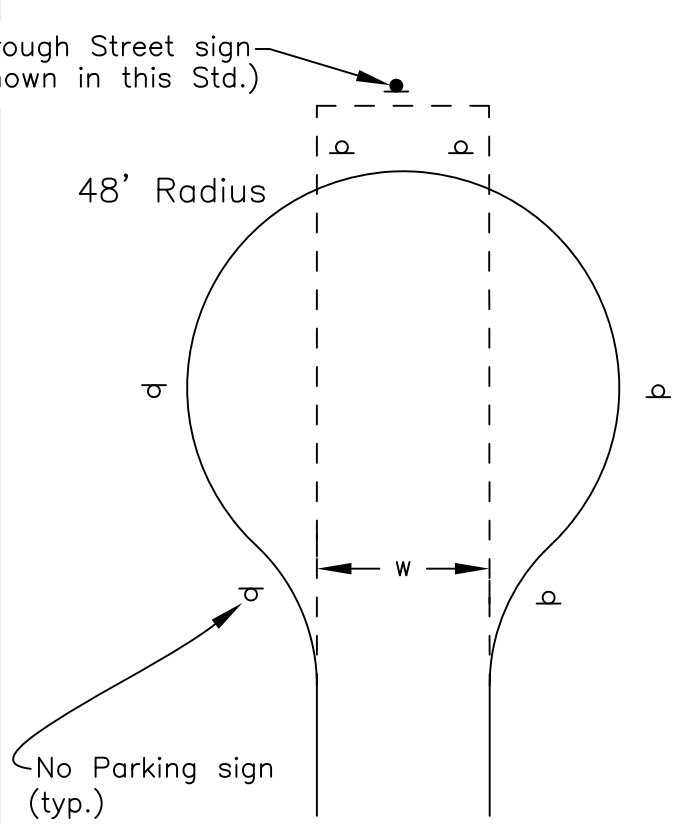
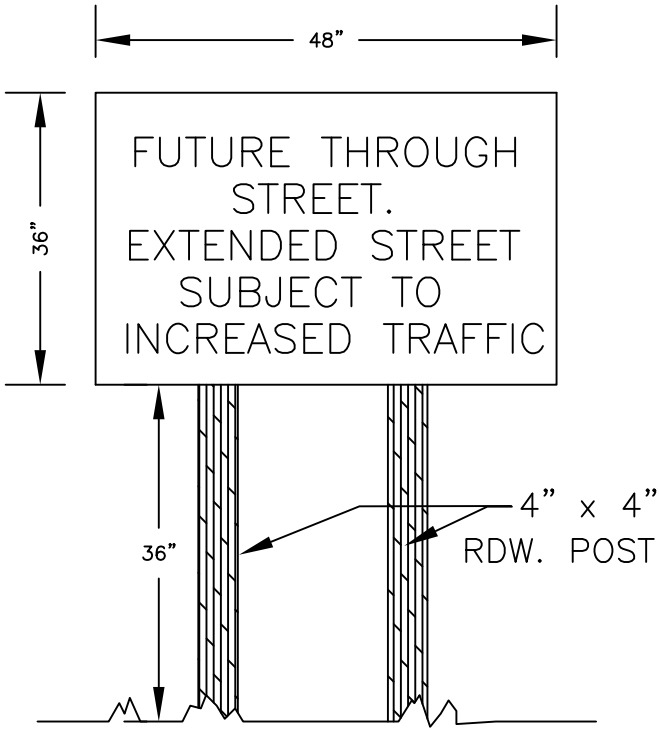


TEMPORARY HAMMERHEAD



TEMPORARY CUL–DE–SAC



NOTES:

1. Sign shall be reflectorized as per City standard sheeting black on white metal sign with 4" letters. See City Engineer for details.
2. Design shall comply with appendix D of the Fire Code
3. If W is less than 30' on temporary hammerhead, legs shall be 40' instead of 30'.
4. For temporary hammerhead driveway cut, apron and concrete slab are acceptable if consistent with template above.
5. Temporary turnaround shall be used only when specifically approved by the City Engineer.

CITY OF ROHNERT PARK

TEMPORARY TURNAROUND FOR FUTURE ROAD

SCALE: NONE	DATE: OCTOBER 2010
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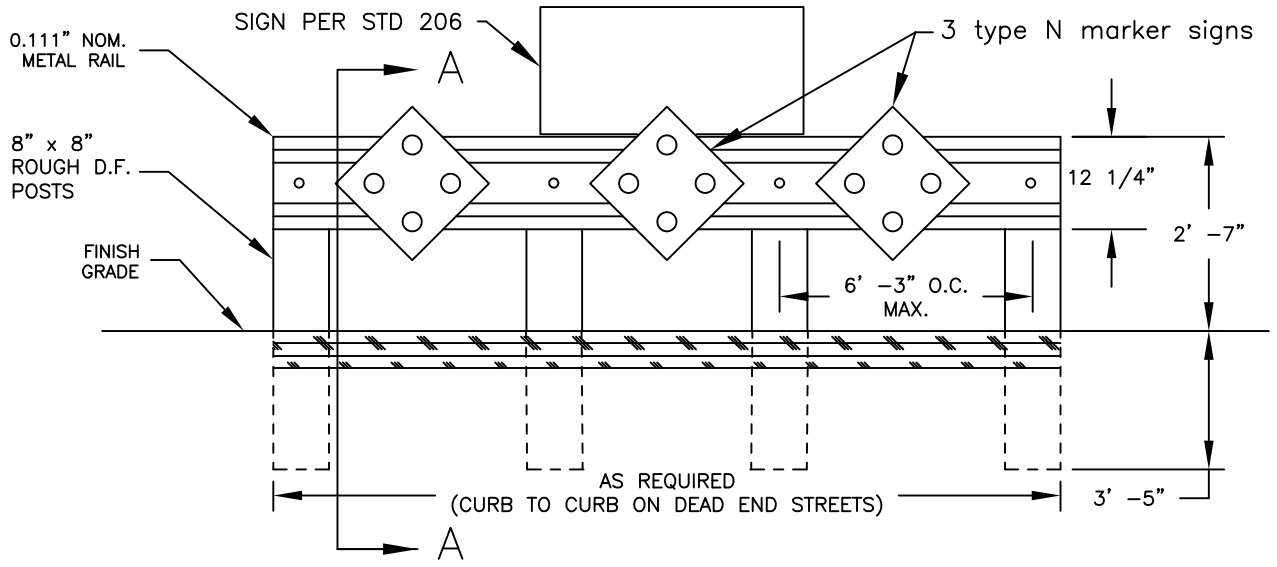
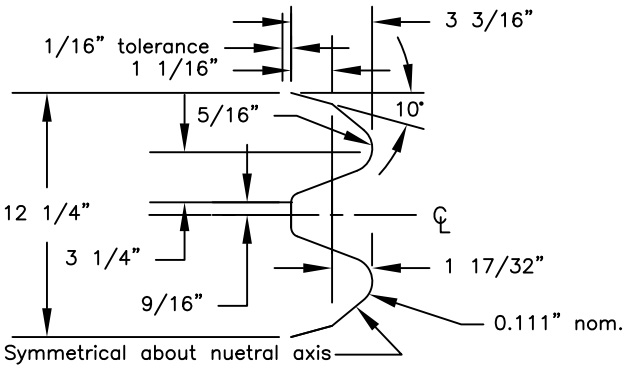
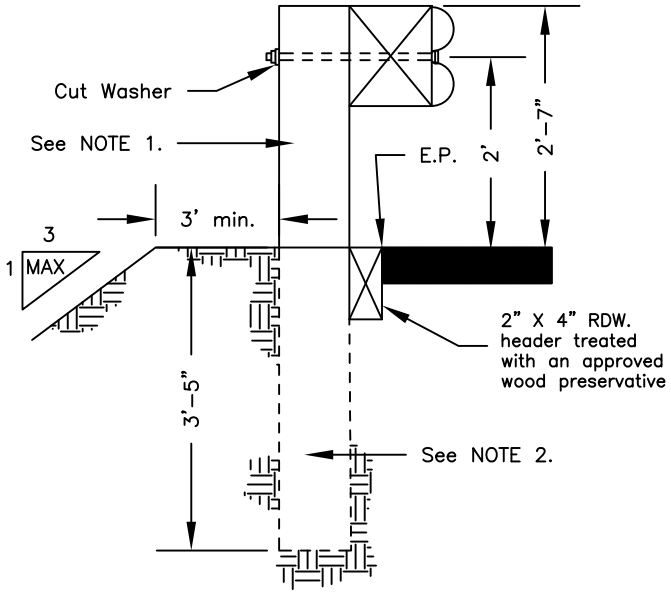
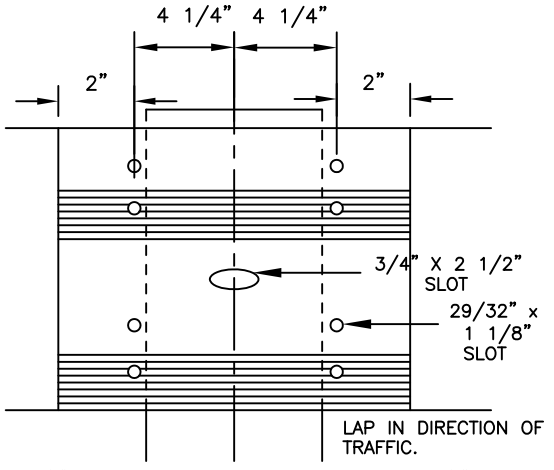




RAIL ELEMENT SECTION



SECTION A–A



5/8" x 1 1/4" BUTTON HEAD, OVAL SHOULDER BOLTS WITH 1 1/4" RECESSED TOTAL HEX NUTS –TOTAL OF 8 PER SPLICE & 4 PER TERMINAL SECTION.

RAIL SPLICE SECTION

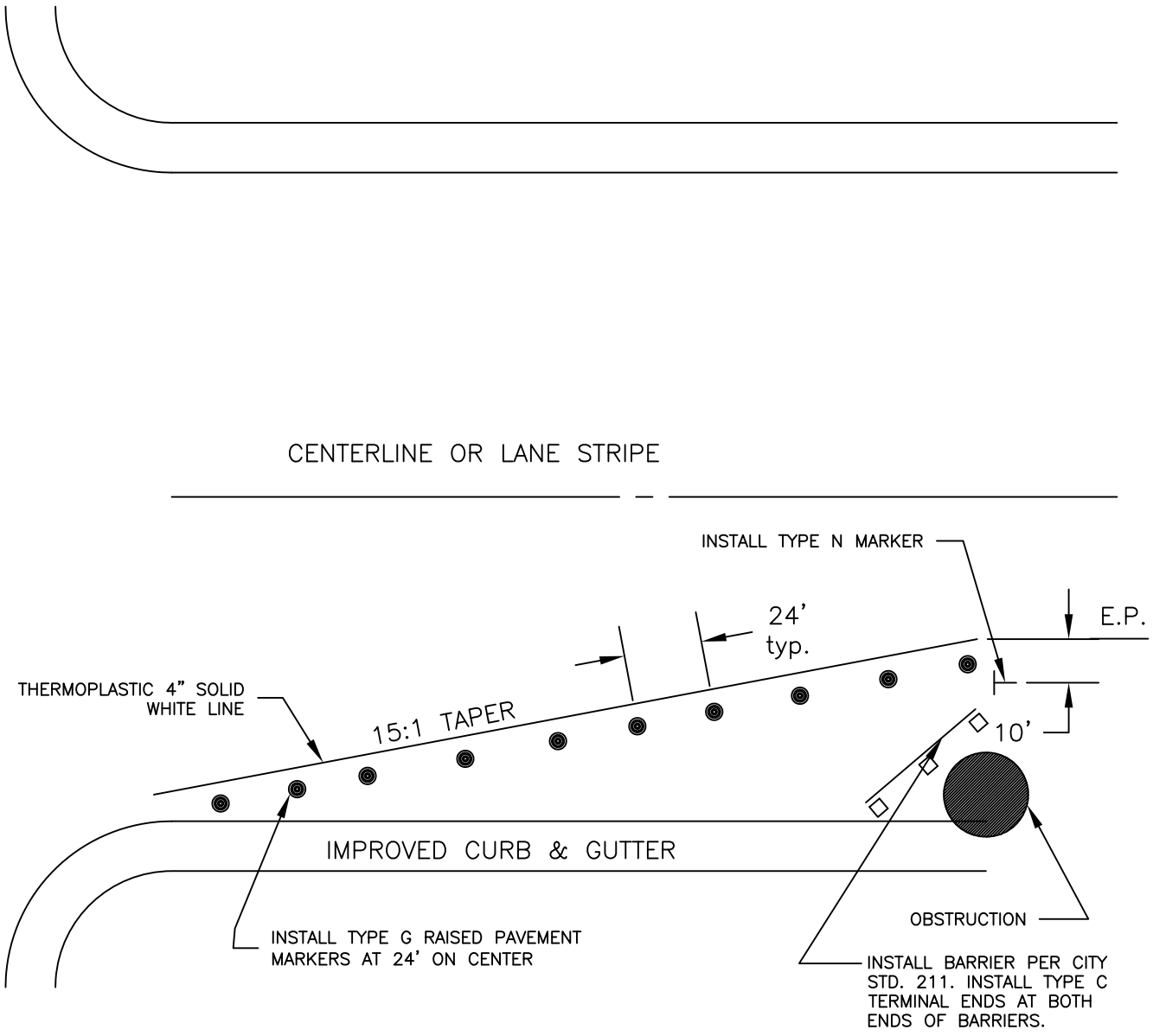
NOTES:

1. POSTS SHALL BE PAINTED ONE COAT OF WHITE PRIMER, AND ONE COAT OF WHITE ENAMEL AFTER ERECTION.
2. ALL PORTIONS OF POSTS TO BE INSTALLED BELOW FINISH GRADE SHALL BE TREATED WITH A WOOD PRESERVATIVE APPROVED BY THE CITY ENGINEER.
3. ON DEAD END STREETS, INSTALL TYPE W21 REFLECTORS AT CITY ENGINEER'S DIRECTION.
4. ALL RAIL ELEMENTS TO BE HOT DIPPED GALV.

CITY OF ROHNERT PARK

METAL BEAM STREET BARRICADE

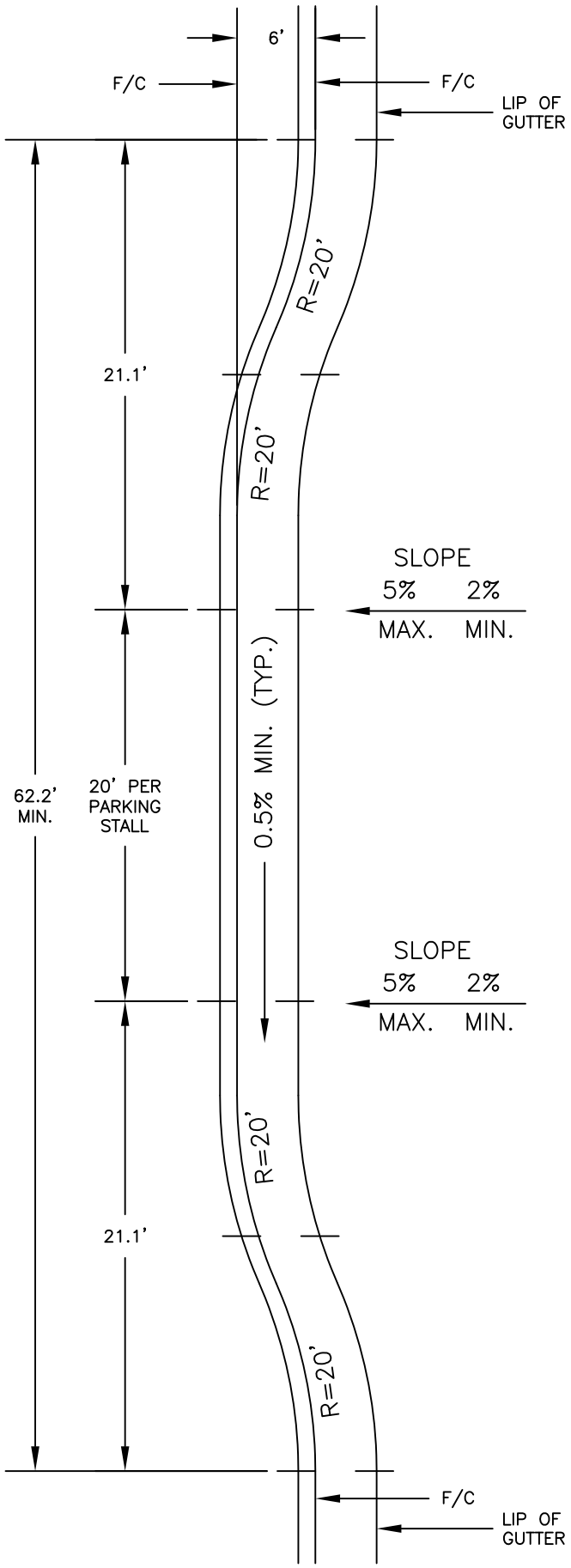
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 211



CITY OF ROHNERT PARK

ROAD WIDTH TRANSITIONS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 212



PARKING BAY DETAIL

NOTES

1. Parking Bay detail to be used only when specifically authorized by the City Engineer

CITY OF ROHNERT PARK	
PARKING BAY	
SCALE: NONE	DATE: OCTOBER 2010
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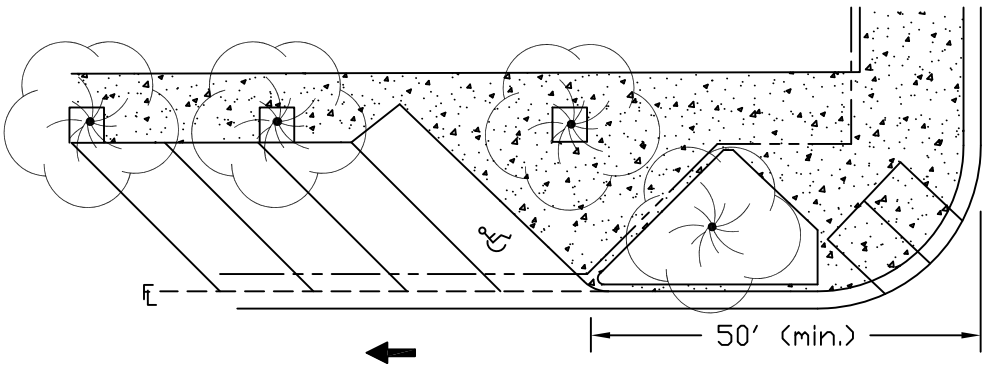
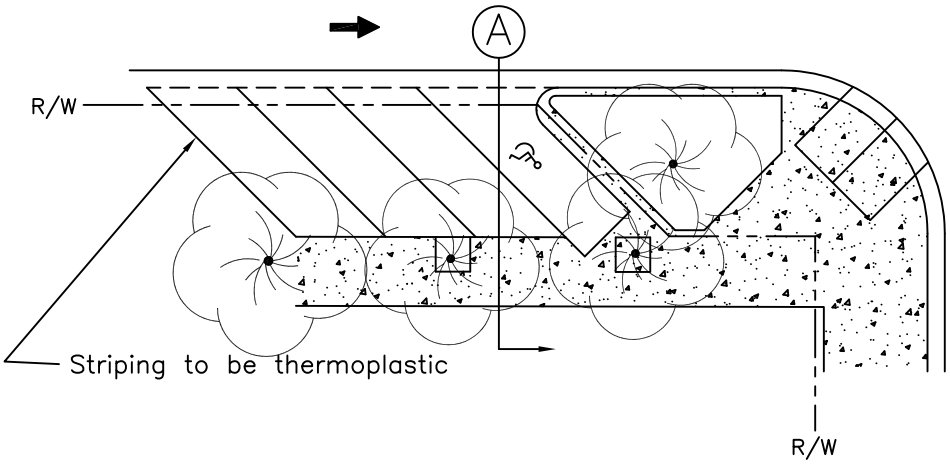
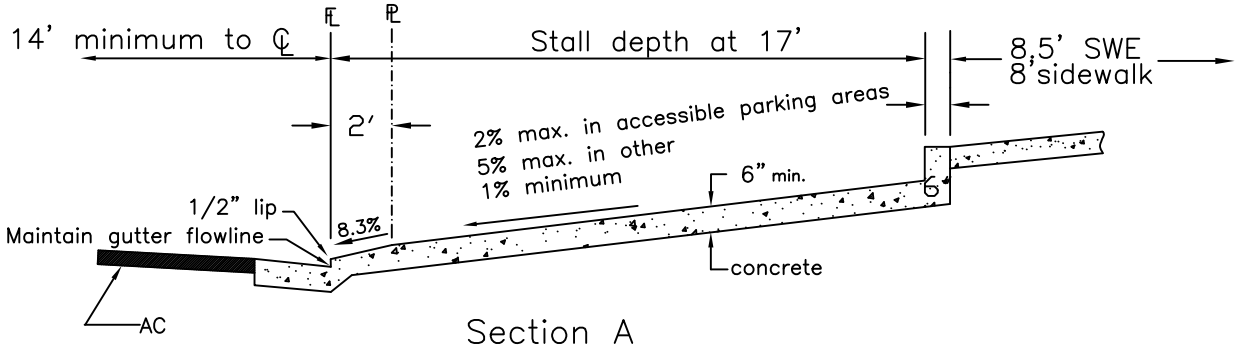






Section A

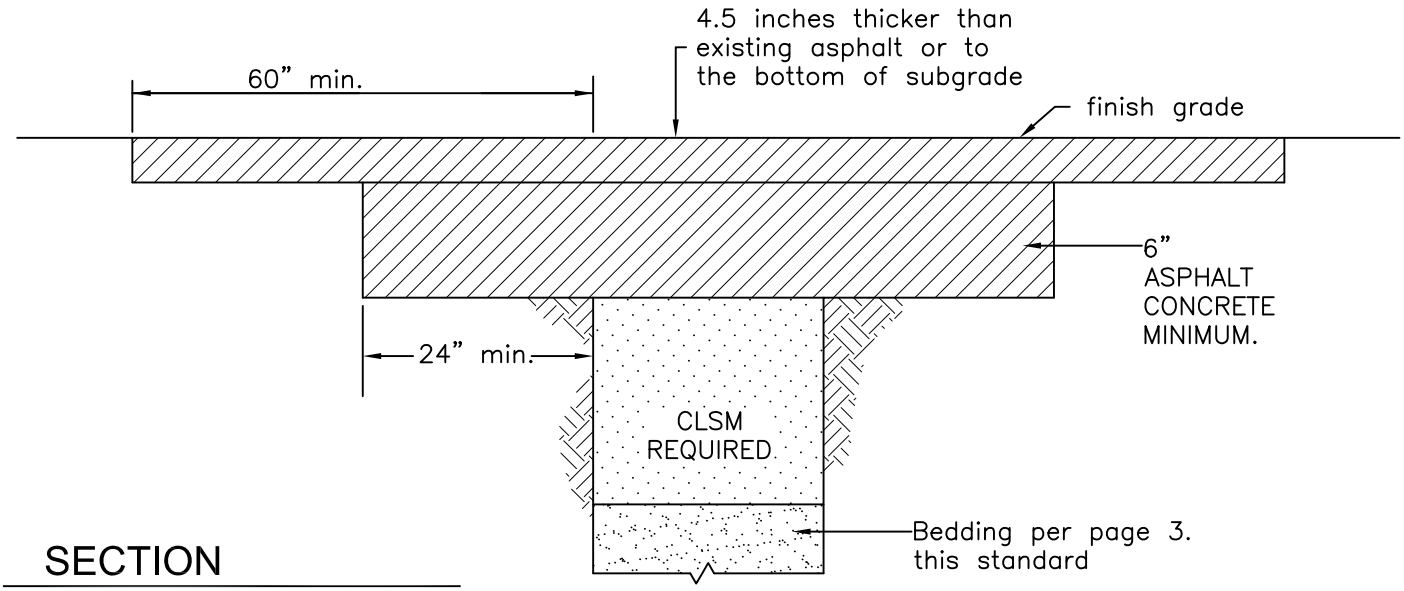
1. Stall widths vary – 9' minimum for residential and 10' for commercial
2. Parking bays to be privately owned and maintained.
3. For use on low volume (local or main) streets and/or within short block streets only (300' or less for commercial).
4. Maximum two stalls per lot for single family residential use.
5. Placement of parking bays restricted to areas with adequate sight distance.
6. Surface drainage flows must be maintained within gutter pan and right–of–way.
7. Handicap accessible projects and commercial applications of this standard must must meet all handicap requirements.
8. Minimum distance from end of curb return to first stall shall be 50'.
9. Street lighting shall meet the City's minimum street lighting requirements.
10. Street tree spacing shall be per City standards.

CITY OF ROHNERT PARK

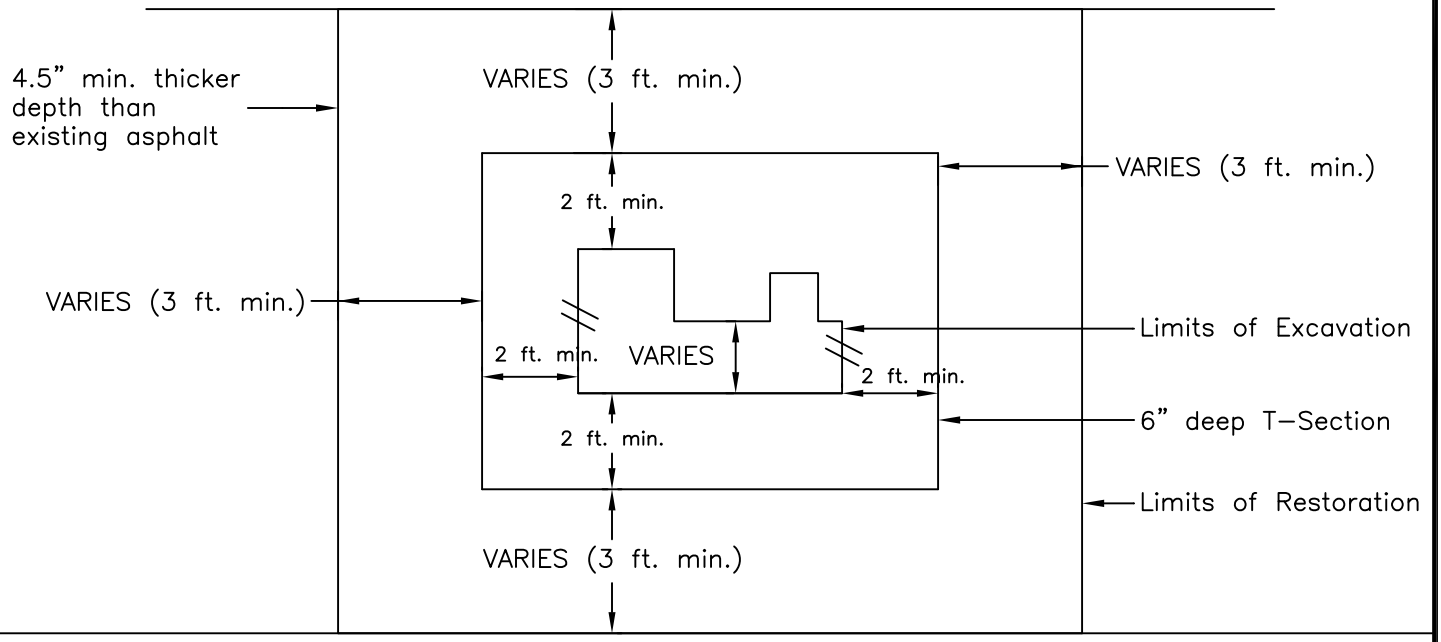
45° PARKING BAY

SCALE: NONE	DATE: MARCH 2011
Approved:	STD. - 214

TRENCH BACKFILL AND SURFACING EXISTING ROADS



SECTION

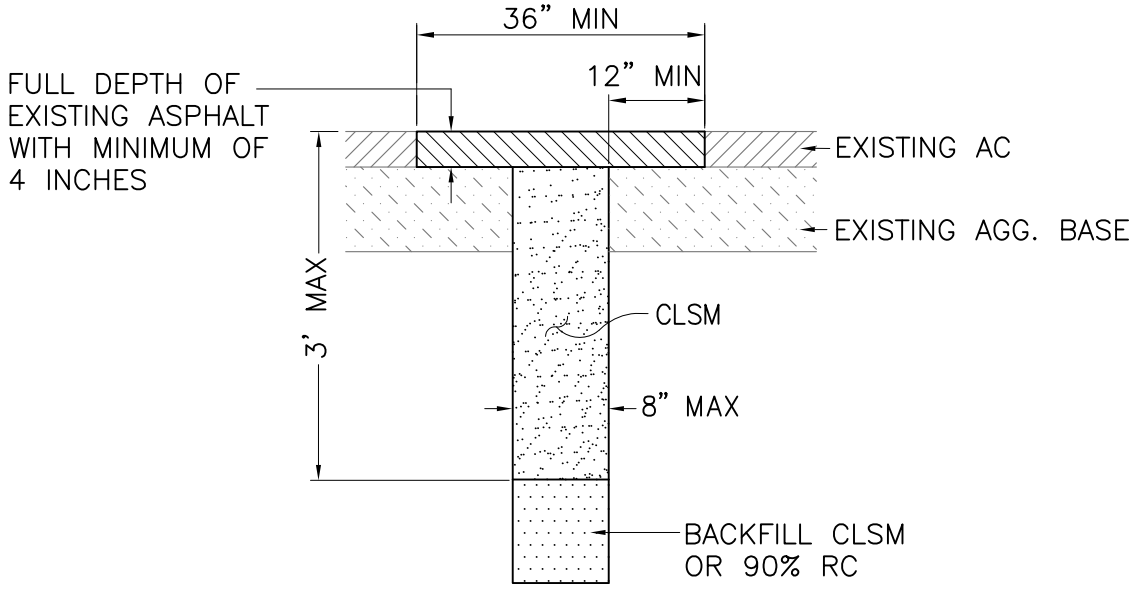


PLAN

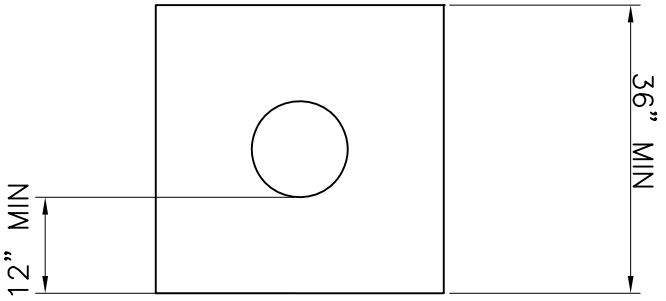
NOTES ON PAGES 5-7
THIS STANDARD

CITY OF ROHNERT PARK	
STANDARD TRENCH DETAIL TRENCH BACKFILL AND SURFACING	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 215

BORE HOLES



SECTION



PLAN

CITY OF ROHNERT PARK	
STANDARD TRENCH DETAIL	
SCALE: NONE	DATE: OCTOBER 2010
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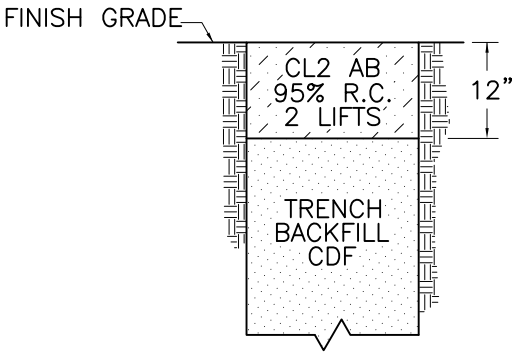
TRENCH WIDTH FOR HDPE PIPE

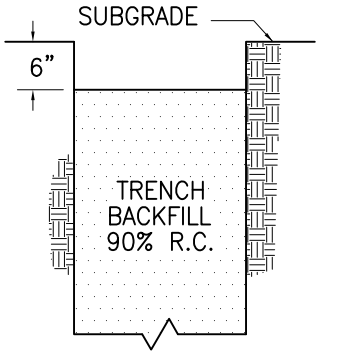
PIPE SIZE*	TRENCH WIDTH (MIN.)
15"	36"
18"	48"
24"	54"
30"	60"
36"	72"

PIPE MUST BE CENTERED IN THE TRENCH.
*INSIDE DIAMETER

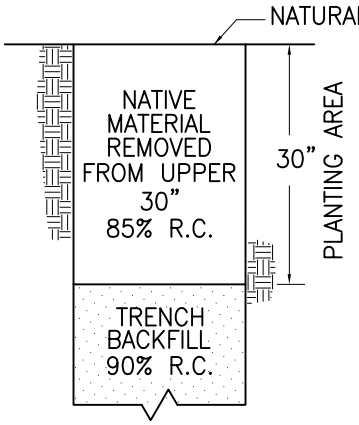
TRENCH BACKFILL
(TYPE TO BE SHOWN ON THE PLANS)



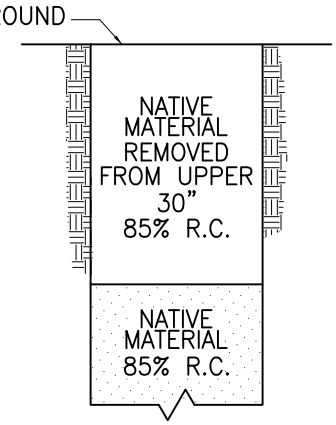
TYPE B
(SHOULDER AREAS)



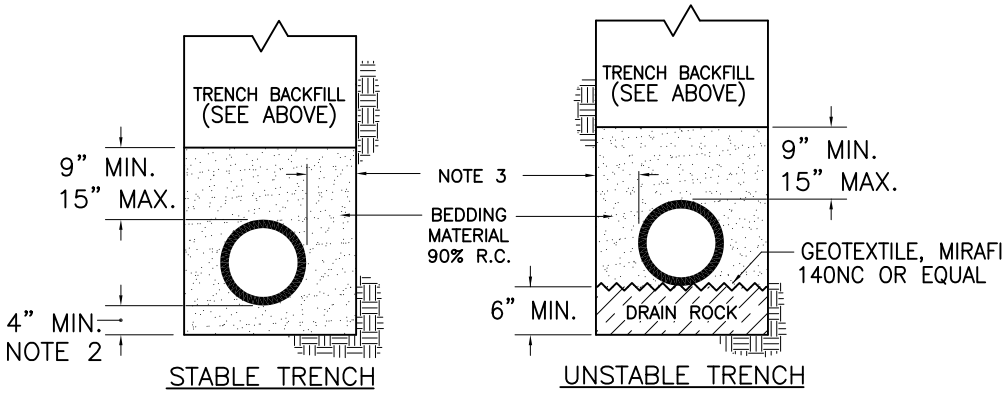
TYPE C
(STREETS UNDER CONSTRUCTION)



TYPE D
(PUBLIC UTILITY EASEMENT)
OUTSIDE STREET AREA



TYPE E
(PUBLIC UTILITY EASEMENT)
UNDEVELOPED AREAS



PIPE BEDDING

NOTES:

1. RELATIVE COMPACTION IS DESIGNATED RC.
2. 1/4 PIPE O.D. MINIMUM WHEN EXCAVATION IS IN ROCKY GROUND.
3. PIPE DIAMETER 18" OR LESS: 6" MIN., 9" MAX. PIPE DIAMETER GREATER THAN 18": 9" MIN., 12" MAX. SEE TABLE ABOVE FOR HDPE PIPE TRENCH WIDTHS.

CITY OF ROHNERT PARK

STANDARD TRENCH DETAIL

SCALE: NONE	DATE: OCTOBER 2010
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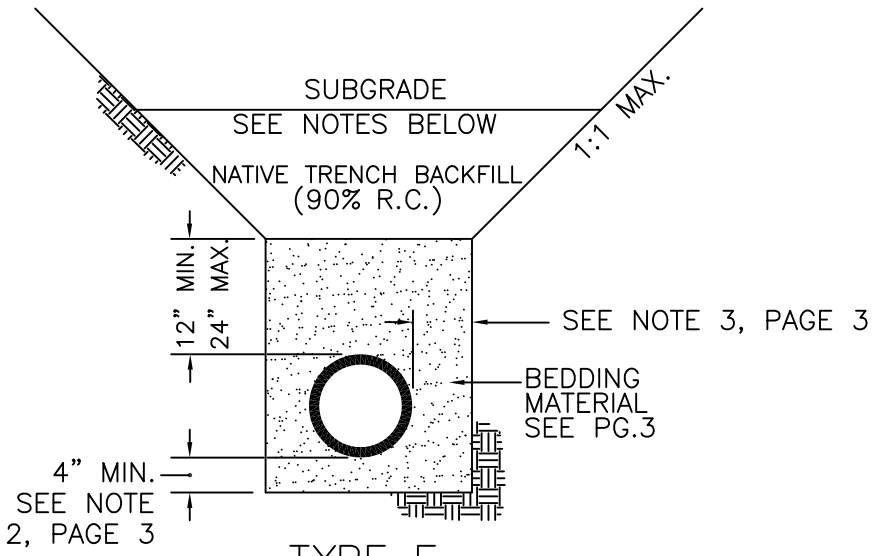
STREET STRUCTURAL SECTION
SHALL BE AS SHOWN ON PLANS



TYPE F
(NEW STREETS UNDER CONSTRUCTION)

NOTES:

1. ROCKS EXCEEDING 6" SHALL NOT BE PERMITTED WITHIN THE TRENCH SECTION.
2. THE MAXIMUM DEPTH OF NATIVE BACKFILL MATERIAL SHALL NOT EXCEED 10', UNLESS THE STREET IS EXCAVATED A UNIFORM DEPTH FROM FACE OF CURB TO FACE OF CURB.
3. EMBANKMENT CONSTRUCTION METHODS SHALL BE USED. ALL SLOPES MUST BE KEYED–IN A MINIMUM OF 1' AS THE TRENCH IS BACKFILLED.
4. THE MINIMUM EQUIPMENT REQUIRED FOR COMPACTION OF NATIVE BACKFILL MATERIAL SHALL CONSIST OF A SHEEPSFOOT VIBRATORY ROLLER WITH A MINIMUM DRUM WIDTH OF 48", A MINIMUM GROSS WEIGHT OF 4600 LBS, OR MUST MEET APPROVAL OF THE CITY ENGINEER.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE PRIVATE SOILS ENGINEER AND THE CITY INSPECTOR 48 HOURS PRIOR TO EXCAVATION.
6. THE PRIVATE SOILS ENGINEER SHALL PROVIDE TESTING AND OBSERVATIONS ON A FULL TIME BASIS DURING ALL NATIVE BACKFILLING OPERATIONS. THE PRIVATE SOILS ENGINEER IS RESPONSIBLE FOR THE VERIFICATION OF ALL NATIVE BACKFILL WORK INCLUDING COMPACTION AND UNIFORM MOISTURE CONDITIONING, AND THAT MOISTURE CONTENT IS ABOVE OPTIMUM MOISTURE TO THE EXTENT APPROPRIATE FOR THE NATIVE MATERIAL BEING USED.

CITY OF ROHNERT PARK	
STANDARD TRENCH DETAIL	
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1. In streets that are less than five (5) years old or have a Pavement Condition Index (PCI) greater than 85, the City Engineer reserves the right to deny any street excavation or require repairs that are over and above these specifications.
2. The Contractor shall at all times so conduct his/her work as to assure the least possible disruption to the motoring traffic and adjacent residents and businesses.
3. During peak traffic and during times when no work is preformed on the new installation, plates shall be in place and the street opened to full traffic flow. Plates shall be placed across the trench in a secure fashion not to move or vibrate under traffic conditions.
4. Avoid weakening or destroying the existing pavement around an excavation with heavy construction equipment, stockpiling, or delivery of materials, etc. No stockpiling of backfill or road building materials is permitted on the pavement.
5. The excavated material from the trench shall be removed from the site. Backfilling shall begin immediately after completion of the designated utility work.
6. Granular backfill shall be used around the pipe and as pipe bedding. Bedding material shall be compacted to at least 90% relative density with moisture control (not on standard Proctor). Lift thicknesses should be less than or equal to 6 inches.
7. PIPE BEDDING and TRENCH BACKFILL shall be free of asphaltic material
8. PIPE BEDDING for slopes less than or equal to 8% shall have a minimum sand equivalent value of 30 and shall conform to the following grading:

1"	3/4"	3/8"	#4	#200
100%	90–100%	65–100%	30–100%	0–15%

9. Pipe bedding for slopes greater than 8% shall have a minimum sand equivalent of 30 and shall conform to the following grading:

1"	3/4"	3/8"	#4	#30	#200
100%	90–100%	65–100%	30–100%	0–100%	0–15%

10. Trench backfill shall be compacted to at least 90% relative density with moisture control (not on standard Proctor). Lift thicknesses should be less than or equal to 12 inches. Compaction testing by an approved soils testing laboratory is required if granular trench backfill is used.
11. TRENCH BACKFILL shall conform to the following grading and have a minimum sand equivalent value of 25:

3"	#4	#30
100%	40–100%	10–100%

CITY OF ROHNERT PARK

STANDARD TRENCH DETAIL

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12. CLSM (Flowable–fill) shall be used in all trenches within existing streets or shoulder areas. The depth shall be a minimum of 3 feet below the roadway aggregate base or from the pipe backfill to the roadway aggregate base, whichever is less. *Trench backfill may be used on an exception basis with the permission of the City Engineer. Compaction testing shall be provided by the contractor.

13. CLSM shall be a mixture of Portland cement, sand, 1" maximum coarse aggregate, air entraining agent, and water, batched by a ready–mixed concrete plant and delivered to the jobsite by means of transit mixing trucks. CLSM may also contain class f pozzolan (fly ash). CLSM shall be used in all roadways and be free of asphaltic material.

14. CLSM (Flowable–fill) The maximum 28–day strength is 60 psi. The following combination of material, or an equivalent, may be used to obtain the desired "flowable–fill". Cement 42 lb/CY (0.47 sack); Water 235 lb/CY(39 gallons or as needed); Coarse Aggregate1700 lb/CY; Sand (ASTM C–33)1845 lb/CY.

15. The consistency of CLSM shall be such that all trench voids are filled with minimum rodding or vibrating but not so wet as to cause excessive shrinkage.

16. Permanent pavement may be placed directly upon the CLSM as soon as it has consolidated for the surface to withstand the process of paving without displacement. The surface of the CLSM shall be firm and unyielding. Any visible movement vertically or horizontally of the CLSM under the action of construction equipment or other maximum legal axle loads shall be considered as evidence that the control density fill does not meet this requirement. The contractor shall provide trench plates to allow traffic flow for all locations until control density fill is ready to be paved.

17. Asphalt repair shall extend 5 feet minimum from either side of the trench wall. Transverse patches on arterial and collector streets shall be overlaid across the entire street width for a distance of five (5) feet minimum on all sides of the trench.

18. The replacement asphalt shall be a minimum of 4.5 inches deeper than the existing asphalt or full depth replacement of asphalt in lieu of the aggregate base and asphalt, whichever is less. *A two inch overlay of the roadway surface may be substituted for this replacement asphalt at the discretion of The City Engineer. Conforms shall meet City Standards.

19. AGGREGATE BASE shall conform to the requirements of the City Standard Specifications, Class 2 aggregate base.

20. Asphalt concrete shall conform to the requirements of Section 39 of the State Standard Specifications.

21. A thickened T section of asphalt shall be placed an additional 6 inches deep to 2 feet either side of the trench wall.

22. Pavements shall be removed by saw cutting or grinding. Neatly cut or grind pavement after trench is backfilled to subgrade.

23. Any damage, even superficial, to the existing asphalt surface in the vicinity of the work shall be repaired at the expense of the Contractor, including but not limited to gouges, scrapes, outrigger marks, backhoe bucket marks, etc. A slurry seal type covering will be considered the minimum repair. Patching may be required, at the discretion of the City Engineer.

24. Existing pavements should be removed to clean, straight lines parallel and perpendicular to the flow of traffic. Do not construct patches with angled sides and irregular shapes. All repairs shall be full lane width. Joints shall be placed at lane lines.

CITY OF ROHNERT PARK

STANDARD TRENCH DETAIL

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25. Utility trench patches shall avoid excessive joints.

    a. When a proposed cut is within ten feet of an existing patch, extend the new patch to the existing patch.

    b. Patches shall be rectangular and maintain the same width throughout the length of the patch.

    c. If a patch is done within an existing patch make the boundaries of the patches coincide.

    d. Avoid frequent changes in width of patches.

    e. Do not leave strips of pavement less than one–half lane in width from the edge of the new patch to the edge of an existing patch or the lip of the gutter.

    f. The patched area must include any damage due to trenching operations within 10 feet of the patch.

26. A tack coat shall be applied to all edges of the existing asphalt before placing the new pavement. After placing the new asphalt, all seams (joints) between the new and existing pavements shall be sealed with rubberized crack seal material.

27. Patch slope and grade must match existing pavement. Patches should have a smooth longitudinal grade consistent with the existing roadway. Patches should also have a cross slope or cross section consistent with the cross slope of the existing roadway.

28. The finish pavement must be flush with the adjacent surfaces. The finished surface of the street repair shall be tested with a twelve– (12–) foot straightedge parallel to the centerline or perpendicular across joints. Variations measured from the testing face of the straightedge to the surface of the street repair shall not exceed 1/8 inch in 12 feet longitudinally and ¼ inch in 12 feet transversely.

29. The contractor is required to provide material testing for each phase of the work and at no cost to the City. The testing firm chosen to perform this work for the Contractor must be qualified and identified on the Permit application.

30. When the final surface is not immediately installed, it shall be necessary to place a temporary asphalt surface on any street cut opening. The temporary surface installation and maintenance shall be the responsibility of the Permittee until the permanent surface is completed and accepted. It shall be either a hot mix or cold mix asphalt paving material. Temporary surfaces shall be compacted, rolled smooth, and sealed to prevent degradation of the repair and existing structures during the temporary period. Permanent patching shall occur within two (2) weeks except as outlined in the Permit. Trenchplate may be used for 24 hours maximum.

31. Removal and replacement of unsatisfactory work shall be completed within fifteen (15) days of written notification of the deficiency unless deemed an emergency requiring immediate action. In the event the replacement work has not been completed, CITY ENGINEER will take action upon the contractor's bond to cover all related costs.

CITY OF ROHNERT PARK	
STANDARD TRENCH DETAIL	
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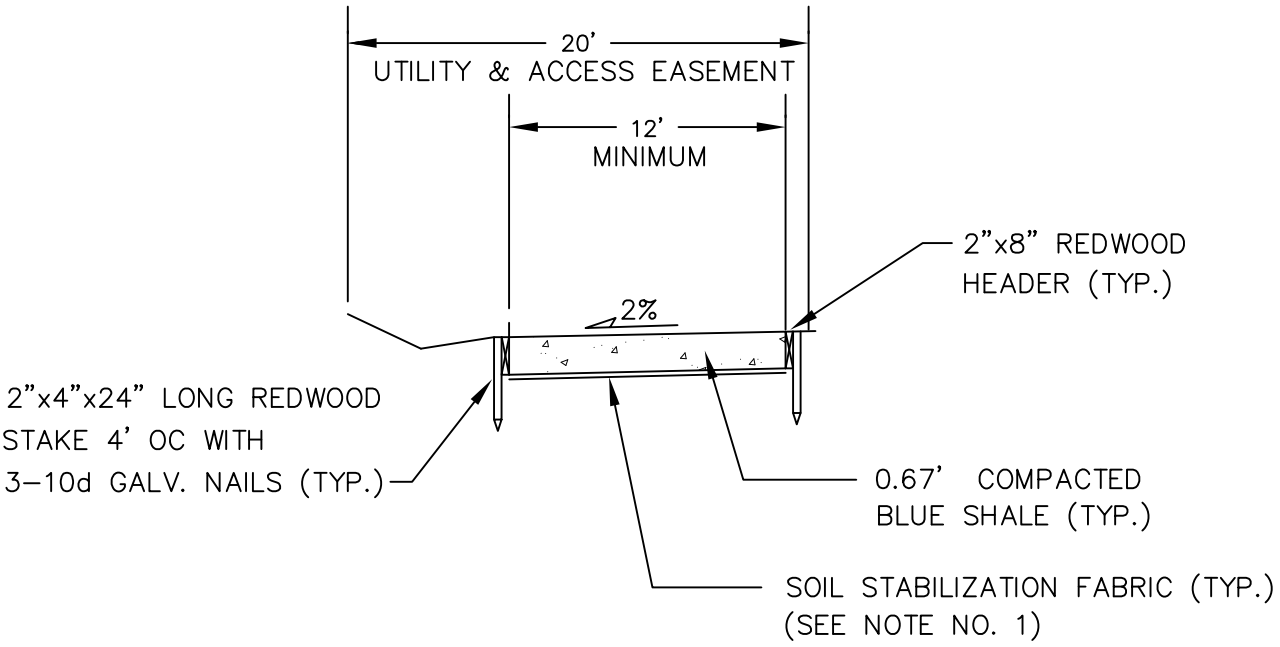
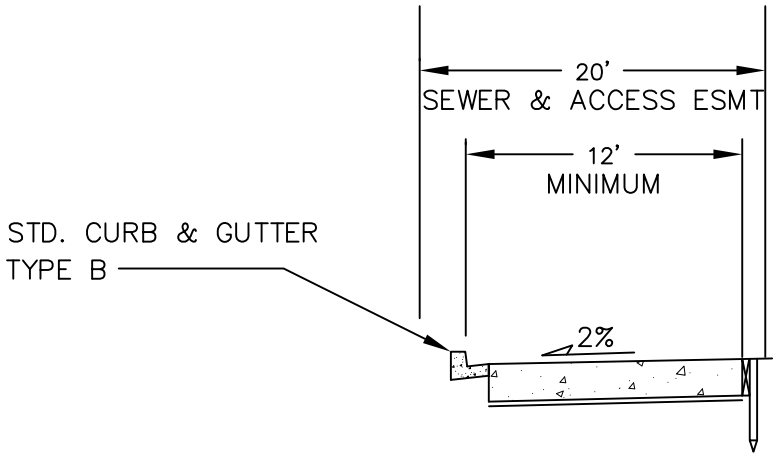
Approved:	STD. - 215



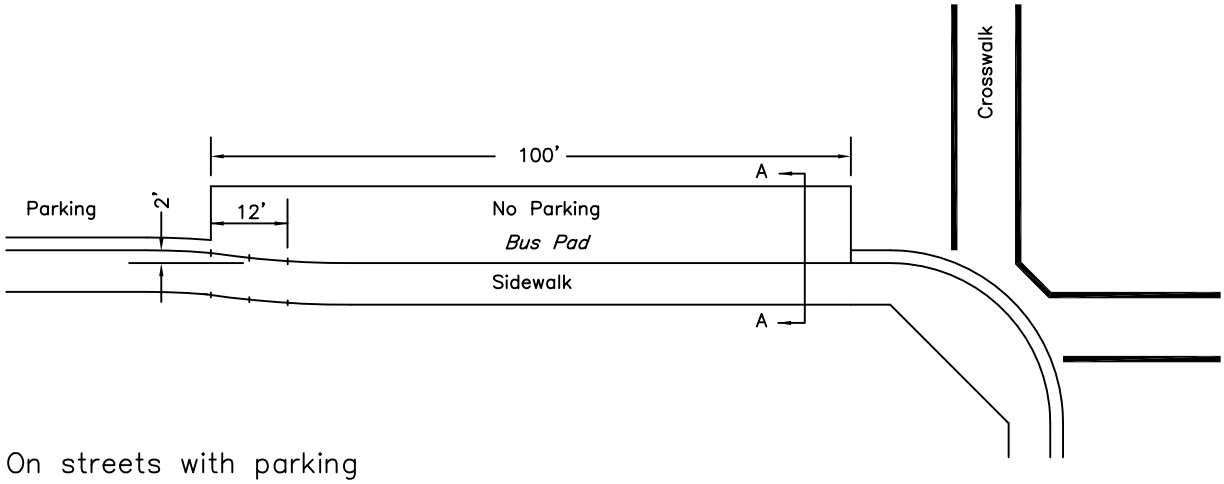


1. SOIL STABILIZATION FABRIC SHALL BE MIRAFI 500–X OR EQUAL.
2. ALL ACCESS ROADS HAVING A GRADE OVER 5% SHALL BE PAVED WITH 6 INCHES OF CLASS II AGGREGATE BASE AND 2 INCHES OF ASPHALT CONCRETE.
3. ALL ACCESS ROADS HAVING A CURVE WITH A RADIUS OF LESS THAN 100 FEET SHALL BE INCREASED IN WIDTH TO 20 FEET WITH A MINIMUM INSIDE RADIUS OF 20 FEET.
4. A HAMMERHEAD TURNAROUND MAYBE REQUIRED AT THE END OF THE UTILITY ACCESS ROAD AT THE DISCRETION OF THE UTILITIES DEPARTMENT.
5. THE SUBGRADE SHALL BE COMPACTED TO 95% RC.

CITY OF ROHNERT PARK

UTILITY ACCESS ROAD

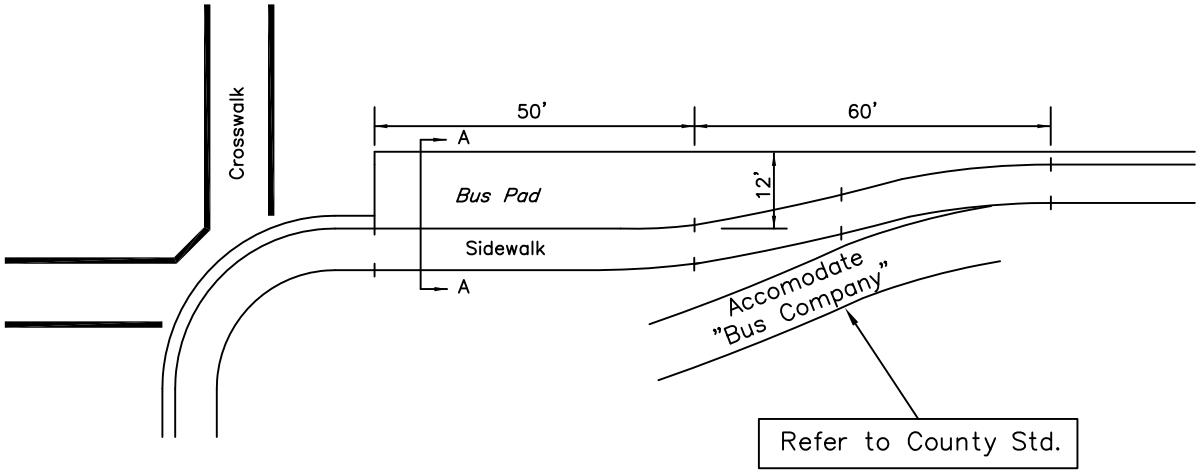
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 216



On streets with parking

This bus stop is "near side" of intersection. "Far side" bus stop is mirror image with the same dimensions. A "far side" bus stop is preferable.

See City Std.–222 for section A–A



On streets without parking

This bus stop is "far side" of intersection. "Near side" bus stop is mirror image with the same dimensions. A "far side" bus stop is preferable.

Notes:

1. Bus benches and shelter shall be located behind the sidewalk or in such a manner that a minimum 5'clear sidewalk is provided.

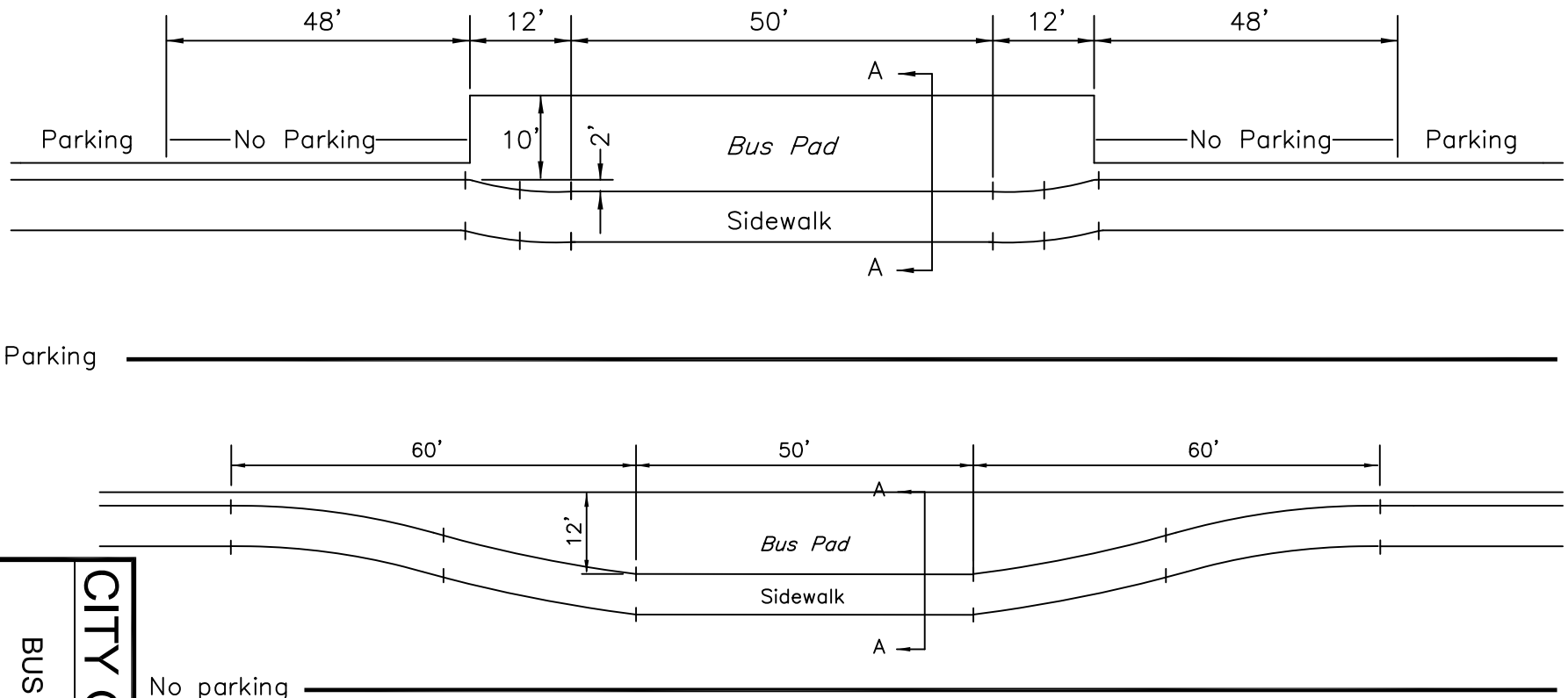
2. Paved section at bus stop to be as per Std. 222.

3. Design of bus stops shall be done in consultation with the transit agency and as approved by the City Engineer

CITY OF ROHNERT PARK

BUS STOP AT INTERSECTION

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 220



See City Std.–222 for section A–A

Notes:

1. Bus benches and shelter shall be located behind the sidewalk or in such a manner that a minimum 5'clear sidewalk is provided.
2. Paved section at bus stop to be as per Std.222.
3. Design of bus stops shall be done in consultation with the transit agency and as approved by the City Engineer

CITY OF ROHNERT PARK

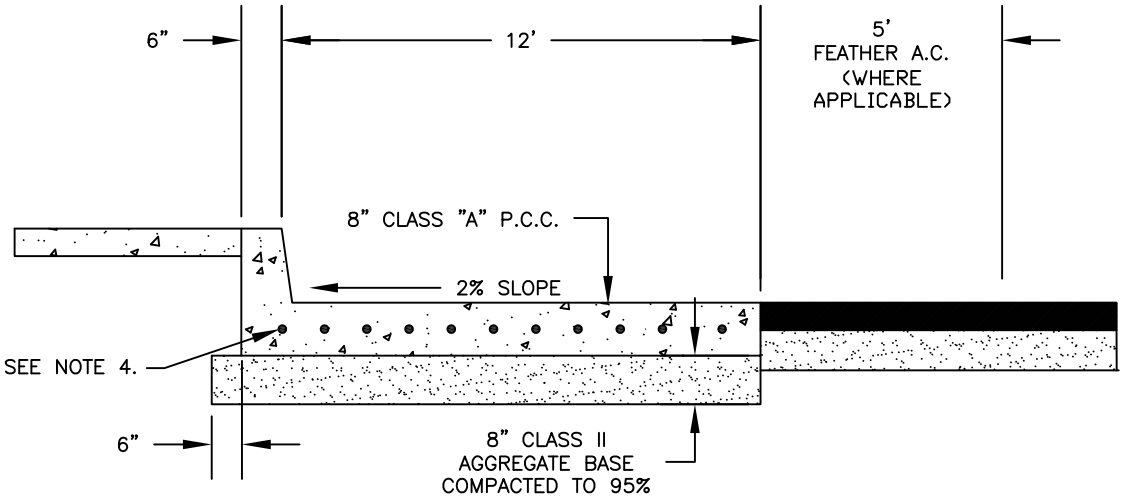
BUS STOP IN MIDDLE OF BLOCK

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 221



SECTION A–A

REFERENCE STD.–220 & STD.–221

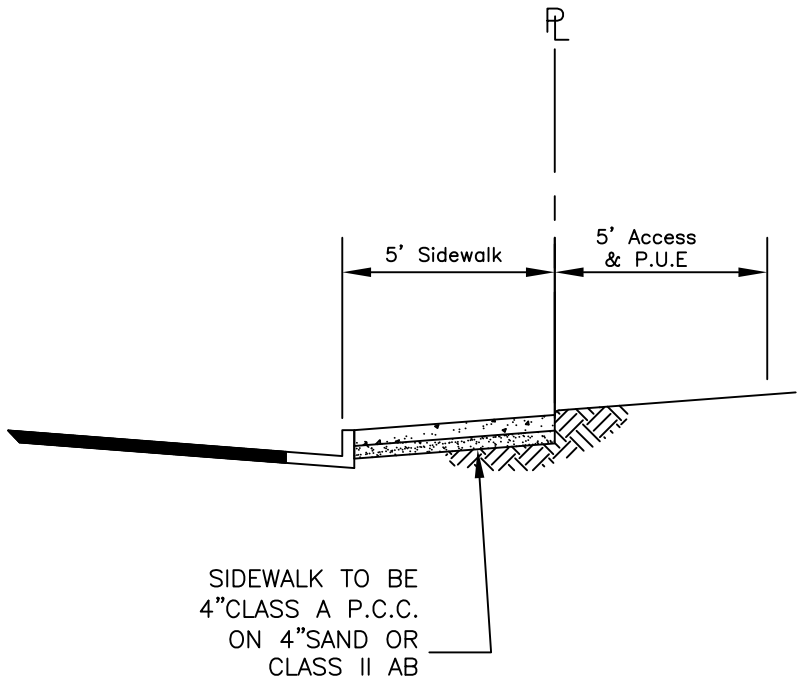
NOTES:

1. Expansion joints & score marks to match existing curb gutter & sidewalk.
2. Use Class A P.C.C.
3. Construct subdrains when required by City Engineer.
4. Reinforcing steel required in concrete: #4 @ 12" O.C. each way, or #5 @ 16" O.C. each way.

CITY OF ROHNERT PARK

CONCRETE BUS PAD DETAIL

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 222

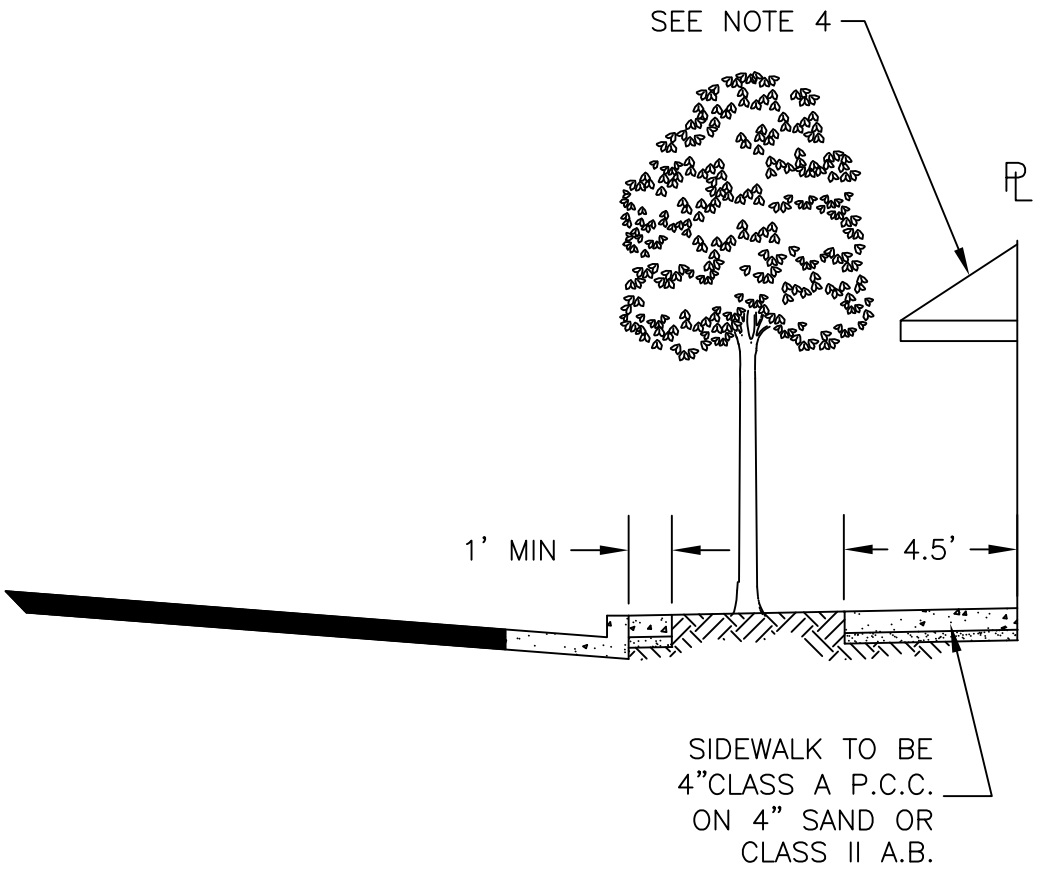


SIDEWALK DIMENSIONS FOR; LANES, MINOR STREETS, AVENUES, NEIGHBORHOOD STREETS, AND INDUSTRIAL STREETS

NOTES:

1. MEANDERING SIDEWALKS AND PLANTER STRIPS TO BE REVIEWED ON A CASE–BY–CASE BASIS PER CITY ENGINEER OR PLANNING COMMISSION.
2. SCORING PATTERN SHOULD MATCH ADJOINING SIDEWALKS.

CITY OF ROHNERT PARK	
SIDEWALK AND EASEMENT DIMENSIONS FOR LANES, MINOR STREETS, AVENUES, NEIGHBORHOOD STREETS, AND INDUSTRIAL STREETS	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 230A

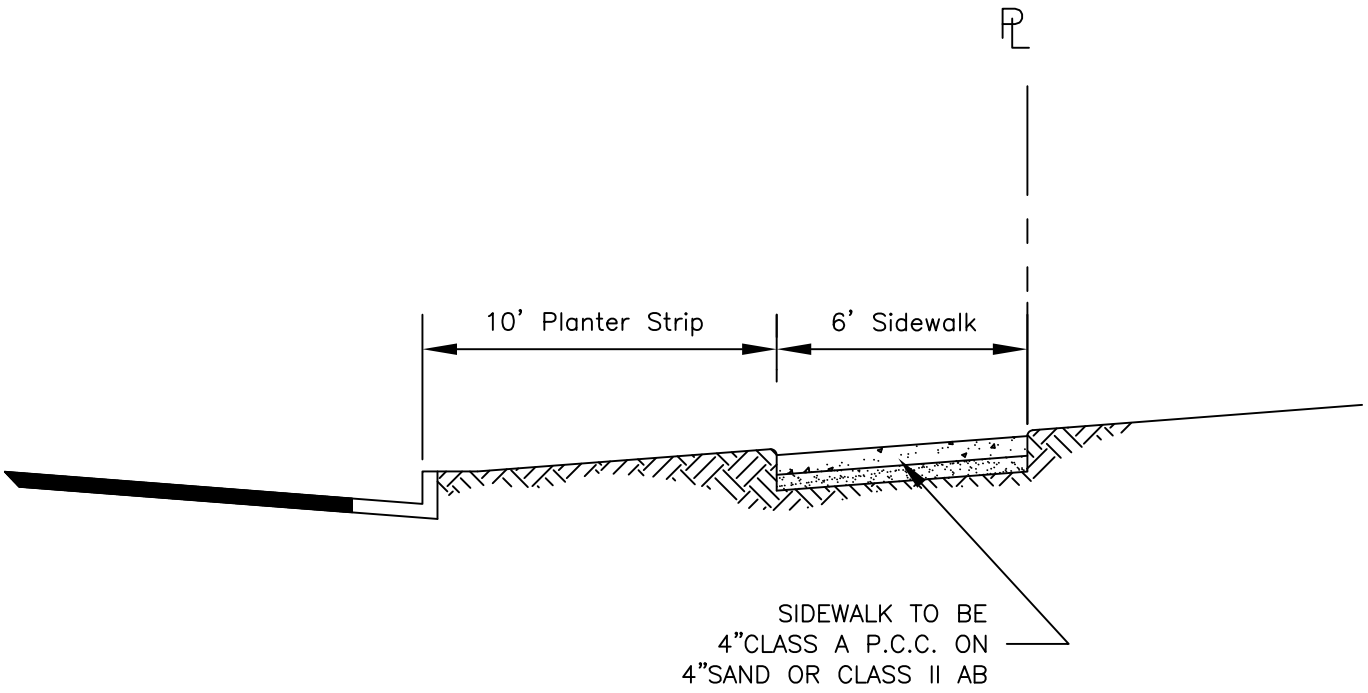


SIDEWALK AND PLANTER STRIP DIMENSIONS FOR FOR MAIN STREETS

NOTES:

1. MEANDERING SIDEWALKS AND CONTIGUOUS SIDEWALKS, TO BE REVIEWED ON A CASE-BY-CASE BASIS PER CITY ENGINEER OR PLANNING COMMISSION.
2. SCORING PATTERN SHOULD MATCH ADJOINING SIDEWALKS.
3. TREE WELLS ARE MINIMUM 4' x 4'.
4. ENCROACHMENT PERMIT REQUIRED FOR AWNINGS.

CITY OF ROHNERT PARK	
SIDEWALK AND PLANTER DIMENSIONS FOR MAIN STREETS	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 230D

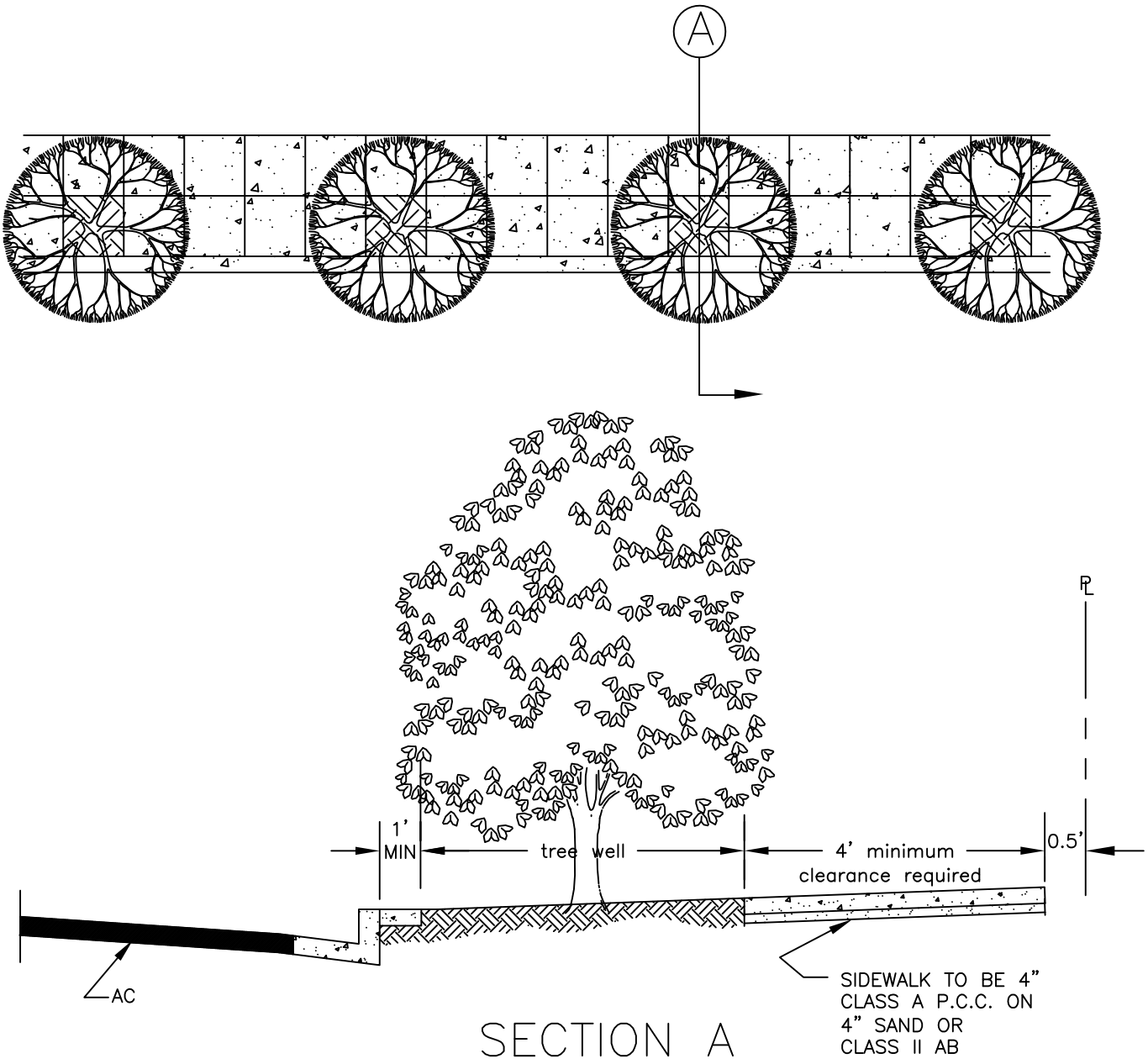


SIDEWALK AND PLANTER STRIP DIMENSIONS FOR PARKWAYS

NOTES:

1. MEANDERING SIDEWALKS AND CONTIGUOUS SIDEWALKS TO BE REVIEWED ON A CASE–BY–CASE BASIS PER CITY ENGINEER OR PLANNING COMMISSION.
2. SCORING PATTERN SHOULD MATCH ADJOINING SIDEWALKS.

CITY OF ROHNERT PARK	
SIDEWALK AND PLANTER DIMENSIONS FOR PARKWAYS	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 230E



SECTION A

1. Street tree planting shall be in accordance with City standard.
2. Tree wells are the minimum size called for in the Street Tree List Vol. 1
3. Weakened planes, score marks and expansion joints shall be per standard 235 or may be in a 4 ft. by 4 ft. pattern as shown.
4. Street tree selections shall comply with City Street Tree List Vol. 1.

CITY OF ROHNERT PARK

SIDEWALK WITH TREE WELLS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 230F

NOTES

1. As site conditions dictate, Case A through Case G curb ramps may be used for corner installations similar to those shown in STD.–232E and STD.–232F. The case of curb ramps used in STD.–232E do not have to be the same. Case A through Case G curb ramps also may be used at mid block locations, as site conditions dictate.

2. If distance from curb to back of sidewalk is too short to accommodate ramp and 4'–0" platform (landing) as shown in Case A, the sidewalk may be depressed longitudinally as in Case B, or C or may be widened as in Case D.

3. When ramp is located in center of curb return, crosswalk configuration must be similar to that shown for STD.–232F.

4. As site conditions dictate, the retaining curb side and the flared side of the Case G ramp shall be constructed in reversed position.

5. If located on a curve, the sides of the ramp need not be parallel, but the minimum width of the ramp shall be 4'–0". Indicate detail landings, and relation to crosswalk.

6. Side slope of ramp flares vary uniformly from a maximum of 10% at curb to conform with longitudinal sidewalk slope adjacent to top of the ramp, except in Case C and Case F.

7. The curb ramp shall be outlined, as shown, with a 12" wide border at the level surface of the sidewalk with 1/4" grooves approximately 3/4" on center. See STD.–232G, grooving detail.

8. Transitions from ramps to walks, gutters or streets shall be flush and free of abrupt changes.

9. Maximum slopes of adjoining gutters, the road surface immediately adjacent to the curb ramp and continuous passage to the curb ramp shall not exceed 5 percent within 4'–0" of the top or bottom of the curb ramp.

10. Curb ramps shall have a detectable warning surface that extends the full width and 3'–0" depth of the ramp. Detectable Warning Surfaces shall conform to the details on STD.–232G and the requirements in the Special Provisions. Detectable warning materials should contrast at least 70% with adjacent surfaces. The material used to provide contrast shall be an integral part of the walking surface and shall differ from adjoining walking surface in resiliency or sound–on–cane contact. ADAAG 4.29.2.

11. The edge of the detectable warning surface nearest the street shall be between 6" and 8" from the gutter flowline.

12. Sidewalk and ramp thickness, "T", shall be 4" minimum.

13. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction. If utilities are not relocated within the curb ramp, the required surface conditions shall be maintained, slip resistance and contrasting color.

14. For retrofit conditions, removal and replacement of curb apron will be at the Contractor's option, unless otherwise shown on project plans, but in all cases must meet current standards.

15. The surface of each curb ramp and its flared sides shall be stable, firm and slip resistant. Indicate finish surface, including concrete or other approved surface materials. The detectable warning material also needs to be slip resistant, measured at the top of the domes surfaces and the surface between domes. Slip resistance shall be measured in accordance with ASTM C1028 and shall achieve a static coefficient of friction of 0.8 or greater, wet or dry. ADAAG 4.5.

16. The surface of each curb ramp and flared sides shall be of contrasting finish from that of the adjacent sidewalk. CBC 1127 B.5.6. Provide 70% contrast per ADAAG 4.29.2.

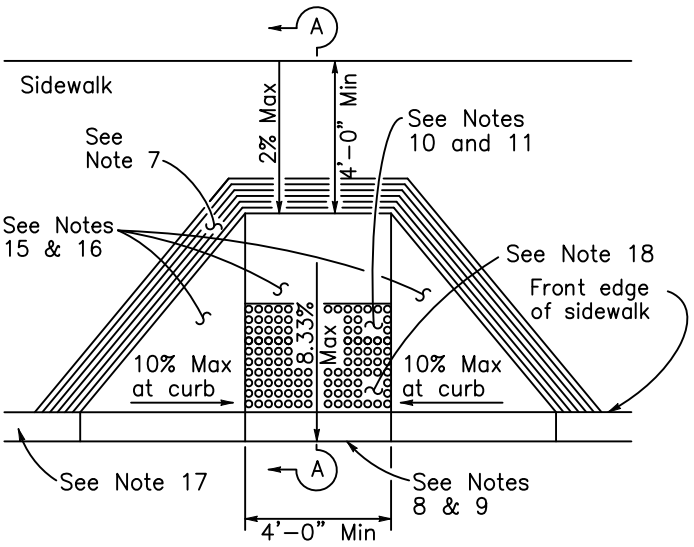
17. Curb ramp shall have a minimum of surface warping and cross–slope. CBC 1127 B.5.2.

18. If possible the centerline of the curb ramp shall be parallel with the crosswalk.

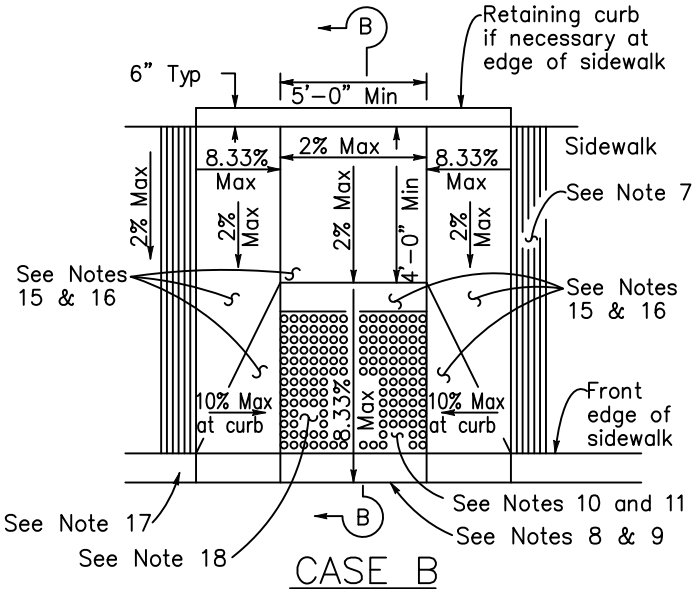
CITY OF ROHNERT PARK

CURB RAMP NOTES (APPLICABLE TO STD.-232A THROUGH STD.-232G)

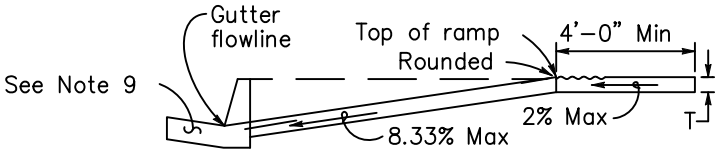
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232A



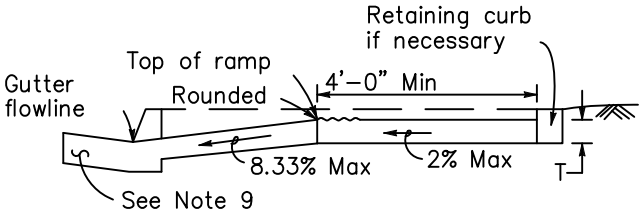
CASE A



CASE B

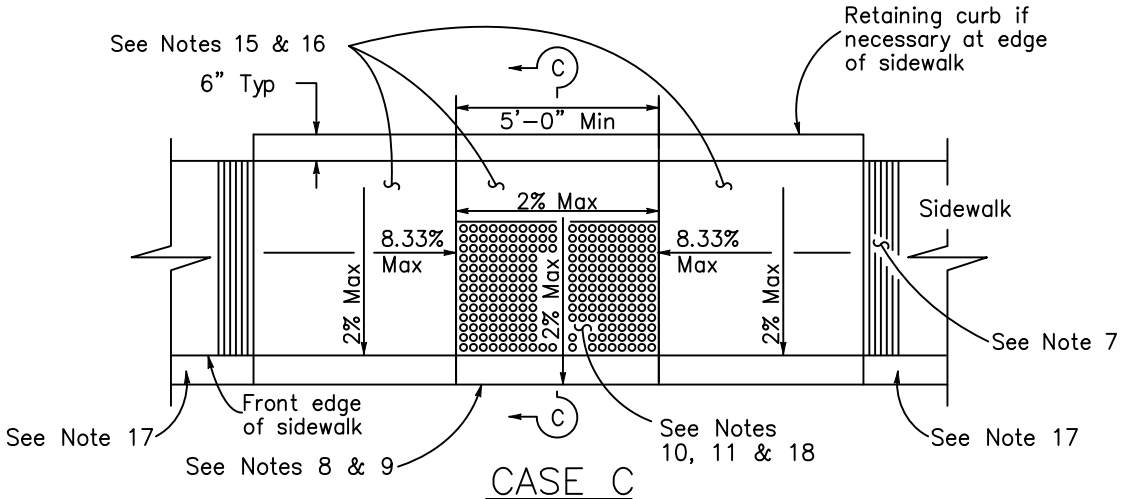


SECTION A–A

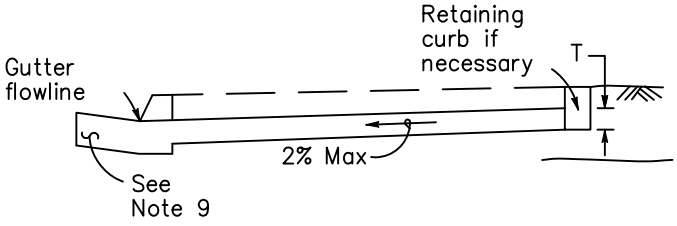


SECTION B–B

Depress entire sidewalk as required



CASE C



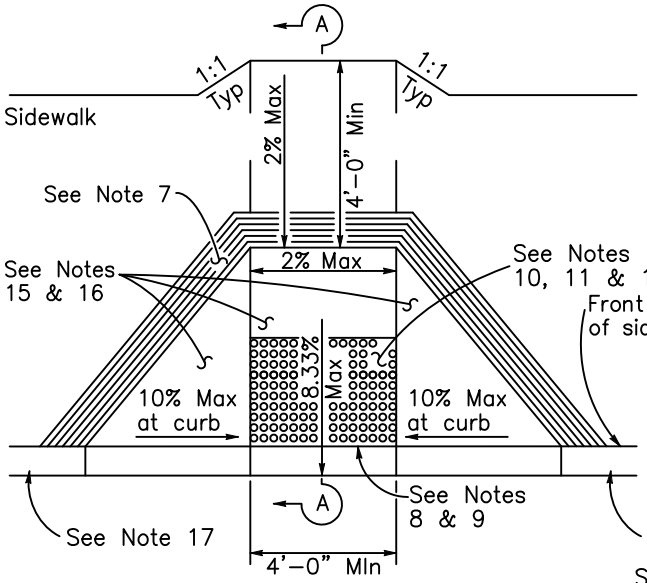
SECTION C–C

SEE STD.–232A FOR ALL NOTE REFERENCES.

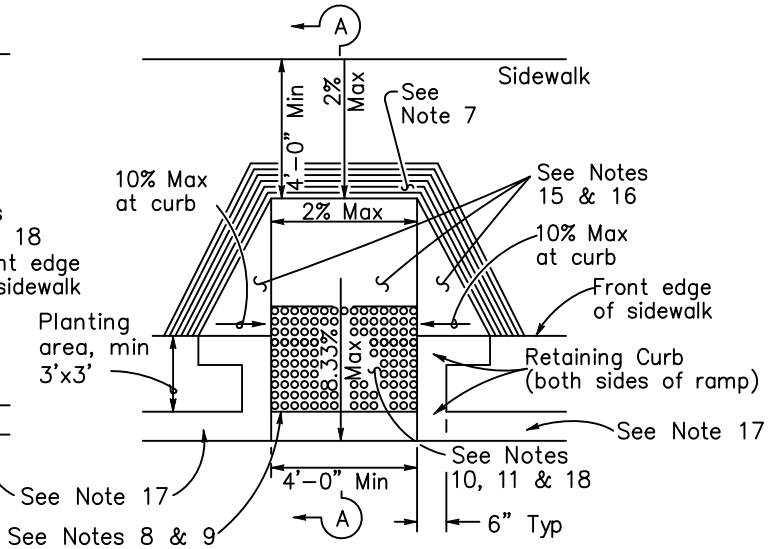
CITY OF ROHNERT PARK

CURB RAMPS CASE A, B & C

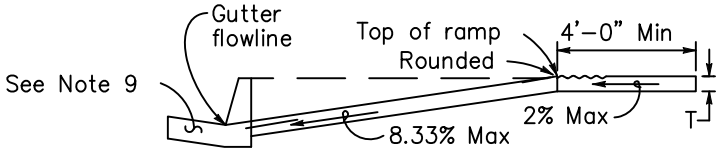
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232B



CASE D



CASE E



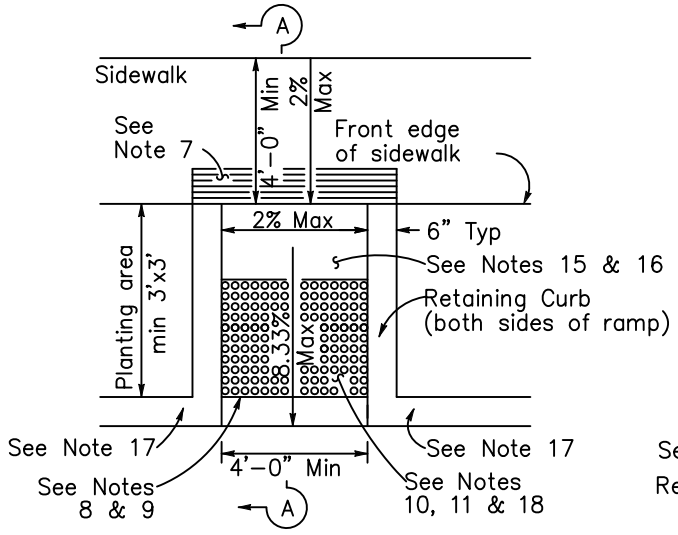
SECTION A–A

SEE STD.–232A FOR ALL NOTE REFERENCES.

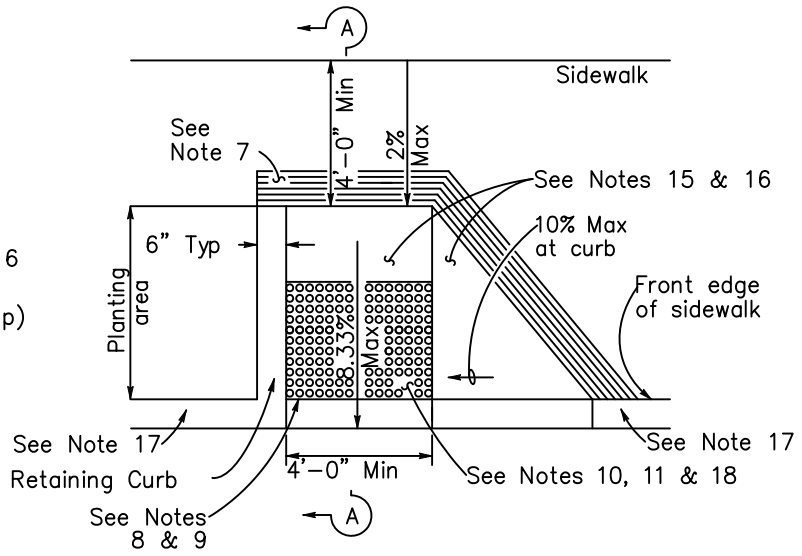
CITY OF ROHNERT PARK

CURB RAMPS CASE D AND E

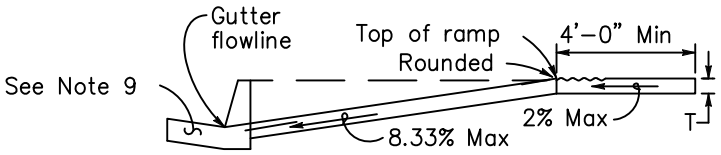
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232C



CASE F



CASE G
See Note 4



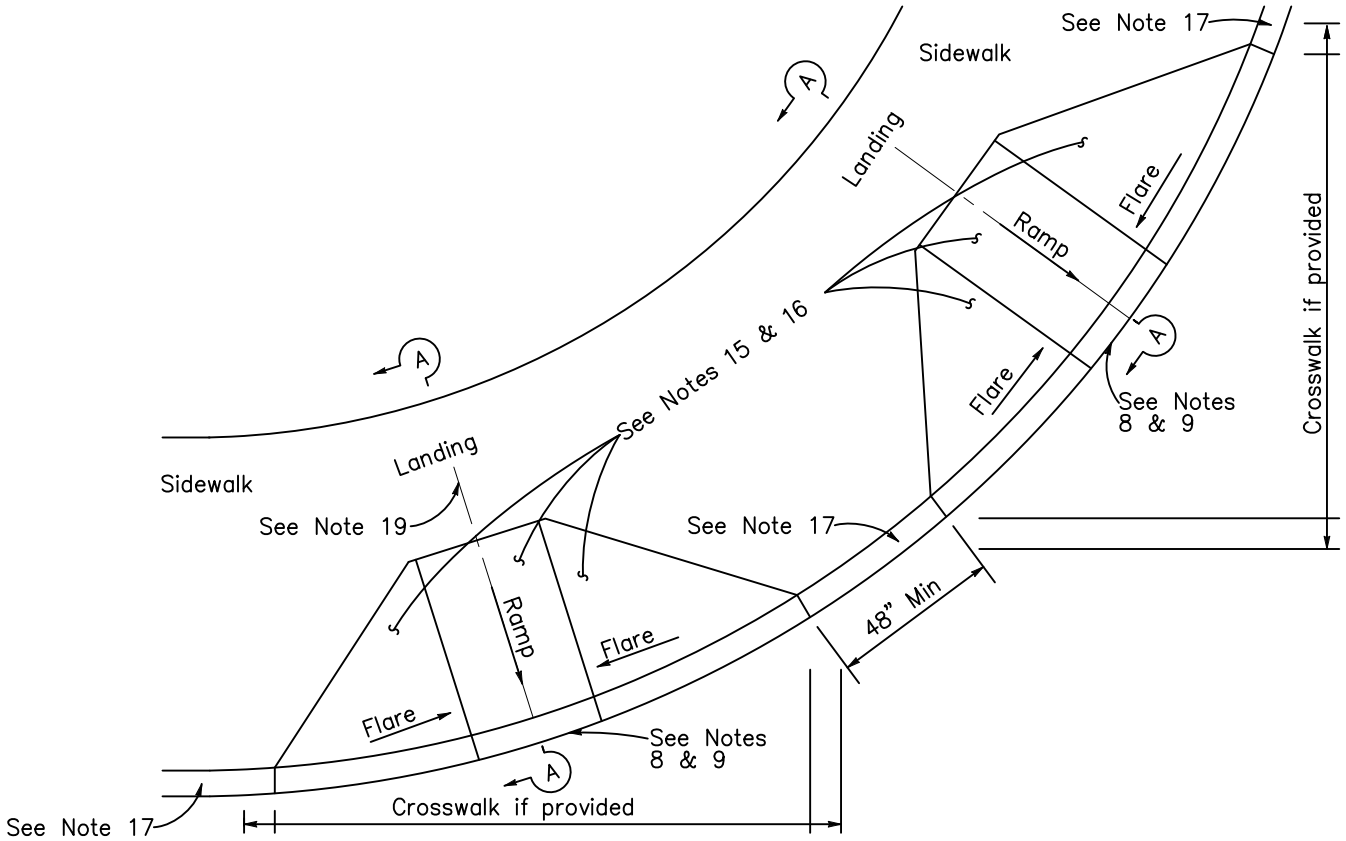
SECTION A–A

SEE STD.–232A FOR ALL NOTE REFERENCES.

CITY OF ROHNERT PARK

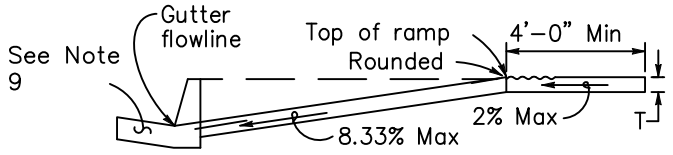
CURB RAMPS CASE F AND G

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232D



TYPICAL TWO–RAMP CORNER INSTALLATION

See Note 1



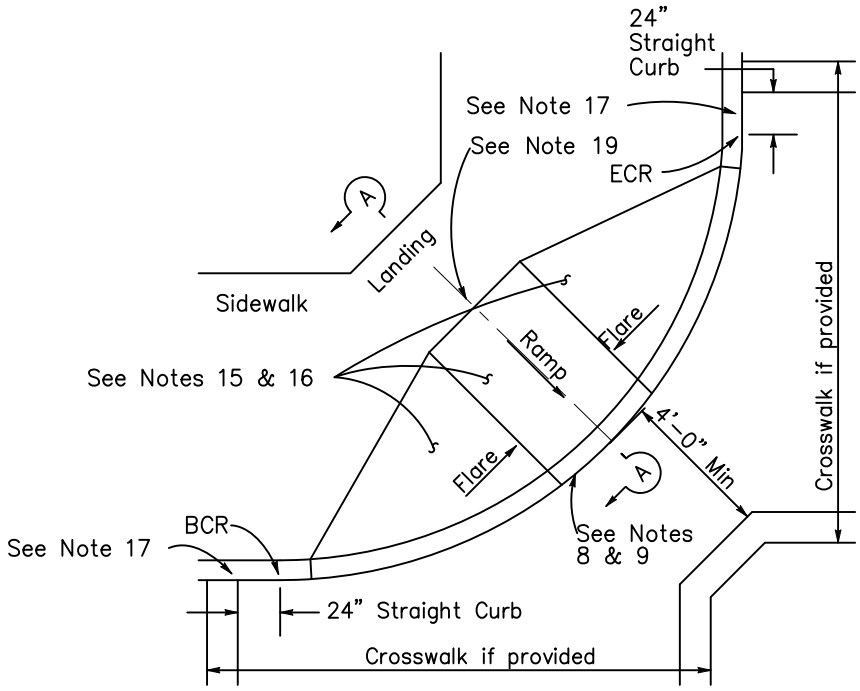
SECTION A–A

SEE STD.–232A FOR ALL NOTE REFERENCES.

CITY OF ROHNERT PARK

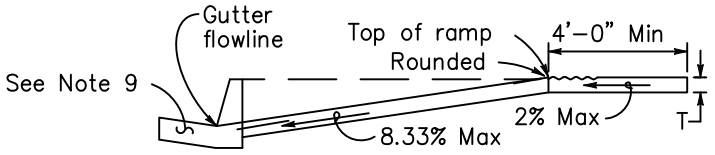
CURB RAMPS TYPICAL TWO-RAMP CORNER INSTALLATION

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232E



TYPICAL ONE-RAMP CORNER INSTALLATION

See Notes 1 and 3



SECTION A-A

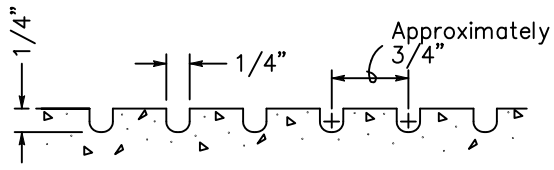
USE OF THIS CURB RAMP REQUIRES
APPROVAL OF CITY ENGINEER

SEE STD.-232A FOR ALL NOTE REFERENCES.

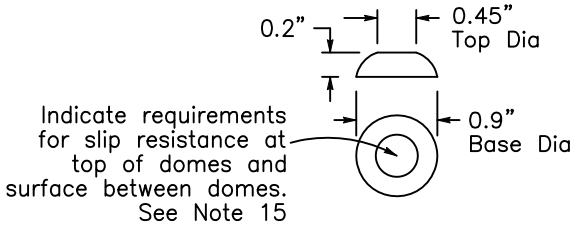
CITY OF ROHNERT PARK

CURB RAMPS TYPICAL ONE-RAMP CORNER INSTALLATION

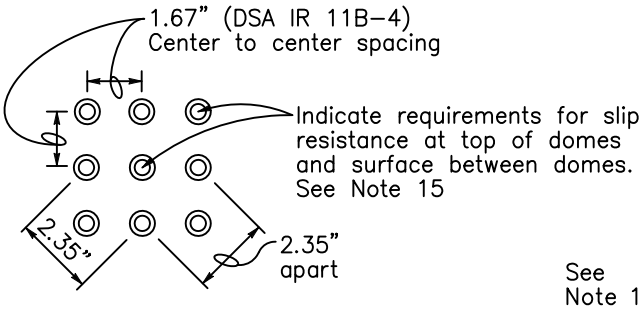
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232F



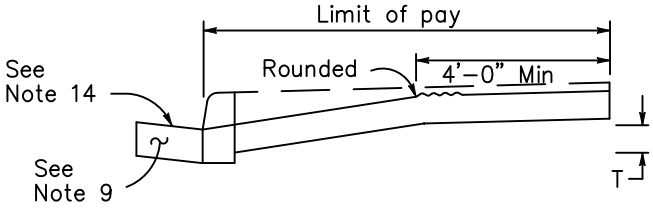
GROOVING DETAIL



RAISED TRUNCATED DOME



RAISED TRUNCATED DOME
PATTERN (IN-LINE)
DETECTABLE
WARNING SURFACE
See Note 10



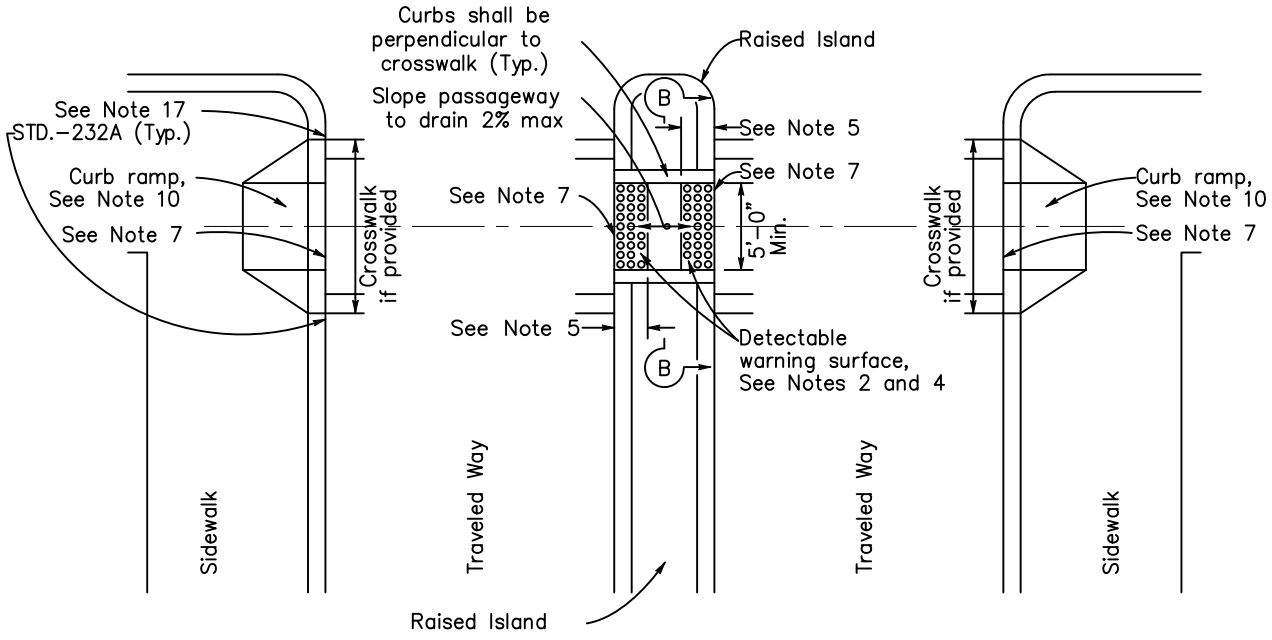
RETROFIT DETAIL
Existing curb and sidewalk

SEE STD.-232A FOR ALL NOTE REFERENCES.

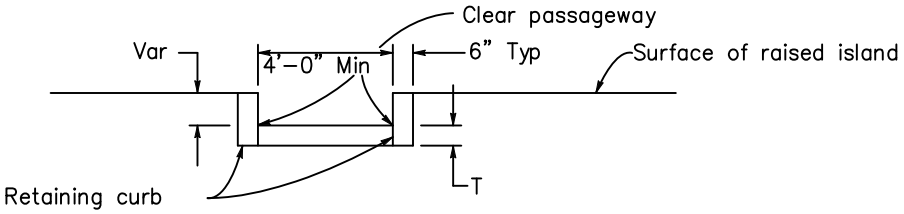
CITY OF ROHNERT PARK

CURB RAMPS MISCELLANEOUS DETAILS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232G



TYPE A PASSAGEWAY



SECTION B–B

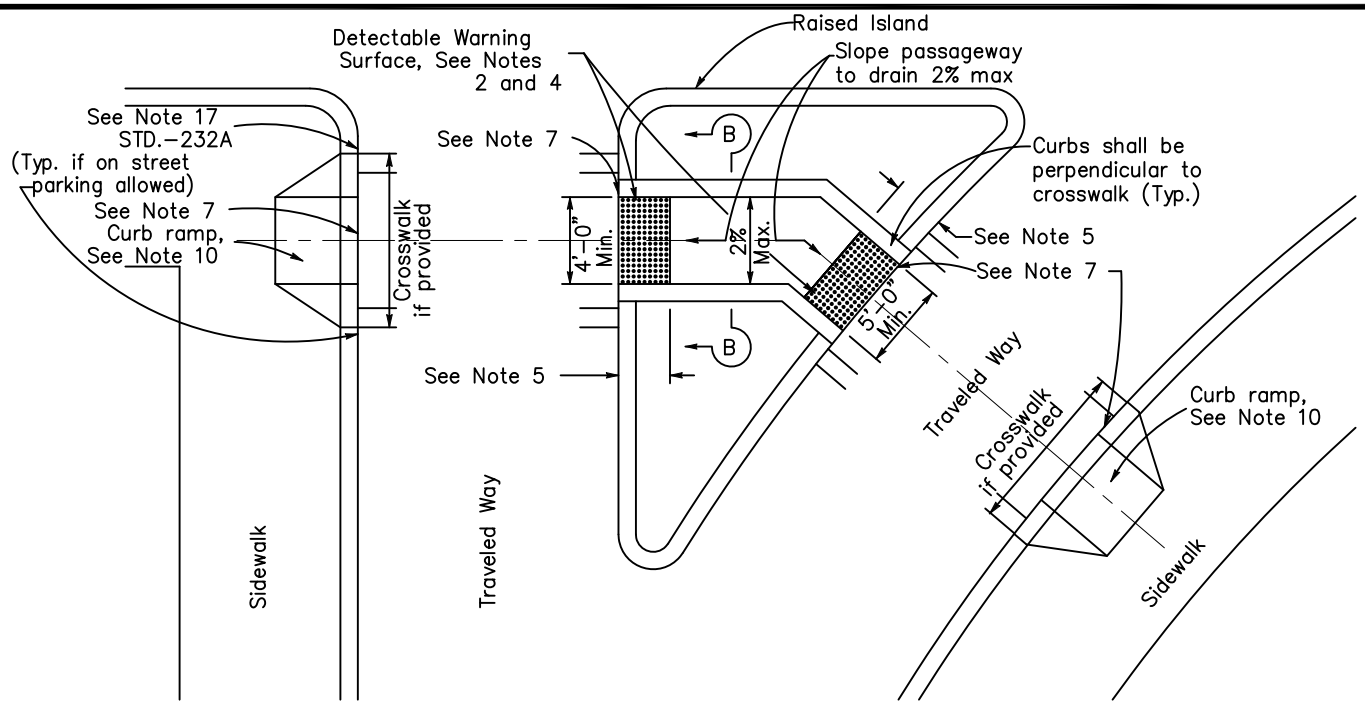
NOTES

1. Sidewalk, ramp and passageway thickness, ''T'', shall be 4" minimum.
2. Minimum width of passageway through raised islands shall be 4'–0", except as approved by city engineer for locations where right of way restrictions, natural barriers, or other existing conditions create an unreasonable hardship, the clear width of the passageway may be reduced to 3'–0".
3. For details of grooving used with Case CM curb ramp, see STD 232G, grooving detail.
4. For details of detectable warning surfaces, see STD 232G.
5. Where an island passage way length is less than 6'–0", the detectable warning surface shall extend the full width and full depth of the passage way length. Where an island passage way length is greater than or equal to 6'–0", but less than 8'–0", a detectable warning surface shall extend the full width and 2'–0" depth of the passage way length. Where an island passage way length is greater than or equal to 8'–0", a detectable warning surface shall extend the full width and 3'–0" depth of the passage way length.
6. For Case CM curb ramp (STD 232K), the edge of the detectable warning surface nearest the street shall be between 6" and 8" from the gutter flowline.
7. Transitions from ramps to walks, gutters or streets shall be flush and free of abrupt changes.
8. Maximum slopes of adjoining gutters, the road surface immediately adjacent to the curb ramp and continuous passage to the curb ramp shall not exceed 5 percent within 4'–0" of the top or bottom of the curb ramp.
9. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
10. For additional curb ramp notes and details, see STD.–232A through STD.–232G.

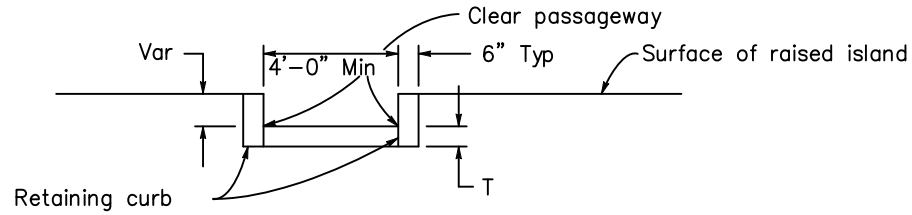
CITY OF ROHNERT PARK

CURB RAMP AND ISLAND PASSAGEWAY
TYPE A PASSAGEWAY

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232H



TYPE B PASSAGEWAY



SECTION B–B

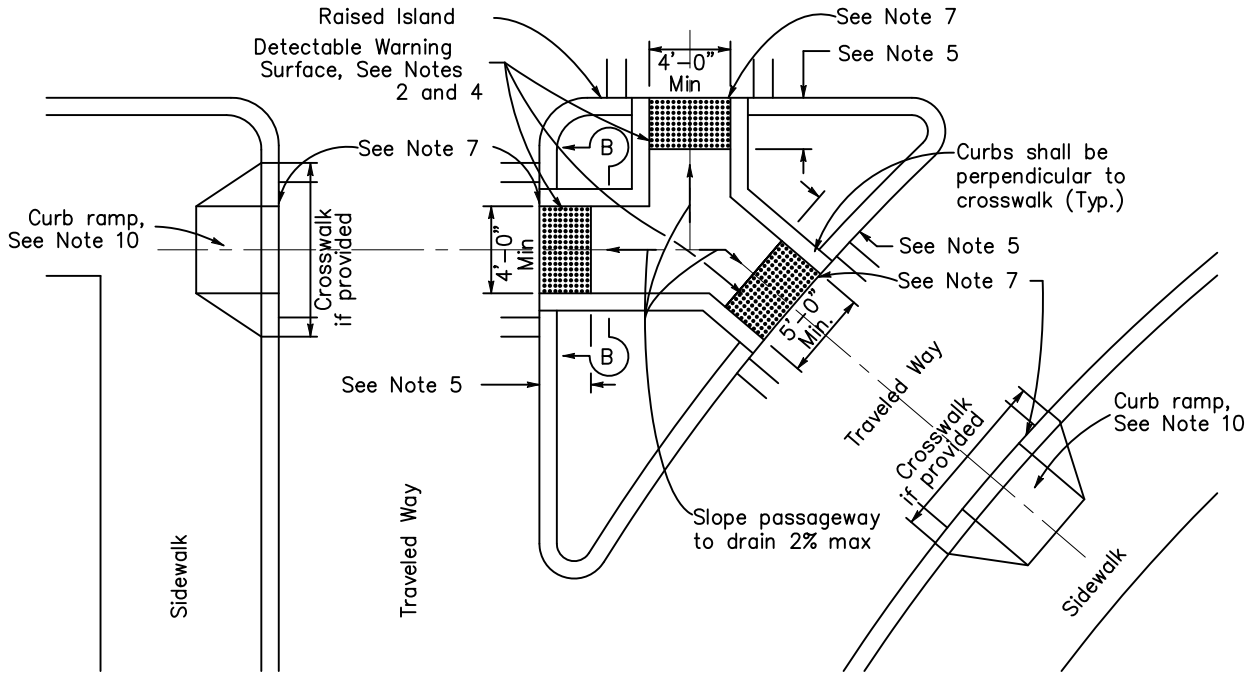
NOTES

1. Sidewalk, ramp and passageway thickness, ''T'', shall be 4" minimum.
2. Minimum width of passageway through raised islands shall be 4'–0", except as approved by city engineer for locations where right of way restrictions, natural barriers, or other existing conditions create an unreasonable hardship, the clear width of the passageway may be reduced to 3'–0".
3. For details of grooving used with Case CM curb ramp, see STD 232G, grooving detail.
4. For details of detectable warning surfaces, see STD 232G.
5. Where an island passage way length is less than 6'–0", the detectable warning surface shall extend the full width and full depth of the passage way length. Where an island passage way length is greater than or equal to 6'–0", but less than 8'–0", a detectable warning surface shall extend the full width and 2'–0" depth of the passage way length. Where an island passage way length is greater than or equal to 8'–0", a detectable warning surface shall extend the full width and 3'–0" depth of the passage way length.
6. For Case CM curb ramp (STD 232K), the edge of the detectable warning surface nearest the street shall be between 6" and 8" from the gutter flowline.
7. Transitions from ramps to walks, gutters or streets shall be flush and free of abrupt changes.
8. Maximum slopes of adjoining gutters, the road surface immediately adjacent to the curb ramp and continuous passage to the curb ramp shall not exceed 5 percent within 4'–0" of the top or bottom of the curb ramp.
9. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
10. For additional curb ramp notes and details, see STD.–232A through STD.–232G.

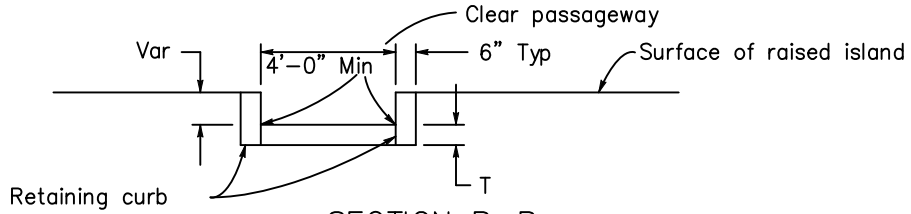
CITY OF ROHNERT PARK

CURB RAMP AND ISLAND PASSAGEWAY
TYPE B PASSAGEWAY

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232I



TYPE C PASSAGEWAY



SECTION B-B

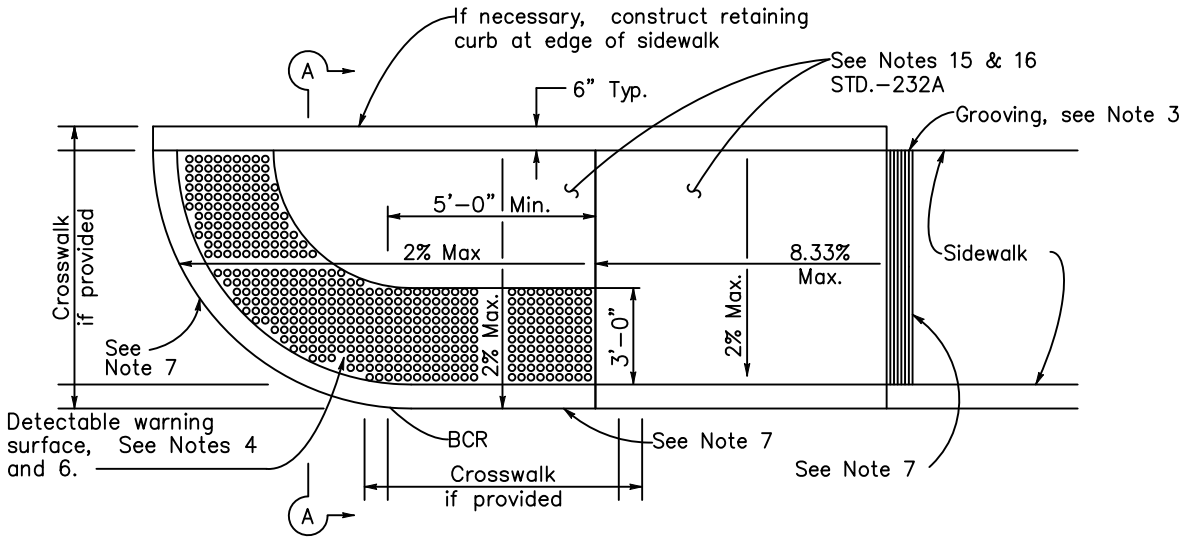
NOTES

1. Sidewalk, ramp and passageway thickness, "T", shall be 4" minimum.
2. Minimum width of passageway through raised islands shall be 4'-0", except as approved by city engineer for locations where right of way restrictions, natural barriers, or other existing conditions create an unreasonable hardship, the clear width of the passageway may be reduced to 3'-0".
3. For details of grooving used with Case CM curb ramp, see STD 232G, grooving detail.
4. For details of detectable warning surfaces, see STD 232G.
5. Where an island passage way length is less than 6'-0", the detectable warning surface shall extend the full width and full depth of the passage way length. Where an island passage way length is greater than or equal to 6'-0", but less than 8'-0", a detectable warning surface shall extend the full width and 2'-0" depth of the passage way length. Where an island passage way length is greater than or equal to 8'-0", a detectable warning surface shall extend the full width and 3'-0" depth of the passage way length.
6. For Case CM curb ramp (STD 232K), the edge of the detectable warning surface nearest the street shall be between 6" and 8" from the gutter flowline.
7. Transitions from ramps to walks, gutters or streets shall be flush and free of abrupt changes.
8. Maximum slopes of adjoining gutters, the road surface immediately adjacent to the curb ramp and continuous passage to the curb ramp shall not exceed 5 percent within 4'-0" of the top or bottom of the curb ramp.
9. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
10. For additional curb ramp notes and details, see STD.-232A through STD.-232G.

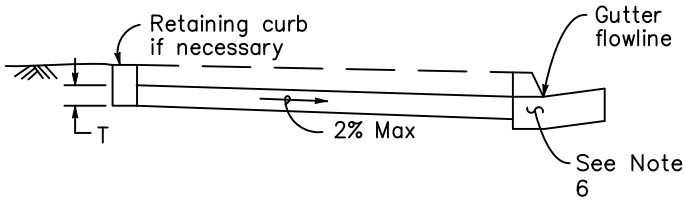
CITY OF ROHNERT PARK

CURB RAMP AND ISLAND PASSAGEWAY TYPE C PASSAGEWAY

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232J



CASE CM CURB RAMP



SECTION A–A

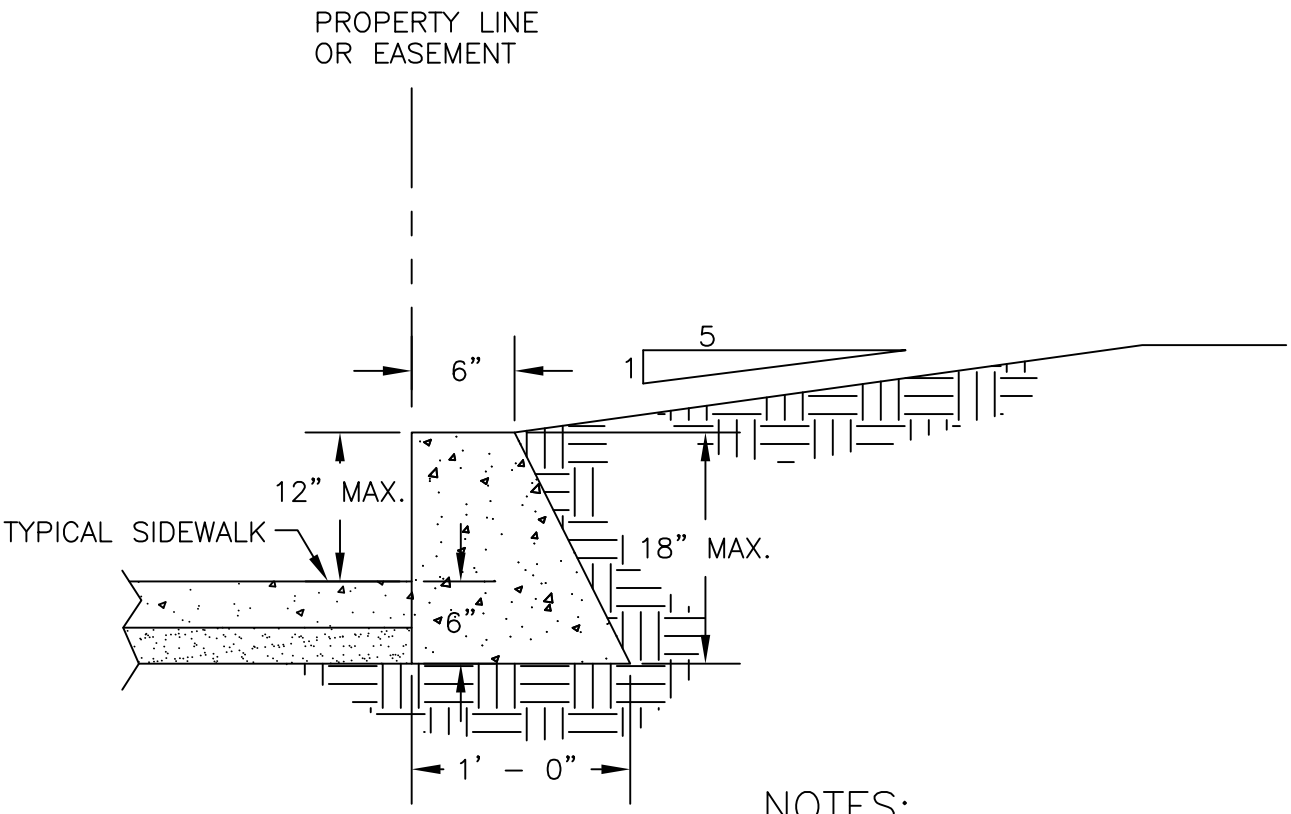
NOTES

1. Sidewalk, ramp and passageway thickness, ''T'', shall be 4" minimum.
2. Minimum width of passageway through raised islands shall be 4'–0", except as approved by city engineer for locations where right of way restrictions, natural barriers, or other existing conditions create an unreasonable hardship, the clear width of the passageway may be reduced to 3'–0".
3. For details of grooving used with Case CM curb ramp, see STD 232G, grooving detail.
4. For details of detectable warning surfaces, see STD 232G.
5. Where an island passage way length is less than 6'–0", the detectable warning surface shall extend the full width and full depth of the passage way length. Where an island passage way length is greater than or equal to 6'–0", but less than 8'–0", a detectable warning surface shall extend the full width and 2'–0" depth of the passage way length. Where an island passage way length is greater than or equal to 8'–0", a detectable warning surface shall extend the full width and 3'–0" depth of the passage way length.
6. For Case CM curb ramp (STD 232K), the edge of the detectable warning surface nearest the street shall be between 6" and 8" from the gutter flowline.
7. Transitions from ramps to walks, gutters or streets shall be flush and free of abrupt changes.
8. Maximum slopes of adjoining gutters, the road surface immediately adjacent to the curb ramp and continuous passage to the curb ramp shall not exceed 5 percent within 4'–0" of the top or bottom of the curb ramp.
9. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
10. For additional curb ramp notes and details, see STD.–232A through STD.–232G.

CITY OF ROHNERT PARK

CURB RAMP AND ISLAND PASSAGEWAY
CASE CM CURB RAMP

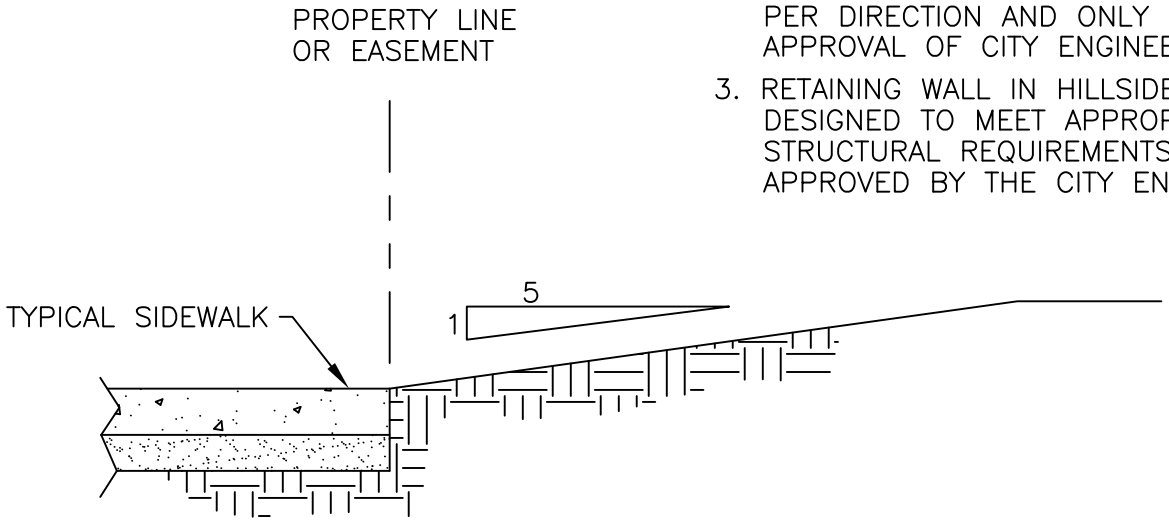
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 232K



WITH RETAINING WALL

NOTES:

1. IN FLATLAND AREAS, MAX SLOPE OF GROUND TO BE 5:1 OR FLATTER AS DIRECTED BY THE CITY ENGINEER.
2. RETAINING WALL TO BE INSTALLED AS PER DIRECTION AND ONLY WITH APPROVAL OF CITY ENGINEER.
3. RETAINING WALL IN HILLSIDES TO BE DESIGNED TO MEET APPROPRIATE STRUCTURAL REQUIREMENTS AND AS APPROVED BY THE CITY ENGINEER.

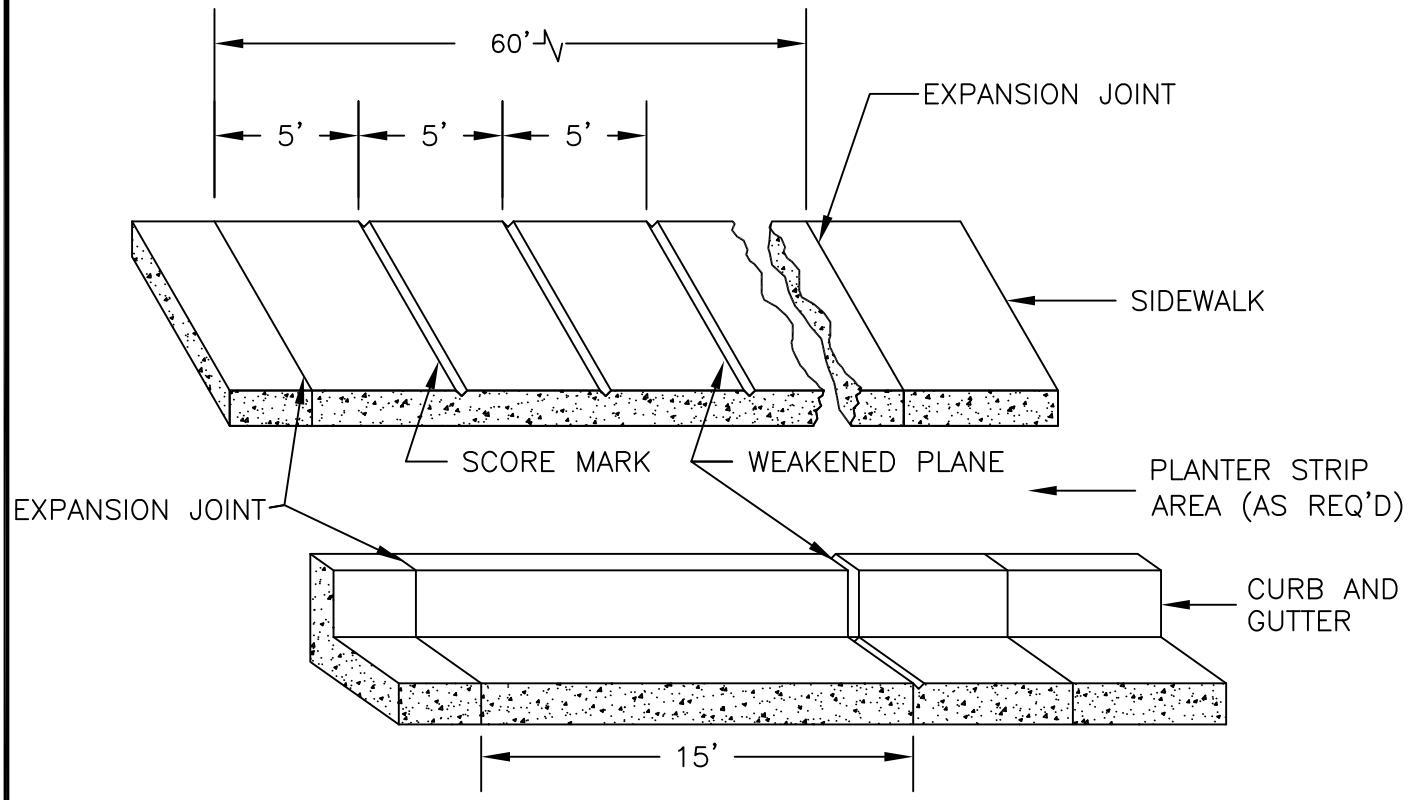


WITHOUT RETAINING WALL

CITY OF ROHNERT PARK

BACK OF SIDEWALK CONFORMS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 233



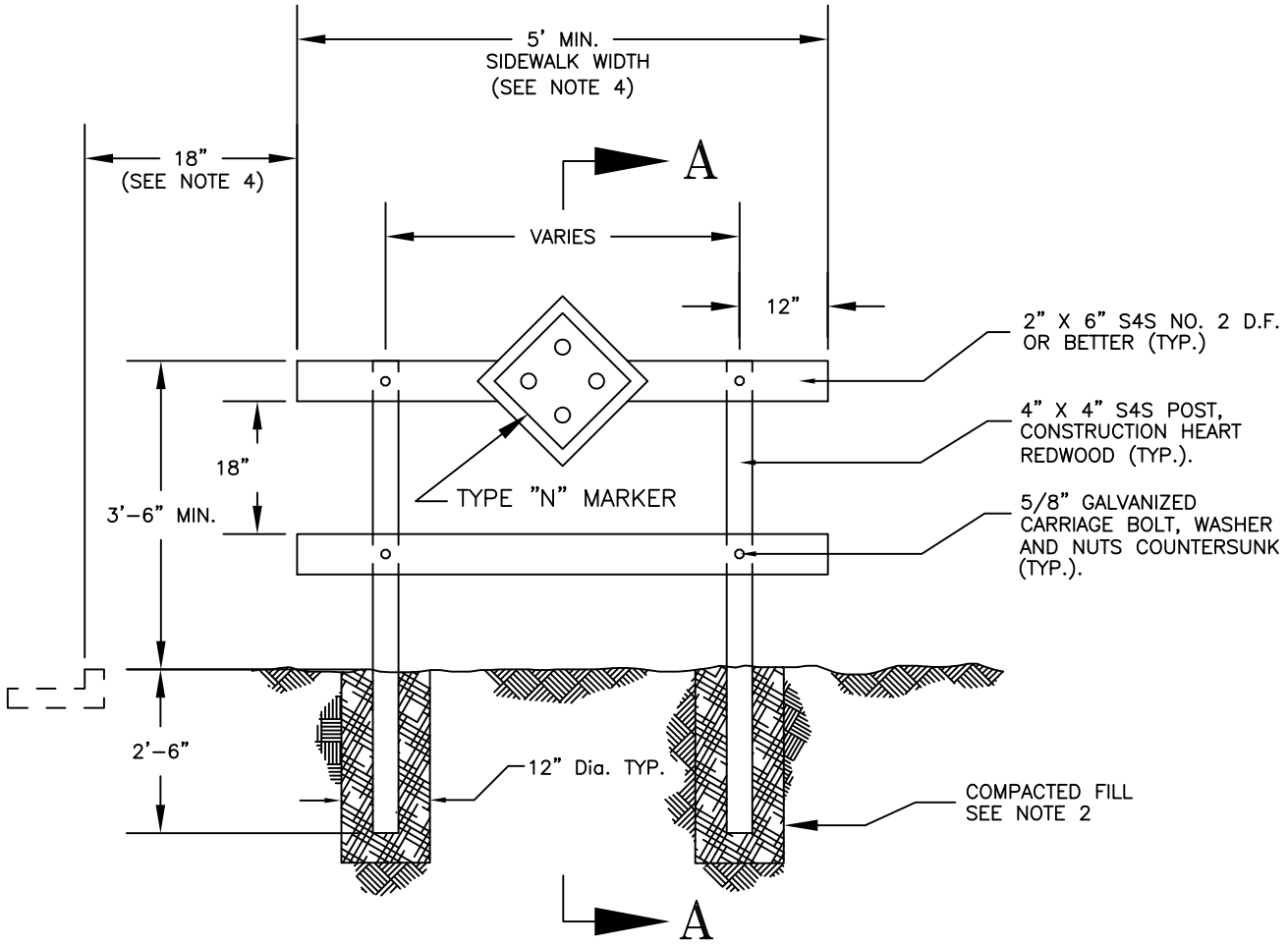
NOTES:

1. WEAKENED PLANE: 1/8" WIDE x 1" DEEP IN SIDEWALKS, 1/8" WIDE x 1 1/2" DEEP IN CURB AND GUTTER.
2. EXPANSION JOINTS MATERIAL TO BE 1/4" THICK PREMOLDED JOINT FILLER FULL THICKNESS OF CONCRETE. APROVED MECHANICAL JOINTS MAY BE USED IN WALKS IN LIEU OF EXPANSION JOINTS.
3. SCORE MARKS FOR SIDEWALKS 6' & MORE IN WIDTH: LONGITUDINAL SCORE MARK ALONG CENTER OF WALK.
4. EXPANSION JOINTS SHALL BE INSTALLED IN THE CURB & GUTTER AT ALL CURB RETURNS.
5. EXPANSION JOINTS SHALL BE PLACED IN THE SIDEWALK AT THE SAME LOCATION AS THOSE IN THE CURB & GUTTER WHEN THE SIDEWALK IS CURB ADJACENT, UNLESS OTHERWISE DIRECTED BY THE CITY ENGINEER.
6. SIDEWALK SHALL HAVE 4" BASE MATERIAL (CLASS II AGGREGATE BASE ROCK OR SAND), 4" OF P.C.C., AND HAVE A 2% SLOPE TOWARDS THE STREET.
7. SCORING PATTERN SHOULD MATCH ADJOINING SIDEWALKS.

CITY OF ROHNERT PARK

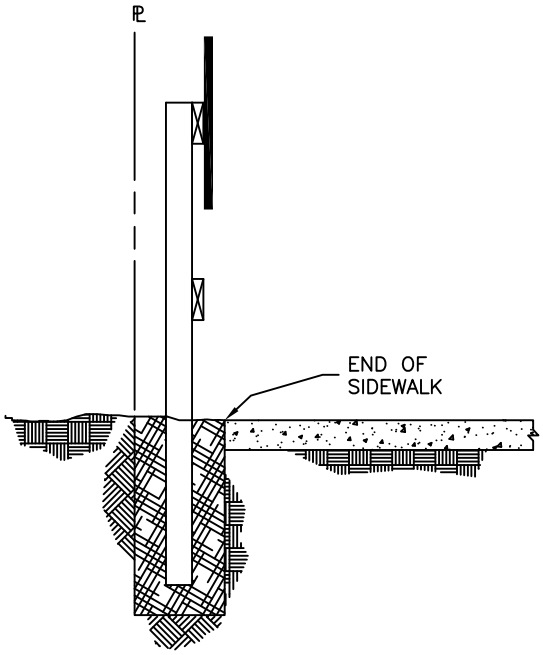
TYPICAL SPACING - WEAKENED PLANES, SCORE MARKS, AND EXPANSION JOINTS

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 235



SIDEWALK BARRICADE

NTS



SECTION A-A

NTS

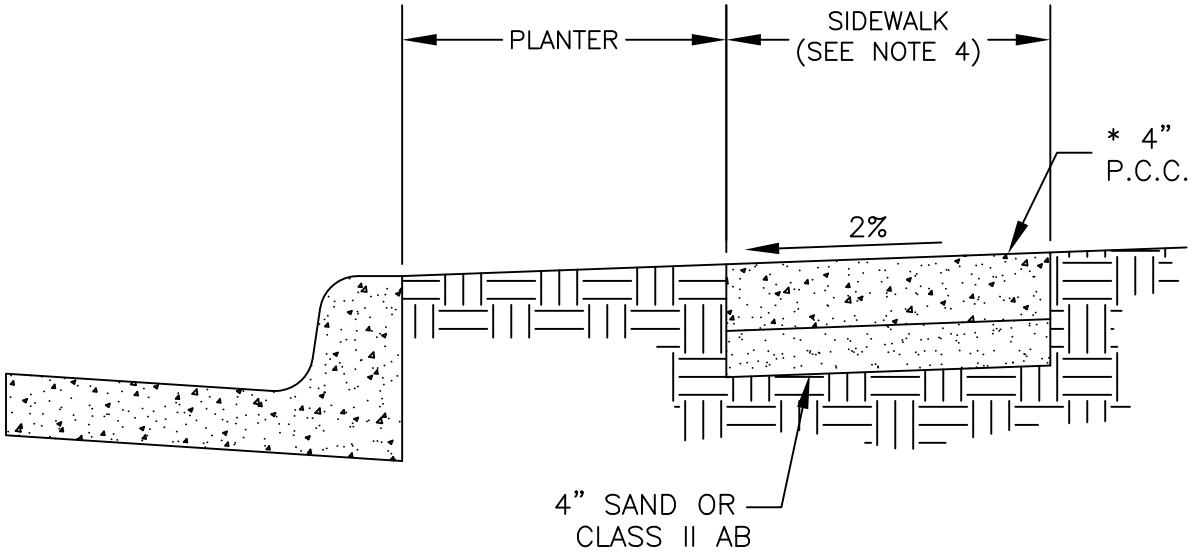
NOTES:

1. PAINT ALL EXPOSED SURFACES WITH 1 COAT OF PRIMER AND 2 COATS OF GLOSS WHITE EXTERIOR ENAMEL AFTER CONSTRUCTION.
2. POSTS SHALL BE BACKFILLED AND COMPACTED WITH NATIVE SOIL.
3. ALL PORTIONS OF POSTS TO BE INSTALLED BELOW FINISHED GRADE SHALL BE TREATED WITH A WOOD PRESERVATIVE.
4. IF SIDEWALK IS CONTIGUOUS TO CURB, BARRICADE SHALL BE 18" BACK FROM FACE OF CURB.

CITY OF ROHNERT PARK

SIDEWALK BARRICADE

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 236



NOTES:

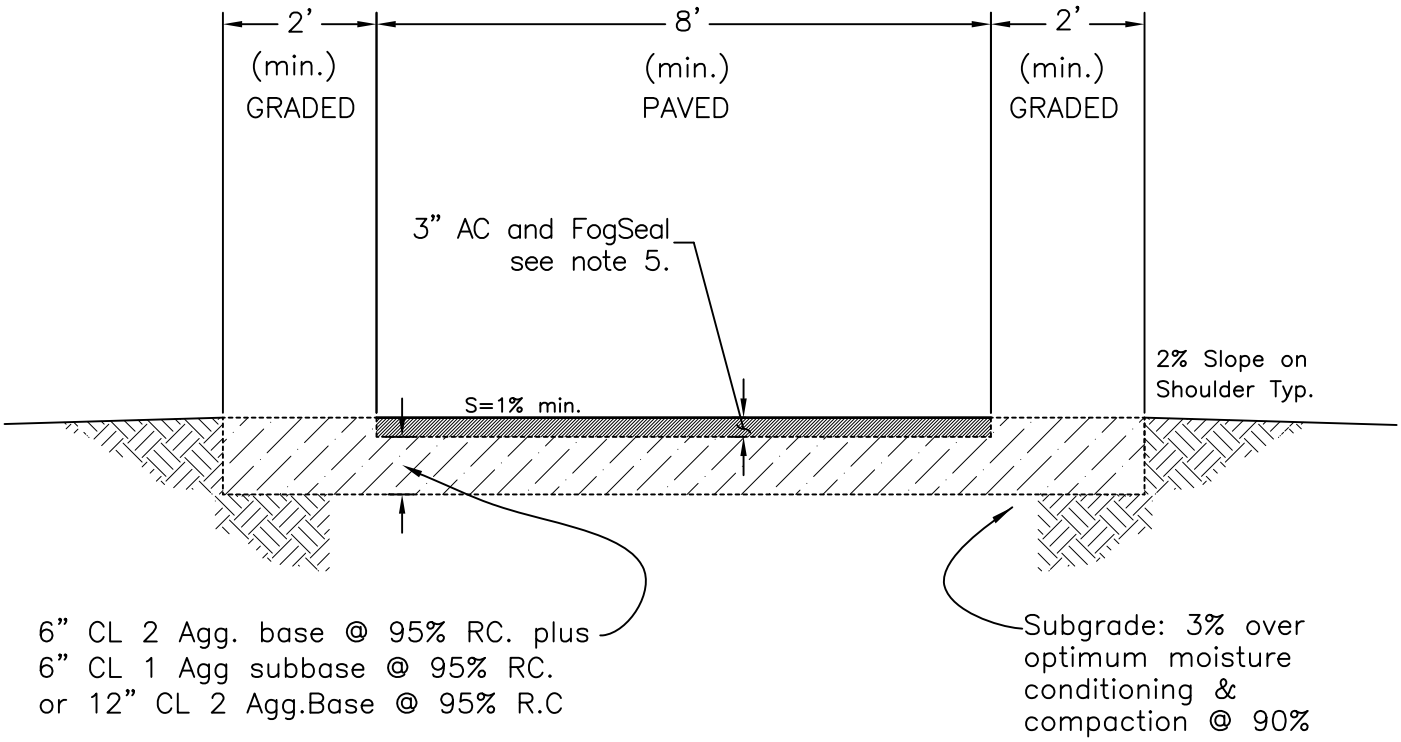
1. JOINTS AND SCORING PER STD.–235.
2. ALL CONCRETE SHALL BE CLASS A P.C.C.
3. * 6" FOR DRIVEWAY AREA.
4. SIDEWALK WIDTH SHALL MATCH EXISTING (UNLESS OTHERWISE CONDITIONED) AND SHALL MEANDER OR WIDEN AT OBSTRUCTIONS TO PROVIDE CLEARANCES AS SHOWN IN CITY STD.– 231.
5. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

CITY OF ROHNERT PARK

REPLACEMENT OF EXISTING SIDEWALK

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 237

CLASS I BIKE PATH OR MULTIUSE TRAIL



NOTES

1. Design of Bike Path or Multipurpose Path shall be per chapter 1000 of the Highway Design Manual.

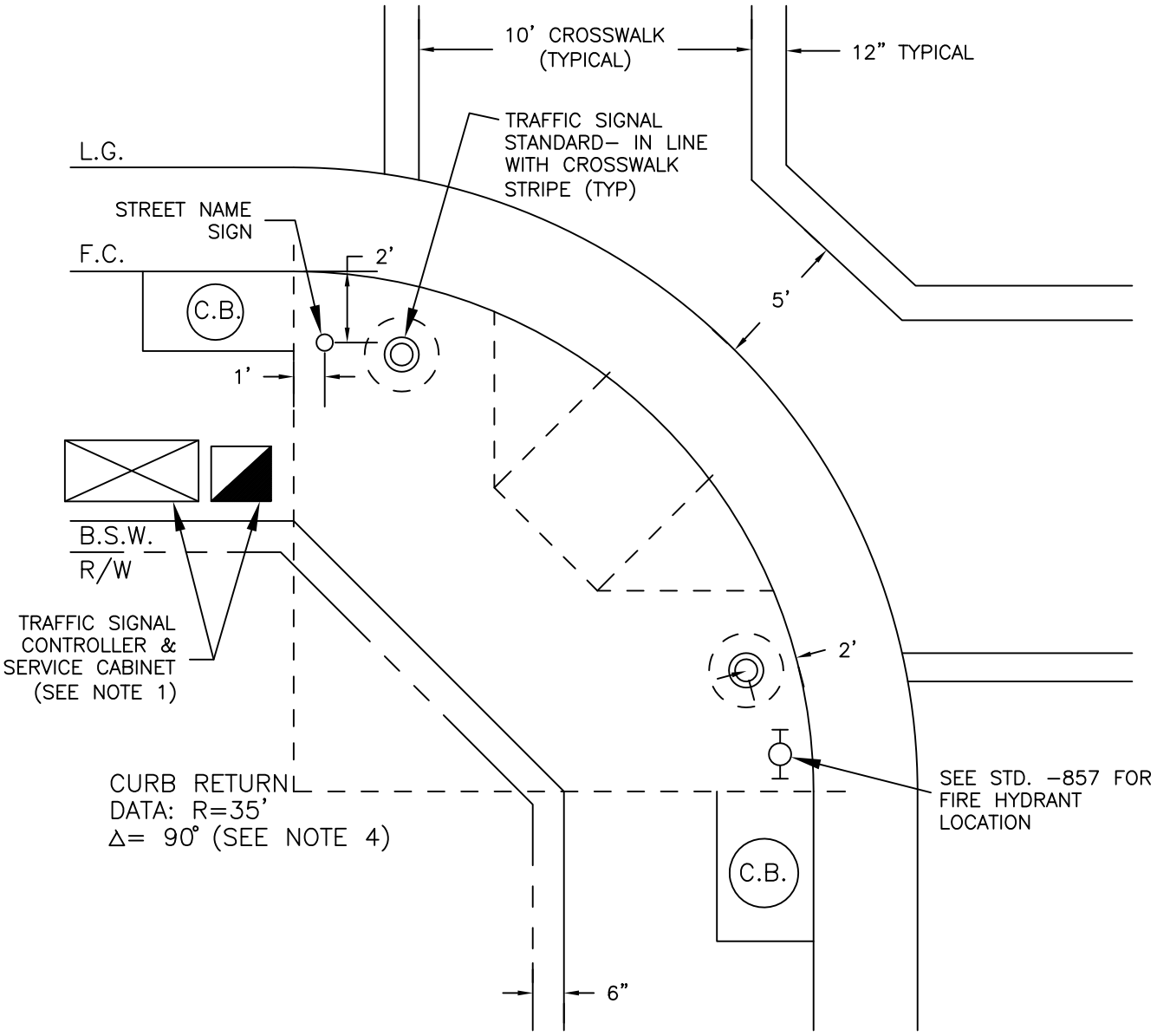
2. The minimum paved width for a two–way bike path shall be 8 ft. The minimum paved width for a one–way bike path shall be 4.5 ft. A minimum 2 ft. graded area shall be provided adjacent to the pavement. A 3 ft. graded area is recommended to provide clearance from poles, trees, walls, fences, guardrails, or other lateral obstructions.

3. A minimum 2 ft. horizontal clearance to obstructions shall be provided adjacent to pavement.

4. The vertical clearance to obstructions across the clear width of the path shall be a minimum of 9 ft.

5. Asphalt paving shall be 1/2" Max.–Med. HMA @ 95% compacton

CITY OF ROHNERT PARK	
CLASS I BIKE PATH	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 238



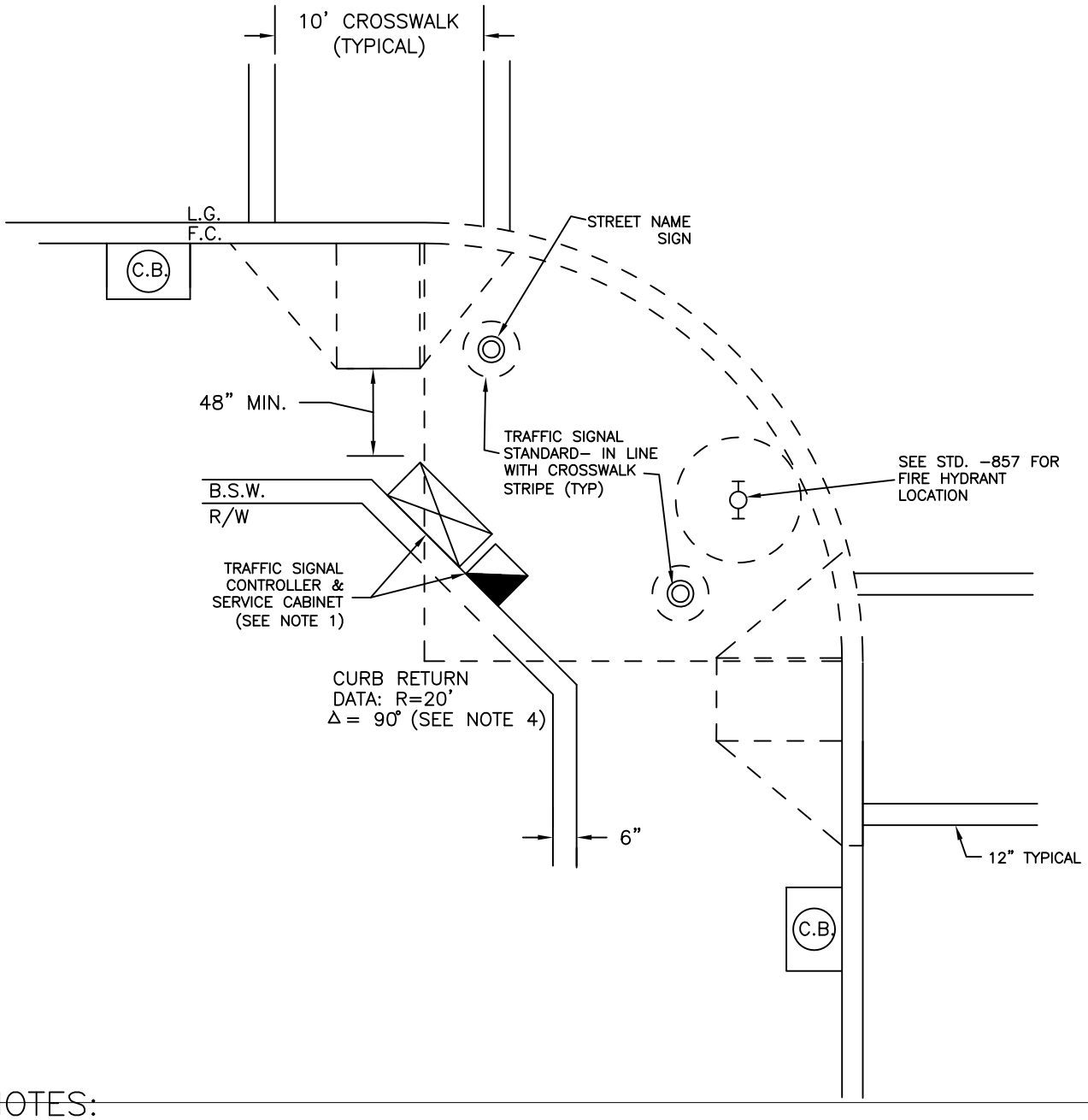
NOTES:

1. TRAFFIC SIGNAL CONTROLLER & SERVICE CABINET MAY HAVE ALTERNATE LOCATIONS IF APPROVED BY THE CITY ENGINEER.
2. THE MINIMUM CURB RETURN RADIUS FOR REGIONAL & INDUSTRIAL STREETS SHALL BE PER SECTION VII. INTERSECTIONS, SUBPARAGRAPH C., "CURB RETURNS."
3. FOR DELTA ANGLES GREATER THAN 90°, CURB RETURN PLAN DETAILS SHALL BE APPROVED BY THE CITY ENGINEER.
4. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

CITY OF ROHNERT PARK

CURB RETURN PLAN DETAIL

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 240a



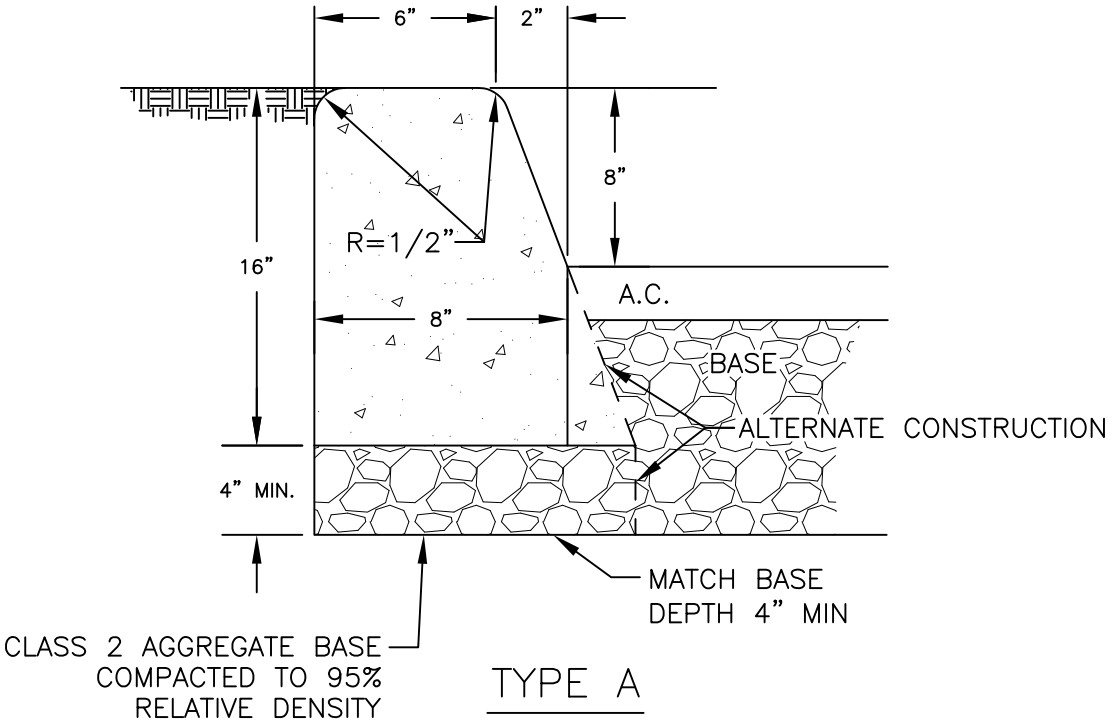
NOTES:

1. TRAFFIC SIGNAL CONTROLLER & SERVICE CABINET MAY HAVE ALTERNATE LOCATIONS IF APPROVED BY THE CITY ENGINEER.
2. THE MINIMUM CURB RETURN RADIUS FOR REGIONAL & INDUSTRIAL STREETS SHALL BE PER SECTION VII. INTERSECTIONS, SUBPARAGRAPH C., "CURB RETURNS."
3. FOR DELTA ANGLES GREATER THAN 90°, CURB RETURN PLAN DETAILS SHALL BE APPROVED BY THE CITY ENGINEER.
4. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

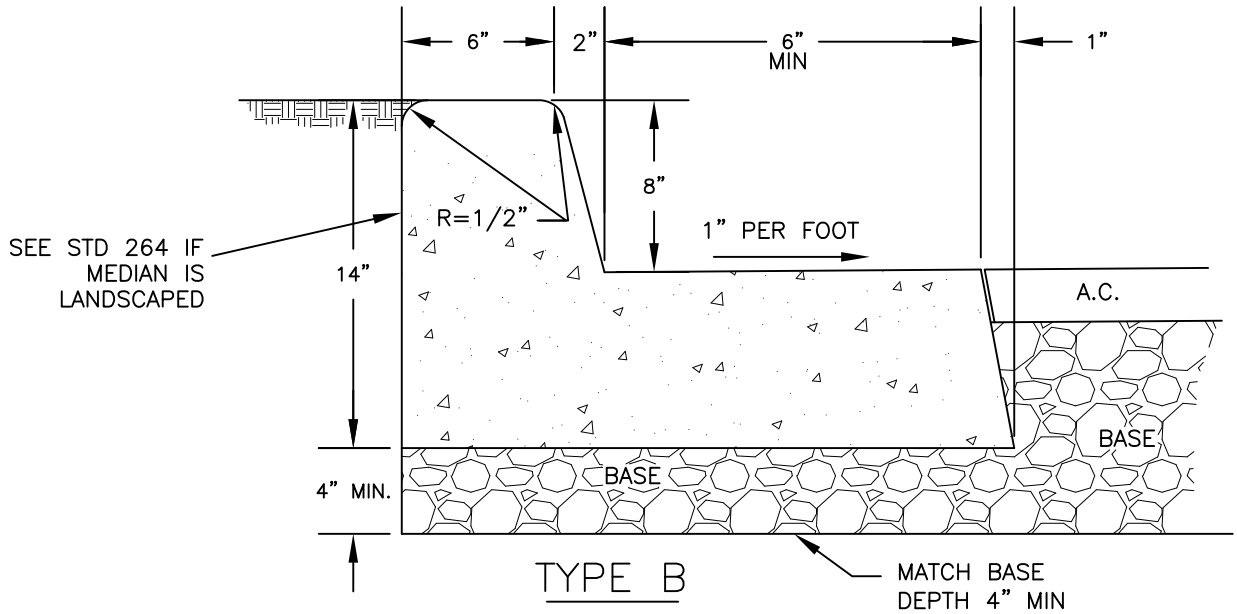
CITY OF ROHNERT PARK

CURB RETURN PLAN DETAIL 2

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 240b



TYPE A



TYPE B

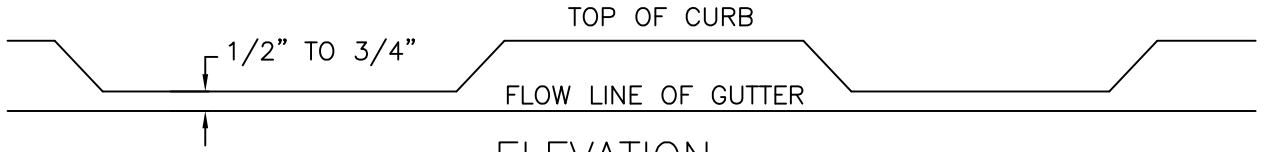
NOTES:

1. TYPE B TO BE USED UNLESS SPECIFICALLY STATED ON THE PLANS AND APPROVED BY THE CITY ENGINEER
2. SEE CITY STD.–235 FOR LOCATION OF WEAKENED PLANES AND EXPANSION JOINTS.
3. THESE DETAILS APPLY TO NEW CONSTRUCTION AND RECONSTRUCTION PROJECTS ONLY. MEDIAN CURB TO BE DETAILED ON PLANS WHERE INSTALLED ON EXISTING PAVEMENT.
4. ALL CONCRETE SHALL BE CLASS "A" P.C.C.
5. WHERE THE MEDIAN ISLAND IS TO BE PAVED, THE MEDIAN AND THE CURBS ARE TO BE POURED AS A UNIT (NO COLD JOINT).

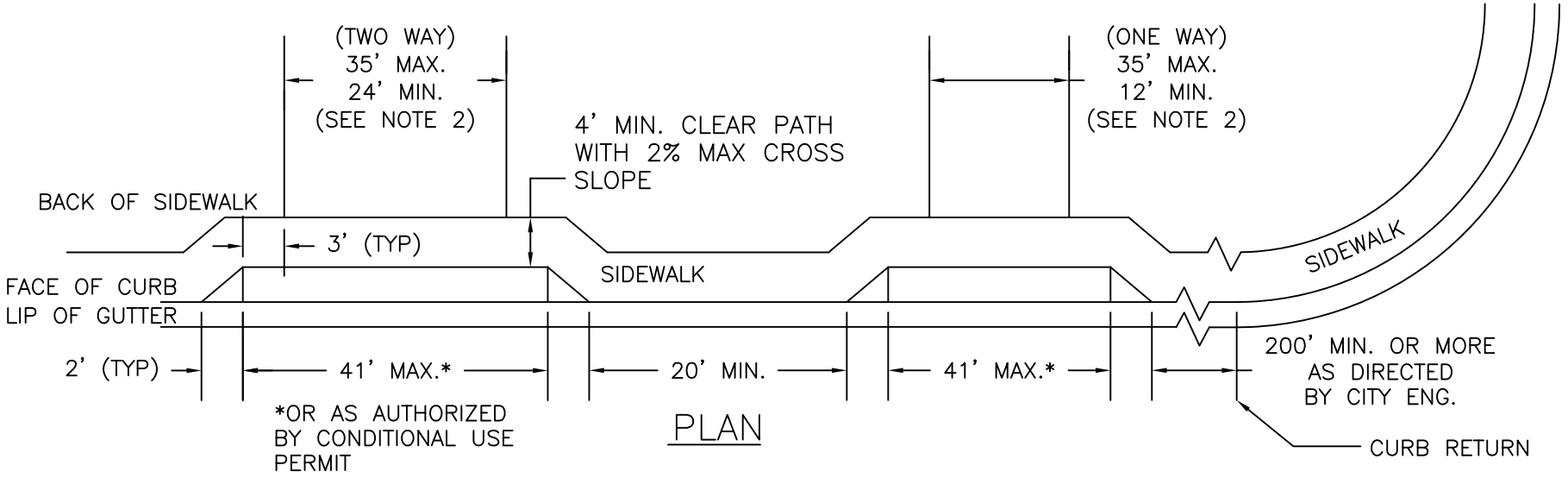
CITY OF ROHNERT PARK

STREET MEDIAN CURB

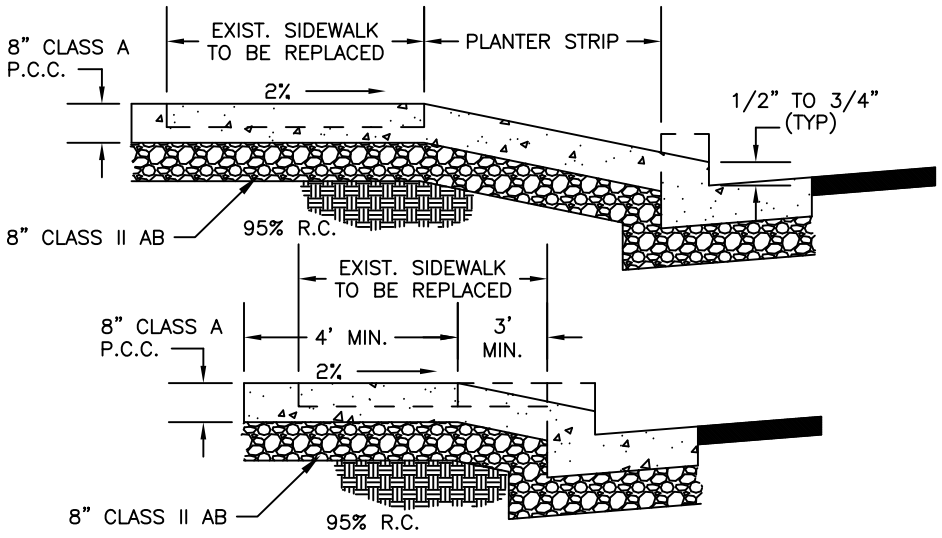
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 242



ELEVATION



PLAN



TYPICAL SECTIONS

NOTES:

1. MAXIMUM OF ONE CURB CUT PER PARCEL FRONTAGE, EXCEPT AS DESCRIBED ON PAGE 15 OF STREET DESIGN STDS OR AS AUTHORIZED BY THE CITY ENGINEER.
2. A MAXIMUM OF 41' WILL BE ALLOWED FOR CURB CUTS, EXCEPT AS OTHERWISE APPROVED BY CONDITIONAL USE PERMITS.
3. CURB ISLANDS BETWEEN DRIVEWAYS SHALL NOT BE LESS THAN 20' AT TOP TO TOP ON A SINGLE PARCEL.
4. WHERE NO SIDEWALK IS TO BE INSTALLED, DRIVEWAY APRON SHALL BE CONCRETE TO PROPERTY LINE.
5. DRIVEWAYS SHALL NOT ENCROACH ON CURB RETURNS OR PROPERTY LINE EXTENSIONS.
6. CONCRETE SHALL BE 1–1/2" MAX. AGGREGATE (6 SACK).
7. 1/8" x 1–1/2" DEEP WEAKENED PLANE JOINTS TO BE PLACED ON BOTH SIDES OF DRIVEWAY.

CITY OF ROHNERT PARK

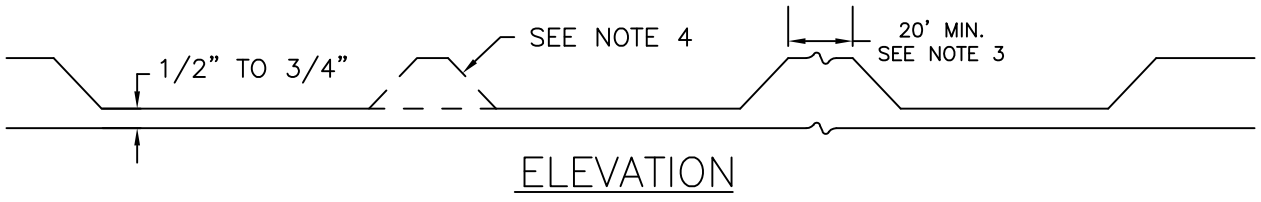
MULTI-RESIDENTIAL AND COMMERCIAL CURB CUTS

SCALE: NONE

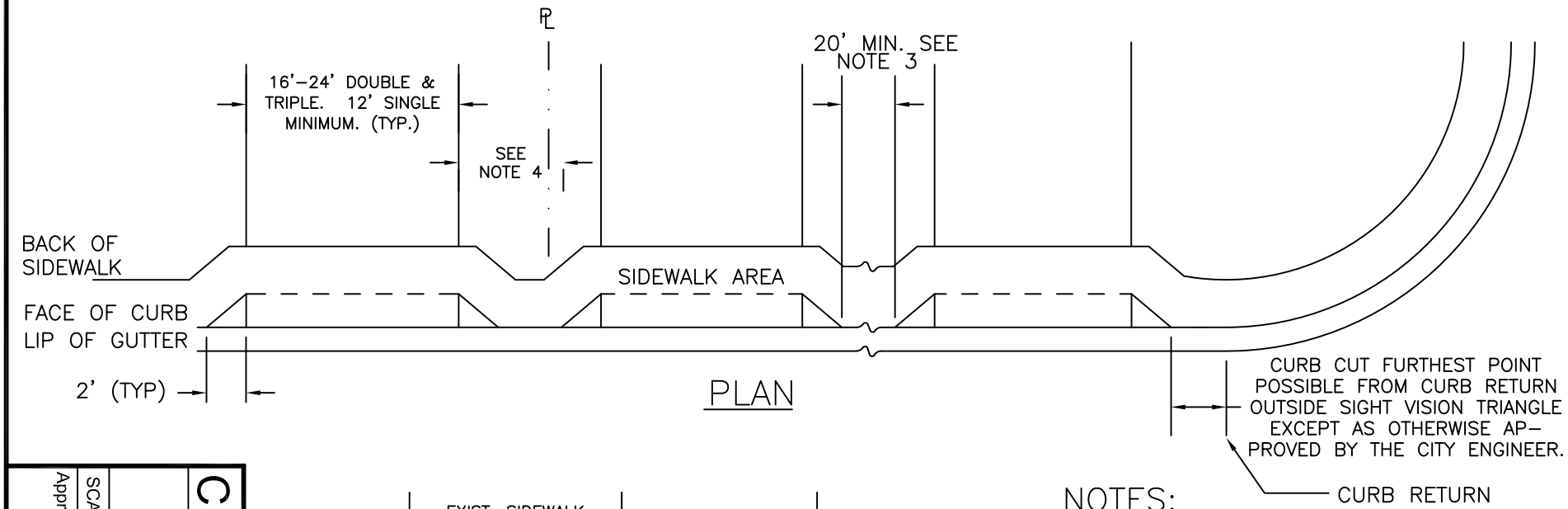
DATE: OCTOBER 2010

Approved:

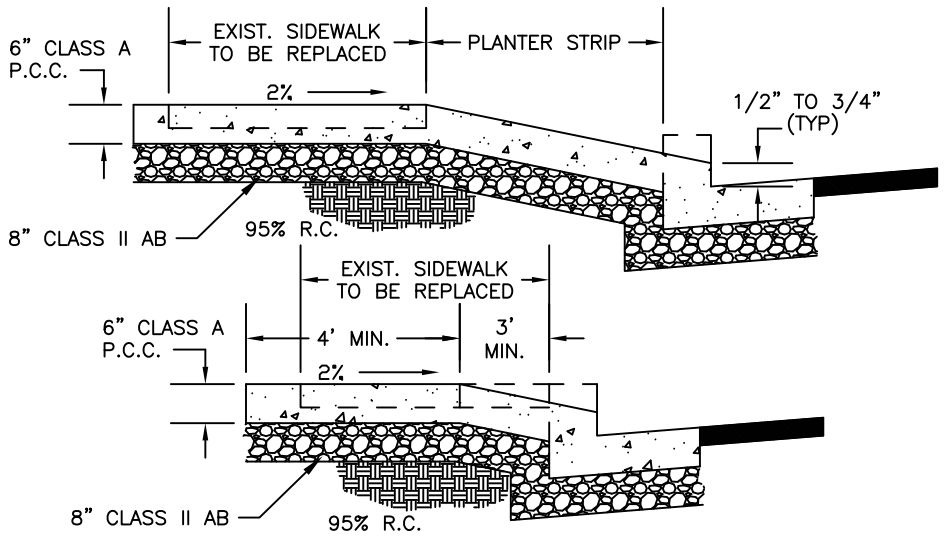
STD. - 250A



ELEVATION



PLAN



TYPICAL SECTIONS

NOTES:

1. MAXIMUM OF ONE CURB CUT PER PARCEL FRONTAGE.
2. A MAXIMUM OF 24' WILL BE ALLOWED FOR CURB CUTS, EXCEPT AS OTHERWISE APPROVED BY CONDITIONAL USE PERMITS.
3. CURB ISLANDS BETWEEN DRIVEWAYS SHALL NOT BE LESS THAN 20' AT TOP TO TOP ON A SINGLE PARCEL.
4. OMIT CURB ISLANDS WHEN ADJACENT DRIVEWAYS ARE LESS THAN 6' APART.
5. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.
6. WHERE NO SIDEWALK IS TO BE INSTALLED, DRIVEWAY APRON SHALL BE CONCRETE TO PROPERTY LINE.
7. DRIVEWAYS SHALL NOT ENCROACH ON CURB RETURNS OR PROPERTY LINE EXTENSIONS.
8. CONCRETE SHALL BE 1–1/2" MAX. AGGREGATE (6 SACK).
9. 1/8" x 1–1/2" DEEP WEAKENED PLANE JOINTS TO BE PLACED ON BOTH SIDES OF DRIVEWAY.

CITY OF ROHNERT PARK

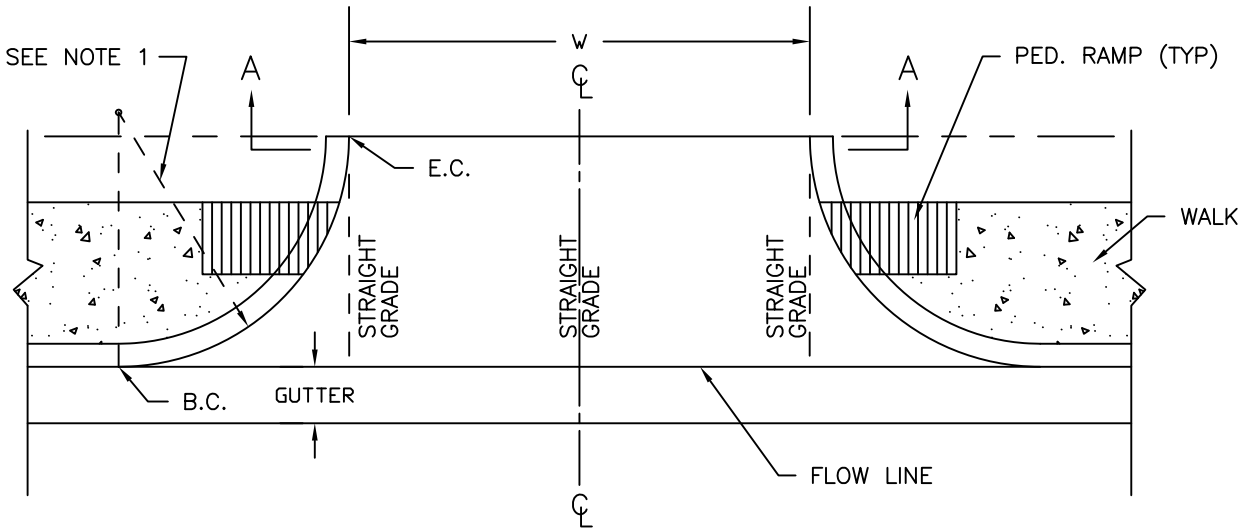
RESIDENTIAL CURB CUTS

SCALE: NONE

DATE: OCTOBER 2010

Approved:

STD. - 250B

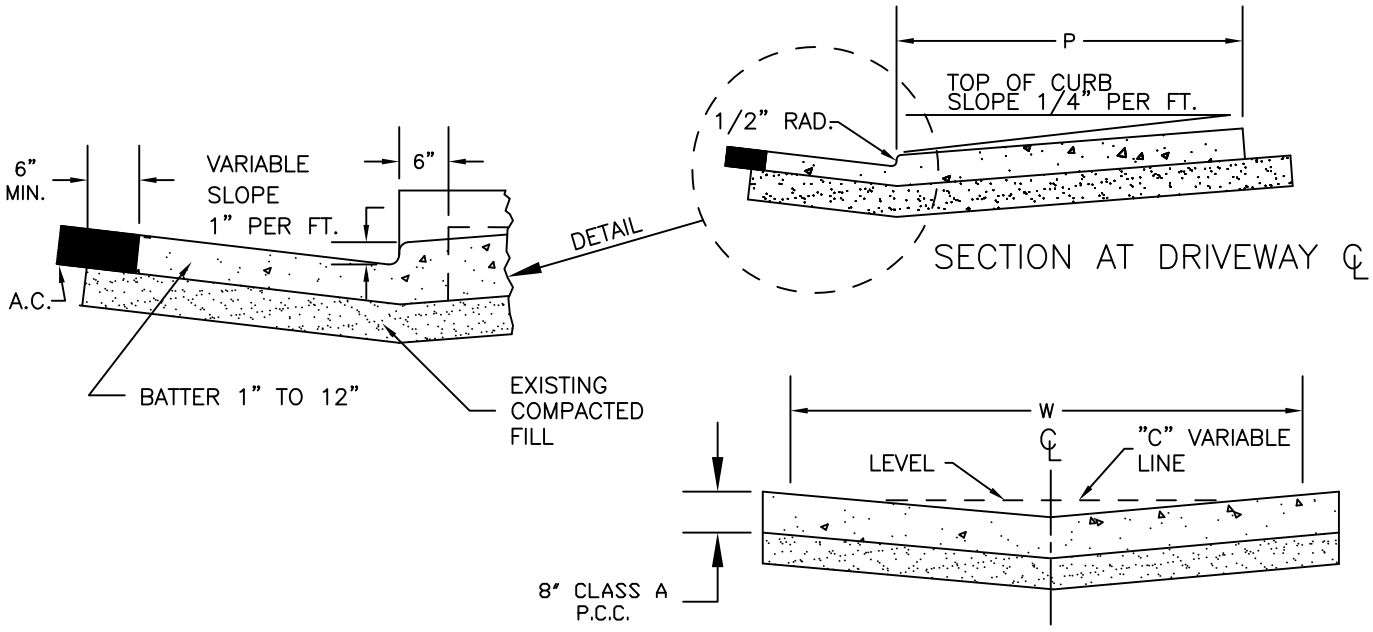


COMMERCIAL DRIVEWAY

NOTES:

THE FLOWLINE SHALL BE RAISED:

1. TWO INCHES AT THE Δ/2 TO EXPEDITE DRAINAGE; OR
2. TO THE BOTTOM OF THE STREET SECTION, WHICHEVER IS GREATER.



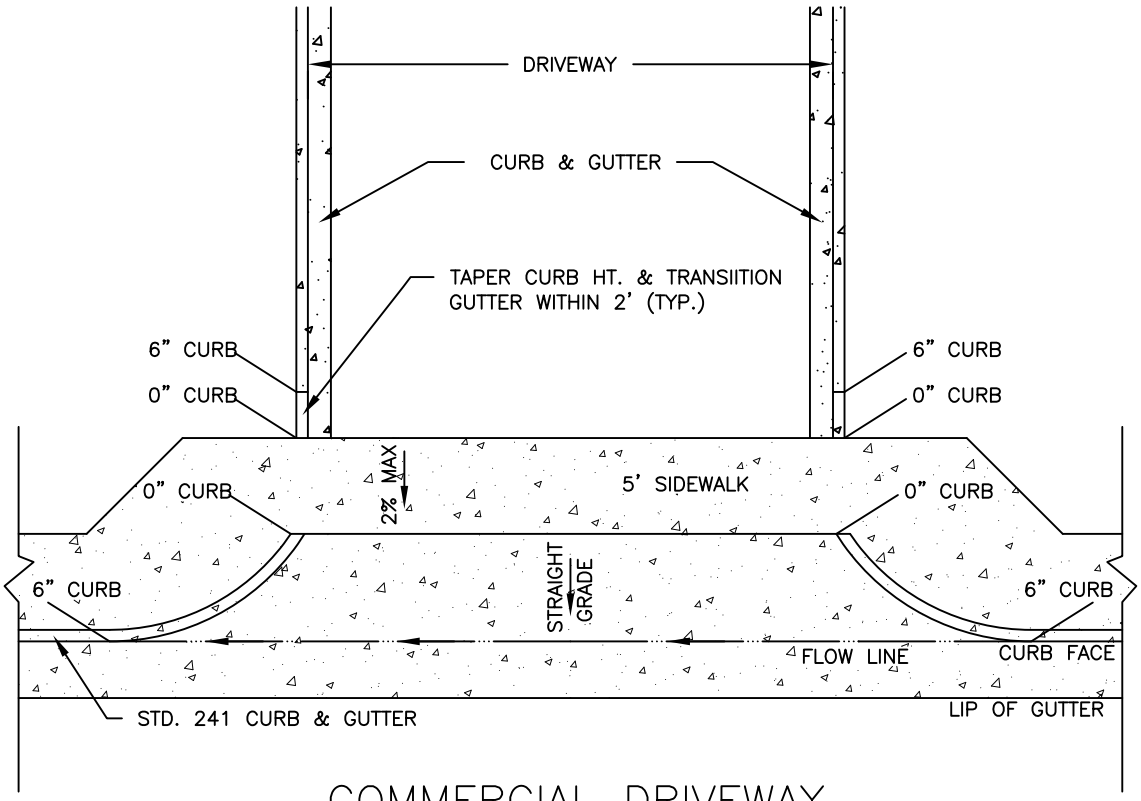
NOTES:

1. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.
2. RADIUS TO BE A MINIMUM OF 10 FEET.
3. PEDESTRIAN RAMP NEEDED ACROSS DRIVEWAY AT SIDEWALK INTERSECTION WITH DRIVEWAY.
4. USE OF THIS STANDARD AS APPROVED BY THE CITY ENGINEER.
5. DRIVEWAYS SHALL NOT ENCROACH ON CURB RETURNS OR PROPERTY LINE EXTENSIONS.
6. CONCRETE SHALL BE 1–1/2" MAX. AGGREGATE (6 SACK).
7. 1/8" x 1–1/2" DEEP WEAKENED PLANE JOINTS TO BE PLACED ON BOTH SIDES OF DRIVEWAY.

CITY OF ROHNERT PARK

CURB RETURN DRIVEWAY (ALTERNATE A)

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 250C

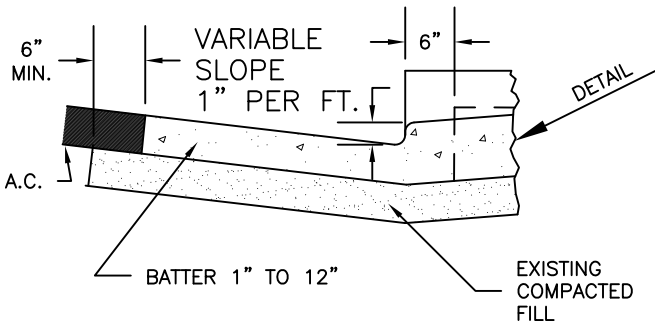


COMMERCIAL DRIVEWAY

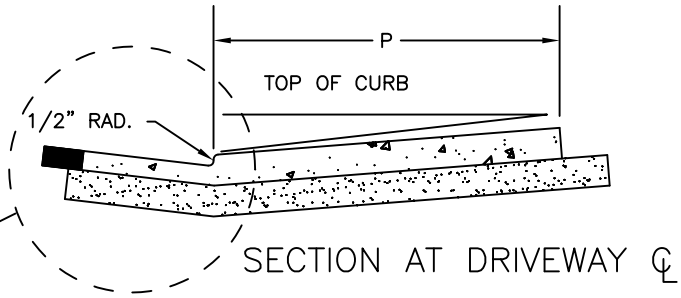
NOTES:

THE FLOWLINE SHALL BE RAISED:

1. TWO INCHES AT THE Δ/2 TO EXPEDITE DRAINAGE; OR
2. TO THE BOTTOM OF THE STREET SECTION, WHICHEVER IS GREATER.



DETAIL



SECTION AT DRIVEWAY ℄

NOTES:

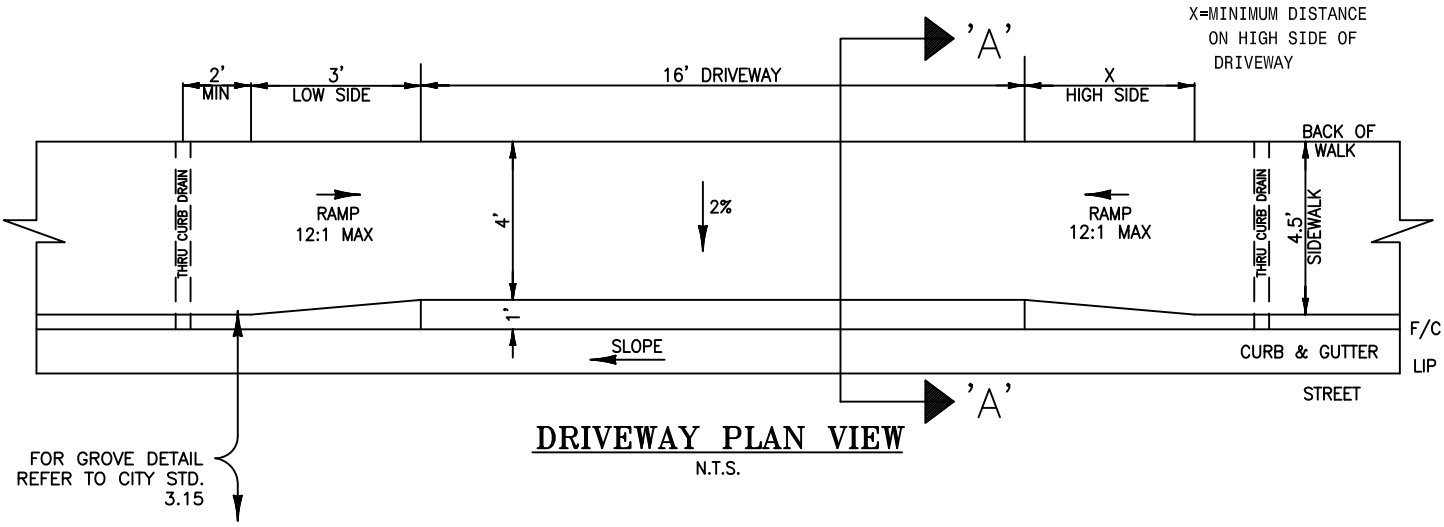
1. CURB RETURN RADII TO BE A MINIMUM OF 10 FEET.
2. USE OF THIS STANDARD AS APPROVED BY THE CITY ENGINEER.
3. DRIVEWAYS SHALL NOT ENCROACH ON CURB RETURNS OR PROPERTY LINE EXTENSIONS.
4. CONCRETE SHALL BE 1–1/2" MAX. AGGREGATE (6 SACK).
5. 1/8" x 1–1/2" DEEP WEAKENED PLANE JOINTS TO BE PLACED ON BOTH SIDES OF DRIVEWAY.

CITY OF ROHNERT PARK

CURB RETURN DRIVEWAY
(ALTERNATE B)

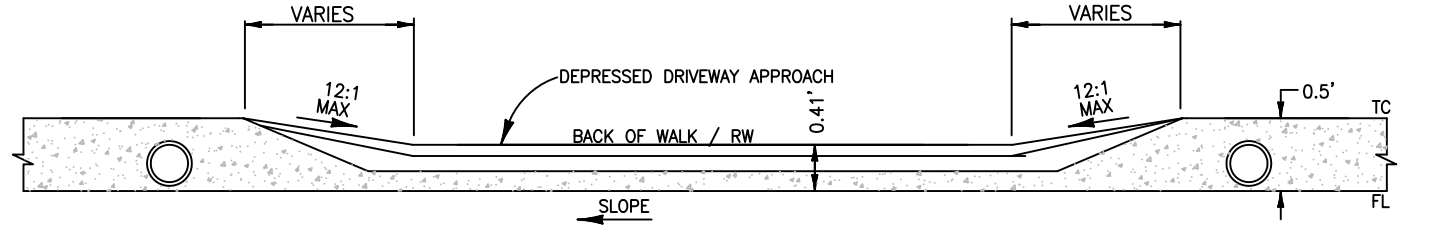
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 250D

STREET SLOPE	X
5-6%	8'
4-5%	6'
3-4%	5'
2-3%	4'
0.5-2%	3'



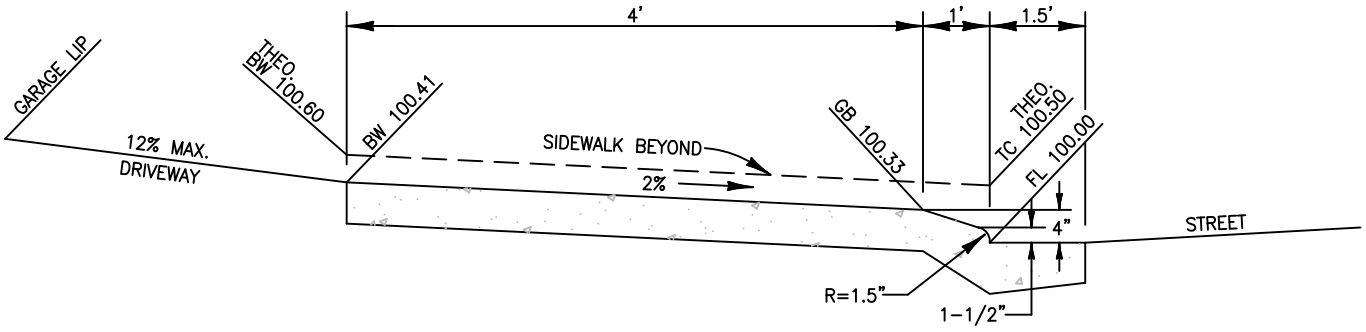
DRIVEWAY PLAN VIEW

N.T.S.



PROFILE AT CURB FACE

N.T.S.



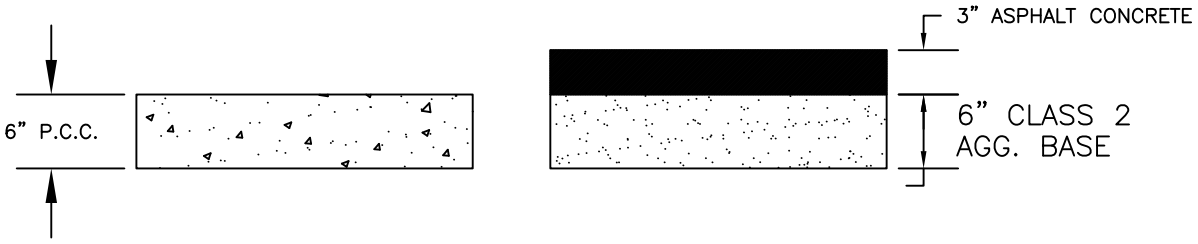
DEPRESSED DRIVEWAY APPROACH
SECTION A-A

N.T.S.

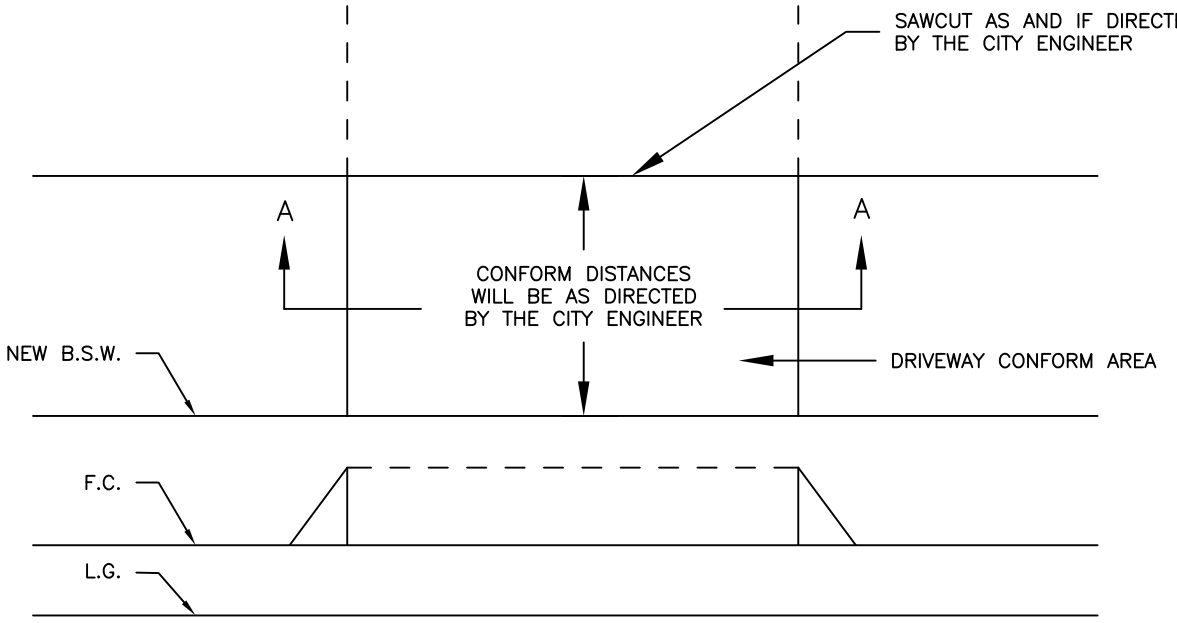
CITY OF ROHNERT PARK

CURB RETURN DRIVEWAY
(ALTERNATE C)

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 250E



SECTION A–A

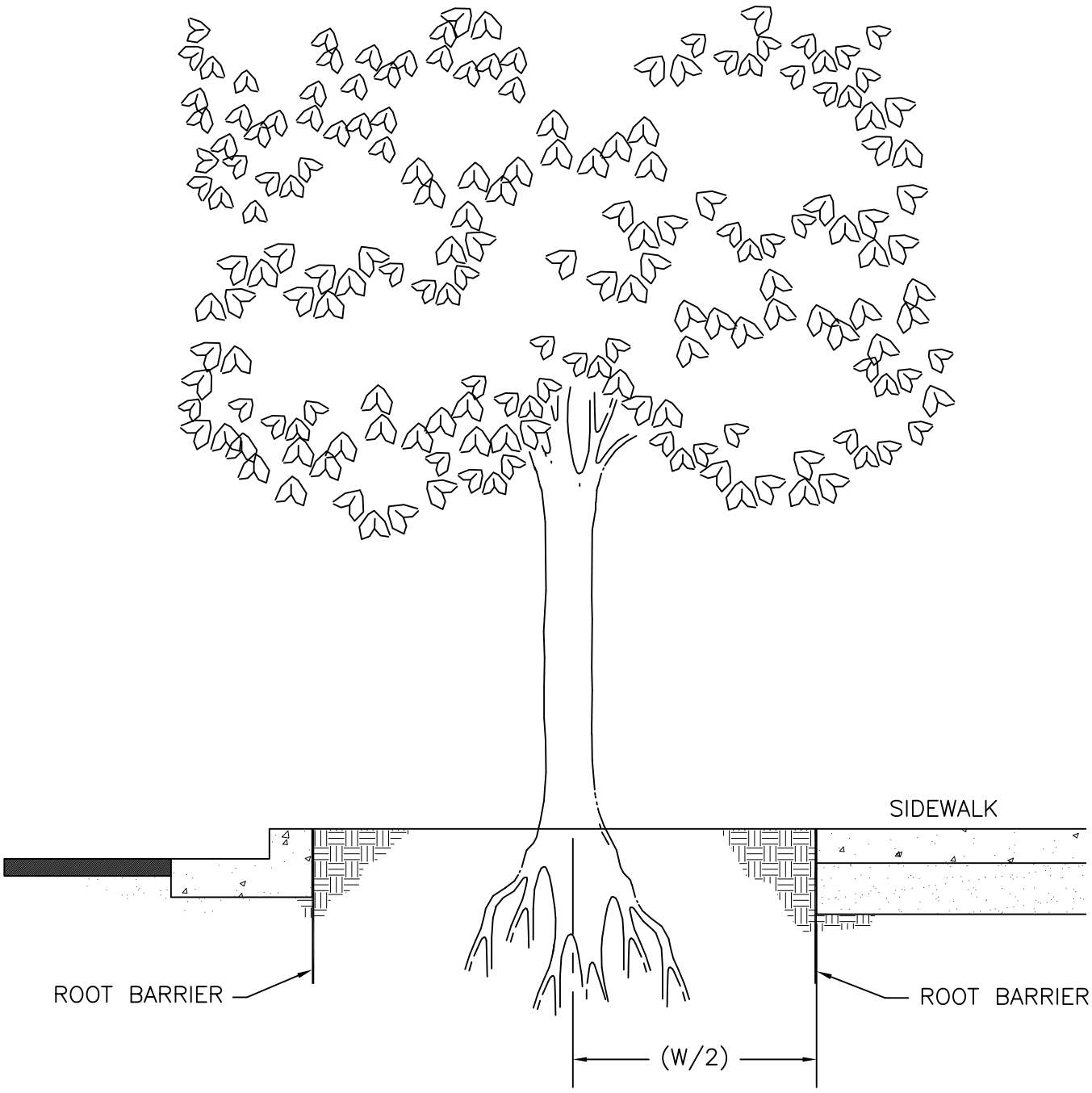


DRIVEWAY CONFORM

NOTE:

1. DESIGN SHALL CONFORM TO THESE REQUIREMENTS EXCEPT AS OTHERWISE APPROVED BY THE CITY ENGINEER.

CITY OF ROHNERT PARK	
DRIVEWAY CONFORM P.C.C. & A.C.	
SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 251



NOTES:

1. FOR TREE TYPE, REFER TO THE STREET TREE LIST IN VOLUME 1.
2. ROOT CONTROL DEVICES SHALL BE USED FOR ALL TREES PLANTED IN SIDEWALK CUTOUTS, PLANTER STRIPS, & BEHIND SIDEWALKS BUT WITHIN THE PUBLIC RIGHT-OF-WAY. FOR ROOT BARRIER TYPE, REFER TO PUBLIC WORKS DEPARTMENT.
3. TREES SHALL BE PLANTED 10' MINIMUM FROM WATER SERVICES OR SEWER LATERALS

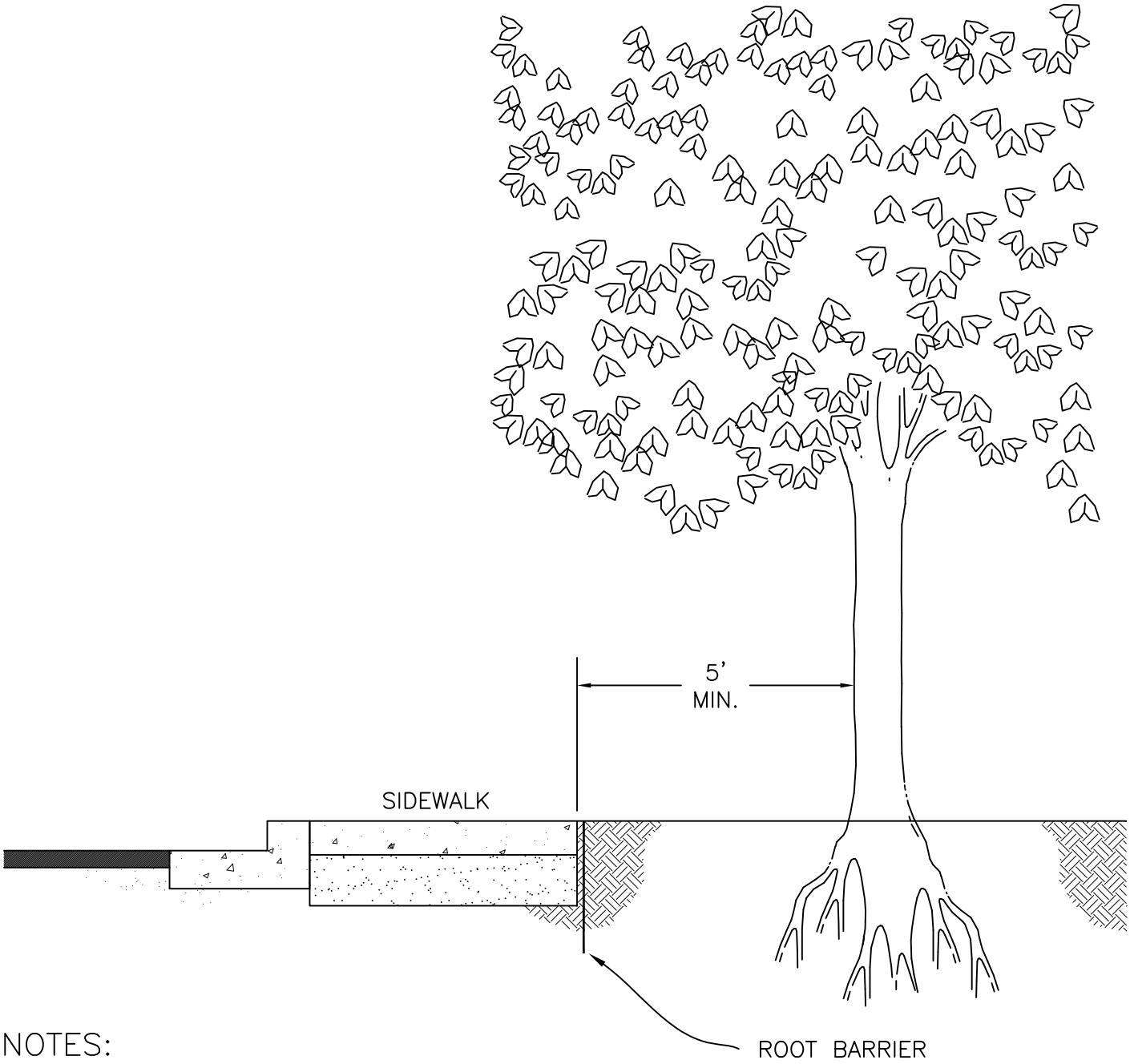
WIDTHS (W):

PER STREET TREE LIST VOL.1

CITY OF ROHNERT PARK

TREE PLANTING IN PLANTER STRIP

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 260



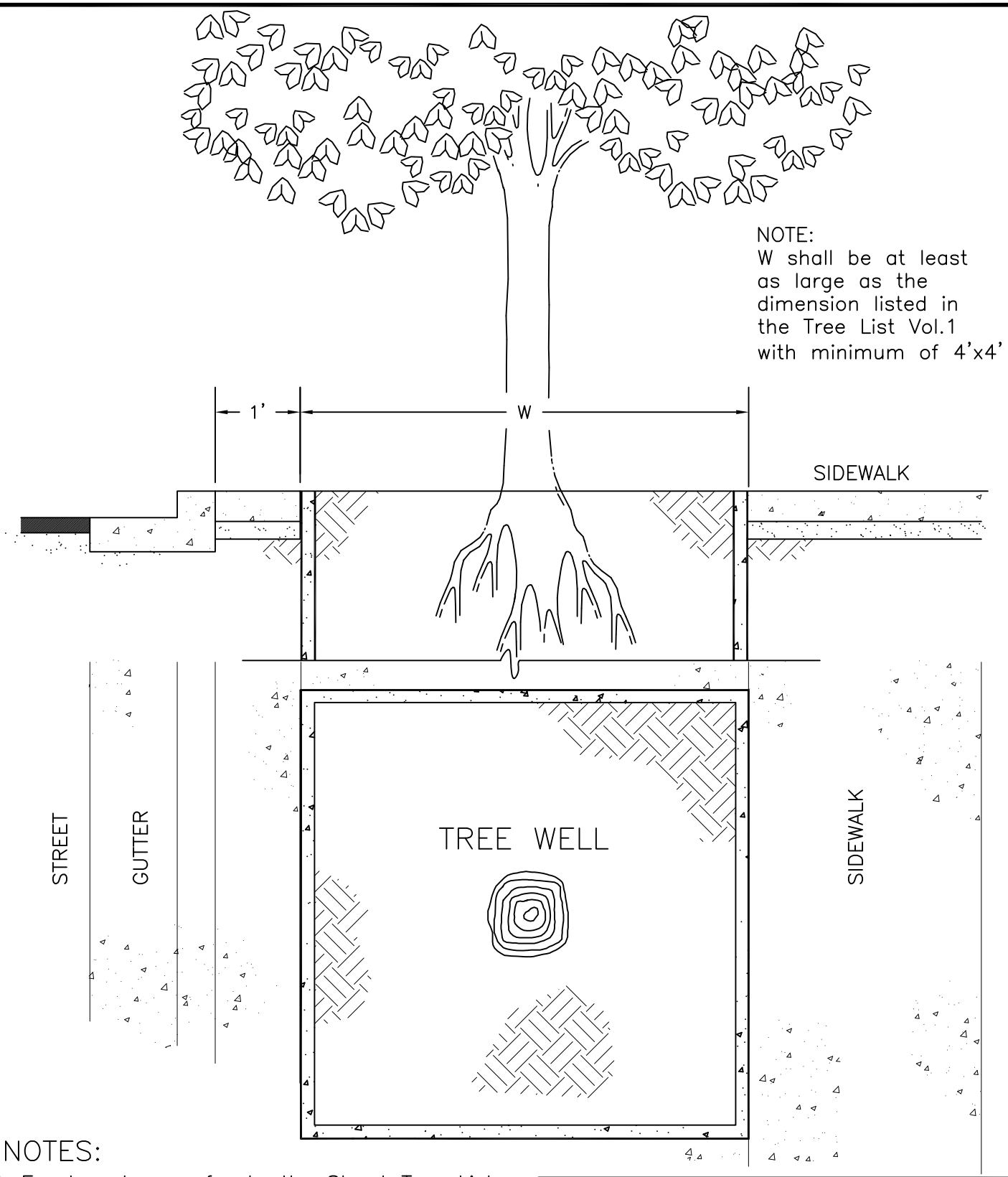
NOTES:

1. FOR TREE TYPE, REFER TO THE STREET TREE LIST IN VOL.1.
2. ROOT CONTROL DEVICES SHALL BE USED FOR ALL TREES PLANTED IN SIDEWALK CUTOUTS, PLANTER STRIPS, & BEHIND SIDEWALKS BUT WITHIN THE PUBLIC RIGHT-OF-WAY. FOR ROOT BARRIER TYPE, REFER TO PUBLIC WORKS DEPARTMENT.
3. TREES SHALL BE PLANTED 10' MINIMUM FROM WATER SERVICES OR SEWER LATERALS

CITY OF ROHNERT PARK

TREE PLANTING IN RIGHT-OF-WAY OR P.U.E. WITH CONTIGUOUS SIDEWALK

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 261



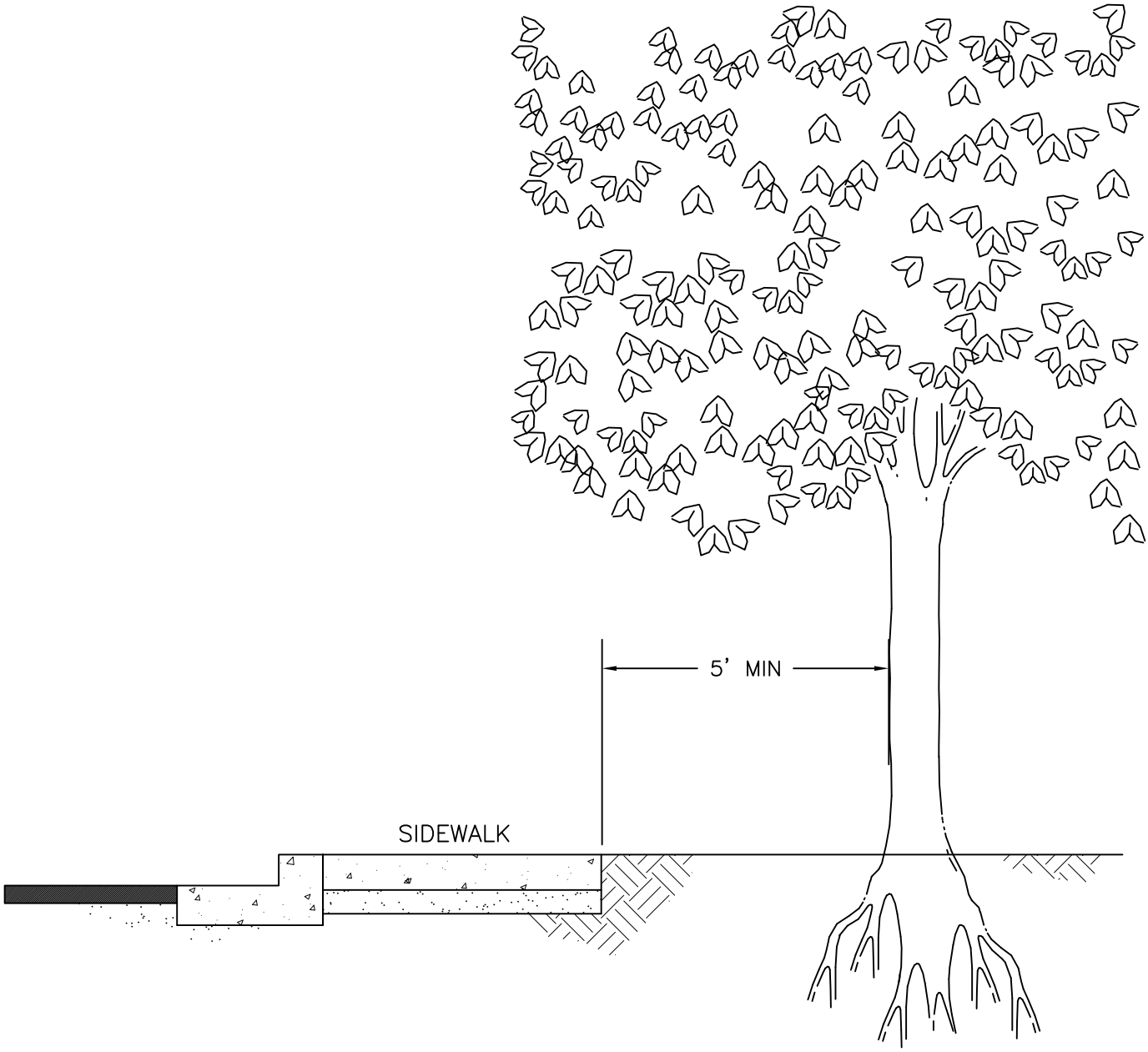
NOTES:

1. For tree type, refer to the Street Tree List in Vol.1.
2. Root control devices shall be used for all trees planted in sidewalk cutouts, planter strips, & behind sidewalks but within the public right–of–way. for root barrier type, refer to public works department.

CITY OF ROHNERT PARK

TREE PLANTING IN TREE WELL

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 262



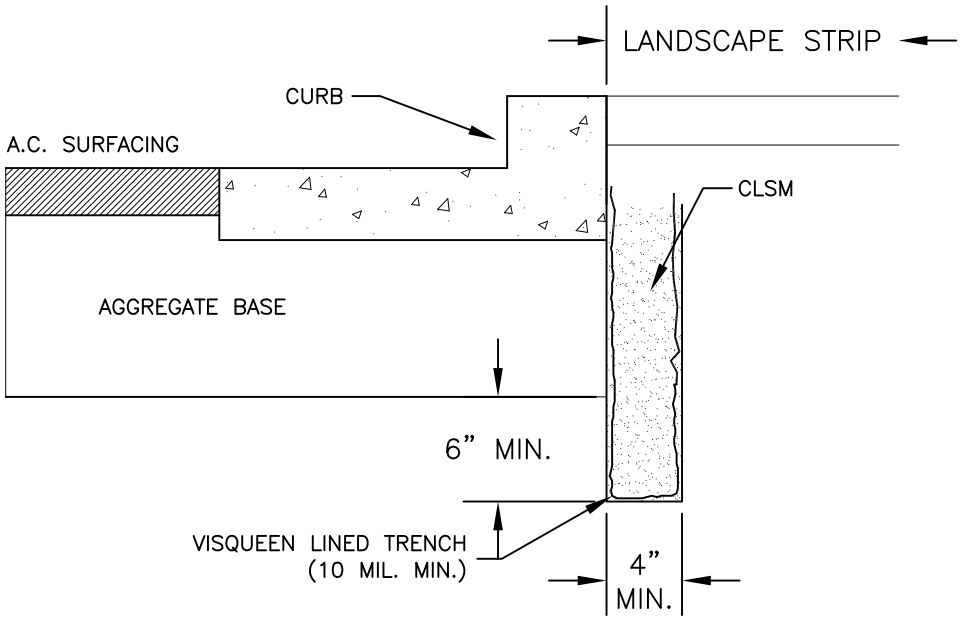
NOTE:

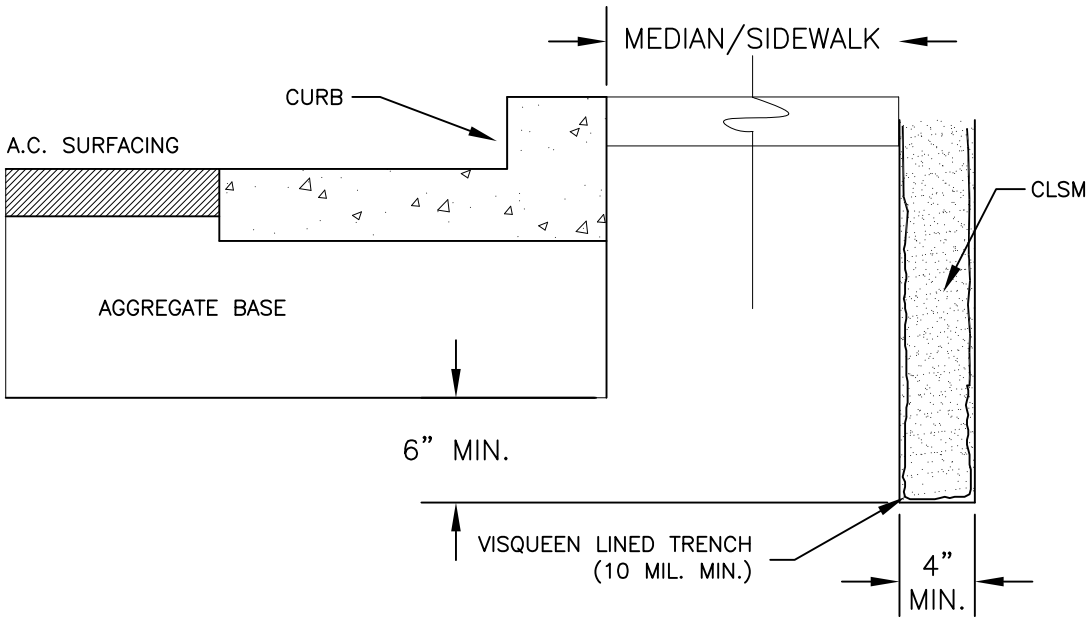
1. FOR TREE TYPE, REFER TO THE STREET TREE LIST IN VOLUME 1.

CITY OF ROHNERT PARK

PRIVATE TREE IN LIEU OF STREET TREE

SCALE: NONE	DATE: OCTOBER 2010
Approved:	STD. - 263





Refer to Section VII.E.3. of Design Standards

Moisture barrier shall be placed at edge of all roadways and medians

Locate moisture barriers at the outside edge of contiguous pavement (eg. if sidewalk is adjacent to road, place moisture barrier at back of sidewalks, if there is a landscape strip place moisture barrier at back of curb.)

CITY OF ROHNERT PARK

MOISTURE BARRIER

SCALE: NONE	DATE: MARCH 2011
Approved:	STD. - 264

City of Rohnert Park

Manual of Standards, Details and Specifications

(Volumes 1, 2 and 3)

Volume 3

Construction Specifications

City of Rohnert Park

Manual
of
Standards, Details and Specifications

Volume 1 Design Standards

Volume 2 Detail Drawings

1. Water
2. Sewer
3. Storm Drain
4. Streets and Roadway
5. Traffic
6. Street Lighting
7. Parks and Landscaping
8. Bicycle Parking

Volume 3 Construction Specifications

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Volume 3

Construction Specifications

Construction Specifications
City of Rohnert Park

Part I Definitions

Public improvements within the City of Rohnert Park shall be constructed in accordance with the Standard Specifications of the State of California, Department of Transportation, Division of Highways (Caltrans), ~~dated July 2002~~latest edition, which specifications are hereinafter referred to as the Standard Specifications, and in accordance with the following modifications and revisions herein stated in Volume 3 of the City of Rohnert Park Manual of Standards and Specifications.

Whenever in the Standard Specifications the terms, State of California, Department of Transportation, Director, Division of Highways, Engineer, or Laboratory are used, the following terms shall be understood and interpreted to mean and refer to such substituted terms as follows:

For State of California substitute City of Rohnert Park.

For Department substitute the Public Works Department of the City of Rohnert Park.

For Director substitute the City Engineer of the City of Rohnert Park.

For Division of Highways substitute the Engineering Division of the City of Rohnert Park.

For Engineer substitute the City Engineer, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

For Laboratory substitute Private Laboratory as authorized by the City to test materials and work involved in the contract.

~~In the event of a discrepancy between the contract documents, the order of precedence from highest to lowest shall be as follows: (1) Contract Change Order, (2) Permits from other agencies, as may be required by law, (3) Contract Specifications, (4) Plans, (5) City of Rohnert Park Manual of Standards and Specifications, and (6) Caltrans Standard Specifications.~~

Specifications pertaining to the administration of the City contracts will be contained in the special provisions for the contract.

References to contract administration, measurement, and payment shall not apply to non-City contracts.

Abbreviations:

"City Std." means City of Rohnert Park Standard Detail
"City Spec." means City of Rohnert Park Construction Specification
"Standard Specifications" means State of California Department of Transportation Standard Specifications~~-~~, latest edition~~dated July 2002~~.

Part II Modifications to Standard Specifications

Part II includes modifications and revisions to the Standard Specifications.

Only those subsections which are modified or revised will be noted herein. The Standard Specifications number sequence will be followed.

Subsections to be modified will be noted as "(Subsection number) (Title)" followed by the modifications or additional requirements. In case of conflict between the Standard Specifications and the modification, the modification shall apply.

Subsections to be deleted without modification will be noted as "(Subsection number) (Title) (Deleted)".

Subsections which are completely revised will be noted as "(Subsection number) (Title) (The following shall apply in lieu of Section_____).

SECTION 6 – CONTROL OF MATERIALS

All materials, parts, and equipment furnished by the Contractor in the Work shall be new, high grade, and free from defects. Quality of work shall be in accordance with the generally accepted standards. Material and work quality shall be subject to the Engineer's approval.

Materials and work quality not conforming to the requirements of the Specifications shall be considered defective and will be subject to rejection. Defective work or material, whether in place or not, shall be removed immediately from the site by the Contractor, at its expense, when so directed by the Engineer.

~~If the Contractor fails to replace any defective or damaged work or material after reasonable notice, the Engineer may cause such work or materials to be replaced. The replacement expense will be deducted from the amount to be paid to the Contractor.~~

~~6-3.02 Statistical Testing~~

~~(The following shall apply in lieu of Section 6-3.02 of the Standard Specifications.)~~

~~Statistical means will not be used for determination of specification compliance. Whenever both individual test results and moving average requirements are specified in these specifications, the moving average requirements shall apply to the individual test results.~~

SECTION 10 – DUST CONTROL

10-1.01 Description

Attention is directed to the provisions in Section 10, "Dust Control", of the Standard Specifications.

10-1.02A Dust Mitigation Measures

1. All dust-producing work and unpaved construction sites shall require at a minimum watering in the late morning and at the end of the workday; the frequency of watering shall be increased if wind speeds exceed 15 mph.

2. Contractor shall maintain dust control to the satisfaction of the City Engineer, seven (7) days a week, 24 hours per day.

3. The Engineer at his discretion may require sprinkling at any time or place.

4. Where recycled water is available potable water shall not be used for dust control.

~~**10-1.04 Payment**~~

~~Full compensation for conforming to the provisions of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.~~

SECTION 12 – TRAFFIC CONTROL

12-1.01 Description

Construction area traffic control devices shall be installed and maintained in accordance with the applicable sections as specified herein, the Standard Specifications, Part VI of the City Traffic Standards, the current edition of the Manual of Traffic Controls published by Caltrans, and as directed by the Engineer.

12-1.02 Traffic Control Plan

Prior to commencing construction which will affect existing traffic, the Contractor shall submit for review by the Engineer, a Traffic Control Plan on an 11" x 17" sheet of paper which contains only information specifically related to work zone traffic control. If the Contractor proposes to use Manual of Traffic Controls Published by Caltrans in lieu of a traffic control plan, in specific work operations, he/she shall submit in writing for consideration which Standard Plan will be used for each work operation. A Traffic Control Plan or proposal shall be submitted for review at least two weeks prior to implementation.

The Traffic Control Plan shall contain a title block which contains the Contractor's name, address, phone number, project superintendent's name, contract name, dates and hours traffic control will be in effect, and a space for review acknowledgment.

The content of the Traffic Control Plan shall include, but is not limited to, the following:

A. Show location and limits of the work zone.

B. Give dimensions of lanes affected by traffic control that will be open to traffic.

C. Indicate signing, cone placement, and other methods of delineation and reference to appropriate City or Caltrans standard.

D. Dimension location of signs and cone tapers.

E. Identify side streets and driveways affected by construction and show how they will be handled.

F. Show how pedestrian traffic will be handled through the construction site.

G. Demonstrate how two-way traffic will be maintained.

No work except for installation of project identification signs will be allowed to commence prior to approval of the Work Zone Traffic Control Plan.

12-1.03 Traffic Control

Attention is directed to Section 7-1.08, "Public Convenience" and to Section 5-1.05, "Order of Work" of the Standard Specifications.

Exact locations of Project Identification signs and Advance Notice signs (Section 7-1.08 “Public Convenience”) shall be determined in the field by the Engineer.

Lane closures will be permitted between the hours of 8:30 a.m. and 4:00 p.m. only. Only one lane at a time may be closed and no lanes shall be closed at any other hours unless specifically approved by the Engineer. The Contractor shall maintain vehicle access to homes and other properties at all times while work is in progress.

The Contractor shall keep the City of Rohnert Park Police and Fire Department informed regarding the closure of any traveled way. At a minimum, the Contractor shall call the Police Department at 584-2600 **daily** to report any traveled way closure. This means immediately upon closure for that day and again immediately after removal of the closure. For closures over multiple days, the daily notification still applies.

If the Contractor has been given an approved Traffic Control Plan that includes road closures, he/she will be required to maintain vehicular access to homes and other properties where work is in progress within the closure area.

Seventy-two (72) hours prior to construction, the Contractor shall place a notice on each front door, and attempt to notify each owner or tenant verbally that work will be underway within his block between stated hours, and request that cars be parked out of the roadway by 8:00 a.m. Service of notice shall not bar use of local cars within the block.

Barricades and flaggers shall be positioned to allow safe turns at intersections.

The Contractor shall maintain traffic control as necessary and as directed by the Engineer. Flaggers, barricades, signing, etc., shall remain in place for protection of City personnel until such time as all temporary lane delineation is complete.

~~SECTION 12-2 FLAGGING~~

~~12-2.02 Flagging Costs~~

~~The first paragraph of Section 12-2.02, "Flagging Cost" of the Standard Specifications is amended to read:~~

~~The cost of furnishing all flaggers, including transporting flaggers, to provide for passage of public traffic through the work under the provisions in Section 7-1.08, "Public Convenience", and Section 7-1.09, "Public Safety", shall be considered as included in the contract lump sum price paid for traffic control and no additional allowance will be made therefore.~~

~~12-4 MEASUREMENT AND PAYMENT~~

~~12-4.01 Payment~~

~~Traffic Control will be paid for at the contract lump sum price, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work involved in traffic control, including temporary relocation of regulatory signs, as specified herein, and no additional allowance will be made therefore.~~

SECTION 12-5 – MATERIAL RECYCLING

12-5.01 Description

The Contractor shall dispose of all portland cement concrete and asphalt concrete, generated from removal or demolition activities on the project, at a recycler for these materials. The Contractor shall provide receipts verifying delivery and approximate quantity (in tons) of the material delivered to a material recycler.

All other excess materials from the project shall become the property of the Contractor and shall be disposed of by him, at his expense.

~~12-5.02 Payment~~

~~Full compensation for material recycling as specified herein shall be considered as included in the contract prices paid for various items of work, and no additional compensation will be allowed therefore.~~

SECTION 15 – EXISTING HIGHWAY FACILITIES

15-3 Removing Concrete

15-3.02 Removal Methods

Concrete removal shall conform to applicable provisions of Section 15-3 of the Standard Specifications and as specified herein.

All concrete to be removed shall be disposed of by the Contractor away from the site of the work. Burying of broken concrete within the limits of the project will not be allowed.

All concrete which is to be removed from sidewalk, curb, gutter, and driveway areas shall be removed to the nearest score mark or construction joint as directed by the Engineer.

~~Reinforcing steel may be encountered in portions of concrete to be removed and no additional allowance will be made for the removal of such steel.~~

~~**15-3.03 Measurement**~~

~~Quantities of concrete removal to be paid for will be measured in place prior to removal.~~

~~**15-3.04 Payment**~~

~~The removal and disposal of concrete will be paid for at the contract price per cubic yard for concrete removal, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in removing and disposing of the material as specified, and no additional allowance will be made therefore.~~

SECTION 16 – CLEARING AND GRUBBING

l6-l.0l Description

Clearing and grubbing shall conform to the applicable provisions of Section l6 of the Standard Specifications, with the following modifications and additional requirements.

Clearing, grubbing, and access shall be confined to the limits shown on the Plans and shall not exceed the minimum necessary to complete operations.

The Contractor shall not remove any trees, brush, shrubs, or other natural objects outside the limits of construction as shown on the Plans, unless directed by the Engineer.

Any trees, brush, shrubs, or other natural objects not ordered removed by the Engineer which have been removed, altered, or damaged shall be replaced in kind by the Contractor before completion of the project.

All unsuitable material shall be disposed of away from the site by the Contractor. The Contractor shall make all necessary arrangements for disposal of material.

l6-l.02 Preservation of Property

All existing street designation and traffic control signs and posts within the ~~aforementioned~~ limits of work shall be carefully removed, cleaned of excess earth and delivered to the City Corporation Yard at ~~1 Trebino Court~~600 Enterprise Drive except those required for traffic control as determined by the Engineer.

l6-l.03 Construction

The area to be cleared and grubbed shall be the area within the right-of-way shown on the Plans, unless otherwise specified in the special provisions.

All stumps, large roots and other objectionable material shall be removed to a depth of 3 feet below finished grade in the area of construction. The resulting spaces shall be backfilled with material suitable for the planned use. Such suitable material shall be placed and compacted in layers as specified in Section 19-6 "Embankment Construction" of the Standard Specifications.

l6-l.04 Removal and Disposal of Materials

Combustible debris shall be disposed of away from the site of the work. Burning within the limits of the project will not be allowed.

~~**l6-l.06 Payment**~~

~~Clearing and grubbing will be paid for at the contract lump sum price for clearing and grubbing, which price shall include full compensation for furnishing all labor, materials tools and~~

~~equipment, and doing all the work involved in clearing and grubbing as specified herein, and no additional allowance will be made therefore.~~

SECTION 19 – EARTHWORK

19-l.01 Description

Unsuitable material may be removed and replaced, or may be stabilized in accordance with the provisions of Section 19-2.02, "Unsuitable Material."

19-l.03 Grade Tolerance

Immediately prior to placing subsequent layers of material thereon, the grading plane shall conform to one of the following:

A. When aggregate subbase or aggregate base is to be placed on the grading plane, the grading plane shall not vary more than 0.05' above or 0.1' below the grade established by the Engineer.

B. When asphalt concrete base is to be placed on the grading plane, the grading plane shall not vary more than 0.05' above or below the grade established by the Engineer.

19-2 Roadway Excavation

19-2.02 Subgrade Stabilization

Unsuitable material shall be stabilized per Section 19-2.02 of the Standard Specifications with the following additions:

In the event that the subgrade material is unstable and cannot be made stable by drying the top six inches as determined by the Engineer, then the Contractor shall excavate an additional six inches, install soil stabilization fabric and install six inches of Class 4 aggregate sub-base.

Prior to placement of soil stabilization fabric, the Contractor shall remove all loose dirt as left from excavation operations.

Soil stabilization fabric shall be installed per manufacturer's recommendations and shall meet or exceed the following specifications:

Grab Tensile Strength 290 lb.
Mullin Burst Strength 500 psi
Trapezoid Tear Strength 120 lb.
Modulus (Load at 10% Elongation) 120 lb.
Equivalent Opening Size 40-70 Sieve
Water Permeability Coefficient(K) .003 cm/sec.

Soil stabilization fabric shall be Mirafi 600-X, Supac 6WS, Fibretex TEN-5, or equal.

Aggregate sub-base shall be Class 4 with a minimum sand equivalent value of 21, a minimum R-value of 50 and shall conform to the following gradings:

Sieve Size	Percent Passing
2"	100
1-1 1/2"	90-100
3/4"	50-85
#4	25-45
#200	2-11

The material contained on the #4 screen shall consist of 100% crushed particles.

Aggregate sub-base shall be end-dumped on the soil stabilization fabric without disrupting fabric or basement soil as directed by the Engineer. Rolling shall commence immediately after spreading of the damp material and before the material has dried sufficiently to allow separation between the fine and coarse particles. Compactor shall be a non-vibratory type and compaction shall be to 92% R.C.

19-2.02 Unsuitable Material

(The following shall apply in lieu of Section 19-2.02)

Material below the natural ground surface in embankment areas, and basement material below the grading plane in excavation areas, that is determined by the Engineer to be unsuitable for the planned use, shall be excavated and disposed of or stabilized as directed or approved by the Engineer.

~~The removal and disposal of such unsuitable material will be paid for as roadway excavation for the quantities involved.~~

When unsuitable material is removed and disposed of, the resulting space shall be filled with material suitable for the planned use. Such suitable material shall be placed and compacted in layers as hereinafter specified for constructing embankments.

Stabilization of unsuitable material shall comply with the following provisions:

A. Unsuitable material may be processed in place, may be excavated and placed on the grade or other locations suitable for further processing, or may be partially excavated and partially processed in place.

B. Processing may consist of drying to provide a stable replacement material, or mixing with hydrated lime or granular quicklime.

C. Stabilized material shall be placed and compacted in layers as hereinafter specified for constructing embankments.

~~Excavations of material to be stabilized will be paid for at the contract unit price for roadway excavation. Such unit price shall include full payment for all work required to stabilize the unsuitable material, except that payment for lime and the spreading of lime will be paid for as extra work in accordance with the provisions of Section 4-1.03D, "Extra Work."~~

~~**19-2.08 Measurement**~~

~~Earthwork operations measured and paid for as roadway excavation for the quantities of material involved shall include excavating unsuitable materials when directed by the Engineer.~~

~~**19-2.09 Payment**~~

~~Payment for roadway excavation shall be in accordance with Section 19-2.09 except that overhaul shall not apply and that excess material from excavation which is not used for embankment construction shall become the property of the Contractor and shall be disposed of by him at his expense.~~

~~Subgrade stabilization will be paid for at the contract price per square yard as measured in the field. Payment shall include full compensation for doing all work involved in stabilizing the subgrade as specified herein including labor, materials, tools and equipment, six inches of excavation, soil stabilization fabric, Class 4 aggregate sub-base, compaction and no additional allowance will be made therefore.~~

~~The estimated quantity of subgrade stabilization is for bidding purposes only. This quantity may be increased, decreased or eliminated in its entirety based on field condition evaluation by the Engineer, and no adjustment in the contract bid price or other contract items will be made therefore.~~

~~The quantity of roadway excavation to be paid includes anticipated excavation for all road and driveway conforms. Payment will conform to Section 19-2.08 of the Standard Specifications.~~

~~Roadway excavation will be paid for at the contract price per cubic yard which price shall include full compensation for all work as specified herein in Section 19 and no additional allowance will be made therefore.~~

19-3.06 Structure Backfill

Specifications for pipe bedding, trench backfill and surfacing shall be as shown on City Std. 215, "Standard Trench Detail."

Except for structural backfill placed at specific locations described and enumerated in Section 19-3.06 of the Standard Specification, structural backfill material specifications and compaction requirements shall be as follows:

Structure backfill shall have a Sand Equivalent value of not less than 30 and shall conform to the following gradation:

Sieve Sizes	Percentage Passing
3”	100
No. 4	40-100

Structural backfill shall be compacted to not less than 90 percent relative compaction, except that when placed under any roadbed, relative compaction shall be not less than 95 percent within 3 feet of finished grade.

19-4 Ditch Excavation

Ditch excavation shall conform to the applicable provisions of Section 19-4 of the Standard Specifications.

19-4.01 Description

Ditches shall be constructed in conformance with the details and at the locations as shown on the Plans, as directed by the Engineer, and as specified herein.

~~**19-4.03 Payment**~~

~~Ditch excavation will be paid for at the contract price per cubic yard, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in ditch excavation and construction as specified herein, and no additional allowance will be made therefore.~~

19-5.03 Relative Compaction

(95 percent – California Test 216 and 231) (The following shall apply in lieu of Section 19-5.03)

Relative compaction of not less than 95 percent shall be obtained for a minimum depth of 0.75-foot below the grading plane for the full width of the planned structural section, whether in excavation or embankment.

Any area of the subgrade determined by the Engineer to be unstable, as evidenced by excessive deflection under the movement of equipment, shall be brought to satisfactory stability by additional rolling, reworking, removal, and replacement of unsuitable material, or stabilization with lime, as directed by the Engineer.

Lime treated materials shall be compacted to not less than 95 percent relative compaction in accordance with the provisions of Section 24, except when lime is used to stabilize unsuitable material as specified in Section 19-2.02.

Relative compaction of not less than 95 percent shall be obtained for embankment under bridge and retaining wall footings without pile foundations within the limits established by incline planes sloping 1.5:1 out and down from lines one foot outside the bottom edges of the footing.

19-5.04 Relative Compaction

(90 percent – California Test 216 and 231) (The following shall apply in lieu of Section 19-5.04)

Relative compaction of not less than 90 percent shall be obtained in all materials in embankment except as specified herein to be 95 percent. Material placed in accordance with the provisions of Section 19-2.02, "Unsuitable Materials," shall be compacted to not less than 90 percent relative compaction.

19-7.02 Imported Borrow

Imported borrow shall be free of any regulated hazardous materials.

SECTION 20-4 – HIGHWAY ROADWAY PLANTING

20-4.05 Planting

Trees shall have a minimum height of ~~eight~~ twelve feet including root ball, and a minimum container size of fifteen gallons, with a caliper of 1" at 12" above the top of the root ball.

Conditions of the plants shall be symmetrical, typical for variety and species, sound, healthy, vigorous, free from plant disease, insect pests or their eggs, and shall have healthy, normal root systems, well filling their containers, but not to the point of being root bound. Plants shall not be pruned or topped prior to delivery.

Each tree shall be tagged to indicate genus and species.

All plant material shall be subject of the inspection and approval of the City. The City has the right to reject any item offered.

a. 48-hour notification shall be given prior to any inspection.

b. Upon initial notification, the Contractor shall indicate the number of sequences or planting phases necessary to complete the entire project.

c. 24-hour notice shall be given the City prior to starting any additional phase.

d. At the time of final inspection, the City may select at random one tree from each planting phase, to be removed and inspected for compliance to planting specification.

Parkway Tree Planting Operations:

All pits shall be dug with bottoms level, the width equal to two times the diameter of the root ball, and the bottom ~~1 1/12 times~~4 inches less than the depth of the root ball. The City upon notification shall inspect pits prior to planting of trees.

Pits shall be backfilled with a thoroughly mixed "prepared soil" ~~to the bottom of the root ball~~. When planting tablets are required, they shall be placed prior to placing the tree in the pit. Five (21 gram) planting tablets shall be evenly spaced around perimeter of pit on top of prepared soil.

"Prepared soil" mix for backfill of the pits for 15-gallon trees shall consist of excavated soils and the following:

a. 50% by volume of nitrolized soil amendment.

b. 50% by volume native soil.

c. Five 21-gram planting tablets. (20-15-5 analysis)

Note: (1) Nitrolized soil amendment shall be a composted wood byproduct combined with one pound of actual nitrogen per cubic yard of shavings.

(2) Planting tablets shall be a commercial fertilizer in tablet form yielding 20% nitrogen, 10% phosphorus and 5% potash. The tablet shall be compressed and yield a slow release of nutrient over a 12-month period.

Set plants in center of pit, in vertical position, so that crown of ball will be level with finish grade after allowing for watering and settling ~~and shall bear the same relationship to finish grade that it did to soil surface in original place of growth~~.

Prepare a depressed earth water basin capable of holding 10 gallons of water. Water shall be applied in that quantity at time of planting.

Each tree must be properly supported by two Lodgepole Pine stakes. Stakes shall be a minimum of 2" x 2" and not less than eight feet in length. Stake all trees at time of planting by placing stake in prepared hole and driving stake a minimum of 30 inches into soil. Stakes shall be placed perpendicular to direction of prevailing winds.

All trees shall be secured to stakes as detailed (or approved equal).

Six-penny scaffold nails shall be used to secure the ties to the stakes – two per side.

Guarantees

Fifteen-gallon trees shall be guaranteed as to growth and health for a period of one year after final acceptance by the City.

Trees that fail to grow or are injured or damaged during planting operations, shall be replaced ~~within 15 days after notification during the contract period and~~ within 30 days ~~during the one-year maintenance period~~. Replacement material shall be guaranteed as specified as original guaranteed material.

Trees not installed according to the requirements will be rejected by the City.

SECTION 21 – NOTIFICATION

21-1.01

The Contractor shall notify the Project Engineer or Project Inspector of any work to be performed on any given work day either on the afternoon of the prior working day or before 8:30 a.m. on the given working day. Any work completed for which the Project Engineer or Project Inspector has not received prior notification of its scheduling MAY NOT BE ACCEPTED ~~FOR PAYMENT~~.

~~**21-3.01 Payment**~~

~~Full compensation for conforming to the provisions of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.~~

SECTION 24 – LIME TREATMENT

24-1.01 Description

(The following shall apply in lieu of Section 24-1.01)

This work consists of stabilizing basement soil, mixing in place material, lime and water, and spreading and compacting the mixture to the lines, grades, and dimensions shown on the Plans and as specified herein.

24-1.01-A

Where designated by the Engineer, basement soil below the planned lime treated subgrade shall be stabilized in the following manner:

The material shall be excavated to the lines and grades specified by the Engineer and spread in a uniform layer over another portion of the grade.

Dry lime in the amount specified by the Engineer shall be spread and mixed into the material as provided in Section 24-1.06, "Mixing". The material shall then be used to backfill the original excavation in 6" compacted layers. Each layer below a plane 12" below the grading plane shall be compacted to not less than 90 percent relative compaction. Each successive 6" layer up to the bottom of the planned lime treated subgrade shall be compacted to not less than 92 percent relative compaction.

24-1.02 Materials

Lime to be used shall be granular quicklime and shall be added to the existing material at the approximate rate of four percent by weight of the dry material, the exact percentage to be determined by the Engineer, based on geotechnical tests provided by the contractor.

~~When permitted by~~Lime treatment must be approved by the Engineer in writing, and ~~when~~ accompanied by an adequate safety program to be proposed by the Contractor. G~~, g~~ranular quicklime shall conform~~ing~~ to the specifications of ASTM Designation C51 ~~may be used in lieu of commercial hydrated lime~~. Hydrated lime shall be used only when permitted by the Engineer in writing.

When sampled by the Engineer at the point of delivery, the sample of quicklime shall contain not less than 90 percent Calcium Oxide, CaO, as determined by ASTM: C 25-67.

G~~When g~~ranular quicklime ~~is used,~~ initial mixing shall continue until the quicklime is uniformly distributed throughout the material. Water shall be added as required to proved sufficient moisture for hydration. The mixture shall be cured for not less than 16 hours prior to final mixing.

~~Lime to be used shall be granular quicklime and shall conform to Section 24-1.02 of the City Specifications, and shall be added to the existing material at the approximate rate of four percent by weight of the dry material, the exact percentage to be determined by the Engineer.~~

The Contractor shall provide a grade checker to insure mixing to the full depth as specified. Water shall be added during the final mixing operations until the water content of the mixture is approximately two percent above the test optimum moisture content.

24-1.06 **Mixing**

Mixing shall be in accordance with Section 24-1.06 of the Standard Specification.

24-1.07~~5~~ Spreading and Compacting

Lime treated material shall be a minimum of 12~~6~~ inches deep except where required elsewhere to be greater and finished to the lines and grades as shown on the Plans.

Lime treated material shall be compacted to not less than 95 percent, as determined by Test Method No. California 216 and 231. The sample of lime treated soil used for determining the maximum wet density shall be obtained from the test site at the time of testing.

The surface of the lime treated material shall not vary more than 0.05-foot above or below the grade established by the Engineer

24-1.~~06~~09 Curing

Curing of lime treated material shall be in accordance with Section 24-1.09 of the Standard Specifications.

The Contractor may, at his option, omit the curing seal if the first lift of A.C. Base is placed within twenty-four (24) hours after the final compaction of the lime treated material.

~~**24-1.08 Payment**~~

~~The contract price paid per square yard for lime treated base shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all the work involved in constructing lime treated base, including furnishing and placing asphaltic emulsion curing seal, and no additional allowance will be made therefore.~~

~~The contract price paid per ton of granular quicklime shall include full compensation for furnishing granular quicklime, including furnishing State Certificates of Weights and Measures, and no additional allowance will be made therefore.~~

SECTION 25 – AGGREGATE SUBBASE

25-1.01 Aggregate Subbase

Aggregate subbase shall be Class 4 conforming to and placed in accordance with the requirements of Section 25 of the Standard Specifications, with the following modifications and additional requirements.

Aggregate subbase shall be Class 4 with a minimum sand equivalent value of 21, a minimum R-value of 50 and shall conform to the following gradation:

Sieve Size	Percent Passing
3"	100
1-1/2"	90-100
3/4"	50-90
#4	25-55
#200	2-11

The material contained on the #4 screen shall consist of 100% crushed particles.

Rolling shall commence immediately after spreading of the damp material and before the material has dried sufficiently to allow separation between the fine and coarse particles.

~~Class 4 aggregate subbase will be paid for at the contract price per square yard.~~

~~The contract price paid per square yard for Class 4 aggregate subbase shall include all compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in furnishing and placing the base material as specified, including furnishing, hauling, and applying water as specified and directed by the Engineer.~~

25-1.03 Grade Tolerance

The subgrade to receive aggregate subbase, immediately prior to spreading, shall not vary more than 0.05-foot above or 0.1-foot below the grade established by the Engineer.

25-1.05 Compacting

The surface of the finished aggregate subbase shall be firm and unyielding. Any visible movement vertically or horizontally of the aggregate subbase under the action of construction equipment or other maximum legal axle loads shall be considered as evidence that the aggregate subbase does not meet this requirement.

~~**25-1.06 Payment**~~

~~Class 4 aggregate subbase will be paid for at the contract price per square yard.~~

~~The Contract price paid per square yard for Class 4 aggregate subbase shall include all compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in furnishing and placing the base material as specified, including furnishing, hauling, and applying water as specified and directed by the Engineer.~~

SECTION 26 – AGGREGATE BASE

26-1.01 Aggregate Base

Aggregate base shall be Class 2 conforming to and placed in accordance with the requirements of Section 26 of the Standard Specifications, with the following modifications and additional requirements.

Rolling shall commence immediately after spreading of the damp material and before the material has dried sufficiently to allow separation between the fine and coarse particles.

26-1.02 Quality Requirements

The minimum sand equivalent shall be 31 for any individual test.

26-1.05 Compacting

The surface of the finished aggregate base shall be firm and unyielding. Any visible movement vertically or horizontally of the aggregate base under the action of construction equipment or other maximum legal axle loads shall be considered as evidence that the aggregate base does not meet this requirement.

~~26-1.06 Payment~~

~~Class 2 aggregate base will be paid for at the contract price per square yard.~~

~~The Contract price paid per square yard for Class 2 aggregate base shall include all compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in furnishing and placing the base material as specified, including furnishing, hauling, and applying water as specified and directed by the Engineer.~~

SECTION 37 BITUMINOUS SEALS

37-2 SLURRY SEAL

37-2.01 Description

This item shall consist of furnishing and placing a slurry seal coat on Rohnert Park City streets as designated herein in conformance with the requirements of Section 37-2, "Slurry Seal", of the Standard Specifications, the International Slurry Seal Association Publication A105 and as specified herein.

This work consists of preparation and application of a Type II latex modified slurry seal on various roadway sections as indicated on the plans, these specifications or as directed by the engineer in the field. A roadway will include all travel lanes, shoulders, acceleration and deceleration lanes, truck turnouts and intersections. Repair any roads, driveways, walls and curbs which are damaged during construction, to their original or better condition.

Slurry Seal shall consist of mixing asphalt emulsion, aggregate, and water and spreading the mixture on a surface or pavement where shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

37-2.03 Materials

The materials used shall conform to Section 37-2.02 “Materials” of the Caltrans Standard Specifications, with the exceptions noted in these Technical Specifications.

37-2.02A Asphaltic Emulsion

Latex emulsified asphalt shall be a quick traffic, quick cure (QT-QC) type, conforming to Section 94. This emulsion shall be homogeneous and show no separation after thorough mixing. It shall break and set on the aggregate within five (5) minutes and be ready for cross-traffic within five to thirty minutes. The latex asphalt emulsion shall conform to the following requirements:

Test on Emulsion	Method of Test	Requirements
Viscosity, SSF @ 77 degrees F, sec	ASTM D244	15-90
PH	ASTM D244	2 +/- 1
Residue by Distillation	ASTM D244	60% minimum

Test on Residue from Distillation Test:

Test on Residue	Method of Test	Requirements
Penetration @ 77 degrees	ASTM D5	40 – 80
Softening Point (Ring & Ball) degrees, F	ASTM D36	130 +
Ductility @ 75 degrees F, 5 cm/min., min.	ASTM D113	25
Fraass-Breaking Point (degrees C)	DIN 52012	– 18

37-2.02B Water

Water shall be free of harmful soluble salts and shall be of such quality that the asphalt will not separate from the emulsion before the slurry seal is in place in the work.

37-2.02C Aggregate

Aggregate shall consist of sound, durable, crushed gravel and approved mineral filler. The material shall be free from vegetable matter and other deleterious substances. Aggregate shall be 100% crushed, with no round particles, and shall be volcanic in origin and black in color. The use of gray or light-colored aggregate will not be allowed. The percentage composition of the aggregate shall conform to the following grading.

PERCENTAGE PASSING

Sieve Size	Type II
No. 3/8”	100
No. 4	94 – 100
No. 8	65 – 90
No. 16	40 – 70
No. 30	25 – 50
No. 200	5 – 15

	Type II
Theoretical asphalt content range, % dry aggregate	7.5 to 13.5
Approximate application rate (pounds per square yard)	15 to 20

The aggregate shall conform to the following additional quality requirements:

Test	California test	Type II
Sand Equivalent	217	70 min.
Durability Index fine	229	70 min

37-2.02D Polymer Latex.

Styrene Butadiene Rubber latex shall be added to the water/soap phase by injection prior to the mill manufacture of the asphalt emulsion by the emulsion producer. The latex shall be BASF NX 1118 or approved equal. The amount of latex solids shall be between 2.5 and 3 percent of the asphalt residual content and shall be certified by the emulsion producer on each load of emulsion delivered to the job site. No post or field addition of Polymer Latex will be allowed. Samples of latex shall be provided and shall conform to the following requirements:

Test	Requirement
Total solids, minimum %	60
Bound Styrene %	24-60
PH at 25 degrees C	4.2-5.2
Brookfield viscosity RVT	1000-4000
Residual Monomer %	0.08 max.

37-2.02E Mineral Filler.

The mineral filler shall be either Portland cement or other approved mineral fillers, if required. Portland cement, if used, shall be commercially available Type I-II and shall be free of lumps and clods.

37-2.03 Mix Design

The tests and mix design shall be performed by a laboratory capable of performing the applicable International Slurry Seal Association (ISSA) tests. Provide the Engineer with the test results and the proposed mix design from a City approved laboratory conforming to the following tests in ISSA A105. The plot of Wet Loss on Wet Track Abrasion and Excess Asphalt verses percent emulsion shall be supplied to the Engineer with the mix design. The proposed slurry seal mixture shall conform to the requirements specified when tested in accordance with the following tests:

Test	SSA Test Method	Requirement
Slurry Seal Consistency, cm	T106	3 max.
Wet Stripping	T114	Pass
Compatibility	T115	Pass (a)
Cohesion Test (b), kg - cm within 1 hour	T139	20 min.
Wet Track Abrasion, g/sq. ft.	T100	75 max.
Excess Asphalt by LWT Sand Abrasion	T109	38 g/m^2 max.
a. Mixing test must pass at the maximum expected air temperature at the project site during application.		
b. Using project source aggregate asphalt emulsion and set-control agents if used.		

The laboratory report shall be signed by the laboratory that performed the tests and mix design and shall show the results of the tests on individual materials, comparing the test results to those required by the specifications. The report shall clearly show the proportions of aggregate, filler (as determined from the tests, minimum and maximum), water (minimum and maximum), and asphalt solids content based on the dry weight of aggregate and set-control agent usage. Previous laboratory reports covering the same materials may be accepted provided they are made during the same calendar year.

37-2.04 Proportioning

Asphalt emulsion shall be added at a rate determined by the mix design and in the range of the table above. A job mix design shall be submitted by the Contractor for approval by the Engineer that conforms to the specification limits, and that is suitable for the traffic, climate conditions, curing conditions and final use. This will include recommended application rate of slurry to suit the job conditions.

Calibrated flow meters shall be provided to measure both the addition of water and liquid additives to the pug mill. If necessary for workability, a retarding agent, that will not adversely affect the seal, may be used.

Water, and retarder if used, shall be added to ensure proper workability and (a) permit uncontrolled traffic on the slurry seal no more than three (3) hours after placement without the occurrence of bleeding, raveling, separation or other distress; and (b) prevent development of bleeding, raveling, separation or other distress within thirty (30) days after placing the slurry seal.

37-2.05 Mixing and Spreading Equipment

Mixing and spreading equipment shall be in accordance with the Caltrans Standard Specifications, Section 37-2.04 and 37-2.05, respectively, and as specified herein.

The Slurry Seal shall be mixed in a self-propelled mixing machine equipped with a continuous flow pug mill capable of accurately delivering and automatically proportioning the aggregate, emulsified asphalt, water and additives.

The slurry seal retention time in the pug mill shall be less than three seconds. No retention of mixed slurry seal shall be allowed within the pug mill by gate shut-off or other mechanical means. The mixing machine shall have sufficient storage capacity of aggregate, emulsified asphalt, and water to maintain an adequate supply to the proportioning controls.

The mixing machine shall be equipped with controls for proportioning the material to the mix. Each material control device shall be calibrated, properly marked, and lockable at the direction of the Engineer.

The mixing machine shall be equipped with an approved fines feeder that provides a uniform, positive, accurately metered, amount of a mineral filler, if used, at the same time and location that the aggregate is fed.

The mixing machine shall be equipped with measuring device that allows for quick accurate measurement of the volume.

The mixing machine shall be equipped with a water pressure system and nozzle type spray bars to provide a water spray immediately ahead of the spreader box.

Gages or approved means of measurement shall be provided on the equipment so that the proportional rates of aggregate, water and asphalt emulsion can be checked at intervals determined by the Engineer.

The spreader shall be capable of spreading a traffic lane width and shall have strips of flexible rubber belting or similar material on each side of the spreader box and in contact with the pavement to prevent loss of slurry from the box. The box shall have baffles, or other suitable devices, to insure uniform application on super-elevated sections and shoulder slopes. Spreader boxes shall be maintained in such a manner as to prevent chatter (wash boarding) or other surface defects that will affect the aesthetic value of the finished slurry seal mat.

The rear flexible strike-off blade shall be capable of being adjusted to the various crown shapes so as to apply a uniform slurry seal. Any burlap drag used shall be replaced when it loses its flexibility.

The Contractor shall calibrate the spreader vehicle(s) to be used on the project to the approved mix design prior to their arrival at the job site, and shall furnish the Engineer a copy of the calibration settings for each vehicle. Thereafter, no adjustments in the aggregate and emulsion settings shall be made without the approval of the Engineer.

The Contractor shall demonstrate the ability to mix and apply slurry in a satisfactory manner and to the approved mix design with each spreader vehicle. The Contractor may not begin work until the ability to apply slurry as specified is demonstrated to the Engineer.

37-2.06 Placing

Prior to sealing each street, the Contractor shall verify that each street to be sealed has been "approved for sealing" by the Inspector.

Surface to receive slurry seal shall be prepared in accordance with the requirements specified for preparing surfaces to receive asphaltic emulsion as specified in Section 37-1.04, "Preparation for Seal Coat", of the Caltrans Standard Specifications.

Before placing the slurry seal, the pavement surface shall be cleaned by sweeping, and other means necessary to remove all loose particles of paving, all dirt and all other extraneous material. Power sweepers shall be required to sweep from face of curb to face of curb. This shall involve a minimum of three passes with a power broom street sweeper (Mobile or equivalent). Pavement missed by or inaccessible to broom sweepers shall be swept clean by other approved methods. Contractor shall provide whatever flushing, compressed air, or other cleaning methods necessary to remove all dirt and loose material from the pavement.

Three working days prior to the slurry seal operations, the contractor shall notify all residents, businesses and agencies with an approved written notice detailing the streets and limits of work to be done along, with the hours of work. The contractor shall also post all streets with temporary "No Parking - Tow Away" signs at 50 foot staggered intervals. These signs shall also state the day of the week and hours of no parking.

Immediately preceding the seal application, the Contractor shall cover all grates, slotted manholes, and other appurtenances on and adjacent to the pavement that would allow the entry of the sealing materials; mask with roofing paper, all closed manhole covers, water and gas valve box covers, monuments, monument boxes, etc.; and remove all existing raised pavement markers, paint and thermoplastic pavement markings.

No adhesive material shall be permitted to cover, seal or fill the joint between the frame and cover of the structure.

Drainage inlets, shall be uncovered and cleaned to the satisfaction of the Engineer as soon as the seal sets. The other surface utilities shall be uncovered and cleaned of slurry material by the end of the same work day at each location. If they are not uncovered within this time frame, no additional seal shall be placed until they are uncovered.

Gutters, curbs, sidewalks, driveways, shoulders and other structures adjacent to the pavement to be slurry sealed shall be cleaned of excess seal to the satisfaction of the Engineer.

Asphalt pavement, concrete curb, gutter, sidewalk, and other concrete surface structures along existing streets damaged by the Contractor's operations, including but not limited to walkways, lawns and other landscaping, fences, gates, driveways, walls and mail boxes shall be replaced in kind by the Contractor.

Hand tools shall be available in order to remove spillage. Ridges or bumps in the finished surface will not be permitted. The mixture shall be uniform and homogeneous after spreading on the existing surface and shall not show separation of the emulsion and aggregate after setting.

Full compensation for protecting and repairing property as specified herein shall be considered as included in the price paid for other items of work, and no additional compensation will be allowed therefore.

The slurry seal shall be mixed, spread, and placed in accordance with the provisions of Caltrans Standard Specifications Section 37-2, with the following exceptions and additions:

The slurry seal shall not be applied when either atmospheric or pavement temperature is 55° F and falling but may be applied when both the atmospheric or pavement is 50° F and rising. The slurry seal shall not be applied during periods of abnormally high relative humidity that prolongs the curing beyond a reasonable time. Slurry seal shall not be applied when raining or foggy. Slurry seal shall not be applied when freezing or rain is expected within 24 hours.

The slurry seal mixture shall not be applied prior to 8:00 A.M. Also, the slurry seal mixture shall not be applied after 3:00 P.M., except if approved by the Engineer. Approval of applications after 3:00 P.M. will only be for the purpose of completing the section of work then underway. Beginning a new section of work after 3:00 P.M. will not be permitted.

The surface shall be fogged with water directly preceding the spreader. The slurry mixture shall be of the desired consistency when deposited on the surface. A sufficient amount of slurry shall be carried in all parts of the spreader at all times so that complete coverage is obtained. No lumping, balling or unmixed aggregate shall be permitted. No segregation of the emulsion and aggregate fines from the coarse aggregate will be permitted. If coarse aggregate settles to the bottom of the mix, the slurry will be removed from the pavement. No excessive breaking of the emulsion will be allowed in the spreader box. No streaks such as caused by oversize aggregate will be left in the finished pavement. Ridges (especially at existing raised pavement markers) and wash-boarding in the finished product will not be allowed.

The slurry mixture shall be uniformly spread. The rear flexible strike-off blade shall make close contact with the pavement.

The slurry seal shall be placed at a rate indicated in these specifications, unless approved by the Engineer prior to start of work. The completed mixture shall be such that the slurry seal mixture has proper workability and will permit traffic flow within four hours after placement without the occurrence of bleeding, raveling, polishing, separation or other distress, and prevent the development of bleeding, raveling, polishing, separation, or other distress within 30 days after its placement.

The quantity of asphaltic emulsion to be used in the slurry seal mixture will be determined from the design asphalt binder content, as approved by the Engineer, and the asphalt solids content of the asphaltic emulsion finished.

The slurry seal mixture shall be applied to the lip of gutter. On streets that have no concrete gutter, the slurry seal shall extend to the face of curb. Any application or spillage beyond this limit shall be removed or cleaned up by the Contractor to the satisfaction of the Engineer. Gutter spills shall be cleaned immediately.

The seal coat shall be applied in such a manner that the joint between the new and existing surface is neat and uniform in appearance true to the line shown on the typical cross section and established by the Engineer. Roofing paper or a comparable substitute shall be used at all ends of slurry seal limits to provide for a clean, neat, and straight definition of the end of the slurry. This includes starts and stops and handwork on turnouts.

Longitudinal joints shall be at the crown of the street or at the edge of travel lanes. Avoid joints in wheel paths.

No excessive buildup or unsightly appearance shall be permitted on longitudinal or transverse joints. Burlap drags shall be used. Overlaps shall not exceed 3 inches.

Approved squeegees shall be used to spread slurry in non-accessible areas to the slurry mixer. Care shall be exercised in leaving no unsightly appearance from hand work.

Slurry seal shall be rolled with a rubber tire roller 9-wheel assembly with a minimum tire pressure of 60 psi.

At any time the quality of the mix or workmanship is not to the satisfaction of the Engineer, the job shall be discontinued until a correction is made which is satisfactory to the Engineer.

Adequate means shall be provided to protect the slurry seal from damage from traffic until such time that the mixture has cured sufficiently so that the slurry seal will not adhere to and be picked up by the tires of the vehicles.

A sand blotter shall be spread at selected intersections and where required by the Engineer, to accommodate pedestrian or vehicular traffic until slurry sets. Sand blotter shall be placed by lightly broadcasting slurry aggregate so the wet slurry seal is not displaced. Sand blotters at intersections shall be swept within 24 hours of placement or sooner if directed by the Engineer.

Any traffic control devices (barricades, cones, or signs), which are moved in the process of applying the slurry, are to be returned to a proper position by the Contractor as soon as possible.

Wheel tracks, footprints, and other undesired markings in the slurry seal shall be repaired to the satisfaction of the Engineer.

Treated areas will be allowed to cure until such time as the Engineer permits their opening to traffic.

Fourteen days after completion of the slurry sealing, the contractor shall sweep the roadway section including all slurry sealed areas and all gutters to remove accumulated fines from the roadway surface.

Thirty days after completion of the slurry sealing, the contractor shall sweep the roadway section including all slurry sealed areas and all gutters to remove accumulated fines from the roadway surface.

SECTION 37 - BITUMINOUS SEALS

37-2 Slurry Seal

37-2.01 Description

This item shall consist of furnishing and placing a slurry seal coat on Rohnert Park City streets as designated herein in conformance with the requirements of Section 37-2, "Slurry Seal", of the Standard Specifications, the International Slurry Seal Association Publication A105 January 1986 (copies available from Association Headquarters, 1101 Connecticut Ave., Northwest Washington D.C. 20036) and as specified herein.

37-2.02A Asphaltic Emulsion

Bituminous binder shall be mixing type asphaltic emulsion SS-1 with Grade 60-70 paving asphalt base (American Asphalt Institute Designation CSS1-h Quickset Cationic Emulsion) conforming to Section 94 of the Standard Specifications.

37-2.02C Aggregate

The mixture shall be spread to an average thickness of 3/16" with a minimum thickness of not less than 1/8" and a maximum thickness not to exceed 1/4", and shall be placed at a rate of not less than 12 pounds or more than 17 pounds of aggregate per square yard of pavement surface.

Aggregate shall conform to the following gradation:

COARSE SEAL

Sieve Size	Percentage Passing
3/8	100
No. 4	95-100
No. 8	75-90
No. 16	50-70
No. 30	30-50
No. 50	18-30
No. 100	9-21
No. 200	5-15

Minimum sand equivalency - 52 or better.

Contractor is to furnish sample of aggregate for testing prior to start of work. Sieve analysis will be made during sealing operations to effect strict compliance with the gradation.

37-2.06 Placing

~~Start and finish of slurry application shall be a straight line obtained by laying a strip of building paper or other approved material on street surface which shall be used for starting and finishing operations. After application of slurry, paper is to be removed leaving a straight edge. Excess materials on street at either end of job shall be removed by Contractor.~~

~~Prior to the sealing operation, the City Public Works Department will arrange to perform any necessary patching of the street surface.~~

~~Immediately prior to the sealing operation, the Contractor will completely clean the pavement surface with power brooms and flushing of pavement with water if deemed necessary by the City Engineer and oil or cover all utility covers.~~

~~There shall be two 12-yard slurry application machines and one 8-yard slurry application machine on the job and in working condition at all times.~~

~~A non-labor supervisor shall be present and on the job at all times with sufficient crew to attain a minimum of 250,000 square feet of production per day.~~

~~See proposed slurry seal program in another section of this contract for locations and total approximate quantity of slurry seal in place.~~

~~All efforts to avoid covering traffic buttons shall be made by the Contractor.~~

~~Application of the Slurry Surfaces. The surface may be pre-wetted by fogging ahead of the slurry box if required by local conditions. Water used in pre-wetting the surface shall be applied at such a rate that the entire surface is damp with no apparent flowing water in front of the slurry box. The slurry mixture shall be of the desired consistency when deposited on the surface and no additional elements shall be added. Total time of mixing shall not exceed four minutes. A sufficient amount of slurry shall be carried in all parts of the spreader at all times so that complete coverage is obtained. No lumping, balling, or unmixed aggregate shall be permitted. If the coarse aggregate settles to the bottom of the mix, the slurry will be removed from the pavement. No excessive breaking of the emulsion will be allowed in the spreader box. No streaks such as caused by oversized aggregate will be left in the finished pavement.~~

~~Joints. No excessive build-up or unsightly appearance shall be permitted on longitudinal or transverse joints.~~

~~Hand Work. Approved squeegees shall be used to spread slurry in non-accessible areas to the slurry mixer. Care shall be exercised in leaving no unsightly appearance from hand work.~~

~~Curing. Treated areas will be allowed to cure until such time as the City representative permits their opening to traffic.~~

~~Clean-up. The Contractor shall clean the streets and all grounds of all excess material, rubbish, equipment and temporary structures associated with the performance of work on a daily basis.~~

~~37-2.08 Payment~~

~~Slurry seal will be paid for at the contract unit price per square foot, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all work involved in constructing the slurry seal complete in place including clean-up and protecting the seal from traffic damage until the mixture has cured sufficiently so that material will not adhere to the tires of vehicles, as specified herein, and no additional allowance will be made therefore.~~

SECTION 39 – ASPHALT CONCRETE

39-1.01 Description

Asphalt concrete surface and the placing thereof shall conform to the requirements of Section 39 of the Standard Specifications.

A minimum of two weeks prior to the placement of any Asphalt Concrete, the Contractor shall notify the Engineer of which asphalt plant will be used to supply the mix. For any job, Asphalt Concrete shall be supplied from a single plant.

39-2.01 Asphalts

The amount of asphalt binder to be mixed with the aggregate will be specified by the Engineer at the time of paving. A different asphalt binder content may be specified for each lift and each location.

Asphalt binder to be mixed with aggregate for Asphalt Concrete surface, leveling, or Open Graded courses shall be PG-64~~AR-4000~~ grade paving asphalt.

~~Asphalt binder to be mixed with aggregate for Asphalt Concrete Base shall be AR-8000 grade paving asphalt.~~

39-2.02 Aggregate

The aggregate grading of the various types of Asphalt Concrete shall conform to one of the following as directed by the Engineer:

Surface Course	Type A – ½" Maximum, Medium or Coarse, or ¾" Maximum, Coarse
Leveling Course	Type A – ¾" Maximum, Medium
Asphalt Concrete Base	Type A or B – ¾" Maximum, Medium
Open Graded	3/8" Maximum

39-4.01 Grade Tolerance

The subgrade to receive Asphalt Concrete or Asphalt Concrete Base immediately prior to applying prime coat, shall not vary more than 0.05-foot above or below the grade established by the Engineer.

39-4.02 Prime Coat and Tack Coat

Prime coat shall consist of either SC-70 or MC-70 grade liquid asphalt as directed by the Engineer and shall be furnished and applied in accordance with the provisions in Section 93 "Liquid Asphalts". Application shall be made when the surface is dry ~~or slightly damp~~, and when the air temperature in the shade is above fifty (50) degrees Fahrenheit, unless otherwise permitted by the Engineer. ~~When approved by the Engineer, additional thickness of Asphalt Concrete (A.C.) may be substituted for the prime coat. An additional 0.04-foot would be required if the design thickness of A.C. is less than 0.25-foot and an additional 0.02-foot if the design thickness of A.C. is 0.25-foot or greater.~~

A. Ensure area is clean and dry. All material accumulations which would interfere with the adhesion of the tack coat or with the placing and performance of the asphalt course shall be removed, including dust, loose aggregate, soil, leaves, and pieces or lumps of other foreign material deposited on the surface.

B. A paint binder (Tack Coat) shall be applied on asphalt to asphalt seams and joints as specified in Section 39-4. Prime Coat and Paint Binder (Tack Coat)," of the State Standard Specifications.

C. Before placing asphalt concrete, an asphalt emulsion tack coat of 70 percent CSS-1 and 30 percent water shall be furnished and applied uniformly to contact surfaces of all cold pavement joints, curbs, gutters, and all existing pavement to be surfaced in conformance with Section 39 of the Caltrans Standard Specifications. Apply a tack coat of emulsion at a rate of approximately 1 liter/m2 (0.2 gal/yd2) to the sides of the repair area.

D. If cut does not extend to subgrade, apply prime coat to prepared subbase at 0.2 to 0.25 gallons per sq. yard to fill all void and interstices and uniformly coat subgrade

E. Asphalt emulsion tack coat shall be applied to any course in advance of spreading the next course at 0.10 to 0.15 gallons per sq yard. Tack coat shall be applied between all asphalt concrete lifts. If successive lifts are paved on the same and when the surface temperature of the lower lift has not fallen below 150ºF, and the surface of the lower lift is clean, then the tack coat between lifts can be eliminated.

F. Asphaltic Concrete shall not be placed until the asphaltic emulsion tack coat has cured.

Following application of the prime coat, at least twenty-four (24) hours shall elapse before placing Asphalt Concrete. Any excess asphalt primer shall be blotted up with sand and removed from the grade.

Tack coat shall be diluted SS1 or CSS1, or undiluted RS-1 or CRS-1 type asphalt emulsion.

39-5 Hauling, Spreading, and Compacting Equipment

39-5.0~~0~~1 ~~Haul Vehicles~~Transporting Asphaltic Concrete

~~Prior to loading Asphalt Concrete, the bed of the haul vehicle shall be clean and free from all soil, sand, gravel, and other deleterious substances.~~

~~All haul vehicles shall be equipped with tarps which are in working order. Tarps shall be used on haul vehicles unless prior approval is obtained from the Materials Laboratory.~~

~~When spraying diesel or other parting agents in the bed of the haul vehicle, the minimum amount necessary to moisten the surface shall be used. In no instance will the parting agent be allowed to accumulate in the bed of the vehicle.~~

A. From mixing site in trucks having tight, clean compartments.

B. Coat hauling compartments with lime-water mixture to prevent sticking.

C. Elevate and drain compartment of excess solution before loading mix.

D. Provide covers over asphalt concrete mixture to protect from weather and to prevent loss of heat.

E. During periods of cold weather or for long distance deliveries, pre-insulation around entire truck bed surfaces.

39-5.02~~1~~ Spreading Equipment

The Asphalt Concrete shall be deposited from the haul vehicle into the hopper of the paving machine.

The practice of depositing the material on the roadbed in a windrow and subsequently using a pick-up machine to deposit the material in the hopper of the asphalt paver will not be allowed. All asphalt shall be placed in such a manner as to avoid separation.

39-5.~~0~~203 Compacting Equipment

Compaction rollers shall be either 2-axle steel-tired rollers, pneumatic-tired rollers, or approved double-drum vibratory rollers. Steel-tired static compaction rollers shall weigh not less than 12 tons.

Double-drum vibratory rollers shall be operated at a maximum speed of 135-feet per minute (approximately 1.5 mph). Double drum-vibratory rollers shall have a minimum frequency of 2400 VPM and the amplitude shall be field-adjustable.

All pneumatic-tired rollers shall be equipped with an approved wind skirt unless otherwise permitted by the Engineer. Pneumatic-tired rollers used for compaction of Asphalt Concrete Base shall be so equipped that the air pressure in all tires may be regulated uniformly by the operator while the roller is in motion.

Finish rollers shall be 2-axle steel-tired tandem rollers weighing not less than 8 tons.

39-6 Spreading and Compacting

39-6.01 General Requirements

Asphalt Concrete shall not be placed on any roadbed until all utility construction beneath the roadbed has been completed, sewer and water lines have been tested, and water lines chlorinated. The surface course of Asphalt Concrete shall not be placed until final utility connections have been made, unless otherwise permitted by the Engineer.

Asphalt Concrete shall not be placed after thirty (30) minutes before sunset, as established by weather bureau, except as otherwise authorized by the Engineer.

Asphalt Concrete or Asphalt Concrete Base shall not be placed during rainy weather or on a wet surface. Asphalt Concrete shall not be placed when the atmospheric temperature is below fifty (50) degrees Fahrenheit or conditions indicate it will drop below fifty (50) degrees Fahrenheit before the material can be satisfactorily compacted. Asphalt Concrete Base shall not be placed when the atmospheric temperature is below forty (40) degrees Fahrenheit or conditions indicate it will drop below forty (40) degrees Fahrenheit before the material can be satisfactorily compacted. Material which cannot be placed in compliance with these requirements shall be rejected.

The compacted thickness of Asphalt Concrete layers shall be as directed by the Engineer. The normal minimum and maximum compacted lift thickness for Asphalt Concrete surfacing are 0.17' and 0.25' respectively. The normal minimum and maximum compacted lift thickness for Asphalt Concrete Base are 0.25' and 0.33~~50~~' respectively. No layer shall be placed over a layer until the temperature at mid depth is not more than 160 degrees Fahrenheit.

39-6.03 Compacting

The temperature of the Asphalt Concrete shall be specified by the Engineer. Unless lower temperatures are specified by the Engineer, all mixtures shall be spread, and the first coverage of initial or breakdown compaction shall be performed, when the temperature of the mixture is not less than 250^{o} Fahrenheit at mid-depth, and all breakdown compaction shall be completed before the temperature of the mixture drops below 200^{o} Fahrenheit at mid-depth. Additional rolling equipment shall be required or the rate of spread shall be reduced to permit compliance with this requirement.

A. Asphalt Concrete surface course and leveling courses.

1. Equipment Required.

   If production in any one hours exceeds the limits set forth below, the Contractor shall cease his paving operation until additional rolling equipment has arrived on the project.

   a. 125 tons per hour or more.

The Contractor will be required to furnish a minimum of two approved double-drum vibratory rollers and one 8-ton tandem finish roller for each asphalt paver, with a separate operator for each roller.

A pneumatic roller may be substituted for one of the vibratory rollers if approved by the Engineer.

b. 50-125 tons per hour.

The required minimum rolling equipment specified above may be reduced to one approved double-drum vibratory roller and one 8-ton tandem roller for each asphalt paver, with a separate operator for each roller when the compacted thickness is not less than 0.17'.

c. 50 tons per hour or less, at any location.
The required minimum rolling equipment specified above may be reduced to one approved double-drum vibratory roller, weighing not more than 12 tons, for each paving machine.

2. Compaction Requirements.

Compaction rolling shall consist of a minimum of four complete vibratory coverages with an approved double-drum vibratory roller.

Finish rolling shall consist of one or more coverages with an 8-ton tandem roller immediately following completion of compaction rolling.

B. Asphalt Concrete Base.

1. Equipment required.

The Contractor shall be required to furnish one approved double-drum vibratory roller and a minimum of one pneumatic-tired roller, with a separate operator for each roller.

An approved double-drum vibratory roller may be substituted for the pneumatic-tired roller specified above.

2. Compaction requirements.

Compaction rolling shall consist of the following: a minimum of two complete vibratory coverages with an approved double-drum vibratory roller, and two complete coverages with a pneumatic-tired roller. The order of rolling shall be specified by the Engineer.

Final rolling shall consist of one coverage with the vibrating units turned off.

Approval of vibratory rollers: The Engineer may approve initial use of a double-drum vibratory roller not previously approved on the basis of tests by other agencies or other information provided by the Contractor.

Approval for subsequent use of the roller shall be based on cores taken from test sections designated by the Engineer and compacted with different numbers of coverages.

Test sections shall be compacted under the following conditions:

1. Asphalt Concrete temperature at mid-depth shall be between 270 and 280 degrees Fahrenheit at the beginning of rolling. Rolling shall not continue after the mix temperature has dropped to 200 degrees Fahrenheit. The compacted thickness shall be between 2" and 3.5".

2. The Contractor or manufacturer's representative shall specify the operating conditions of frequency and amplitude.

The basis for approval shall be the attainment of 97% relative compaction and satisfactory surface condition following final rolling. The number of coverages required shall be the minimum number required to obtain 97% relative compaction.

The mix will be sampled during paving of the test sections, and the test maximum density will be the average density of specimens compacted in accordance with California Test 304. The in-place density for each test section shall be the average of three core densities. Relative density will be the ratio of in-place density to test maximum density as determined by California Test 375.

~~**39-8.01 Measurement**~~

~~Asphalt Concrete and Asphalt Concrete Base will be measured by weight. The quantity to be paid for shall be the combined weight of the mixture.~~

~~All weights shall be supported by State Certificates of Weights and Measures furnished by the Contractor.~~

~~**39-8.02 Payment**~~

~~Compensation for edge grinding of the existing AC surface in preparation for the overlay shall be considered as included in the contract price paid for asphalt concrete surface.~~

~~Asphalt concrete surface will be paid for at the contract price per ton for asphalt concrete in accordance with Section 39-8.02 of the Standard Specifications and will be measured in accordance with Section 39-8.01 of the Standard Specifications.~~

~~Asphalt concrete base will be measured and paid for in accordance with Section 39-8.01 and 39-8.02 of the City of Rohnert Park Construction Specifications.~~

~~The Contract price paid per ton for Asphalt Concrete and Asphalt Concrete Base shall include full compensation for furnishing all labor, materials, tools, and equipment, and doing all the work involved in furnishing and placing Asphalt Concrete and Asphalt Concrete Base as specified, including furnishing and applying tack coat and saw cutting joints.~~

~~Full compensation for furnishing weighmaster's certificates shall be considered as included in the contract price paid per ton for Asphalt Concrete and Asphalt Concrete Base and no additional allowance will be made therefore.~~

39-9 Side Street Conforms

39-9.01 Description

Side street conforms shall conform to the requirements of City of Rohnert Park Std. 208, with the following additions: The side street structural section shall be 3.5 inches of asphalt concrete base and 2.5 inches of asphalt concrete surfacing between the limits of the main street and the conform line. Beyond the conform line the existing asphalt shall be removed and replaced as directed by the Engineer to provide a smooth transition.

~~39-9.05 Payment~~

~~The work involved in constructing side street conforms will be paid for at the contract unit price for AC surfacing, AC base, and roadway excavation, which price shall include full compensation for furnishing all labor, materials, tools, and equipment, and doing all work required to construct side street conforms, and no additional allowance will be made therefore.~~

39-10 Edge Grinding

39-10.01 Description

Edge grinding shall be done per City of Rohnert Park Std. 208, 209 and 210.

~~39-10.02 Payment~~

~~Edge grinding shall be paid for at the contract price per lineal foot, which price shall include full compensation for furnishing all labor, materials, tools, and equipment, and doing all work involved in edge grinding, and no additional allowance will be made therefore.~~

39-11 Pavement Reinforcing Fabric

Pavement reinforcement fabric is allowed only with the permission of the City Engineer.

39-11.01 Description

The fabric shall be a needle-punched non-woven 100% polypropylene fabric which conforms to the following properties:

P R O P E R T Y	MIN. VALUE
Tensile Strength, either direction (Per ASTM D1682-64)	90 lbs.
Elongation at Break, either direction (Per ASTM D1682-64)	50%
Weight, oz./sq. yd. (Per ASTM D-1910)	4.0 ± 0.5
Asphalt Retention by Fabric (Army Corps of Engineers Method)	0.20 gsy residual
Mullin Burst Strength (Per ASTM D-751)	160 psi

Prior to placing the fabric, the existing pavement to receive the fabric shall be cleaned to the satisfaction of the engineer of all materials such as, but not limited to, leaves, sand, dirt, gravel, water and vegetation.

Placement of the fabric shall be made only under the following conditions:

(1) The ambient air temperature is above 50° Fahrenheit and rising.

(2) The pavement is dry and the pavement temperature is above 40° Fahrenheit and rising.

The surface area to receive the fabric shall be sprayed with steam refined pavement asphalt type AR-4000 at the rate of 0.22 -0.28 gallons per square yard. The Contractor's attention is directed to Section 92-1.04, "Applying", of the Standard Specifications. The exact rate of application will be determined by the Engineer. The asphalt shall be sprayed with a suitably metered truck or the truck must have been recently calibrated by test method California No. 399A. The temperature of the asphalt binder must be spread in the range of 290° Fahrenheit and 365° Fahrenheit.

The width of asphalt application will be the fabric width plus 4 inches. Paving asphalt shall be applied no further in advance of the overlay than the distance which the Contractor can maintain free of traffic and in no case more than 100 yards. The paving operation shall closely follow fabric placement and no more fabric than can be covered up with the hot mix that working day shall be placed.

The fabric shall have no overlap. Fabric shall be butted at all joints. Transverse joints shall be shingled in the direction of paving to prevent edge pick-up by the paver.

The fabric shall be placed into the asphaltic binder with a minimum of wrinkles and broomed or squeegeed to remove any bubbles prior to the binder cooling substantially enough so that the fabric will not adhere to it. The equipment for placing the fabric shall be mechanized and capable of handling full rolls of material and shall be capable of laying the fabric without forming excessive wrinkles and/or folds. As directed by the Engineer, if fabric folds or wrinkles ½ inch in height or greater exist, the fabric shall be slit and allowed to lay flat. Brooming will maximize fabric contact with the pavement surface. The equipment used to place the fabric is subject to approval by the Engineer.

At each utility cover which could be covered with fabric, the fabric shall be neatly cut around the cover to allow for raising the cover to finished grade.

Turning of the paving machine or other vehicles should be gradual and shall be kept to a minimum to avoid damage to the membrane. Should equipment tires tend to stick to the fabric during pavement operations, small quantities of asphalt concrete shall be broadcast ahead to prevent sticking.

Pavement reinforcing fabric shall be Glasspave 25 or equivalent~~:~~

~~Petromat~~
~~Mirafi 900N~~
~~Fibretex A0~~

~~**39-11.02 Payment**~~

~~Quantities of pavement reinforcement fabric to be paid for shall be computed on the basis of the exact amount of area covered in the field.~~

~~The contract price paid per square yard for pavement reinforcing fabric shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and placing pavement reinforcing fabric, complete in place, as shown on the Plans and as specified herein, and as directed by the Engineer.~~

SECTION 39A – ASPHALT CONCRETE TRENCH PAVING

39A-1.01 Description

Asphalt concrete surfacing and asphalt concrete base and the placing thereof shall conform to the requirements of Section 39 of the Standard Specifications and as specified herein.

39A-2.01 Asphalts

Asphalt thickness for final asphalt surfacing shall conform to City Std. 215 or as shown on the Plans. **Note to Designer:** State existing section and proposed new trench asphalt concrete thickness.

For temporary paving, use 1/2" maximum, medium grade aggregate and SC 3000 asphalt for use the same day, or SC 250 for use over a one week period.

The amount of asphalt binder to be mixed with the aggregate will be specified by the Engineer at the time of paving. A different asphalt binder content may be specified for each lift and each location.

~~39A-5.01 Spreading Equipment~~

~~When trench width is three feet or less, the asphalt concrete used for trench paving may be deposited directly from the haul vehicle into the trench. The asphalt shall then be raked smooth prior to compaction.~~

39A-6.01 General Requirements

The Contractor shall provide compaction of backfill and base material as the job progresses, each day. Temporary paving (2" minimum) will be placed each day over the work, leaving not more than 25 feet unpaved. The balance of the trench shall be covered with steel plates, capable of sustaining normal traffic loads. Temporary A.C. paving shall be used around all edges of steel plates.

Finished asphalt trench paving shall be even, smooth riding and have an appearance that is compatible to the surrounding surface.

Upon placement of the last lift of Class 2 aggregate base as shown for Type A trench on City Std. 215, the Contractor shall cut the edges of pavement in a neat manner to the locations shown on said Std. 215.

~~39A-8.01 Payment~~

~~Full compensation for furnishing and installing temporary and final paving asphalt shall be considered as included in the prices paid for the various contract items of work and no additional allowance will be made therefore.~~

SECTION 40 – PORTLAND CEMENT CONCRETE PAVEMENT

40-1.01 Description

Portland Cement Concrete Pavement shall be constructed in accordance with Section 40 of the Standard Specifications and as specified herein.

40-1.04 Grade Tolerance

The subgrade to receive concrete pavement, immediately prior to placing, shall conform to the compaction and elevation tolerances specified for the material involved and shall be free of loose or extraneous material.

40-1.05 Reinforcement

Reinforcement, where required, shall conform to the provisions of Section 52 of the Standard Specifications, the details as shown on the Plans, and as directed by the Engineer.

40-1.08 Joints

Expansion joints shall be constructed in accordance with the details and at the locations shown on the Plans and in conformance with the requirements of Section 73 of the Standard Specifications.

~~**40-1.13 Measurement**~~

~~Quantities of Portland Cement Concrete Pavement will be measured by the cubic yard, computed on the basis of measurement of areas of completed work in place and the thickness shown on the Plans.~~

~~**40-1.14 Payment**~~

~~The contract price paid per cubic yard for Portland Cement Concrete Pavement shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in constructing pavement complete in place as specified, including furnishing and placing expansion joint filler and dowels, furnishing and applying curing materials, and no additional allowances will be made therefore.~~

~~Six inch P.C.C. curb shall be considered as included in the contract price paid per cubic yard for Portland Cement Concrete Pavement and no additional allowance will be made therefore.~~

SECTION 51 – CONCRETE STRUCTURES

51-1.02 Minor Structures

Catch basins shall be constructed to the details and at the locations shown on the plans and in accordance with these Specifications. Catch basin covers shall be concrete with cast iron frame.

Storm drain manholes and drop inlets shall be constructed in conformance with the details and at the locations shown on the plans and in accordance with these Specifications.

51-1.04 Structures

Storm drain manholes shall be standard 48" diameter precast concrete manholes or 60" diameter precast concrete manhole at the locations shown on the plans and in accordance with City Standard Details.

Concrete for manhole bases shall be Class A portland cement concrete conforming to the applicable requirements of Section 90 of the Standard Specifications and shall be poured full thickness against the sides of the manhole excavation or shall be formed.

Manhole barrels and taper sections shall be precast concrete sections using Type II portland cement complying with ASTM Designation: C150. The barrel and taper sections shall be constructed in accordance with the applicable provisions of ASTM Designation: C478.

Top of manhole frames and covers shall be set accurately to the final finished grade in paved streets and to the elevation shown in unimproved areas.

Concrete for catch basins shall be Class "A" portland cement concrete conforming to the requirements of Section 90 of the Standard Specifications.

In lieu of the inspection of reinforcing steel as provided under Section 52-1.04 of the Standard Specifications, upon request the Contractor shall furnish the Engineer with a certificate from the supplier of the reinforcing steel stating that the steel delivered complies with the requirements of Section 52-1.02 of the Standard Specifications.

Bar reinforcing shall conform to and be placed in accordance with Section 52 of the Standard Specifications.

Connections to existing storm drain structures shall be made with care to avoid unnecessary damage to any existing curb and gutter or sidewalk. Any damaged section shall be removed and replaced in accordance with City Standards and as approved by the Engineer. Pipe connections to the existing structures shall be sealed with cement mortar.

Drop inlets and grates shall be bicycle-safe and designed for H20 loading. Frame and grate shall be hot-dipped galvanized after fabrication

51-1.135 Mortar

51-1.135A Description

Mortar shall consist of a mixture of Type II Portland Cement complying with ASTM C150, sand, and water. Sand for mortar shall be clean, dry, well-graded sand, free of organic or other deleterious matter, silt or other objectionable matter, and shall be of such size as determined by laboratory sieves, that all will pass a No. 30 sieve size, square openings.

Mortar shall consist of one part by volume of cement and three parts by volume of sand. The mortar shall contain only enough water to permit placing and packing. Mixed mortar shall be used before initial set and in no case will retempering with additional water be permitted.

Mortar shall conform to the requirements of Section 51-1.135 of the State Standard Specifications.

51-1.135B Admixtures

No admixtures will be permitted unless authorized by the ENGINEER.

51-1.135C Curing

After placing, all surface of mortar shall be cured by the water method in accordance with Section 90-7, "Curing Concrete" of the State Standard Specifications, for a period of not less than 3 days.

SECTION 56 – SIGNS

Street name signs and traffic regulatory signs and hardware which are not to be mounted on traffic signal mastarms or poles shall be provided and installed by the Contractor at the locations shown on the Plans and Part III of the City Traffic Standards.

Existing street name signs and traffic regulatory signs which are not on traffic signal mastarms/poles shall be relocated as shown on the Plans by the Contractor.

New street name signs and traffic regulatory signs and brackets to be mounted on traffic signal mastarms/poles shall be provided and installed by the Contractor.

Existing street name signs and traffic regulatory signs on traffic signal mastarms/poles will be relocated by the Contractor~~ity~~.

~~Installation and/or relocation of street name and traffic regulatory signs not on traffic signal mastarms/poles will be paid for at the contract lump sum price, which price shall include full compensation for furnishing all labor, materials, tools and equipment and doing all work involved in providing and installing signs complete as specified herein, and no additional allowance will be made therefore.~~

SECTION 63 – CAST-IN-PLACE CONCRETE PIPE

63-1.02 Materials

Consistency of the concrete shall be determined in accordance with ASTM C-143. Maximum slump shall be 2 inches.

63-1.05A Structures

Where shown on the Plans, inlet and outlet structures shall be constructed or installed in connection with cast-in-place concrete pipe. Where such structures are constructed or installed, the ends of pipes shall be placed flush or cut off flush with the structure face, unless otherwise directed by the Engineer.

A starter section shall be used at the beginning of each run of cast-in-place concrete pipe, and a closing section shall be used where a run cannot be completed because of lack of clearance ahead in the trench. Starter sections shall be six feet in length and of the same inside diameter as the cast-in-place concrete pipe. Manhole bases may be formed by opening and troweling the cast-in-place concrete pipe on continuous runs.

Storm drain manholes shall be standard four or five-foot diameter precast manholes as detailed in the City Standard Details. Storm drain manhole barrels and taper sections shall be precast concrete sections using Type II Portland Cement complying with ASTM C-150.

Catch basins shall be constructed as shown in the City Standard Details. Concrete for cast-in-place catch basins shall be Class B. Bar reinforcing steel shall conform to and be placed in accordance with Section 52 of the Standard Specifications.

Connections to existing storm drain structures shall be made with care to avoid unnecessary damage to any existing curb and gutter or sidewalk. Any damaged section of curb and gutter or sidewalk shall be removed and replaced in accordance with City Standards and as approved by the Engineer. Pipe connections to the existing structures shall be sealed with cement mortar.

63-1.06 Curing and Protection of Concrete, and 63-1.07 Backfill

Backfill shall be placed in accordance with City Std. 215, "Standard Trench Detail", except that the pipe bedding specifications shall not apply.

Curing and protecting concrete shall comply with the following requirements:

When Type E trench backfill is designated, the cast-in-place concrete pipe shall be cured by placing backfill material to an approximate depth of one foot over the top of the pipe.

When either Type A, B, C or D backfill is designated the concrete shall be cured by placing trench backfill complying with the specifications contained in City Std. 215 to an

~~approximate depth of 0.5 foot following application of either a waterproof membrane or a pigmented curing compound as provided in Section 90, "Curing Concrete".~~

~~Hand spraying of the curing compound will be permitted. During the period following the placement of the concrete, the ends of the pipeline shall be covered with suitable material to maintain a humid condition within the pipe for a minimum of seven days.~~

~~Initial backfill placement shall be made immediately after the concrete has hardened sufficiently to prevent injury to the pipe during backfill operations. When Type E backfill is designated, only soft, damp, and loose material shall be used for the initial placement of backfill.~~

~~The concrete pipe shall be protected as provided in Section 90, "Protecting Concrete".~~

~~After the pipeline has been completed, but not prior to seven days following the placement of the concrete, the Contractor shall backfill the pipe trench in accordance with the requirements of Std. 215.~~

~~In all cases, the Contractor shall be responsible for correcting any damage to cast-in-place concrete pipe caused by premature or excessive loading prior to the end of a seven day curing period.~~

~~63-1.09 Payment~~

~~Cast-in-place pipe will be paid for at the contract price per linear foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work specified herein, and no additional allowance will be made therefore.~~

SECTION 63 - CAST-IN-PLACE CONCRETE PIPE

63-1.02 Materials

Consistency of the concrete shall be determined in accordance with ASTM C143. Maximum slump shall be 2-inches.

63-1.03 Inspection

For private development projects, full time inspection of all public cast-in-place concrete pipe shall be provided by the project developer. The name and contact information for the specialty inspector shall be submitted to the City Public Works Department two weeks prior to commencement of pour. No pipe shall be poured without the presence of the specialty inspector onsite. Within 30 days of completion of pour, the private inspector shall submit to the City an inspection report listing dates, locations, measured wall thickness, and other details of the inspection. The private inspector's report shall certify that the pipe meets the requirements of the specifications and shall be stamped and signed by a registered civil engineer. No paving or other construction over the pipe, except backfilling, shall proceed prior to City approval of the private inspector's report. The private inspector shall comply with OSHA requirements for permit-required confined spaces per Federal Register 29 CFR part 1910.146.

63-1.05A Structures

Where shown on the plans, inlet and outlet structures shall be constructed or installed in connection with cast-in-place concrete pipe. Where such structures are constructed or installed, the ends of pipes shall be placed flush or cut off flush with the structure face, unless otherwise directed by the Engineer.

A starter section shall be used where the beginning of a run of cast-in-place concrete pipe is at a structure, and a closing section shall be used where a run cannot be completed because of lack of clearance ahead in the trench. Starter sections, as required, shall be 6 feet in length and of the same inside diameter as the cast-in-place concrete pipe. Manhole bases and or structures may be formed by opening and troweling the cast-in-place concrete pipe on continuous runs.

Structures shall be as described in Section 65-1.04 of the City of Rohnert Park Construction Specifications for Public Improvements.

63-1.06 Curing and Protecting Concrete

(The following shall apply in lieu of Sec. 63-1.06.)

Backfill shall be placed in accordance with Std. 215 of the City of Rohnert Park Design and Construction Standards, except that the pipe bedding specifications shall not apply.

Curing and protecting concrete shall comply with the following requirements:

The concrete shall be cured by placing trench backfill complying with the specifications contained in Std. 215 to an approximate depth of 0.5 foot following application of either a waterproof membrane or a pigmented curing compound as provided in Section 90-7, "Curing Concrete."

Hand spraying of the curing compound will be permitted. During the period following the placement of the concrete, the ends of the pipeline shall be covered with suitable material to maintain a humid condition within the pipe for a minimum of 7 days.

Initial backfill placement shall be made immediately after the concrete has hardened sufficiently to prevent damage to the pipe during backfill operations.

The concrete pipe shall be protected as provided in Section 90-8, "Protecting Concrete."

After the pipeline has been completed, but not prior to 7 days following the placement of the concrete, the Contractor shall backfill the pipe trench in accordance with the requirements of Std. 215.

In all cases, the Contractor shall be responsible for correcting any damage to cast-in-place concrete pipe caused by premature or excessive loading prior to the end of a 7-day curing period.

63-1.07 Television Inspection of Cast-in-Place Concrete Storm Drain Pipe

Television inspection of cast-in-place concrete storm drain pipe shall be as described in Section 79 of the these Specifications.

SECTION 64 – ASBESTOS CEMENT PIPE

SECTION REPLACED~~DELETED~~

Asbestos cement pipe is not authorized for use within the City of Rohnert Park.

SECTION 64 – PLASTIC PIPE

64-1.01 Description

All plastic storm drain pipe shall be type S corrugated polyethylene pipe.

64-1.02 Size and Materials

Plastic pipe for use in public storm drain systems shall be Type S, smooth interior wall, corrugated exterior wall, high density polyethylene pipe (HDPE) as specified in AASHTO designation M294. Pipe shall be manufactured from virgin compounds with no plasticizers. HDPE compounds used in the manufacture of plastic pipe shall be per the Standard Specifications.

64-1.04 Couplings and Fittings

Pipe couplings and fittings shall be a bell and spigot joint with a rubber gasket on the spigot meeting ASTM F-477 and shall provide a soil-tight seal and be made of the same material and from the same manufacturer as the pipe. The method of joining pipes and fittings shall be as recommended by the pipe manufacturer. Pipes and fittings coupled together shall have no more than one corrugation distance of separation between them.

64-1.05 Excavation and Backfill

Excavation and backfill shall be as shown on Std. 215 of the City of Rohnert Park Design and Construction Standards and the following provisions.

The space between the pipe and trench wall shall be wider than the compaction equipment used in the pipe zone, regardless of the dimensions shown on the Std. 215 unless ~~self-compacting~~CLSM backfill material is used.

Pipe bedding will be placed in 6" (maximum) lifts to 6" above the top of pipe with each lift hand or mechanically tamped. The final lift may be compacted with a plate type vibrating compactor.

During construction, heavy equipment vehicle loads shall be avoided over the pipe or additional cover shall be placed at vehicle crossings.

64-1.07 Laying Pipe

Plastic storm drain pipe shall be installed in accordance with the Standard Specifications, generally accepted practice and on the alignment and grade as shown on the plans. When long radius curves are permitted, adjustments in horizontal alignment will be achieved through adjustments at each coupling, within manufacturer's specification, and not by bending of the pipe.

Pipe shall be centered in the trench.

Unless otherwise specifically permitted by the Engineer, all pipe shall be laid upgrade.

Where ground water or surface drainage occurs, pumping shall continue until backfilling has progressed to a sufficient height to prevent flotation of the pipe.

64-1.10 Television Inspection of Plastic Storm Drain Pipe

Television inspection of plastic storm drain pipe shall be as described in Section 79 of these Specifications.

64-2.01 Trench Shoring and Bracing - Storm Drain

All bracing and shoring shall conform to Section 65-2 of these Specifications.

SECTION 65 – REINFORCED CONCRETE PIPE

65-1.01 Description

Reinforced concrete pipe shall be installed on the alignment and grade as shown on the Plans and in accordance with the applicable provisions of Section 65 of the Standard Specifications and as specified herein and as directed by the Engineer.

Catch basins shall be constructed to the details and at the locations shown on the Plans and as specified herein.

Drop inlets shall be constructed in conformance with the details and at the locations shown on the Plans and as specified herein.

Reinforced concrete pipe shall be either Class III, Class IV, or Class V, as shown on the Plans and shall conform to the provisions of ASTM C-76.

65-1.03 Earthwork

If, during excavation for any culvert, material is encountered which is unsuitable as a foundation for such culvert, such unsuitable material shall be removed to a depth as required by the Engineer and the resulting space shall be refilled with approved material.

Excavation and backfill shall be as shown on City Std. 215, "Standard Trench Detail".

65-1.04 Structures

Storm drain manholes shall be a standard 48" diameter precast concrete manholes at the locations shown on the Plans and as specified herein and City Std. 400.

Concrete for manhole bases shall be Class A portland cement concrete conforming to the applicable requirements of Section 90 of the Standard Specifications and shall be poured full thickness against the sides of the manhole excavation or shall be formed.

Manhole barrels and taper sections shall be precast concrete sections using Type II portland cement complying with ASTM Designation: C150. The barrel and taper sections shall be constructed in accordance with the applicable provisions of ASTM Designation: C478.

Top of manhole frames and covers shall be set accurately to the existing finished grade in paved streets and to the elevation shown in unimproved areas.

Concrete for catch basins shall be Class "A" portland cement concrete conforming to the requirements of Section 90 of the Standard Specifications.

~~Bar reinforcing steel shall conform to and be placed in accordance with the applicable provisions of Section 52 of the Standard Specifications with the following modifications:~~

~~In lieu of the inspection of reinforcing steel as provided under Section 52-1.04 of the Standard Specifications, the Contractor shall furnish the Engineer with a certificate from the supplier of the reinforcing steel stating that the steel delivered complies with the requirements of Section 52-1.02 of the Standard Specifications.~~

~~Storm drains manholes shall be standard four or five foot diameter precast manholes as detailed in the Standard Plans. Storm drain manhole barrels and taper sections shall be precast concrete sections using Type II Portland Cement complying with ASTM C-150.~~

~~Catch basins shall be constructed as shown in the City Standard Details. Concrete for cast-in-place catch basins shall be Class B. Bar reinforcing steel shall conform to and be placed in accordance with the provisions of Section 52.~~

~~Connections to existing storm drain structures shall be made with care to avoid unnecessary damage to any existing curb and gutter or sidewalk. Any damaged section shall be removed and replaced in accordance with City Standards and as approved by the Engineer. Pipe connections to the existing structures shall be sealed with cement mortar.~~

~~65-1.07 Laying Culvert Pipe~~

~~Unless otherwise specifically permitted by the City Engineer, all pipe shall be laid upgrade.~~

~~No pipe shall be laid which is cracked, checked, spalled or damaged and which in the opinion of the Engineer is unsuitable for use.~~

~~65-1.10 Payment~~

~~Manholes will be paid for at the contract price each, which shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in constructing manholes complete in place as shown on the Plans including excavation, backfill, furnishing and installing cast iron frame and cover, and no additional allowance will be made therefore.~~

~~Reinforced concrete pipe will be paid for at the contract price per lineal foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in installing the pipe complete in place as shown on the Plans, as specified herein, and no additional allowance will be made therefore.~~

~~Full compensation for disposing of excess material shall be considered as included in the contract price paid per applicable bid item of work, and no additional allowance will be made therefore.~~

~~Catch basins will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work involved in constructing standard catch basins in place complete as herein specified, including excavation, backfill, bar reinforcement and concrete.~~

~~Remove and install catch basins, Type II, will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, and equipment, and doing all work including removing and disposing of existing catch basin; replacing curb, gutter, and sidewalk as required; excavation; backfill; bar reinforcement; and concrete.~~

~~Drop inlets will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, and equipment, and doing all work involved in constructing drop inlets in place complete as herein specified, including excavation, backfill, bar reinforcement and concrete.~~

~~The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing different sizes and classes of pipe including excavation, backfill, disposal of excess material and connecting new pipe to existing facilities, complete in place, and replacement of any damaged curb and gutter or sidewalk, as shown on the Plans, and as specified herein, and as directed by the Engineer.~~

~~The contract unit price paid for storm drain structures including manholes, catch basins, and inlet and outlet structures, shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the structures, complete as shown on the Plans, including excavation, backfill and disposal of excess material.~~

~~65-2 Trench Bracing and Shoring~~

~~65-2.01 Description~~

~~All bracing and shoring shall conform to Section 5-1.02A and Section 7-1.01E of the Standard Specifications and the Division of Industrial Safety Construction Safety Orders which are currently in use.~~

~~The Contractor shall take all necessary measures to protect the workmen and adjacent areas and structures from the hazards of the trenching or excavation operations.~~

~~65-2.05 Payment~~

~~Trench bracing and shoring will be paid for at the contract lump sum price, which price shall include full compensation for furnishing all labor, materials, tools and equipment and doing all work involved in trench bracing and shoring as specified herein, and no additional allowance will be made therefore.~~

SECTION 65 – REINFORCED CONCRETE PIPE

65-1.01 Description

Reinforced concrete pipe shall be installed on the alignment and grade as shown on the plans and in accordance with the applicable provisions of Section 65 of the City of Rohnert Park Construction Specifications and as directed by the Engineer. Reinforced concrete pipe shall be Class III, Class IV, or Class V, as shown on the plans, and shall conform to the provisions of ASTM C76.

65-1.02 Materials

All concrete pipe shall conform to the provisions of Section 65-1.02 of the Standard Specifications prior to shipment from the manufacturer.

65-1.03 Earthwork

Excavation and backfill shall conform to the City of Rohnert Park Construction Specifications. Backfill shall be in accordance with Std. 215 and as shown on the plans.

If, during excavation for any culvert or structure, material is encountered which is unsuitable as a foundation for such culvert or structure, such unsuitable material shall be removed to a depth as required by the Engineer and the resulting space shall be refilled with approved material.

Trenching operations shall be conducted in such a manner as not to disturb the existing curb and gutter and existing utilities.

Trenching operations for pipelines and structures shall be conducted in such a manner to minimize damage to existing tree roots. Hand digging shall be used where necessary to protect tree roots. Where tree roots are encountered, root pruning shall be accomplished by use of sharp tools appropriate for the size of root to be cut. Each cut shall be clean with no torn bark or splintered wood remaining on the tree. All tree work shall be performed by a certified arborist from the list approved by the City.

All raised pavement markers, street striping, chatter bars or any other traffic markings disturbed during work shall be replaced in kind by the Contractor to the satisfaction of the Engineer.

Excavation and backfill shall be as shown on Std. 215.

65-1.07 Laying ~~Culvert~~ Pipe

Unless otherwise specifically permitted by the Engineer, all pipe shall be laid upgrade. No pipe shall be laid which is cracked, checked, spalled, or damaged and which, in the opinion of the Engineer, is unsuitable for use.

Connections to existing storm drain structures shall be made with care to avoid unnecessary damage to any existing curb and gutter or sidewalk. Any damaged section shall be removed and replaced in accordance with City Standards and as approved by the Engineer. Pipe connections to the existing structures shall be sealed with cement mortar.

Proper implements, tools, and facilities satisfactory to the Engineer shall be provided and used by the contractor for the safe and efficient execution of the work. All pipe, fittings, and accessories shall be carefully lowered into the trench by means of derrick, ropes, or other suitable equipment in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. The pipes and accessories shall be inspected for visible defects prior to lowering into the trench. Any visibly-defective or unsound pipe shall be replaced.

The line and grade of existing utilities designated to remain shall not be altered. Any leakage caused in existing utilities by reason of the Contractor's operations shall be immediately repaired at the Contractor's expense.

Existing water lines shall be supported in place maintaining service during construction. The Contractor shall be responsible for any damage to the water lines during construction and any damage resulting from improper backfilling techniques. Water services shall be relocated where encountered during construction and as shown on the plans.

Existing sewer lines shall be supported in place maintaining service during construction. The Contractor shall be responsible for any damage to the sewer lines during construction and any damage resulting from improper backfilling techniques.

65-1.08 Television Inspection of Reinforced Concrete Storm Drain Pipe

Television inspection of cast-in-place concrete storm drain pipe shall be as described in Section 79 of the these Specifications.

65-2 Trench Bracing and Shoring - Storm Drain

65-2.01 Description

All bracing and shoring shall conform to Section 5-1.02A and Section 7-1.01E of the Standard Specifications and the Division of Industrial Safety Construction Safety Orders which are currently in use.

The Contractor shall take all necessary measures to protect the workers and adjacent areas and structures from the hazards of the trenching or excavation operations.

SECTION 66 – CORRUGATED METAL PIPE

66-1.01 Description

All corrugated metal pipe shall meet the requirements of Section 66 of the Standard Specifications. Corrugated aluminum pipe, if used, shall meet the requirements of Section 66-2 of the Standard Specifications.

~~**66-4.02 Payment**~~

~~Corrugated metal pipe will be paid for at the contract price per linear foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in furnishing and installing the corrugated metal pipe complete in place, including excavation and backfill.~~

~~Full compensation for disposing of excess material shall be considered as included in the contract price paid per applicable bid item of work and no additional allowance will be made therefore.~~

SECTION 71 – SEWERS

71-1.02 Materials

Sewer pipe to be installed shall be ductile iron pipe, high density polyethylene, or polyvinyl chloride pipe, in conformance with the appropriate provisions of the City Construction Specifications, Section 71, Standard Specifications for Public Works Construction, as noted on the Plans and as specified herein. Asbestos cement pipe shall not be allowed.

71-1.02A Polyvinyl Chloride (PVC) Pipe

PVC solid wall sewer pipe and fittings for gravity sewer shall be made from all new, rigid, un-plasticized polyvinyl chloride in accordance with ASTM Standard Specifications D3034 and F679 and shall have a wall thickness of at least SDR 26. Joints shall consist of an integral thickened bell-and-rubber ring and shall provide for expansion and contraction at each joint. The rubber ring shall be compatible with the pipe manufacturer's recommended lubricant.

All pipe shall have a home mark to indicate full penetration of the spigot when the joint is made.

All PVC pipe entering or leaving a concrete structure shall have an elastomeric waterstop firmly clamped around the pipe exterior and cast into the structure base per City Standard 500 or near the structure wall center per City Standard 533.

71-1.02B Restrained Joint (PVC) Pipe and Fittings

Restrained joint PVC pipe and fittings shall conform to the requirements of ASTM D2241. Joints shall be gasketed and conform to the requirements of ASTM D3139 and ASTM F477. Use only full circle type restraint clamps. Restraint systems that use set screws that impose point loads on the pipe will not be permitted.

71-1.02C Ductile Iron Pipe

Ductile iron pipe shall be cement lined, new pipe conforming to ANSI A 21.51-197s or most recent issue, if any as sponsored by the American Water Works Association for thickness Class 50 Ductile Iron Pipe. The pipe shall be furnished with either bell and spigot ends, "Tyton Joints," or mechanical joints, except where specifically specified on the Plans.

Ductile iron pipe used in force mains shall be polyethylene or epoxy lined.

All ductile iron pipe buried underground shall be encased in polyethylene film in the tube form. Polyethylene material and installation procedure for the encasement shall conform to ANSI/AWWA C105/A21.5-82 or most recent issue, if any. Installation Method "A" as described in aforementioned specification shall apply.

Couplings for connection to the sewer main shall be of a type approved by the City Engineer.

71-1.02D Ductile Iron Restrained Joint Fittings

Restrained joint fittings shall be ductile iron in accordance with applicable requirements of ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of latest revision and shall be compatible with the type and pressure class of pipe used.

71-1.02E Sewer Force Main and Gravity HDPE Pipe

The Contractor shall provide high density polyethylene pipe (HDPE) as specified. The pipe shall be made to diameter and tolerances in accordance with ASTM F714. All pipe shall be made from virgin grade material. The pipe shall be of the diameter and class shown or specified and shall be furnished complete with all fabricated fittings, and other appurtenances as necessary for a complete and functional system.

Markings: Pipe materials shall be legibly marked by the pipe manufacturer. The following shall be printed on the pipe:

1. Name and trademark of manufacturer.
2. Nominal pipe size.
3. Standard Dimension Ratio.
4. The letters PE followed by the polyethylene grade per ASTM D1248 followed by the Hydrostatic Design Basis in hundreds of psi.
5. Manufacturing Standard Reference.
6. A production code from which the date and place of manufacture can be determined.

The Contractor shall provide submittals to the Engineer for approval on all materials.

Quality Control Submittals:

1. HDPE Pipe, Butt-Fusion Welded Joints:

   a. The Contractor shall provide written verification that personnel using the fusion joining equipment are trained in the skills necessary for the correct joining of HDPE pipe and recommended methods for service connections to the satisfaction of the pipe supplier. Certification of the training shall be provided from the certified representative of the pipe manufacturer.
   b. Fusion equipment shall be operated only by technicians who have been certified by the pipe manufacturer or supplier and who have a minimum of five (5) years of experience fusion welding pipelines. The technician's experience shall be documented in the HDPE pipe submittal, including a current (within the past three years) training certificate.
   c. The Contractor shall perform trial fusion welds and submit samples to the Engineer for review prior to installation of the pipe. Full penetration welds shall provide a homogeneous material across the cross section of the weld. The fusion

machine and technicians employed for the trial welds shall be the same utilized for the installation work.

d. Quality assurance procedures certified by the pipe manufacturer to be in full accordance with the requirements of this Specification shall be submitted by the Contractor.

4. Certification. The Contractor shall furnish a certified affidavit of compliance for all HDPE pipe and fittings furnished confirming that the materials supplied fully conform to the requirements specified herein.
5. Certifications of Calibration: Approved testing laboratory certificate or manufacturer's calibration certificate.
6. Quality assurance procedures shall be performed by the pipe manufacturer fully in accordance with the requirements of this specification. The certification shall include certified laboratory data confirming that said tests have been performed on a sample of the pipe to be provided under this contract, or pipe from that production run, and that satisfactory results were obtained.

Shop Drawings:

1. The Contractor shall submit catalog cuts, specifications, dimensioned drawings, installation details and sketches, and other pertinent information for the HDPE pipe installation work. All materials provided shall be in full accordance with the requirements of the reference specifications specified above.
2. The Contractor shall verify with the pipe manufacturer all connection details.
3. The Contractor shall submit detail drawings and a written description of the construction procedure to install pipe.

Pipe shall be high molecular weight, high-density polyethylene pipe. The material shall be listed by the Plastic Pipe Institute (PPI) with a designation of PE 3608 and have a minimum cell classification of 345464C, D, or E as described in ASTM D3350. The pipe material shall meet the requirements for Type III, Class B or C, Category 5, Grade P34 material as described in ASTM D1248. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material pipe. Pipe and fittings shall be made in conformance with ASTM F714 and ASTM D3261 as modified for the specified material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions or other injurious defects. It shall be uniform in density and other physical properties. Any pipe not meeting these criteria shall be rejected.

Only tools approved by the pipe manufacturer or the Engineer shall be used for assembly of pipe fittings and service connections to ensure proper installation.

The heater plate used for pipe joining shall be equipped with suitable means, such as thermometers or pyrometers, to measure the temperature of plate surfaces and to ensure uniform heating.

Butt fusion fittings shall be in accordance with ASTM D3261 and shall be manufactured by injection molding, a combination of extrusion and machining, or fabricated from HDPE pipe conforming to this specification. All fittings shall be pressure rated to provide a working pressure rating no less than that of the pipe. Fabricated fittings shall be manufactured using a McElroy Data logger to record fusion pressure and temperature. A graphic representation of the temperature and pressure data for all fusion joints made producing fittings shall be maintained as part of the quality control. The fitting shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

Each polyethylene fusion fitting shall meet all the material requirements established for the pipe to which the fitting is to be jointed. Fittings fabricated from pipe shall be manufactured from pipe stock with a wall thickness at least 25% greater than that of the pipe to which the fitting is to be joined or shall be otherwise externally reinforced so that the fitting carries a pressure rating equal to that of the pipe from which it is made. Each fitting shall be designed and manufactured to operate at not less than the design pressure of the pipe system for which it is intended.

Polyethylene pipe shall be joined by butt fusion welding, as specified herein.

RESTRAINED JOINTS:

Mechanical restraint for HDPE may be provided by mechanical means separate from the mechanical joint gasket sealing gland. The restrainer shall provide wide, supportive contact around the full circumference of the pipe and be equal to the listed widths. Means of restraint shall be machined serrations on the inside surface of the restrainer equal to or greater than the listed serrations per inch and width. Loading of the restrainer shall be by a ductile iron follower that provides even circumferential loading over the entire restrainer. Design shall be such that restraint shall be increased with increases in line pressure.

Serrated restrainer shall be ductile iron ASTM A536-80 with a ductile iron follower; bolts and nuts shall be corrosive resistant, high strength alloy steel.

The restrainer shall have a pressure rating of, or equal to that of the pipe on which it is used or 150 PSI whichever is lesser. Restrainers shall be JCM Industries, Sur-Grip or pre-approved equal.

Nominal Size	Restraint Width	Serrations per inch
4", 6"	1-1/2"	8
8" 10 & 12"	1-3/4"	8

Pipe stiffeners shall be used in conjunction with restrainers. The pipe stiffeners shall be designed to support the interior wall of the HDPE. The stiffeners shall support the pipe's end and control the "necking down" reaction to the pressure applied during normal installation. The pipe stiffeners shall be formed of 304 or 316 stainless steel to the HDPE manufacturers published average inside diameter of the specific size and DR of the HDPE. Stiffeners shall be by JCM Industries or pre-approved equal.

Install in accordance with manufacturer's recommendations and as directed herein.

JOINING:

BUTT FUSION: Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. All field welds shall be made with fusion equipment equipped with a McElroy Data Logger. Temperature , fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records.

SIDEWALL FUSION: Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.

MECHANICAL: Bolted joining may be used where the butt fusion method cannot be used. Flange joining will be accomplished by using a HDPE flange adapter with a ductile iron back-up ring. Mechanical joint joining will be accomplished using either a molded mechanical joint adapter or the combination of a Sur-Grip Restrainer and Pipe Stiffener as manufactured by JCM Industries, Inc. Either mechanical joint joining method will have a ductile iron mechanical joint gland.

OTHER: Socket fusion, hot gas fusion, threading, solvents, and epoxies may not be used to join HDPE pipe.

QUALITY AND WORKMANSHIP: The pipe and/or fitting manufacturer's production facility shall be open for inspection by the owner or his designated agents with a reasonable advance notice. During inspection, the manufacturer shall demonstrate that it has facilities capable of manufacturing and testing the pipe and/or fittings to the standards required by this specification.

PIPE PACKAGING, HANDLING & STORAGE: The manufacturer shall package the pipe in a manner designed to deliver the pipe to the project neatly, intact and without physical damage. The transportation carriers shall use appropriate methods and intermittent checks to insure the pipe is properly supported, stacked and restrained during transportation such that the pipe is not nicked, gouged, or physically damaged.

Pipe shall be stored on clean, level ground to prevent undue scratching or gouging. If the pipe must be stacked for storage, such stacking shall be done in accordance with the pipe

manufacturer's recommendations. The pipe shall be handled in such a manner that it is not pulled over sharp objects or cut by chokers or lifting equipment.

Sections of pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed. The undamaged portions of the pipe shall be rejoined using the heat fusion joining method.

Fused segments of the pipe shall be handled so as to avoid damage to the pipe. Chains or cable type chokers must be avoided when lifting fused sections of pipe. Nylon slings are preferred. Spreader bars are recommended when lifting long fused sections.

71-1.03 Excavation and Backfill

Backfill shall be in accordance with City Standard 215 except trench backfill section in roadways and paved areas shall be CDF.

Sheet piling and other sheeting shall be withdrawn in such a manner as to prevent caving at the walls of excavations or damage to piping or other structures. Except as may be hereinafter modified, no sheeting shall be left in the trench and no backfill shall be made against the sheeting before it is removed. Any sheeting extending below the invert of the pipe shall be left in place by cutting off in a manner satisfactory to the Engineer.

Trenching operations shall be conducted in such a manner not to disturb the existing curb and gutter and the existing utilities. Flow shall be maintained in any sanitary sewers, storm drains, water lines, or water courses encountered in trenching.

The Contractor shall remove all water which may accumulate in the excavation during the progress of the work can be done in the dry. Trenches shall be kept free from water while the pipe or other structures are installed and until backfilling has progressed to a sufficient height to anchor the work against possible flotation or leakage. At all times, the Contractor shall have sufficient pumping machinery available for immediate use. Water shall be disposed of in such a manner as to cause no injury to public or private property, or be a menace to public health.

Blasting will not be permitted.

All trench excavation materials from trenches shall be the property of the Contractor. None of the excavation material shall be disposed of on the work site. Prior to disposal of any material, the Contractor shall submit to the Engineer written authorization for such disposal of material and entry permission signed by the owners of the disposal site, and shall comply with any other requirements of disposal, such as City and County permits, as may be required.

All raised pavement markets, street striping, chatter bars or any other traffic markings disturbed shall be replaced in kind by the Contractor to the satisfaction of the Engineer.

All cutting, handling and disposal of asbestos cement pipe shall be done in compliance with the Contractor's State Licensing Law and all other applicable laws and regulations.

71-1.03A Trench Bracing and Shoring

All bracing and shoring shall conform to Section 5-1.02A and Section 7-1.01E of the Standard Specifications and the Division of Industrial Safety Construction Safety Orders which are currently in use.

The Contractor shall take all necessary measures to protect the workmen and adjacent areas and structures from the hazards of the trenching or excavation operations.

Settlement monitoring shall be required for major excavations where shown on the plans, next to existing improvements or as directed by the City Engineer.

71-1.04 Existing Manholes

Existing manholes and cleanouts located within the street right-of-way shall be adjusted to conform to finished pavement grades in accordance with the details shown on City Standard 500 and as described in section 71-1.07A of these specifications.

Prior to the removal of an existing manhole frame, a platform shall be constructed in the manhole above the top of the sewer to prevent any dirt or debris from falling into the sewer. The platform shall remain in place until all work on the manhole has been completed and the asphalt concrete has been placed around the manhole. Prior to the removal of the platform from the manhole, all dirt and debris shall be removed.

Lowering of the manhole ring and cover shall be accomplished by the removal of existing concrete grade rings below the manhole ring or by removing the upper section of manhole barrel and substituting therefore a shorter section of barrel.

Trimming of taper sections is not permitted.

All sections of removed and or replaced manhole barrels shall be sealed with a preformed mastic seal, Ram-Nek or approved equal. Exterior joints shall be taped using a 6-inch wide 60 mil tape, Infi-shield or approved equal.

After placing the surface course of asphalt concrete, all manholes and cleanouts shall be located and marked with white paint before the close of that working day.

Within two working days of paving, all manholes and cleanouts shall be adjusted to grade and inspected.

Existing grade adjustment rings in the adjustment of manhole frames shall become the property of the Contractor.

71-1.05 Pipe Laying

Where groundwater occurs, pumping shall continue until back filling has progressed to a sufficient height to prevent flotation of the pipe. Water shall be disposed of in such a manner as to cause no property damage or not be a hazard to public health.

Where construction consists of constructing a new main or extension of an existing main, the downstream end of the new main shall be securely closed with a tight fitting plug until the construction is accepted by the Engineer.

If the new sewer main is connecting to an existing main at a location other than a manhole, prior to requesting the staking, the Contractor shall pothole the existing sewer main to verify invert grades and locations.

Sewer pipe shall be laid in straight lines and on uniform rates of grade between points where changes in alignment or grade are shown on the Plans. The interior of the pipe shall be free of foreign matter before lowering into the trench.

The pipe manufacturer's written instructions covering the installation of the pipe shall be closely followed unless otherwise directed by the Engineer or as specified herein. After each pipe section is laid, the pipe joints shall be checked by the Contractor with a feeler gauge to determine if the rubber ring is properly seated for push on joint PVC or D.I. pipe. The trench shall not be backfilled until authorized by the Engineer. Pipe laying shall proceed upgrade with the spigots pointing in direction of flow. The invert of the pipe shall be set at required line and grade as determined from batter boards set not over 25 feet apart. Electro-optical grade setting devices may be used provided the Contractor certifies that the device will be operated by a person proficient in its operation.

Any section of pipe found to be defective or which has had grade or joints disturbed shall be re-laid by the Contractor at his expense.

Proper implements, tools, and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and efficient execution of the work. All pipe, fittings, and accessories shall be carefully lowered into the trench by means of derrick, ropes, or other suitable equipment in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. The pipe and accessories shall be inspected for visible defects prior to lowering into trench. Any visibly defective or unsound pipe shall be replaced.

The line and grade of existing utilities shall not be altered. Any leakage caused in existing utilities by reason of the Contractor’s operations shall be immediately repaired at the Contractor's expense.

Existing storm drains shall be supported or removed and replaced at the Contractor's option. In any case, the Contractor shall be responsible for maintaining the existing line and grade of the

storm drains. If the Contractor elects to remove and replace, backfill shall be in conformance with City Standard 215.

Existing water lines shall be supported in place with service maintained during construction. The Contractor shall be responsible for any damage to the water lines during construction and any damage resulting from improper backfilling.

Existing sewer lines shall be supported in place with service maintained during construction. The Contractor may, at his option, remove and replace any sewer laterals which are not in use during construction. The Contractor shall be responsible for repairing damage to sewer lines during construction and any damage resulting from improper backfilling.

Sewer lateral inverts shall be set at or above the midpoint of the sewer main. Sewer laterals shall be placed at the locations shown on the Plans or as directed by the Engineer. The Engineer shall have the authority to direct the Contractor as to the location of laterals to be placed in the field. Typically, each sewer lateral found to exist shall be replaced, unless specifically deleted by the Engineer. In all cases, a minimum separation of five (5) feet shall be left between parallel sewer laterals and water services.

71-1.07 Sewer Structures

Manholes shall be standard precast concrete manholes as detailed on City Standard 500, and as shown on the Plans. Mains larger than 27" in diameter require 60" diameter manholes. Concrete manhole bases may be precast or cast-in-place. Precast concrete manhole bases must be approved by the City Engineer.

Manhole bases may be poured-in-place concrete on undisturbed earth. The bases shall be poured a minimum full thickness as shown on City Standard 500 against the side of the manhole excavation or to dimensions shown on the Plans if the dimension exceeds the minimum required. The manhole excavation site shall be dewatered before pouring.

Pre-cast manhole bases, conforming to City Standard 500 in dimensions and the requirements outlined below for materials may be used. Such pre-cast bases shall be placed on a minimum 6-inch thick cushion of drain rock, as specified in City Standard 500. The drain rock shall extend a minimum of 6 inches beyond the outside edges of the base.

Concrete for manhole bases shall be Class A portland cement concrete conforming to the applicable requirements of Section 90 of the Standard Specifications. The portland cement shall be Type V conforming to ASTM C 150 or low-alkali-Type II cement meeting the requirements for Type V cement.

Where steel reinforcement is required in manhole base construction, such reinforcement shall be furnished and placed as shown on City Standard 500 and in accordance with the applicable provisions of Section 52 of the Standard Specifications.

The base slab and initial riser section shall be connected to create a watertight joint per City Standard 500. Flow channels shall be constructed as shown on the Plans. Changes in size or grade shall be made gradually and changes in direction by smooth curves. All finished surfaces shall be smoothly troweled with a steel trowel. All manhole barrels and taper section shall be precast concrete sections using Type V portland cement complying with ASTM C150 or low-alkali Type II cement meeting the requirements for Type V cement.

The 48-inch and 60-inch diameter barrels and taper sections shall be constructed in accordance with the applicable provisions of ASTM C478 and shall be inspected by the Engineer to determine that the interior surfaces are smooth and free of pockets or depressions.

Manhole frames and covers shall be in accordance with City Standard 512.

Tops of manhole frames and covers shall be set accurately to finished grade in paved streets and one foot above finished grade in unimproved areas. The frames shall be evenly set per City Standard 500. Where manholes are set above finished grade, the earth shall be mounded up around the manhole in a neat and acceptable manner to the satisfaction of the Engineer.

Where sewer pipe is to be installed into or out of existing manholes, and the invert of the new connection penetrates the manhole barrel section, the barrel section wall shall be core drilled. The Contractor shall install an elastomeric seal and silicone caulk per City Standard 533. Where sewer pipe is to be installed into or out of existing manholes, and the invert of the new connection penetrates the manhole base the manhole base may be chipped and the Contractor shall install an elastomeric waterstop and 316 stainless steel band per City Standard 500. Form a smooth channel in the manhole base using Dam-It by Euclid. For either method the Contractor shall backfill the area around the pipe with a non-shrink grout to insure a watertight connection.

All joints in manholes shall be sealed by means of a preformed, self-bonding, self-sealing plastic gasket, such as “Ram-Nek” manufactured by the K.T. Snyder Company, Houston, TX, or approved equal. Joint seals shall be installed in full compliance with the manufacturer’s current recommendations.

71-1.07A Chimney Sections

All manhole castings shall be adjusted to meet final paving elevation with the installation of HDPE grade rings and shall be installed per City Standard 500 and as described herein.

After final installation a final deviation of more than 0.25 inch between the top of the manhole lid and the surrounding paving at any location shall be cause for rejection. Installation of HDPE Adjusting Rings shall be per manufacture's recommendations. In order to achieve a flush finish between the top of the concrete cone section and the first HDPE grade ring the alignment tab on grade ring bottom may need to be removed so that the grade ring will sit on the manhole cone section flush and not have point loading.

Clean and inspect the top surface of the concrete cone. The surface should be smooth and free of bumps and pits that may prevent a good water tight seal. Smooth the top of the concrete cone with a chisel or grind the surface as needed to remove protrusions. Clean the concrete cone or top

slab with a whisk broom . Ensure a flat seating surface free of rocks, gravel, blacktop, protruding concrete or debris. Utilize compressed air to blow dust and debris from the surface after grinding. Where the top of the concrete cone is rough, use non-shrink hydraulic cement, according to manufacturer's recommendations, to fill in depressions and smooth the concrete cone. Grinding and grouting shall be done when required to:

1. Remove any protrusions over ¼ inch.

2. Make the manhole ring stable without any rocking prior to foaming.

The HDPE adjusting ring system shall be measured in place dry prior to final assembly. The annular space between the rings and cone basin, the rings, and the rings and cover frame shall be sealed utilizing an approved construction foam in accordance with manufacturer's instructions. With the sealant applied, place the first ring down onto the cone or top slab with the male lip into the opening. The ring must be stable prior to foaming. Point loading on the ring is cause for rejection of the finished work.

Prior to setting the cover frame in place, construction foam sealant shall be placed on the top of the last ring. Be sure to apply the sealant in a location so that it contacts the cover frame the full 360 degrees. With the sealant applied, set the cover in place verifying that it is centered on the top ring. Cover and frame shall be aligned per Rohnert Park City Standard 512A. Install external joint seal over the entire chimney area, extending from the cover to three inches below the top of the cone. Wrap with 60 mil 6 inch wide corrosion prevention tape.

CONCRETE COLLARS

No backfilling, except with concrete, will be permitted, except over excavated areas may be filled with CLSM. Seal all saw cut grooves beyond the edge of concrete. Concrete collars shall be constructed with quick set concrete, mixture to be approved by the Engineer. Except as approved by the Engineer, Contractor shall keep traffic off of raised facilities for 24 hours.

The surface of the finished concrete shall be finished 2 inches below flush with the pavement. The top surface of the cast collar shall be screeded off at the correct elevation to receive and support the full depth of the pavement surface course. Contractor shall let the 8" concrete collar cure for 24 hours prior to traffic loading. Cover manhole with steel plate during curing process. The concrete shall attain a modulus of rupture of 1,000 pounds per square inch prior to beginning paving operations.

71-1.08 Trench Resurfacing

Trench resurfacing shall be as shown on Standard 215, "Standard Trench Detail," of the City of Rohnert Park Standard Plans except that aggregate base shall be replaced with asphalt concrete paving and as specified in Section 39A, "Asphalt Concrete Trench Paving," of the City of Rohnert Park Construction Specifications.

71-1.09 Testing of Sewers

Testing of all portions of the sewer including manholes will be required.

All sewer pipes shall be tested per the appropriate test as described in City Standard 530 and 530A guidelines or as described below. Manholes shall be tested per City Standard 530B The Contractor shall furnish to the City a 5% deflection mandrel and proving ring for gravity mains as shown on City Standard 518 at the City's request.

GRAVITY HDPE PIPELINES: Trunk sewers with no lateral connections between manholes constructed of HDPE shall be tested in accordance with ASTM F1417. All other HDPE sewers shall be tested per City Standard 530 and 530B.

HDPE Force Mains shall be tested as referenced in City Standard 530A.

SECTION 72 – SLOPE PROTECTION

72-1.01 Description

Slope protection shall consist of loose rock riprap. The slope protection shall be placed at the location shown on the Plans in conformance with the requirements of the Standard Specifications and the Sonoma County Water Agency Flood Control Design Criteria Manual.

72-2.02 Materials

Loose Rock Riprap - Rocks shall be angular and well graded from an average diameter of four (4) inches to an average diameter of fifteen (l5) inches with approximately fifty (50) percent by weight smaller than nine (9) inches in average diameter. Not more than ten (l0) percent of the rock riprap by weight shall be less than four (4) inches average diameter. An occasional rock having an average diameter of not more than 20 inches may be included, provided that no more than five (5) percent of the rock riprap area shall have these larger rocks projecting above the neat lines, but in any event the total rock mass shall be dense and well integrated.

~~72-2.05 Payment~~

~~The contract lump sum price paid for loose rock riprap shall include full compensation for furnishing all labor, materials, tools, and equipment, and doing all the work involved in furnishing and placing the loose rock riprap as specified, including furnishing and hauling as directed by the Engineer, and no additional allowance will be made therefore.~~

72-5 Grouted Rock Riprap

Grouted rock riprap shall be constructed in accordance with the details as shown on the Plans, Standard Specifications, as specified herein, and at the direction of the Engineer.

Concrete for grouted rock riprap shall be in accordance with Section 90 of the Standard Specifications and shall be Class "C".

Rocks shall not exceed a one foot diameter and shall not be less than three inches in diameter. Rocks shall be so placed as to provide a minimum of voids and the larger rocks shall be placed in the toe course and on the outside surface of the slope protection. The rock may be placed by dumping and may be spread in layers with suitable equipment. Local surface irregularities of the grouted rock riprap shall not vary from the plan slopes by more than six inches, measured at right angles to the slope.

The surfaces of the rock to be grouted shall be cleaned of adhering dirt and clay and moistened. Grout shall be brought to the place of final deposit by means of chutes, tubes, or buckets, or may be placed by means of pneumatic equipment or other mechanical methods. In no case shall grout be permitted to flow on the rock riprap a distance in excess of ten feet. Immediately after depositing, the grout shall be spaded and rodded into place with suitable spade trowels or other approved means until a minimum penetration of eight inches is achieved.

Grouted rock riprap shall be cured as provided in Section 90 of the Standard Specifications.

~~72-5.05~~ **~~Measurement~~**

~~Grouted rock riprap will be measured by the square yard, complete in place. Rock placed in excess of the dimensions shown on the Plans or as directed by the Engineer will not be paid for.~~

~~72-5.06~~ **~~Payment~~**

~~Grouted rock riprap will be paid for at the contract price per square yard, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work including excavation and backfill, rock placement, concrete placement, and no additional allowance will be made therefore.~~

SECTION 73 – CONCRETE CURBS AND SIDEWALKS

73-1.05 Curb Construction

Portland cement concrete curb and gutter shall be constructed in conformance with the details and at the locations shown on the Plans and in accordance with the applicable provisions of Section 73 of the Standard Specifications and as specified herein.

Curb openings, for driveways, shall be constructed at existing driveways, and at locations shown on the Plans or directed by the Engineer.

All concrete which is to be removed from curb, gutter, and driveway areas shall be removed to the nearest construction joint or as directed by the Engineer.

Median curb per City of Rohnert Park Standard Details shall be constructed at the locations shown on the Plans and in accordance with the applicable provisions of Section 73 of the Standard Specifications and these modifications.

All oil, paint, tire marks, and other discoloring shall be removed from the curb and gutter by sandblasting prior to acceptance by the Engineer. Cement mortar will not be an acceptable substitute for sandblasting.

No deduction in measured length of curb and gutter to be paid for will be made for curb openings for driveways.

73-1.07 Sidewalk, Driveway, Island Paving, Handicap Ramp, and Valley Gutter Construction

Portland cement concrete sidewalk shall be constructed in accordance with the details and at the location shown on the Plans and in conformance with the requirements of Section 73 of the Standard Specifications and as specified herein.

All concrete which is to be removed from sidewalk and driveway areas shall be removed to the nearest transverse score mark across the full width of sidewalk or construction joint as directed by the Engineer.

Concrete for sidewalk shall conform to the requirements of Section 73 of the Standard Specifications.

All soft or spongy material shall be removed and replaced with suitable material as required by the Engineer.

Portland cement concrete driveways shall be constructed in conformance with the details and at the locations shown on the Plans and in accordance with the applicable provisions of Section 73 of the Standard Specifications, and as specified herein.

Island paving shall be constructed in accordance with the details and at the location shown on the Plans, and as directed by the Engineer.

Handicap ramps shall be constructed in accordance with the details and at the locations shown on the Plans per City Std. 232.

Portland cement concrete valley gutter shall be constructed in accordance with the details and at the location shown on the Plans and in conformance with the requirements of Section 73 of the Standard Specifications and City of Rohnert Park Standard Details with the following modifications and additional requirements.

Concrete for valley gutter shall conform to the requirements of Section 73 of the Standard Specifications and as specified herein.

All soft or spongy material shall be removed and replaced with suitable material as required by the Engineer.

~~73-1.08~~ ~~Payment~~

~~Full compensation for furnishing and applying curing materials to curb and gutter, for forming and constructing curb openings for driveways, for furnishing and placing Class 2 aggregate base under curb and gutter, and for removing discoloring shall be considered as included in the contract price paid per lineal foot for concrete curb and gutter and no additional allowance will be made therefore.~~

~~Portland cement concrete curb and gutter will be paid for at the contract price per lineal foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment and doing all the work involved in constructing curb and gutter complete in place as specified, including furnishing and placing expansion joint filler, constructing weakened plane joints, excavating, and backfilling.~~

~~Median curb will be paid for at the contract price per lineal foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in constructing median curb complete in place as specified.~~

~~Full compensation paid for furnishing all labor, materials, tools and equipment, and doing all the work involved in constructing handicap ramp shall be paid for at the contract square foot price paid for portland cement concrete sidewalk, and no additional allowance will be made therefore.~~

~~Quantities of portland cement concrete sidewalk to be paid for will be computed on the basis of measurement of areas of completed sidewalk in place, which quantities shall include the areas of handicap ramp construction.~~

~~Excavation involved in removing and constructing sidewalk shall be considered as included in the contract price per square foot of sidewalk and no additional compensation will be allowed therefore.~~

~~Portland cement concrete sidewalk which is shown on the Plans to be installed will be paid for at the contract price per square foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in removing and constructing sidewalk complete in place as specified, including furnishing and placing of sand cushion, expansion joint filler, constructing weakened plane joints, furnishing and applying curing materials and performing all excavation and backfilling, and conform areas behind sidewalk.~~

~~Quantities of portland cement concrete driveway to be paid for will be computed on the basis of measurement of areas of completed driveway in place.~~

~~Excavation involved in removing and constructing concrete driveway shall be considered as included in the contract price per square foot of concrete driveway and no additional allowance will be made therefore.~~
~~Portland cement concrete driveway will be paid for at the contract price per square foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in constructing driveway complete in place as specified, including furnishing and placing expansion joint filler, constructing weakened plane joints, furnishing and applying curing materials and performing all excavation and backfilling.~~

~~Quantities of island paving to be paid for will be computed on the basis of measurement of areas of completed island paving in place.~~

~~Island paving will be paid for at the contract price per square foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in constructing island paving complete in place as specified, and as directed by the Engineer.~~

~~Quantities of portland cement concrete valley gutter to be paid for will be computed on the basis of measurement of areas of completed valley gutter in place.~~

~~Excavation involved in removing and constructing valley gutter shall be considered as included in the contract price per square foot of valley gutter and no additional compensation will be allowed therefore.~~

~~Portland cement concrete valley gutter will be paid for at the contract price per square foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in removing and constructing the valley gutter complete in place as specified, including furnishing and placing of Class II aggregate, constructing weakened plane joints, and furnishing and applying curing materials, and no additional allowance will be made therefore.~~

SECTION 76 – CONCRETE CYLINDER PIPE

76-1.01 General

Concrete Cylinder Pipe or Reinforced Mortar Pressure Pipe shall meet the requirements of Section 76 as specified herein. If Concrete Cylinder Pipe is selected, it shall conform to the requirements specified in this section and cathodic protection shall be provided as specified in herein.

76-1.02 Description

Mortar lined and coated steel cylinder pipe shall be pretensioned concrete cylinder type in accordance with AWWA C303 and as noted herein. Piping shall be per AWWA C303 for piping inclusive of 60-inch diameter, unless otherwise noted.

Pretensioned concrete cylinder pipe shall conform to AWWA C303 and its appendix except as follows. All piping and appurtenances shall be designed for 100 psi working pressure minimum and shall be capable of withstanding a trench load of 20 feet. Rubber gaskets shall conform to Section 76-1.02 (4), "Flanges, Gaskets, and Bolts", as specified herein. Buttering material for sealing interior joints and grout for exterior sealing of joints shall conform to mortar specified in section 3.10 of AWWA C303.

Piping shall be designed in accordance with the appendix of AWWA C303. Pipe diameter referred to is inside diameter of pipe after installation of pipe lining.

Piping 48 inch diameter and larger shall be designed to limit deflection. When this type of pipe is used for 48-inch diameter and larger pipe, the Contractor shall assume complete responsibility for proper installation to prevent deflections in excess of the limits specified in Section 76-1.07, "Laying Concrete Cylinder Pipe", Part 50, "Pipe Deflection", as specified herein.

1. Materials. Cement shall be portland cement in accordance with ASTM C150 and shall be Type II. Steel cylinders shall be ASTM A570 structural quality Grade C and shall be 10 gauge minimum. Steel for joint rings shall conform to ASTM A570 Grade A and shall be minimum 12 gauge for diameters up to 18 inches, minimum 3/l6 inch for diameters 18 through 42 inches and ¼ inch for diameters 48 inches and larger. Spigot rings shall be formed from hot rolled steel having Carnegie Shape M3516.

2. Construction. Reinforcing bars shall be wound helically around the cylinder under a tensile stress in accordance with AWWA C303. A device shall be provided for stressing, measuring, and indicating the tension of the bar reinforcement during the winding operation.

   As the circumferential bar reinforcement is wound, a portland cement paste composed of one sack of cement to not more than five gallons of water shall be applied to the

rod or to the cylinder in such a manner that the section of bar bearing on the cylinder shall be coated with cement paste.

Immediately preceding application of concrete encasement, a cement paste composed of one sack of portland cement to not more than five gallons of water shall be applied uniformly over the steel surface.

3. Data Required. The manufacturer shall provide the following data in addition to the other requirements herein: an affidavit of compliance; design calculations; steel test reports; concrete test reports; rubber gasket test reports; and the pipe laying diagram. The pipe shall be marked in accordance with AWWA C303.

4. Flanges, Gaskets, and Bolts. Steel pipe flanges whose nominal diameter is 6 inches or greater shall conform to AWWA Standard C207, Class D. All flanges shall be furnished with gaskets, studs, or bolts and nuts. Where a flange is not connected to another appurtenance or pipe, a blind flange shall be attached.

   Gaskets for flanges shall be 1/l6-inch thick, rubber or asbestos composition. The gaskets shall conform to ASTM Designation F104 (112100-M6).

   Unless otherwise specified, all bolts, studs, and nuts shall be steel conforming to the requirements of ASTM Designations A307, A325, or approved equal. Washers shall be of forged or rolled steel. All bolting material shall be cadmium plated.

   Unless otherwise specified, steel bolts shall be furnished with regular semifinished hexagonal heads and nuts. Bolt heads and nuts shall be sufficient to break the bolt in the body portion when tested.

5. Protective Coatings for Appurtenances. This section covers the preparation of surfaces and the application of protective coatings and related materials as required to complete the work as specified herein.

   Galvanized metal, non-ferrous metal parts, stainless steel parts, austenitic gray iron, and high nickel cast iron parts shall not be coated unless otherwise specified in these specifications. Surfaces not to be coated shall be protected from contamination and damage during the cleaning and coating of adjacent surfaces.

   The items listed in the following schedule shall be shop-coated, unless otherwise specified. Field coating may be permitted on items not specified herein upon approval of the Engineer.

   Coating materials, minimum number of coats, and minimum dry film thickness for the various items of work shall be as specified below, unless otherwise shown on the drawings. Surface preparation and undercoat(s) shall be in accordance with the coating manufacturer's recommendations.

	ITEM	COATING
A.	All bolts, nuts, and washers.	Cadmium plated in accordance with ASTM Designation A165.
B.	Exterior surfaces of buried blind flanges.	Two coats, 8 mils each, Kopper's Bitumastic 300 M coat-tar epoxy or ENGARD 800 coal tar epoxy or approved equal.
C.	Interior ferrous surfaces of blind flanges and valves.	Same as Item "B".
D.	All surfaces of buried valves.	Same as Item "B".
E.	Exterior surfaces of pipe ends to coal-tar enamel coating and wrapping.	Same as Item "B"; extend for all sleeve-type couplings.
F.	Exterior surfaces of nuts and sleeve-type couplings, and blind flanges.	One coat, 8 mils, of bolts for flanged joints, Kopper Bitumastic 300 M coal-tar epoxy or Engard to be applied after installation and hand tool cleaning.

Compensation for furnishing and application of protective coatings will be deemed included in the contract prices for the various items of work and no additional payment will be made therefore.

6. Marking of Pipes. Each pipe section and special fitting shall be marked clearly on the interior surface with the manufacturer's name or trademark and the date of manufacture. In addition, special marks of identification, sufficient to show the proper location of the pipe or special fitting in the line, shall be placed on each pipe or special.

   Each pipe shall be marked with a designation, e.g. 48 PT 100. The first number denotes pipe inside diameter in inches; "PT" denotes pretensioned pipe; and the last number denotes the operating head in psi, as specified herein.

The pipe coating shall be marked with the date the coating was applied.

~~**76-1.03 Earthwork**~~

~~Excavation and backfill shall be as shown on the Plans and as specified by Std. 215, Sheet 2, "Standard Trench Detail", except that Asphalt Concrete shall conform to the requirements of the Standard Specifications of the State of California for Type A - ½" Medium Asphalt Concrete and Bituminous Binder shall be AR-4000 paving asphalt.~~

~~Disposal of Excavated Material. All excess trench excavation material from trenches shall be the property of the Contractor. Prior to disposal of any material, the Contractor shall submit to the Engineer written authorization for such disposal of material and entry permission signed by the owners of the disposal site, and shall comply with any other requirements for disposal, such as~~

~~City and County permits, as may be required. The Contractor shall, at no additional cost to City, maintain drainage patterns during construction to blend with the adjacent topography.~~

~~Unless otherwise shown on the drawings or directed by the Engineer, the Contractor may, where the pipeline crosses a drainageway or ditch, permanently cut the slopes to 6:1 or flatter to provide access across the drainageway or ditch for construction and maintenance vehicles.~~

76-1.07 Laying Concrete Cylinder Pipe

1. Alignment, Angles, and Bends. In general, the centerline of the pipe shall be as shown on the Plans. When necessary, and with the approval of the Engineer, the pipeline may deviate slightly from this alignment.

   Changes in the direction of alignment or grade of the pipeline shall be accomplished by using specially fabricated bends, by beveling the ends of the pipe, or by pulling the joints. It is desirable to eliminate special sections or fittings wherever possible and the Contractor may submit alternate curves for approval by the Engineer. Wherever a grade break is shown on the drawings at a specific station, it is permissible to alter said station so that the change in grade is more gradual and can be taken up in the joints without exceeding the allowable angle of deflection recommended by the pipe manufacturer.

   In general, the Contractor shall hold the flow line of the pipe at or below the specific elevation denoted on the profile. When necessary, and with the approval of the Engineer, the pipeline may deviate slightly from this profile; however, in no case shall the top of the pipe have less than the cover indicated on the typical trench details shown on the Plans.

   Beveling pipe ends to provide for angles in the pipeline, where fittings or specials are not used, shall be accomplished by cutting the pipe sections to the proper length and beveling one or both ends of each pipe section by welding the bell or spigot ring to the pipe cylinder at a deflection of no more than five degrees from the plane perpendicular to the longitudinal axis of the pipe section. Pulled joints will be permitted at beveled pipe ends.

2. Joints and Couplings. Field joints may be either welded or rubbergasketed type, except where specifically shown on the Plans and where welding is necessary to anchor pipe in tension.

   Where the words "weld joints" are shown on the profile sheets, the Contractor is required to weld the joint. The weld may be on the inside or outside.

   The Contractor shall weld all vertical and horizontal joints which deflect more than five degrees. The length of pipe to be welded shall be as shown on the Plans.

All field-welded joints shall conform to the requirements of AWWA Standard C206 as modified herein.

Bell and spigot joints shall be double-welded (an inside and outside weld) at concrete encasements and in casings under highways and railroads. Prior to backfilling this type of joint, the Contractor shall test the joint in accordance with AWWA Standard C206, Section A8-2, paragraph 2.2, or by soap or wash pass test.

Where flanged coupling adapters are specifically called for on the drawings, the coupling shall be harnessed against tension in accordance with AWWA Manual M-11 design details. Where there will be no tension across a joint and the Contractor uses a flexible coupling, at his option, the harness may be omitted. The outside of pipe cylinders to be fitted with flexible couplings shall be free from surface defects and shall have the longitudinal or spiral welds ground to plate or sheet surface for a distance of 10 inches back from the pipe ends. Pipe cylinders shall have tolerances within the limits required by the manufacturer of the coupling to be used.

3. Pipeline Anchorage. The Contractor shall provide such anchorage for the pipeline, fittings, and appurtenance structures as may be required to adequately resist 150% of the pipeline working pressures specified herein.

   Anchorage for the pipe against longitudinal thrust, when the bend is greater than 5 degrees, shall be provided by Portland Cement Concrete thrust blocks or by welding for the required distances on each side of the vertical or horizontal bends, as shown on the Plans. The length of welded joints each side of a mainline valve shall be the same as for a 90 degree deflection as shown on the Plans. Field-welded joints shall be as specified in Section 76-1.07 as specified herein.

   The City retains the right to inspect any and all welds. Any welds found to be unacceptable shall be rewelded and retested. The Contractor will be responsible for the cost of any retesting of welds.

   All welds shall be sandblasted prior to grouting of the joints.

   In lieu of welding the pipe, Portland Cement Concrete thrust blocks shall be required at bends, tees, and reducers. The concrete thrust blocking shall be as shown on the Detail Sheet provided in these specifications.

4. Pipe Cleaning and Leakage Test. The Contractor, after placement of the pipe, shall remove all construction materials and shall sweep or otherwise clean the pipe of all dirt and debris.

   After the backfill has been completed, the pipeline and valves shall be tested for water-tightness by filling it with water and bringing the hydrostatic pressure to not less than 25 percent and not more than 50 percent in excess of the "working pressure". "Working pressure" for the pipeline shall be 100 psi minimum.

The Contractor shall furnish necessary bulkheads, pumps, pressure gages, means of measuring water loss, water, and all other equipment, materials, and labor required for making the test.

The line shall be isolated for testing by placing temporary bulkheads in the pipe. The Contractor shall contact the Public Works Department (707) 588-3300 for information regarding allowable uses of City water and available sources of water, other than the City water system, for construction purposes.

The amount of water required to maintain the test pressure shall be measured accurately by means approved by the Engineer. While the pipe is under pressure, a survey shall be made by the Contractor along the pipeline for leaks. Regardless of the test results, all detectable leaks shall be repaired by the Contractor and the pipeline retested so that the remaining amount of leakage can be determined. If the leakage rate exceeds that specified, the repair and retest procedure shall be repeated until the pipeline passes the leakage test.

For the pipeline to satisfactorily pass the leakage test, the measured leakage under the test shall not exceed 40 U.S. gallons per inch of inside diameter per 24 hours per mile of pipe.

5. Pipe Deflection. Vertical ring deflection in pipe after backfill shall not exceed the following limits:

   Pretensioned Steel Cylinder Concrete Pipe is $(\frac{D^2}{4000})$ inches.

   Where "D" is nominal pipe diameter in inches.

   If deflections are found to be in excess of the above, the pipe shall be uncovered and allowed to reround, and the bedding and backfill shall be re-compacted. If the pipe lining or coating is damaged or if the pipe does not reround to less than the above limits, it shall be replaced at the Contractor's expense.

6. Bedding. Pipe bedding shall conform to City Std. 215.

7. Dewatering. The Contractor shall perform all dewatering and maintain temporary drainage as required to keep the excavation free of water through the construction operations.

   Wherever necessary for dewatering or to provide proper drainage, the Contractor shall, at his own expense, furnish and operate all necessary pumping equipment, drainage sumps, well point system, and other drainage facilities.

8. Warning Tape. After bedding is completed and before backfilling begins, the Contractor shall furnish and install underground line warning ribbon or tape, one foot

above the pipeline. The tape shall be made of high-quality polyethylene base material that will resist acids, alkalis, and other substances normally found in soils. The tape shall have a thickness of at least .004-inch and have a width of at least 6 inches. The tape shall be color-coded (nonfading bright green) with overcoating printing which reads continuously:

"CAUTION CAUTION"
"RECLAIMED IRRIGATION WATER"

The tape shall be Brady Identoline or approved equal. The cost of furnishing and installing this tape shall be considered as included in the contract price for the appropriate pipe item.

~~**76-1.09 Measurement**~~

~~The final quantity for each pipe item will be based on measurement along the top of the pipe, in place, and shall include the length through and occupied by special structures, such as gate valves, meters, etc.~~

~~**76-1.10 Payment**~~

~~Payment for furnishing, installing, and testing the pretensioned concrete steel cylinder pipe will be made at the contract unit price for the applicable pipe item and shall include full compensation for all labor, materials, equipment, and other costs incidental thereto, including earthwork as specified herein, trench resurfacing, disposal of excess material, bedding, dewatering, removal and replacement of fences, all bends and special fittings, transporting and storing the pipe, pipeline jointing, anchorage, cleanup, tests, retests and repairs, tape, connecting new pipe to existing facilities, and all other related work not specifically covered under another bid item.~~

SECTION 77 – PIPE CASING

77-1.01 Description

Pipe casing shall conform to the requirements of the Plans, Sections 65 and 66 of the Standard Specifications and as specified herein.

The method of installing the casing shall be at the Contractor's option. The casing may be either 5/8" thick corrugated galvanized steel liner plate, 5/8" thick steel pipe, or reinforced concrete pipe, Class III minimum. The casing shall be of sufficient strength to withstand surface loads imposed by E80 railroad loads under the railroad area and H20 highway loads under the highway area and must also be of sufficient strength to withstand all additional construction loads. Method of installation and materials to be used shall be submitted to the Engineer for approval. If corrugated steel liner plate or steel pipe is used, the liner or the pipe shall be galvanized and bituminous lined and coated. Bituminous coating shall be either field applied or furnished by the manufacturer and shall conform to the following specification. Coating may be either asphalt mastic or tar base.

Corrugated steel liner plate or steel pipe shall be galvanized in accordance with ASTM A-123-71. Bolts, nuts, and pipe plugs shall be galvanized in accordance with ASTM A-153-67.

Bituminous coating shall be as per AASHTO Designation M243-73 Asphaltic Mastic or Tar Base. All galvanized surfaces shall be coated.

The excavated hole shall be as per AASHTO Designation M243-73 of one part Type II Portland Cement and two parts sand conforming to ASTM C33 and graded so that 100% by weight will pass a standard No. 8 mesh sieve, and at least 48% by weight will pass a standard No. 40 mesh sieve, and the minimum amount of water required for mixing and placing. Sluicing and jetting with water will not be permitted.

~~No separate measurement or payment will be made for constructing jacking pits and backfilling all pits after the pipe is placed. Full compensation will therefore be considered as included in the price paid for pipe casing. The pipeline contained in the pipe casing will be paid for at the contract price paid for the pipeline.~~

~~77-1.10 Payment~~

~~Pipe casing will be paid for at the contract price per linear foot which price shall include full compensation for furnishing all labor, materials, tools and equipment necessary to install the pipe casing complete in place including bituminous coating, grouting, installation pits, and any other item of work not mentioned but necessary to furnish and install the pipe casing herein specified and no additional allowance will be made.~~

SECTION 78 – REINFORCED PLASTIC MORTAR PRESSURE PIPE

78-1.01 General

Reinforced Plastic Morter Pressure Pipe shall only be used with the permission of the City Engineer.

Concrete Cylinder Pipe or Reinforced Plastic Mortar Pressure Pipe shall conform to the requirements of the Standard Specifications and as specified herein. If Reinforced Plastic Mortar Pressure Pipe is selected, it shall conform to the requirements specified in this section and cathodic protection shall not be required, except for the "Pipe Casing" specified in Section 77 if corrugated steel liner plate or steel pipe is used.

78-1.02 Description

Reinforced Plastic Mortar Pressure Pipe shall be manufactured in accordance with ASTM D-3517 and as specified herein.

All piping and appurtenances shall be designed for 100 psi working pressure minimum and shall be capable of withstanding a trench load of 20 feet.

All Reinforced Plastic Mortar Pressure Pipe shall be designed to limit deflection. When this type of pipe is used, the Contractor shall assume complete responsibility for proper installation to prevent deflections in excess of the manufacturer's recommendations.

1) Data Required: The manufacturer shall provide the following data in addition to the other requirements herein: an affidavit of compliance; design calculations; test reports on pipe and joints; pipe laying diagram; and five copies of the manufacturer's installation guide.

2) Marking of Pipes: Each pipe section and special fittings shall be marked clearly on interior surface with the manufacturer’s name or trademark and the date of manufacture. Pipe markings shall be in accordance with ASTM D-3517. In addition, special marks of identification, sufficient to show the proper location of the pipe or special in the line, shall be placed on each pipe or special.

~~**78-1.03 Earthwork**~~

~~Excavation and backfill shall be as shown on the Plans and as specified by Std. 215, Sheet 2, "Standard Trench Detail", except as follows: Asphalt Concrete shall conform to the requirements of the Standard Specifications of the State of California for Type A - ½" Medium Asphalt Concrete and Bituminous Binder shall be AR-4000 paving asphalt. Also, pipe bending material shall be 4 sack Portland Cement Concrete with aggregate graded as follows: 100% passing 3/4", 30% to 70% passing #4, and 0% to 10% passing No. 200.~~

~~1) Disposal of Excavated Material: Disposal of excavated material shall be as specified in Section 76-1.03, "Earthwork", Part "1)" as specified herein.~~

~~2) Test Borings: Reference is made to Section 76-1.03, "Earthwork", Part "2)" as specified herein.~~

78-1.04 Laying Reinforced Plastic Mortar Pressure Pipe

1) Alignment, Angles, and Bends: Laying of reinforced Plastic Mortar Pressure Pipe shall be as specified in Section 76-1.07, "Laying Concrete Cylinder Pipe", Part 1, except that the last paragraph is not applicable.

2) Joints, Couplings, and Adapters: Joints shall be as specified in ASTM D-3517. Couplings and adapters shall be as recommended by the manufacturer.

3) Pipeline Anchorage: The Contractor shall provide such anchorage for the pipeline, fittings, and appurtenance structures as may be required to adequately resist 150% of the pipeline working pressures specified herein.

Portland Cement: Concrete thrust blocks shall be required at bends, tees, and reducers. The concrete thrust blocking shall be as shown on the detail sheet provided in these specifications.

4) Pipe Cleaning and Leakage Test: The Contractor, after placement of the pipe, shall remove all construction materials and shall sweep or otherwise clean the pipe of all dirt and debris.

After the backfill has been completed, the pipeline and valves shall be tested for watertightness by filling it with water and bringing the hydrostatic pressure to not less than 25 percent and not more than 50 percent in excess of the "working pressure". "Working pressure" for the pipeline shall be 100 psi minimum.

The Contractor shall furnish necessary bulkheads, pumps, pressure gages, means of measuring water loss, water, and all other equipment, materials, and labor required for making the test.

The line shall be isolated for testing by placing temporary bulkheads in the pipe. The Contractor shall contact the Public Works Department at (707) 588-3300, for information regarding allowable uses of City water and available sources of water, other than the City water system, for construction purposes.

The amount of water required to maintain the test pressure shall be measured accurately by means approved by the Engineer. While the pipe is under pressure, a survey shall be made by the Contractor along the pipeline for leaks. Regardless of the test results, all detectable leaks shall be repaired by the Contractor and the pipeline retested so that the remaining amount of leakage can be determined. If the leakage rate exceeds that specified, the repair and retest procedure shall be repeated until the pipeline passes the leakage test.

For the pipeline to satisfactorily pass the leakage test, the measured leakage under the test shall not exceed 40 U.S. gallons per inch of inside diameter per 24 hours per mile of pipe.

5) Bedding: Pipe bedding shall conform to City Std. 215 except that pipe bedding material shall be 4 sack Portland Cement concrete with aggregate graded as follows: 100% passing 3/4", 30% to 70 % passing #4, and 0% to 10% passing a No. 200.

6) Dewatering: Dewatering shall be as specified in Section 76-1.07, "Laying Concrete Cylinder Pipe", Part 7.

7) Warning Tape: Warning tape shall be as specified in Section 76-1.07, "Laying Concrete Cylinder Pipe", Part 8.

~~**78-1.09 Measurement**~~

~~The final quantity of each pipe item will be based on measurement along the top of the pipe, in place, and shall include the length through and occupied by special structures, such as gate valves, meters, etc.~~

~~**78-1.10 Payment**~~

~~Payment for furnishing, installing, and testing the reinforced Plastic Mortar Pressure Pipe will be made at the contract unit price for the applicable pipe item and shall include full compensation for all labor, materials, equipment, and other costs incidental thereto, including earthwork as specified herein, trench resurfacing, disposal of excess material, bedding, dewatering, removal and replacement of fences, all bends and special fittings, transporting and storing the pipe, pipeline jointing, anchorage, cleanup, tests, retests and repairs, tape, connecting new pipe to existing facilities, and all other related work not specifically covered under another bid item.~~

SECTION 79 – VIDEO INSPECTION OF STORM DRAINS

79-1.01 Description

Television inspection of all new and modified storm drain pipes and structures is required.

The contractor shall hire an independent pipe video inspection service to perform the inspection. The camera used shall be self-propelled or pulled, be able to pan and tilt and shall be equipped with high-intensity lights. A ~~VHS video tape or~~ digital video on ~~CD or~~ DVD in an acceptable format of the television inspection shall be produced along with a printed log of the inspection and delivered to the Engineer. The pipe video inspection service shall be pre-approved by the City.

The pan and tilt color camera used for the inspection shall be specifically designed and constructed for such inspection. The camera shall be mounted on adjustable skids or tractor to keep it in the center of the pipe. Lighting for the camera shall be supplied by a lamp(s) on the camera, capable of being dimmed or brightened remotely from the control panel. The lighting system shall be capable of illuminating the entire periphery of the pipe. The color camera shall be operative in 100% humidity conditions and shall have a minimum of 330 lines of resolution but must be capable of discerning small, hairline cracks and other minor defects.

The pan and tilt color camera shall be moved through the line at a uniform slow rate of 30 feet per minute maximum. A 2- inch depth gauge shall be pulled or pushed in front of the camera.

All pipe cleaning prior to the video inspection will be at the contractor's expense. All cleaning water and debris shall be captured, removed and properly disposed. Cleaning water will not be allowed to discharge to the storm drain system.

The contractor is responsible for all stuck, broken or lost equipment and shall bear all necessary cost to retrieve said equipment including dig ups.

All work performed must meet quality and clarity standards set by the City of Rohnert Park and are subject to Public Works review. A pan and tilt color camera will be used for all video inspections of storm drains within the jurisdiction of the City of Rohnert Park.

The following conditions shall exist prior to the television inspection:

- All storm drain pipes shall be installed, grouted, backfilled to 5 feet over the top of the pipe or to subgrade, and compacted;
- Conduits or pipelines for all underground utilities (sewer, water, cable television, telephone, electrical, gas, street light) that cross storm drain trench shall be installed;
- The bases of all structures shall be in place and grouted;

- The system shall be cleaned and all debris removed;

- Street shall be unpaved;

When the above work has been completed, the contractor shall notify the Engineer 48 hours in advance of the date for television inspection. Immediately before inspection the system shall be flushed with clean water. During this inspection, the contractor or authorized representative shall be present to observe the video as provided by the television camera.

At the beginning of each run of storm drain pipe the video shall display:

A. The project name;
B. Date;
C. Company performing the inspection;
D. Run number (unique designation for each section of pipe);
E. Street name (if applicable);
F. Pipe size;
G. Pipe material;
H. Structure numbers (as labeled on the plans) at each end of the pipe;
I. Direction of the camera;
J. Type of structure.

The video tape shall display the following information continuously during the run:

A. The camera's location via a continuously updated footage counter measuring the distance from point of entry;
B. Project name;
C. Structure numbers (as shown on the plans) at each end of the run;
D. Run number.

The camera shall stop at all structures, connections or defects (sags, bad joints, etc.) for a period of at least 10 seconds and be noted on the log sheet. The camera will be panned or tilted toward the connection or defect so that any portion of the connection or defect that is visible from within the pipe or structure can be completely inspected.

A printed record shall be made for each pipe run and shall clearly show the:

A. Run number;
B. Structure number at each end of the run;
C. Direction of camera travel;
D. Location and description of each defect discovered by the camera;
E. Line size;
F. Length of run;
G. Structure depths;
H. Location of blind connections.

The video inspection disk or tape and report shall be delivered together to the Engineer and become the property of the City of Rohnert Park.

The following video tape observations shall be considered defects in the construction of the storm drain system and will require corrections prior to acceptance:

- Off grade - 0.08' or more deviation from grade;
- Joint separations;
- Offset joints;
- Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rock, root, etc.);
- Debris or other foreign objects;
- Pipe deflections greater than 7.5% of base diameter, measured inside the pipe;
- Other obvious deficiencies when compared to approved Plans and Specifications, these Standards and City Design and Construction Standards.

The contractor will be notified in writing of any deficiencies revealed by the television inspection that will require repair, following which the contractor shall excavate and make the necessary repairs and request a television re-inspection. Television re-inspection shall be at the contractor's expense.

Any subsequent televising of the lines, if deemed necessary by the City, shall be completed at the City's expense. Any defects found prior to or during the warranty period shall be corrected by the contractor.

SECTION 80 – FENCES

80-1.01 Description

All fence shall be constructed in accordance with Section 80 of the Standard Specifications, the details as shown on the Plans, as specified herein, and as directed by the Engineer.

80-1.04 Connections

Existing cross fences shall be connected to the new fences. Corner posts with braces for every direction of strain shall be placed at the junction with existing fences. The wire in the new and existing fences shall be fastened to the posts.

80-3.01 Materials

Fencing materials shall conform to Section 80-3.01 of the Standard Specifications and the details as shown on the Plans.

80-3.02 Construction

Fence construction shall be in accordance with Section 80-3.02 of the Standard Specifications, the details as shown on the Plans, as specified herein, and as directed by the Engineer.

80-3.04 Payment

Barbed wire fence will be paid for at the contract price per linear foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work involved in constructing barbed wire fence including furnishing and installing posts and wire, clearing the line of the fence and disposing of the resulting material, excavating high points in the existing ground, excavating and backfilling holes, disposing of surplus excavated material, and furnishing and placing concrete footings and deadmen, and connecting new fences to existing cross fences, and no additional allowance will be made therefore.

80-4.01D Gates

A gate shall be placed in a location determined in the field by the Engineer as specified herein.

80-4.04 Payment

Chain link fence shall be paid for at the contract price per linear foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work involved in constructing the chain link fence in place, complete as shown on the Plans, and as herein specified including all necessary concrete.

~~**The gates shall be paid for at the contract unit price each, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work involved in constructing the gates in place complete as shown on the Plans and as specified herein.**~~

SECTION 80 – CHAIN LINK FENCE CONSTRUCTION

80-1.01 Description

The chain link fence, gates, and appurtenances to be erected under this contract shall be constructed in accordance with Section 80 of the Standard Specifications, the details shown on the Plans, as specified herein, and as directed by the Engineer.

The fence and gates shall consist of six foot high steel mesh fabric with a top rail and topped by three strands of barbed wire equally spaced six inches apart on angled extension arms for a total fence height of approximately seven feet.

80-1.02 Connections

Existing cross fences shall be connected to the new fences. Corner posts with braces for every direction of strain shall be placed at the junction with existing fences. The wire in the new and existing fences shall be fastened to the posts.

80-1.03 Materials

Fabric: Chain link fence fabric shall be galvanized steel fabric conforming to the specifications of AAFHP Designation M-181. The fabric shall be #9 gauge, 72" high, and woven into approximately a two inch mesh. All chain link fabric shall be galvanized after weaving by the hot dip process with a minimum of 1.2 ounces of zinc retained per square foot of uncoated wire service.

Posts and Framework: All posts, gate frames, and top rails shall be steel pipe galvanized according to the specifications of AASHO Designation M-111 and shall conform to the following dimensions and weights:

	O.D.	Min. Wt. Per L.F.
Line Posts	2"	2.72
Terminal and Corner Posts	2½"	3.65
Gate Posts	4"	9.11
Top Rails	1-5/8"	2.27
Gate Frames	1-5/8"	2.27

Line post spacing shall not exceed ten foot centers. All line and corner posts shall be a minimum of nine feet in length and gate posts a minimum of ten feet in length.

Braces: All terminal and corner posts shall be truss braced from a first line post to the bottom of the terminal post with a 3/8" galvanized truss rod assembly.

Gates: Two 8-foot drive gates providing a 16-foot wide clear opening shall be provided and installed where shown on the Plans and as directed by the Engineer. Gates shall be provided with

catch and locking attachment of an approved design which will not rotate around the latch post. Stops to hold gates open and a center rest with catch shall be provided. Gate hinges shall provide a 90 degree opening. All fittings shall be hot dip galvanized.

80-1.04 Erection

The fence shall be installed by skilled and experienced fence erectors on lines and grades furnished by the Engineer. Line and corner posts shall be set in concrete foundations a minimum of 36" inches deep and gate posts a minimum of 48" deep. Concrete foundations shall be no less than three times the diameter of the posts.

~~80-1.05 Removal of Existing Fence~~

~~Prior to erecting the chain link fence under this contract, the Contractor will be required to dismantle and remove the existing wood post and barbed wire fence existing along the approximate route for the new chain link fence.~~

~~The existing fence shall become the property of the Contractor and shall be disposed of away from the construction site to the satisfaction of the Engineer.~~

~~80-1.06 Payment~~

~~Quantities of chain link fence to be paid for will be determined from actual measurement, such measurement to be made parallel to the ground slope along the line of the completed fence.~~

~~Chain link fence will be paid for at the contract price per linear foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work, including furnishing and placing gates, concrete foundations, furnishing and installing three strands of barbed wire on top of chain link fence, and furnishing and installing wire fasteners, and no additional allowance will be made therefore.~~

~~Removal of existing fence will be paid for at the contract lump sum price, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in dismantling, removing, and disposing of the existing fence, including backfilling of post holes, all to the satisfaction of the Engineer, and no additional allowance will be made therefore.~~

SECTION 80-5 – REDWOOD FENCE

80-5.01 Description

Redwood fencing shall be constructed in accordance with the details shown on the Plans as specified herein and as directed by the Engineer.

80-5.02 Materials

Fencing materials shall consist of the following:

4"x4" Posts @ 6'0" O.C.
2"x4" Running Rails, Top and Bottom
1"x6" or 1"x8" Fence Boards (5')

All fencing material shall be standard, rough-sawn redwood.

80-5.03 Gates

The existing gates shall be relocated as shown on the Plans and as directed by the Engineer. Gates shall be rehung from 4"x4" redwood posts.

~~**80-5.04 Payment**~~

~~Redwood fence will be paid for at the contract price per lineal foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work involved in constructing the redwood fence in place, including installing posts, excavating and backfilling holes, and connecting to existing fence, and no additional allowance will be made therefore.~~

~~Gates will be paid for at the contract lump sum price, which price shall include full compensation for removing and relocating the existing gates, installing supporting posts, excavating and backfilling holes, and furnishing and placing concrete footings, and no additional allowance will be made therefore.~~

SECTION 81 – MONUMENTS

81-1.01 Description

All City monuments shown on the Plans shall be placed in accordance with the requirements of Section 81 of the Standard Specifications and as specified herein.

The exact location of the monuments will be established by the Engineer as shown on subdivision map and upon completion, the monuments will be checked and the center point stamped by the Contractor's/Developer's Engineer.

~~**81-1.06 Payment**~~

~~City monuments will be paid for at the contract unit price each, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in constructing monuments complete in place, including removal of existing monuments disturbed during construction which shall be replaced with new monuments, and no additional allowance will be made therefore.~~

SECTION 83 – RAILING AND BARRIERS

83-1.01 Railing

The work shall consist of constructing metal tube bridge railing (Type 116) at the locations and in accordance with the details shown on the Plans, and as specified in Section 83 of the Standard Specifications and as specified herein, and as directed by the Engineer.

Metal beam guard railing shall conform to the provisions in Section 83-1, "Railing," of the Standard Specifications and as specified herein. Line posts and blocks shall be wood.

When metal beam guard railing is connected to structures, walls or abutments, the structure, wall or abutment will be considered the end post and the point used for measuring the rail length shall be the midpoint between the 2 bolts attaching the rail element to the structure, wall or abutment.

The quantities of return and end sections and the various types of terminal sections will be determined as units from actual count.

83-1.02D Steel Bridge Railing

Metal tube bridge railing, metal beam guard railing, terminal end sections and all hardware shall be ASTM A-588 structural steel (USS Cor-10 or Bethlehem MAYARI or equal).

~~**83-2.04 Payment**~~

~~"Additional" rail posts and rail tubing materials as specified in the Plans shall be delivered to the City Corporation Yard at Donahue and Decker. Full compensation for providing extra rail posts and rail tubing shall be considered as included in the contract price paid per linear foot of Metal Tube Railing (Type 116) and no additional allowance will be made therefore.~~

~~Metal tube bridge railing (Type 116) will be paid for at the contract price per lineal foot, which price shall include full compensation for furnishing all materials, tools, labor, and equipment for doing all the work involved in installing railing as shown on the Plans and as specified herein, and no additional compensation will be allowed therefore.~~

~~The metal beam guard railing will be paid for at the contract price per lineal foot, which price shall include full compensation for furnishing all labor, materials, tools and equipment and incidentals, and for doing all the work involved in constructing the barrier, complete in place, including excavating and backfilling barrier post holes, and disposing of surplus excavated material, as shown on the Plans, and as specified in these specifications and the special provisions, and as directed by the Engineer.~~

~~The contract unit prices paid for cable anchor assemblies and terminal sections shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in constructing cable anchor assemblies and terminal sections.~~

SECTION 84 – TRAFFIC STRIPES AND PAVEMENT MARKINGS

84-1.01 Description

Traffic stripes and pavement markings shall conform to the applicable provisions of Section 84 of the Standard Specifications, Part IV of the City Traffic Standards, and as specified herein and shall be done at the locations shown on the Plans.

Existing stripes and pavement markings which are damaged by the work shall be replaced.

~~84-1.09 Payment~~

~~Traffic stripes and pavement markings will be paid for at the lump sum contract price, which price shall include furnishing all paint and glass beads, thermoplastic pavement marking material, tape, and furnishing all equipment, tools, and labor, and doing all the work involved as herein specified, including eradication of existing traffic stripes and pavement markings, temporary traffic stripes and pavement markings and replacement of damaged stripes and markings, and no additional allowance will be made therefore.~~

SECTION 85 – PAVEMENT MARKERS

85-1.01 Description

Raised pavement markers shall be placed in conformance with the details and at the locations shown on the Plans and in accordance with the applicable provisions of Section 85 of the Standard Specifications, as specified herein and Volume 1, Part IV of the City Traffic Standards.

The exact location and limits of raised pavement markers will be determined in the field by the Engineer.

Existing raised pavement markers conflicting with the proposed striping shall be removed immediately prior to placement of new markers.

Existing raised pavement markers to remain, which are damaged by the Contractor, shall be replaced.

Raised pavement markers shall be installed the day following pavement overlay.

~~**85-1.09 Payment**~~

~~Raised pavement markers, reflective and nonreflective, will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work involved in placing raised pavement markers, complete in place, including adhesives, removing existing pavement markers, and no additional allowance will be made therefore.~~

SECTION 86 – TRAFFIC SIGNAL DETECTOR LOOPS AND VIDEO DETECTION SYSTEM

86-1.01 Description

The Contractor shall furnish and install traffic signal detector loops or video detection system shown on the Plans in conformance with the applicable provisions of Section 86, "Signals and Lighting", of the Standard Specifications and Standard Plans, the City Traffic Standards, as specified herein, and as directed by the Engineer.

86-2.05 Conduit

Conduit shall conform to the Standard Specifications and the City Traffic Standards.

Trenching depth shall be per Section 86-2.01 of the Standard Specifications and as specified herein.

86-2.06 Pull Boxes

Pull boxes shall conform to Part V.G of the City Traffic Standards and as specified herein.

All existing pull boxes to receive new conductors and/or conduits shall be cleaned out, all existing grout removed, and the bottoms regrouted with a drain hole or the boxes replaced to meet current City Traffic Standards.

86-2.08 Conductors

All conductors for traffic signal or street lighting systems shall conform to Section 86 of the Standard Specifications, Part V.H of the City Traffic Standards, as shown on the Plans, or as specified herein.

86-2.09 Wiring

Wiring shall conform to the Standard Specifications and Part V.I of the City Traffic Standards.

86-2.14C Functional Testing

The functional test for each traffic signal detector loops or video detection system shall consist of not less than 48 hours of continuous, satisfactory operation. If unsatisfactory performance of the system develops, the conditions shall be corrected and the test shall be repeated until the 48 hours of continuous, satisfactory operation is obtained.

86-5 Detectors

86-5.01A Inductive Loop Detectors

Inductive loop detectors shall conform to Sections V-J and V-K of the City Traffic Standards.

Detector handholes shall be Type A installed per State Std. ES-5E.

Any existing traffic signal detectors shown on the Plans to remain that are damaged shall be replaced at the Contractor's expense within five (5) working days or as directed by the Engineer.

~~**86-8.10 Payment**~~

~~Full compensation for installation of pull boxes shown on the Plans shall be paid for at the contract unit price each, which price shall include full compensation for furnishing all labor, material, tools, equipment and doing all work involved as shown on the Plans and as specified herein and no additional allowance will be made therefor.~~

~~Traffic signal detector loops to be installed as shown on the Plans will be paid for at the contract unit price per each, which price shall include full compensation for furnishing all labor, material, tools, equipment, and doing all work involved, including sawcutting the pavement, furnishing and installing cable and epoxy sealant, connecting to the traffic signal controller and testing, and no additional allowance will be made therefor.~~

~~Type A detector handholes will be paid for at the contract unit price per each, which price shall include full compensation for furnishing all labor, material, tools, equipment, and doing all work involved including excavation and backfilling and connecting to the detector lead-in cable, and no additional allowance will be made therefor.~~

SECTION 90 - PORTLAND CEMENT CONCRETE

90-1.01 Description

Class A concrete shall be truck-mixed, ready-mixed concrete consisting of a mixture of Type II Portland Cement complying with ASTM C150, sand, fine aggregate, coarse aggregate, and water. The proportions of the water, sand, and aggregate shall be regulated so as to produce a plastic, workable, and cohesive mixture. All materials required, and the procedure of mixing, shall conform to the provisions of Section 90 of State Standard Specifications.

Class A concrete shall contain 564 pounds (six sacks) of Portland Cement per cubic yard and shall have a 28-day compressive strength of 4000 pounds per square inch.

90-1.03 Steel Reinforcement

Reinforcing bars, where required, shall be deformed billet steel in conformance with ASTM A615, including supplementary requirements, Grade 60. Wire fabric, where required, shall be welded steel mesh conforming to ASTM A185.

90-1.04 Mix Designs

Reports of concrete mix designs shall be provided for review by the Engineer.

90-1.05 Placement and Curing

Placement, consolidation, and curing of concrete shall conform to the provisions of Section 90 of State Standard Specifications.

SECTION 98 – HANDICAP RAMP CONSTRUCTION

98-1.05 Curb, Curb and Gutter, and Sidewalk Removal and Construction

Portland cement concrete curb, curb and gutter, and sidewalk shall be removed and constructed in conformance with the details and at the locations shown on the Plans and in accordance with the applicable provisions of Section 73 of the Standard Specifications and as specified herein.

All oil, paint, tire marks, and other discoloring shall be removed from the curb and gutter by sandblasting prior to acceptance by the Engineer. Cement mortar will not be an acceptable substitute for sandblasting.

All soft or spongy material shall be removed and replaced with suitable material as required by the Engineer.

98-1.06 Pull Box Relocation

Existing pull boxes that are within the area of handicap ramp construction shall be reset to grade as directed by the Engineer.

98-1.07 Sign Relocation

Street and traffic signs that conflict with the construction and/or use of the handicap ramp shall be relocated as directed by the Engineer.

~~**98-1.09 Payment**~~

~~Full compensation for furnishing and applying curing materials to curb, curb and gutter, and sidewalk for furnishing and placing Class 2 aggregate base under curb and gutter, and for removing discoloring shall be considered as included in the contract price paid for the various contract items of work and no additional allowance will be made therefore.~~

~~The contract price paid for removal and construction of curb, curb and gutter, and sidewalk shall include full compensation for furnishing all labor, materials, tools and equipment and doing all the work involved in removing and constructing curb, curb and gutter, and sidewalk complete in place as specified, including furnishing and placing expansion joint filler, constructing weakened plane joints, excavating, and backfilling.~~

~~Quantities of portland cement concrete curb, curb and gutter, and sidewalk to be paid for will be computed on the basis of measurement of areas of complete curb, curb and gutter, and sidewalk in place.~~

~~Excavation involved in removing and constructing curb, curb and gutter, and sidewalk will be paid for and included in the unit bid price for sidewalk and no additional compensation will be allowed therefore.~~

~~P.C.C. curb shall be paid for at the contract price per lineal foot.~~

~~P.C.C. curb and gutter shall be paid for at the contract price per lineal foot.~~

~~P.C.C. sidewalk shall be paid for at the contract price per square foot.~~

~~Pull box relocation shall be paid for at the contract price each, which shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work involved in relocating the existing pull boxes and no additional allowance will be made therefore.~~

~~Sign relocation shall be paid for at the contract price each, which shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work involved in sign relocation and no additional allowance will be made therefore.~~

SECTION 99 – WATER MAIN CONSTRUCTION

99-1.01 Description

All water mains and related appurtenances shall be constructed in accordance with the City of Rohnert Park Standard Details and Specifications, the Standard Specifications for Public Works Construction "Greenbook" and the Plans.

99-1.02 Pipe

The pipe, except where otherwise specified on the Plans, can be either ductile cast iron or polyvinyl chloride (PVC), all in accordance with the following:

A. Ductile iron pipe shall be cement lined, new pipe conforming to ~~ANSI A 21.51 1976~~AWWA C151 or most recent issue, if any, as sponsored by the American Water Works Association for thickness Class 50 ductile iron pipe. The pipe shall be furnished with either bell and spigot end, "Tyton Joints" or mechanical joints except where otherwise specified on the Plans.

B. Polyvinyl chloride (PVC) pipe shall be new pipe, minimum Class 150, or as shown on the Plans and conforming to the requirements of AWWA C900 "Standard for Polyvinyl Chloride Pressure Pipe, 4 inch through 12 inch for Water" and shall be furnished with either bell ends or couplings designed to effect an elastomeric pressure seal.

C. Each and every length of pipe and coupling shall be marked with the manufacturer's name, lot number, and the date the pipe was tested.

The pipe shall be tested in accordance with the most recent American Water Works Standard Specifications and amendments thereto for the pipe furnished. The testing shall be performed in a State licensed materials testing laboratory where the testing standards meet or exceed State of California testing standards.

Accompanying or preceding each load of pipe delivered, a certificate shall be furnished to the City certifying that the pipe which is (to be) delivered has been tested and meets the requirements of the American Water Works Association Standard Specifications. The certificate shall identify the pipe by manufacturer's name, lot number, and date tested by a State certified materials testing laboratory.

D. Number 12 insulated copper wire shall be laid on top of and along the entire length of all non-metallic service laterals and mains, and shall be extended to the surface at all valve location blow-offs and meter boxes sufficiently for locator equipment to be attached.

99-1.03 Polyethylene Water Service Tubing

All polyethylene water service tubing shall conform to the latest AWWA Standards as described in ANSI/AWWA of the latest revision for 3/4-inch and 1-inch tubing.

99-1.04 Fittings

All fittings shall be new gray iron or ductile iron fittings conforming to ANSI/AWWA C110/C153 of latest revision and shall have the proper type of ends to match the type of pipe used.

Gray iron fittings shall be coated inside and outside with a petroleum asphaltic coating conforming to AWWA C110 and shall meet or exceed the pressure rating of the pipe to be installed.

Ductile iron fittings shall be cement mortar lined in accordance with AWWA C104 of latest revision and shall have a petroleum asphaltic coating conforming to AWWA C110. Ductile iron fittings shall have a minimum pressure rating of 250 psi and shall otherwise meet or exceed the pressure rating of the pipe to be installed and shall have a minimum Class 53 thickness rating.

99-1.05 Gate Valves

Gate valves shall conform to AWWA Standard C509 of latest revision and shall be the resilient seat type with non-rising stem opening counter-clockwise with O-ring stem seal and suitable ends for connections to type of pipe or fitting used. The working pressure rating of gate valves shall meet or exceed the pressure rating of the pipe specified on the Plans. External bolts and nuts shall be 304 stainless and~~or~~ poly wrapped per standard.

99-1.06 Butterfly Valves

Butterfly valves shall conform to AWWA Standard C504 of latest revision and shall be of the rubber seat type. Valve discs shall rotate 90 degrees from the full open position to the tight shut position. The valve seat shall provide a tight shutoff at a pressure differential of 150 psi upstream and 0 psi downstream in either direction. The valve operator shall be the traveling nut type. Valve shall open with a counter-clockwise rotation of the operating nut.

99-1.06A Cut-in Tee and Valve Assembly

The Contractor shall cut-in tee and valve assemblies at the location(s) shown on the Plans per City Std. 854 and Std. 877, as directed by the Engineer, as specified herein.

99-1.06B Air Relief Valve Assembly

The Contractor shall install air relief valve assemblies at the location(s) shown on the Plans, per City Std. 883, as directed by the Engineer, and as specified herein.

99-1.07 Valve Boxes

Each gate valve shall be covered by a precast 8-inch valve box set flush with street surface with cast iron ring and cover marked "WATER". The valve boxes are to be Christy G 5, G 8, or approved equal.

99-1.08 Locating and Adjusting Water Valve Boxes

After a street has been paved, mark the location of all water valve boxes in white paint before the close of that workday.

Within 48 hours of paving, adjust all water valve boxes up to grade.

99-1.09 Fire Hydrant and Lateral Assembly

At the location(s) shown on the Plans, the Contractor shall provide and install a fire hydrant and lateral assembly per City Std. 857.

No bends will be allowed in fire hydrant laterals without approval of the ~~City Utilities~~ Engineering Department.

Fire hydrants shall conform to the list of approved fire hydrants shown on City Std. 857.

Residential fire hydrants will have one 2-1/2-inch outlet and one 4-1/2-inch outlet.

Commercial fire hydrants will have two 2-1/2-inch outlets and one 4-1/2-inch outlet.

All hydrants shall be painted in accordance with the specifications shown on City Std. 857.

Before a fire hydrant may be placed in service, a high velocity flushing of the hydrant lateral shall be witnessed and approved by ~~Utilities Department personnel~~the Public Works Inspector.

Barrels of existing fire hydrants to be abandoned shall be removed carefully and delivered to the City Corporation Yard at 600 Enterprise Drive per Section 15-2.04, "Salvage" of the Standard Specifications.

99-1.10 Asbestos Cement Pipe

The installation of asbestos cement pipe is prohibited. All cutting, handling and disposal of asbestos cement pipe shall be done in compliance with the Contractor's State Licensing Law and all applicable laws and regulations.

99-1.11 Trench Excavation, Backfill, and Resurfacing

Excavation, backfill, and resurfacing of the water main trench under this contract shall conform to City Std. 215, as specified on the Plans and as specified herein.

Excess material from excavation shall become the property of the Contractor and shall be disposed of to the satisfaction of the engineer.

Prior to disposal of any materials or operation of any equipment on sites provided by the Contractor for disposal of excess trench excavation owned by him/her, the Contractor shall submit to the engineer written authorization for such disposal of materials and entry permission signed by the owners of the disposal site and the required permits.

Attention is directed to Section 7-1.08, "Public Convenience" of the Standard Specifications.

Caution shall be exercised when trenching through signalized intersections. Location(s) of traffic detector loops, as shown on the Plans, is schematic only.

If trenching or other construction operations cause damage to any traffic detector loops, the Contractor shall notify the Engineer immediately. Five (5) days prior to cutting any traffic detector loop, the Contractor shall contact the Public Works Department at (707) 588-3300.

The Contractor shall replace the traffic detector loops per ~~City Std. 732 and~~ City Traffic Standards V.J and V.K, and as directed by the Engineer. Replacement shall be accomplished within two (2) working days of damage, as determined by the Engineer, minimizing interruption of full operation of the traffic signal.

Blasting will not be permitted.

All raised pavement markers, street striping, chatter bars or any other traffic markings disturbed during this contract work shall be replaced in kind by the Contractor to the satisfaction of the Engineer.

99-1.11A Trench Bracing and Shoring - Water

All bracing and shoring shall conform to Section 5-1.02A, "Trench Excavation Safety Plans", and Section 7-1.01E, "Trench Safety" of the Standard Specifications and the Division of Industrial Safety Construction Safety Orders which are currently in use.

The Contractor shall take all necessary measures to protect the workmen and adjacent areas and structures from the hazards of the trenching or excavation operations.

99-1.12 Laying and Handling Pipe Materials

Proper implements, tools, and facilities satisfactory to the engineer shall be provided and used by the Contractor for safe, convenient and workmanlike prosecution of the work. All pipe fittings and valves shall be carefully lowered into the trench in such a manner as to prevent damage to pipe coatings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. Before lowering and while suspended, the pipe shall be inspected for defects and the cast iron pipe rung with a light hammer to detect cracks. Any defective, damaged or unsound pipe

shall be rejected and sound material furnished. Curing of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to pipe. All pipe stockpiled on the job shall be stored with the ends covered to prevent the entrance of foreign matter.

Whenever it is necessary either in vertical or horizontal plane, to avoid obstructions or when long radius curves are permitted, the amount of deflection shall not exceed the maximum recommended by the pipe manufacturer or that required for satisfactory jointing.

Each length of pipe shall be free of any visible evidence of contamination, dire, and foreign material before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after laying. At times when pipe laying is not in progress, the open ends of any pipe which have been laid shall be closed by approved means to prevent the entrance of small animals or foreign material. Trench water shall not be permitted to enter the pipe.

Pipe shall be laid in accordance with the Plans, and as specified herein.

All pipe stockpiled on the job shall be stored with the ends covered to prevent the entrance of foreign matter. At times when pipe laying is not in progress, the open ends of any pipe which have been laid shall be closed by mechanical plug or other means approved by the Engineer.

Excavations shall begin by exposing end(s) of existing main(s) to determine individual lines and grades. New mains shall begin eight (8) feet from and on the same line as the existing main. Minimum depth of cover from finished grade shall be 36 inches for 8-inch mains, 44 inches for 12-inch mains and 48 inches for 16-inch and larger mains or as shown on the Plans.

99-1.13 Laying PVC Pipe

Individual pieces of pipe, valves, and fittings shall be joined by placing the rubber rings on the machined ends of the pipe and pulling the couplings, valves, or fittings in accordance with the manufacturer's recommendations. The rings shall be checked to be sure they are in the proper position after the coupling is in place. Care shall be taken to insure proper seating of the rings, and adapters shall be utilized for connections as required by the manufacturer.

Fittings for PVC pipe shall be either the mechanical joint type or push-on type.

PVC pipe shall be as specified in and installed per AWWA C900 of latest revision and in accordance with the manufacturer's recommendations.

99-1.14 Laying Ductile Iron Pipe

The flame cutting of pipe by means of oxyacetylene touch shall not be allowed.

Ductile iron pipe shall be as specified in and installed per AWWA C600 of latest revision and in accordance with the manufacturer's recommendations.

99-1.15 Service Laterals

Service laterals other than those shown or noted on the Plans shall not be installed prior to obtaining City approval. Service laterals encountered in construction that will not be used shall be abandoned.

99-1.6A Thrust Backing

All tees, bends, and plugs shall be provided with thrust backing and/or harness as shown on the Plans or in accordance with City Stds. 851 and 852 and as specified herein.

99-1.16B Thrust Blocking and/or Restrained Joints

Thrust blocking and/or restrained joints shall conform to City Stds. 853 and 854 and as specified herein.

99-1.17 Abandoning Water System Components

For all abandoned water services up to and including 2-inch, remove the valve and saddle and install a full circle clamp on main under Public Works Department inspection.

For flanged or mechanical joint tees, remove the valve and install a blind flange or mechanical joint plug under Public Works Department inspection.

For push-on tees, the tee, valve and concrete thrust block must be removed and the main repaired with approved pipe and suitable couplings.

99-1.18 Hydrostatic Test

The test shall be performed after the line has been laid and all backfill placed and compacted as specified elsewhere in these specifications. The Contractor, at his/her option, may test the line at any time during construction. However, the final test for acceptance shall be made only after all backfill is in place. Each valved section of pipe, or combined sections, as approved by the engineer, shall be subjected to a hydrostatic pressure of not less than 50 psi, above working pressure and not less than 150 psi, at any point on the main. The duration of each pressure test shall be thirty minutes. Valves on existing mains in services situated in the public right of way or PUE required to be operated ~~in connection with this job~~ shall be operated only by personnel of the City forces. Each section of pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, and all necessary apparatus ~~except~~ including gauge and measuring devices shall be furnished by the Contractor. ~~The City of Rohnert Park will furnish the gauge and measuring devices for the test.~~ The Contractor shall make the taps into the pipe and shall furnish all necessary assistance for conducting the tests. Before applying the test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at the points of the highest elevation, and afterwards tightly plugged.

Suitable means shall be provided by the ~~City~~ Contractor for determining the quantity of water leakage under the test pressure. No pipe installation will be accepted until or unless this leakage is less than 40 U.S. gallons per 24 hours, per mile of pipe, per inch nominal diameter of pipe. Should any test of combined sections of pipe laid disclose leakage per mile of pipe greater than that water specified, or if individual sections show leakage greater than the specified limit, the Contractor shall, at his/her own expense, locate the cause and repair the defect until the leakage is within the specified allowance.

Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section of it, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. The engineer shall designate the time at which the tests shall be made.

The Contractor shall repair any obvious leaks even though the hydrostatic test results are within the prescribed limits above.

99-1.18A Permanent Blow-Offs

Permanent blow-off(s) shown on the Plans shall be installed per City Std. 861 and 862, as directed by the Engineer, and as specified herein.

Blow-off ball valve and plug shall be installed a minimum of two (2) inches and a maximum of six (6) inches below meter box lid.

99-1.18B Temporary Blow-Offs

Temporary blow-off(s) shown on the Plans shall be installed per City Std. 859, with thrust blocking and harness when required, as directed by the Engineer, and as specified herein.

99-1.19 Chlorination of Water Main

Chlorine may be applied by any of the AWWA standard methods, subject to the approval of the Engineer. The point of application of the chlorination agent shall be at the beginning of the pipe extension, or any valved section of it, and through a corporation stop inserted in the newly laid pipe.

Water from the existing distribution system shall be controlled to flow very slowly in the newly laid pipe during the application of chlorine. Precautions shall be taken to prevent backpressure causing a reversal of flow into the pipe being treated. In the process of chlorinating, all valves and other appurtenances on the new pipe shall be operated in such a way as to provide that the chlorine mixture shall be fully distributed to all parts of the new water system. Valves on existing pipes in service shall be operated only by City forces.

The rate of chlorine feed shall be in such proportion to the rate of water entering the pipe that the chlorine dose applied to the water entering the newly laid pipe shall be at least 100 ppm. The chlorine mixture shall be retained in the pipe for a period of twenty-four hours. After the chlorine

mixture has been retained for the required time, the chlorine residual at the pipe extremities and at representative points shall be at least 5 ppm.

Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipeline. The water throughout its length shall, upon test, both chemically and bacteriologically be proved equal to the water quality served the public from the existing water supply system. The necessary samples will be taken and tests made by ~~or under the supervision of~~ the City of Rohnert Park Public Works Department Personnel. Should the initial treatment, in the opinion of the engineer, prove ineffective, the chlorination procedure shall be repeated until confirmed tests show that the water sampled from the newly laid pipe conforms to the above requirements. The first test will be paid for by the City. Subsequent tests will be paid for by the Contractor.

There shall be a 24-hour waiting period after blowing off the main prior to taking bacteria samples. The initial bacteria tests shall be of the 72-hour duration type. If the initial bacteria test fails, two consecutive passing bacteria tests must be obtained prior to making the tie-in. The first of these two subsequent tests shall be of the 24-hour duration type, and the second shall be of the 72-hour duration type. Bacteria tests are valid for only 30 days. If there is more than a 30-day lapse between a passing bacteria test and the applicable tie-in, the bacteria test must be repeated prior to water main tie-in.

Chlorinated water used to disinfect the pipe is the property of the Contractor and its disposal is the responsibility of the Contractor. Chlorinated water used to disinfect the pipe shall be disposed of in accordance with all laws and regulations.

The following criteria must be met prior to disposal of chlorinated water to storm sewers or other inland waterways:

(1) Water to be disposed of must contain no chlorine residual.

(2) pH must be between 6.5 and 7.5.

(3) North Coast Regional Water Quality Control Board, at 576-2220, must be notified of discharge.

Discharges not meeting the above criteria may be allowed to be disposed of into the sanitary sewer system, but must first meet the following requirements:

(1) The Contractor shall obtain permission from the City of Rohnert Park Public Works Department at (707) 588-3300 prior to the discharge being disposed of in the sanitary sewer system. The payment of any fees required will be the responsibility of the Contractor.

(2) The pH of the water shall be between 6.0 and 9.5.

(3) The discharge rate shall be sufficiently slow to keep from surcharging to sewer collection system at any point.

Should the initial treatment, in the opinion of the Engineer, prove ineffective, the chlorination procedure shall be repeated until confirmed tests show that the water sampled from the newly laid pipe conforms to the above requirements.

The initial bacteria samples will be taken and tests made by the City of Rohnert Park. There shall be a 24-hour waiting period after blowing off the pipe prior to taking bacteria samples. If the initial bacteria test fails, two consecutive passing bacteria tests must be obtained prior to making the tie-in. The ~~City~~ Contractor will pay for ~~retesting up to ten~~ additional individual bacteria sample tests. If additional testing is required, it will be necessary for the Contractor to arrange for and to pay for the tests at a State of California certified laboratory. In extreme cases, at the discretion of the Engineer it may be necessary to require, at the Contractor's expense, a complete Title 22 potable water test prior to tie-in.

Bacteria tests are valid for 30 days. If there is more than a 30-day lapse between a bacteria test and the applicable tie-in, the bacteria test must be repeated prior to performing the tie-in.

99-1.20 Water Main Connection Work

The Contractor shall notify the City inspector 48 hours prior to individual mainline shutdowns required to facilitate his tie-in operations. The Contractor shall schedule tie-in work with the Public Works Inspector at (707) 588-2237. Tie-ins will not be scheduled until a written passing bacteria test has been received by Public Works. All shutdowns and valve turning operations shall be performed by City Water Utility personnel only. A Public Works Department Inspector must be present during all tie-in operations. All shutdowns and valve turning operations shall be performed by City Water Utility personnel only. No tie-ins shall be performed without prior authorization of the Engineer.

Pipe and fittings furnished for tie-ins shall be no smaller than the existing water main to which each tie-in is made.

Contractors or parties who fail to keep field appointments shall be billed for scheduled Utilities Crew waiting or standby time which was used and the Contractor shall bear the costs incurred by the Utility for re-notification of its customer.

As a general rule, customer service shall not be terminated or interrupted on Monday.

Interruption of service to commercial customers shall, as much as practical, be coordinated with the customer's needs. The City will contact the customers, consider the customer's interests and inform the Contractor accordingly.

After hours work or weekend work is to be avoided whenever possible and any overtime costs shall be borne by the Contractor requesting such ~~after hours~~afterhours work. Normal working hours are Monday through Fridays, 8:00 a.m. to 5:00 .p.m.

Contractors or parties requiring work of any kind by the City forces shall request such services a minimum of 48 hours in advance of the time such services are desired. Work requests, which will involve City forces for more than 8 hours or an extensive number of City supplied parts, shall be requested a minimum of 7 calendar days in advance.

If it is necessary to terminate service to any customer, the Contractor shall make the request for such work an additional 72 hours (three additional working days for a total of five working days advance notice) in advance of the time such services are desired to allow the customers affected to have a minimum of 72-hour notice.

During the work, the Contractor shall exercise all necessary precautions to prevent the entrance of trench water or any other foreign material into the water main and shall conduct all operations in accordance with the most stringent sanitation practices. The interior of all appurtenances being installed shall be thoroughly swabbed with a strong HTH solution prior to installation.

Upon completion of construction, final connection will be made by the Contractor under inspection by City Public Works Inspector, unless otherwise specified on the Plans.

The Contractor shall notify the City inspector 48 hours prior to individual mainline shutdowns required to facilitate a tie-in. The Contractor shall schedule tie-in work with the Public Works Inspector at (707) 588-2237. Tie-ins will not be scheduled until a written passing bacteria test has been received by Public Works. All shutdowns and valve turning operations shall be performed by City Utilities personnel only. A Public Works Department Inspector must be present during all tie-in operations. No tie-ins shall be performed without prior authorization of the Engineer.

Contractors or parties who fail to keep field appointments shall be billed for scheduled City Crew waiting or standby time which was used and the Contractor shall bear the costs incurred by the City for notification of its customers for the subsequent appointment.

When installing a cut-in-tee that is larger than the existing pipe, the new assembly must be installed at the depth sufficient to allow the valve to remain below the subgrade of the street which may necessitate lowering the existing pipe.

When a connection is required to an existing water pipe, the Contractor shall provide all excavation, shoring, backfill and trench resurfacing per City Std. 215. Where the connection is to be a “hot tap”, the Contractor shall provide and install the tapping valve and sleeve, and any other hardware required and City forces will make the tap at the developer’s expense. When any joint on an existing water pipe is disturbed, that joint and any proposed hot tap 4 inch and larger shall be replaced with a “cut-in” tee. When a “cut-in” tee and valve(s) assembly is required on the Plans, the Contractor shall provide and install the entire assembly (including valves), and any other hardware necessary under City Public Works Department inspection, and shall provide all other work and materials necessary to complete the installation to City Standards.

During the work, the Contractor shall exercise all necessary precautions to prevent the entrance of trench water or any other foreign material into the water main and shall conduct all operations

in accordance with the most stringent sanitation practices. The interior of all appurtenances being installed shall be thoroughly swabbed with a strong HTH solution prior to installation.

Tie-in or cut-in tee connections to cast iron, PVC, or ductile iron pipes shall be made with mechanical joint solid sleeves. Flexible connections shall only be used when connecting to asbestos cement pipe.

Pipe and fittings furnished for tie-ins shall be no smaller than the existing water main to which each tie-in is made.

Fire hydrant tie-in shall be considered as a water main tie-in, including the gate valve.

Fire service tie-in shall be considered as a water main tie-in, including the gate valve.

99-1.21 Water Main Component Reporting.

The Contractor shall submit the material type, manufacturer, and model number of all water system components to the City inspector prior to final testing. A water system materials form will be provided to the Contractor for this reporting.

99-1.22 Construction Water

Construction water shall be obtained from the City water system only at the point(s) designated by the Engineer. ~~Construction water for the work under this contract will **NOT** be furnished by the City.~~

The Contractor must obtain permission from the City Public Works ~~Utilities Services~~Department for each metered construction water connection.

A deposit for each meter/hydrant will be required which is refundable upon removal of the meter by City forces, less any charges for water used. A non-refundable set-up/removal fee will be charged. Hydrant meters are obtained through the City Finance Department.

Contractors are prohibited from operating gate valves or fire hydrants on the City system.

Acquisition of water through appropriation at unmetered fire hydrants or other facilities is a violation of City ordinance and State law. Use of construction water from sources other than the City Water System must be approved by the Engineer.

The Contractor shall obtain water as specified herein.

99-1.23 Water Services

The Contractor shall install new polyethylene service laterals at the location(s) shown on the Plans, including service saddles, ball valve corporation stop, spacer, inlet and outlet meter valves, meter box(es), traffic loading lids when required, and removal and disposal of old meter

box(es) when required. Typically new service laterals shall be as close as possible to existing laterals and as directed by the Engineer in the field. New service laterals shall be installed with a minimum horizontal clearance of five (5) feet from sewer laterals.

Upon completion and successful testing of new water system, the Contractor shall transfer the existing meter and tie-in the new service to the new meter box under City Public Works Inspector. The Contractor shall coordinate this work to provide minimum customer out-of-service time and inconvenience.

Contractor shall notify customers before transferring meter. The Contractor shall turn off house valve and blow off the new service before meter transfer. After transfer, the Contractor shall open hose bib to flush out air and sediment and then turn on house valve.

99-1.24 Fire Service Lateral Assembly

Fire service lateral assembly with appropriately sized tee, pipe, gate valve, and other appurtenances shall be installed at the location(s) shown on the Plans in conformance with City Std. 854, Std. 877, with reference to Std. 879, as directed by the Engineer, and as specified herein.

99-1.25 Remove and Relocate Existing Fire Hydrant

At the location(s) shown on the Plans, the Contractor shall install a hydrant lateral, including tapping sleeve or tee, gate valve, pipe, bury and riser per City Std. 857 with a blind flange for testing, as directed by the Engineer, and as specified herein.

Upon satisfactory completion of the new water system, including tie-ins and testing, the Contractor shall remove the blind flange and relocate the existing hydrant barrel to the new lateral. Relocated hydrants shall be out of service no longer than 24 hours. The riser on the old hydrant shall be removed and salvaged per Section 15-2.04, "Salvage" as specified herein.

~~**99-1.26 Pumper Connection and Lateral Assembly**~~

~~At the location shown on the Plans, the Contractor shall install a pumper connection and lateral assembly per City Std. 858, and as specified herein.~~

99-1.~~27~~ 26 Valve Removal

The Contractor shall remove the existing valve, riser, valve box, cover, plug or cap the tee or water main and replace structural section and asphalt surfacing as required at the location(s) shown on the Plans, as directed by the Engineer, and per Section 15-2.04, "Salvage" as specified herein.

99-1.~~28~~ 27 Valve Box Removal

The Contractor shall remove existing valve boxes, (including boxes for blow-offs when required) risers, and covers and replace structural section and asphalt surfacing at the location(s) shown on the Plans, as directed by the Engineer and per Section 6-1.04, "Salvage" as specified herein.

99-1.~~29~~ 28 Meter Box Removal

The Contractor shall remove existing abandoned meter boxes, remove and replace sidewalk per City Std. 235 at the locations shown on the Plans, as directed by the Engineer, and as specified herein.

99-1.~~30~~ 29 Backflow Assembly (Typical Backflow Preventer)

The Contractor shall install a double-check valve assembly per City Std. 874 and/or 876 at the location shown on the Plans, as directed by the Engineer, and as specified herein.

99-1.~~31~~30 Cleaning and Flushing New Water Mains

The Contractor shall clean and flush water mains in the following manner:

The Contractor shall insert a flexible polyurethane foam "swab" (density: 2# per cu. ft.) complete with polyurethane drive seal, into the beginning section of pipe. The "swab" shall remain there until the remainder of the pipeline is completed.

Cleaning and flushing shall be accomplished by propelling the "swab" down the pipeline to the exit point with potable water. Flushing shall continue until the water is completely clear.

If the cleaning and flushing exit point is through a fire hydrant (8 inch line or smaller) the Contractor shall remove the hydrant internal valve assembly to allow passage of the "swab".

After swabbing, proper disinfectant procedures shall be used per Section 99-1.19 of the City Specifications.

~~**99-3.01 Payment**~~

~~The linear footage of water pipe to be used in computing payment shall be determined by measuring the total length of pipe installed or removed, including tie-ins.~~

~~Water pipe will be paid for at the contract price per linear foot, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all the work involved, including excavation, depressions under existing facilities, backfill, trench paving, testing, chlorinating, installation of fittings, as specified herein, and no additional allowance will be made therefore.~~

Full compensation for polyethylene water service tubing shall be considered as included in the prices paid for the various contract items of work and no additional allowance will be made therefore.

Full compensation for furnishing and installing fittings shall be considered as included in the prices paid for the various contract items of work and no additional allowance will be made therefore.

Gate valves will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all the work involved, including excavation, backfill, and valve boxes raised to grade, as specified herein, and no additional allowance will be made therefore.

Butterfly valves will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all work involved, including excavation, backfill, and valve boxes raised to grade, as specified herein, and no additional allowance will be made therefore.

Cut-in tee and valve assembly will be paid for at the contract price each, which price includes full compensation for furnishing all labor, materials, tools, equipment, and doing all the work involved, including excavation, back fill, thrust blocking and valve boxes raised to grade, as specified herein, and no additional allowance will be made therefore.

Air relief valve assemblies will be paid for at the contract price each, which price includes full compensation for furnishing all labor, materials, tools, equipment and doing all work involved, including excavation, backfill, valve boxes raised to grade, as specified herein, and no additional allowance will be made therefore.

Full compensation for valve boxes and installation shall be considered as included in the prices paid for various contract items of work and no additional allowance will be made therefore.

Fire hydrant and lateral assembly will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment and doing all work involved including sidewalk or other surface repair as required and testing, as specified herein, and no additional allowance will be made therefore.

Full compensation for abandoning existing fire hydrant, including removal and salvage of the barrel, shall be considered as included in the contract price paid for fire hydrant and lateral assembly and no additional allowance will be made therefore.

Full compensation for cutting, handling, and disposal of asbestos cement pipe shall be considered as included in the prices paid for the various items of work and no additional allowance will be made therefore.

Full compensation for excavation, furnishing and placing backfill, asphalt surfacing, replacement of pavement markers, street striping or any other traffic markings, and replacement of traffic

detector loops shall be considered as included in the prices paid for the various contract items of work and no additional allowance will be made therefore.

Trench bracing and shoring (water) will be paid for at the contract lump sum price, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all the work involved in trench bracing and shoring, as specified herein, and no additional allowance will be made therefore.

Full compensation for all pipe laying shall be considered as included in the prices paid for the various contract items and no additional allowance will be made therefore.

Full compensation for thrust blocking and/or restrained joints shall be considered as included in the prices paid for various contract items and no additional allowance will be made therefore.

Full compensation for hydrostatic testing of the water main and appurtenances shall be considered as included in the prices paid for the various contract items and no additional allowance will be made therefore.

Permanent blow-offs will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment and doing all work involved, as specified herein, and no additional allowance will be made therefore.

Temporary blow-offs will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all work involved as specified herein, and no additional allowance will be made therefore.

Full compensation for chlorination of pipeline, appurtenances, and purging water main prior to bacteria sampling shall be considered as included in the prices paid for the various contract items and no additional allowance will be made therefore.

Full compensation for the disposal of all chlorinated water by the Contractor shall be considered as included in the prices paid for the various contract items of work and no additional compensation shall be allowed therefore.

Water main tie-ins will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all work involved, including excavation, installation of fittings, thrust blocks, and removal of temporary blow-offs, temporary restrained caps or plugs required to facilitate tie-in operations, backfilling, and resurfacing, and excluding that portion of pipe paid for under water pipe, as specified herein, and no additional allowance will be made therefore.

Full compensation for water main component reporting shall be considered as included in the prices paid for the various contract items and no additional allowance will be made therefore.

Full compensation for construction water and all work involved in its development and distribution shall be considered as included in the prices paid for the various contract items and no additional allowance will be made therefore.

Water service will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment and doing all work involved, including excavation, backfilling, resurfacing, raising meter boxes to grade, installation of inlet and outlet meter valves, testing, chlorinating, on site tie-ins, meter transfers, removing and disposing of old meter boxes when required, removing and replacing curb, gutter, sidewalk, and driveways when required, as specified herein, and no additional allowance will be made therefore.

Fire service lateral assembly will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment, including tee, pipe, gate valve, and other appurtenances, and doing all the work involved in installation of the fire service lateral assembly complete in place, as specified herein, and no additional allowance will be made therefore.

Remove and relocate existing fire hydrant will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, and equipment and doing all work involved, including excavation, installation of valve, valve box and riser, pipe and fittings, thrust blocking, backfill, sidewalk or other surface repair as required, and testing, as specified herein, and no additional allowance will be made therefore.

Full compensation for removal and salvage of the existing fire hydrant valve box, riser, and cover shall be included in the contract price each paid per Section 99-1.28, "Valve Box Removal" as specified herein.

Pumper connection and lateral assembly will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, and equipment, and doing all work involved including thrust blocking, excavation, backfill, raising valve boxes to grade, sidewalk or other surface repair as required and testing, as specified herein, and no additional allowance will be made therefore.

Valve removal will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all the work involved, as specified herein, and no additional allowance will be made therefore.

Valve box removal will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all the work involved, as specified herein, and no additional allowance will be made therefore.

Full compensation for furnishing and placing backfill and asphalt surfacing for valve box removal shall be considered as included in the prices paid for the various items of work and no additional allowance will be made therefore.

~~Meter box removal will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all the work involved, including sidewalk or other surface removal and replacement, as specified herein, and no additional allowance will be made therefore.~~

~~Backflow assembly will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools, equipment, including pipe and fittings, testing, and doing all the work involved in installation of the double-check valve assembly complete in place, as specified herein, and no additional allowance will be made therefore.~~

~~Full compensation for furnishing all labor, materials, tools and equipment and doing all work involved in cleaning and flushing the water mains shall be included in the various contract items of work and no additional allowance will be made therefore.~~

~~SECTION 100 – TRAFFIC CONTROL DEVICES~~

~~The Contractor shall comply with Section 100 of the Specifications, as specified herein, and as directed by the Engineer.~~

~~Prior to commencing construction, the Contractor shall submit for approval to the Engineer a schedule of work demonstrating how two-way traffic (four-way at intersections) will be maintained.~~

~~Traffic control devices shall be paid for at the contract lump sum price, which price shall include full compensation for complying with the requirements of this section, including providing construction schedule, warning signs, lights, flagmen, and any other devices necessary to provide traffic control, and no additional allowance will be made therefore.~~

SECTION 100-1 – ADJUST MANHOLES TO GRADE

Existing manholes located within the street right of way shall be adjusted to conform to finished pavement grades in accordance with City Standard No. 500 and as specified herein.

All silent night type manhole frames and covers that are required to be adjusted to grade shall be removed and delivered to the City Corporation Yard. At this point the Contractor will be furnished new frames and covers to be installed in the project. The City will furnish new frames and covers at no cost to the Contractor.

Prior to removal of an existing manhole frame, a platform shall be constructed in the manhole above the top of the sewer to prevent any dirt or debris from falling into the sewer. The platform shall remain in place until all work on the manhole has been completed and the asphalt concrete has been placed around the manhole. Prior to the removal of the platform from the manhole, all dirt and debris shall be removed.

All manhole frames and covers shall be adjusted to grade after placement of the finish course of asphalt concrete.

Trimming of taper sections will not be permitted.

All sections of the manhole grade rings shall be set in cement mortar the same day that the grade rings are placed. Asphalt concrete paving over cement mortar shall be installed by the end of the following work day. All joints shall be smoothly plastered inside and out.

The top of the completed manhole shall contain at least one 3 inch grade adjustment ring.

Existing grade adjustment rings removed in the adjustment of manhole frames shall become the property of the Contractor and if undamaged and thoroughly cleaned of mortar may be reused in the work. If not so used, they shall be disposed of away from the site of work at the expense of the Contractor.

The manhole cover frame shall be reinstalled to align with the opening in the grade adjustment rings. Any frames that are misaligned by more than one-quarter inch shall be removed and reinstalled.

Contractor shall accurately locate and record the location of all manholes to be raised to grade and shall furnish the Engineer a copy of said record prior to starting construction.

Adjusting existing manholes to grade will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools and equipment and doing all the work involved in adjusting manholes, to grade as herein specified, including required excavation and backfill, additional grade rings if required and furnishing location of manholes to be adjusted to grade, removing and delivering silent

~~night frames and covers to Corporation Yard and transporting new frames and covers to job site and no additional allowance will be made therefore.~~

SECTION 100-2 – ADJUST VALVE COVERS, CLEANOUTS AND MONUMENTS TO GRADE

Existing valve covers, cleanouts, and monuments located within the street section shall be adjusted to conform to finished pavement grades.

Contractor shall accurately locate and record the location of existing valve covers cleanouts, and monuments to be raised to grade and shall furnish the Engineer a copy of said record prior to starting construction.

All sections of valve covers, cleanouts, monuments, and grade rings shall be set in cement mortar the same day that the grade rings are placed. Asphalt concrete paving over cement mortar shall be installed by the end of the following work day.

All silt and debris shall be removed from valve boxes and monument vaults. This shall include all existing silt and debris plus material caused by the Contractor's operation.

~~Adjusting existing valve covers, cleanouts, and monuments to grade will be paid for at the contract price each, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in adjusting valve covers, monuments, and cleanout covers to grade as herein specified, including required excavation and backfill, additional grade rings if required, furnishing location of existing valve covers, monuments and cleanout covers to be adjusted to grade, removing silt and debris and no additional allowance will be made therefor.~~

~~In the event that the Contractor encounters water utility valve boxes which must be raised, the Contractor is to contact the Public Works Department to obtain a replacement valve box. The Utility will provide replacements, provided that the Contractor is not required to replace them as part of the contract or due to Contractor damaging them.~~

SECTION 100-7 – SACKED CONCRETE RIPRAP

Sacked concrete riprap shall be constructed at the location and in accordance with the details shown on the Plans and as directed by the Engineer.

Sacked concrete riprap shall conform to the applicable provisions of Section 72-4 of the Standard Specifications~~, with the following modifications.~~

~~Measures of quantities of concrete riprap for payment will be based on the quantities of Portland Cement Concrete used as shown by material supplier's delivery tags supplied the Engineer at the time of delivery, but shall be subject to correction by the Engineer for excessive spillage or diversion to other uses.~~

~~Payment for~~ sacked concrete riprap ~~will be made at the contract unit price per cubic yard, which price shall be full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in placing the sacked concrete riprap in place, including furnishing and filling sacks and performing all necessary excavation.~~

~~Full compensation for excavation and cutting of side slopes shall be considered as included in the contract unit price paid per cubic yard of sacked concrete riprap and no additional allowance will be made therefore.~~

SECTION 100-8 – REINFORCED CONCRETE HEADWALL

A reinforced concrete headwall shall be constructed with the details and at the location shown on the Plans. Bar reinforcing steel shall conform to and be placed in accordance with the applicable provisions of Section 52 of the Standard Specifications, with the following modifications.

In lieu of the sampling of reinforcing steel as provided under Article (d) of Section 52-1.04 of the Standard Specifications, the Contractor shall furnish the Engineer with a certificate from the supplier of the reinforcing steel stating that the steel delivered complies with the requirements of Section 52-1.02 of the Standard Specifications.

~~A four-inch Class "A" Portland Cement Concrete slab shall be placed in accordance with the details and at the locations shown on the Plans.~~

Concrete for the headwall shall be Class "A" Portland Cement Concrete conforming to the requirements of Section 90 of the Standard Specifications.

~~The reinforced concrete headwall will be paid for at the lump sum price, which price shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all the work involved in constructing said headwall complete in place as herein specified, including excavation, backfill, bar reinforcement, concrete four-inch concrete slab, and wire mesh.~~

~~SECTION 100-9 – ASPHALT CONCRETE DIKE~~

~~Asphalt concrete dike shall be 0.5' dike-Type A conforming to State Standard Plan A73 9 and shall be constructed in conformance with the details and at the locations shown on the Plans and in accordance with the applicable provisions of Section 39 of the Standard Specifications, and as specified herein.~~

~~Lengths of asphalt concrete dike to be paid for will be measured in place along the face of the berm.~~

~~The contract price paid per linear foot for asphalt concrete dike shall include full compensation for furnishing all labor, materials, tools, and equipment, and doing all the work involved in constructing asphalt concrete dike complete in place as specified.~~

SECTION 100-10 – REMOVE AND RESET MAILBOX

Existing mailboxes shall be removed and reset in accordance with the Plans and as specified herein.

Existing posts that are not suitable shall be replaced with temporary timber posts of good, sound material suitable for the purpose intended.

Concrete for the pedestals shall be produced from commercial quality aggregates and cement shall contain not less than 5 sacks of cement per cubic yard.

Redwood posts and planks shall be constructed of construction clear redwood, free of heart center, rough.

Existing mailboxes shall be removed and reset on portable mounts consisting of concrete pedestals formed in 5-gallon cans or buckets during construction.

Newspaper boxes attached to existing mailbox posts shall be removed and fastened to the new mailbox posts ~~and no separate payment will be made therefor~~.

During the construction operations, the mailboxes shall be moved as necessary to clear the way for the Contractor's operations, but at all times shall be accessible for rural delivery.

When construction is complete, the posts and pedestals shall be removed and disposed of as provided in Section 15-2 of the Standard Specifications and the mailboxes shall be installed in final position on new redwood posts and planks.

~~Newspaper boxes on individual posts will be considered as mailboxes for measurement and payment.~~

~~Multiple mailboxes on a single or double post will be considered as one unit for measurement and payment purposes.~~

~~In the event of an increase or decrease in any amount in the contract quantities of mailboxes, such increase or decrease shall not be considered an alteration in excess of 25 percent of the contract amount of such items under provisions of Section 4-1.03B of the standard specifications and no adjustment of the contract unit price for mailboxes will be made by reason of such increase or decrease.~~

~~The contract unit price paid each for "Remove and Reset Mailbox" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing the boxes, constructing the portable mounts, installing the boxes on the mounts in final position, including all necessary concrete, excavation, backfill and painting, as shown on the Plans, as specified in the Standard Specifications and as specified herein, and as directed by the Engineer.~~