

**TECHNICAL SPECIFICATIONS  
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## TECHNICAL SPECIFICATIONS

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## DESCRIPTION OF BID ITEMS

### SECTION 10-1 – MOBILIZATION / DEMOBILIZATION

#### **10-1.01 GENERAL**

Mobilization shall conform to the provisions in Section 9-1.16(D), "Mobilization," of the State Standard Specifications, and shall consist of preparatory work and operations including, but not limited to, those necessary for the movement of personnel, equipment, supplies incidental to the project site, for the establishment of all staging areas and other facilities necessary for work on the project and for all other work and operations which must be performed or for project costs incurred prior to beginning work on the various Contract items. Mobilization shall include obtaining insurance and bonds, obtaining and paying for all permits by other agencies if applicable, furnishing temporary construction utilities, installing construction and other construction facilities all as required for the proper performance and completion of the work.

The work of this bid item also includes demobilization. Demobilization shall include final cleaning and restoration of the job site, removal of all temporary facilities and equipment from the work area, disconnection of the temporary construction utilities and turnover of project to the City.

#### **10-1.02 MEASUREMENT AND PAYMENT**

Full compensation for completing the requirements of this section shall be considered as included in the lump sum price paid for "Mobilization / Demobilization" (**Bid Item 1 & Bid Item 1.1**).

Partial payments for Mobilization / Demobilization shall not exceed the following:

- (1) When 5 percent of the original contract amount is earned, 50 percent of the amount bid for Mobilization, or 5 percent of the original contract amount, whichever is lesser, may be paid.
- (2) When 10 percent of the original contract amount is earned, 75 percent of the amount bid for Mobilization or 7.5 percent of the original contract amount, whichever is lesser, may be paid.
- (3) When 20 percent of the original contract amount is earned, 95 percent of the amount bid for Mobilization, or 9.5 percent of the original contract amount, whichever is lesser, may be paid.
- (4) When 50 percent of the original contract amount is earned, 100 percent of the amount bid for mobilization, or 10 percent of the original contract amount, whichever is lesser, may be paid.
- (5) Upon completion of all work on the project, (including: punch list items, cleaning up and removal of all temporary facilities and equipment from the project site) payment of any amount bid for Mobilization in excess of 10 percent of the original contract amount will be paid.

## **SECTION 10-2 – PUBLIC SAFETY AND TRAFFIC CONTROL**

### **10-2.01 GENERAL**

The Contractor shall provide for the safety of traffic and to the public in accordance with the provisions of Section 7-1.03, "Public Convenience," and Section 7-1.04, "Public Safety," and of the Standard Specifications and these Special Provisions.

The Contractor shall control his/her operations and those of his/her subcontractors and all suppliers, to assure the least inconvenience to the traveling public. Under all circumstances, safety shall be the most important consideration.

The Contractor shall maintain the free and unobstructed movement of vehicular traffic with respect to his/her own operations and those of his/her subcontractors and all suppliers in accordance with Section 10-1.17 "Maintaining Traffic" of these special provisions and shall limit such operations for the convenience and safety of the traveling public.

### **10-2.02 MEASUREMENT AND PAYMENT**

The contract lump sum price paid for "Public Safety and Traffic Control" (**Bid Item 3 & Bid Item 1.3**) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved, complete in place, as shown on the Plans, as specified in the Standard Specifications, these Specifications, and as directed by the Engineer.

## **SECTION 10-3 – PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE**

### **10-3.01 GENERAL**

The Contractor shall be responsible for the preservation of all public and private property and shall protect carefully from disturbance or damage all land monuments and property markers until the Engineer has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character, during the prosecution of the work, resulting from any act, omission, neglect, or misconduct in his/her manner or method of executing the work, or at any time due to defective work or materials, and said responsibility will not be released until the project shall have been completed and accepted.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his/her own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, or otherwise restoring as may be directed, or he shall make good such damage or injury in an acceptable manner.

### **10-3.02 MEASUREMENT AND PAYMENT**

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

## **SECTION 10-4 – COOPERATION**

### **10-4.01 GENERAL**

Attention is directed to Section 5-1.20, "Coordination with other Entities" and Section 5-1.36C "Nonhighway Facilities" of the Standard Specifications.

The Engineer will notify and request any non-City utility companies and agencies to adjust their manhole and valve castings to grade. The Contractor shall adjust all City-owned utility facilities to grade as provided for in these Special Provisions.

Prior to working on any storm drain facilities, the Contractor shall prepare and submit to the City Inspector, for approval, a storm water diversion plan when installing new storm drain structures.

### **10-4.02 MEASUREMENT AND PAYMENT**

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

## **SECTION 10-5 – WATER POLLUTION CONTROL**

### **10-5.01 GENERAL**

The Contractor shall be responsible for implementing and managing these systems during the life of the project. The SPCP shall conform to all applicable requirements in Section 13-2, "Water Pollution Control," of the State Standard Specifications these Special Provisions, Section 30, Stormwater Pollution Control.

### **10-5.02 SUBMITTAL**

The Contractor shall submit a **Water Pollution Control Program (WPCP)** to address the storm drain and various improvements to the Engineer for approval. The WPCP shall conform to the Section 13 Water Pollution Control of the Standard Specifications and these Specifications.

### **10-5.03 EXECUTION**

The WPCP shall be prepared using the latest template posted on the State's Construction stormwater website.

Dewatering work shall comply with Section 13-4 Job Site Management of the Standard Specifications and shall include the following:

1. Keep all excavations reasonably free from water during construction.
2. Disposal of water shall not damage property or create a public nuisance.
3. Have on hand pump equipment and machinery in good working condition for emergencies and workmen available for its operation.
4. Dewatering systems shall operate continuously until foundations are poured or trenches are backfilled.
5. Groundwater shall be controlled to prevent softening of the bottom of excavations, or formation of "quick" conditions.
6. Dewatering systems shall not remove natural soils.
7. Control surface runoff to prevent entry or collection of water excavations.
8. Release of groundwater shall be controlled to prevent disturbance of the natural foundation soils or compact fill.

9. There shall be no discharge of turbid water on site.
10. Discharge or disposal of water shall be controlled to prevent erosion

The Contractor shall not perform work that may cause water pollution until the WPCP has been approved by the Engineer. The Engineer's review and approval shall not waive any contract requirements and shall not relieve the Contractor from complying with Federal, State and local laws, regulations, and requirements.

#### **10-5.04 MEASUREMENT AND PAYMENT**

The contract lump sum price paid for "Water Pollution Control" (**Bid Item 2 & Bid Item 1.2**) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in implementation and maintenance of the water pollution prevention system, complete in place, as shown on the Plans, as specified in the Standard Specifications, these Specifications, and as directed by the Engineer.

### **SECTION 10-6 – CONSTRUCTION LAYOUT**

#### **10-6.01 GENERAL**

The Contractor shall establish the lines and grades required for the completion of the work specified in these specifications and on the plans. Sewer facility layout locations indicated in the plans are approximate only. Prior to construction of sewer improvements, the Contractor shall set markers indicating the location of each pump station and alignment of the sewer line for approval by the Engineer. Markers for the sewer line shall be set at 30-foot minimum intervals or as approved by the Engineer. The Contractor shall coordinate with each homeowner to verify their pump station location, control panel location, and connection to existing electrical facilities.

Contractor shall be responsible for preserving all benchmarks and reference points.

#### **10-6.02 MEASUREMENT AND PAYMENT**

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

### **SECTION 10-7 – UTILITY LOCATION**

#### **10-7.01 GENERAL**

The Contractor shall also take adequate measures to protect the existing utilities from damage. At locations where underground utilities may interfere with work, exploratory excavations by potholing or by other appropriate methods approved by the Engineer shall be conducted to determine the impact of such facilities and to verify the actual location(s) and the size(s) of existing underground utilities and improvements and that there is sufficient cover over the utilities to provide clearance for the planning and overlay process without damage to the existing utility facilities. This information will be used for the following purposes:

1. Verifying there is sufficient clearance between new and existing utilities
2. Determining and other information necessary to support the project's construction.

Utility location shall be done in each given area where excavation work is to occur at least fourteen (14) calendar days in advance of any excavation or construction in that area, to avoid possible delay in the progress of the work. If any conflicting utilities exist, the Contractor shall immediately notify the Engineer.

The Contractor shall exercise care during the utility location operation so as not to damage any utilities encountered.

Within the public right-of-way, the Contractor shall submit to the Engineer a complete log of all exploratory excavation which summarizes the location(s), the size(s), elevation and/or depth of each utility. The log shall be verified by the City inspector prior to the backfilling of the holes. The records shall be submitted to the Engineer within two (2) working days after the completion of exploratory excavation in each area. The records shall also include dates of the utility location operations and any additional discovered information or pertinent data.

Upon completion of exploratory excavation in each area, and after verification of the logs by the City inspector, the holes shall be immediately backfilled and compacted in accordance with the specifications or restored as directed by the Engineer.

#### **10-7.02 MEASUREMENT AND PAYMENT**

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

### **SECTION 10-8 – CLEARING AND GRUBBING AND REMOVALS**

#### **10-8.01 GENERAL**

All clearing and grubbing work shall be done in accordance with Section 17-2, "Clearing and Grubbing", of the State Standard Specifications, these Specifications, and as directed by the Engineer.

#### **10-8.02 EXECUTION**

Clearing and grubbing shall consist of, but not limited to, removing and disposing of vegetation, debris, soil, trees less than 6-inches in diameter, roots, pavement, and all other objectionable material as required to construct the improvements, as shown on the Plans and as specified in these Specifications.

Plant removal, as indicated in the plans shall include removal of any roots or trunks to a depth of fifteen (15) inches below existing grade or as directed by the Engineer.

The Contractor shall dispose all excess materials consistent with Section 11 "Disposal" of the Special Conditions.

Prior to starting clearing and grubbing operations, the Contractor shall inform the Engineer of the intended limits of their clearing and grubbing operations and shall obtain the Engineer's approval on such proposed limits. The Contractor shall not clear and grub any area not essential to their construction obligations and protect from injury or damage resulting from their operations all vegetation, facilities, or improvements, which are to remain. All edges of existing paving to remain shall be sawcut in a neat, clean manner.

#### **10-8.03 MEASUREMENT AND PAYMENT**

Full compensation for providing "Clearing and Grubbing and Removals" includes furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in site clearing, complete in place, including disposal, as shown on the plans, as specified in the Standard Specifications and these Specifications, and as directed by the Engineer, and shall

be considered as included in the contract prices for the various items of work and no additional compensation will be made therefor.

## **SECTION 10-9 – DEMOLITION**

### **10-9.01 GENERAL**

The Contractor shall remove and dispose pavement sections, sewer cleanouts, manholes, existing facilities conflicting with installation of these sewer improvements, and abandoned certain pipelines as specified as necessary for the construction of work as shown on the plans and as specified.

Dust Control shall conform to the provisions of Section 10-5, "Dust Control" of the State Standard Specifications.

The Contractor shall obtain all special permits and licenses and give all notices required for performance and completion of the demolition and removal work, hauling, and disposal of debris.

Contractor shall review with Engineer the exact limits of work and extent of materials to be removed.

- A. Examine site and structures and determine exact nature and status of structural elements and above ground and below ground utilities prior to commencing demolition.
- B. City assumes no responsibility for actual condition of items or structures to be demolished.

### **10-9.02 SUBMITTALS**

Contractor shall submit a schedule indicating proposed methods and sequence of operations for selective demolition work for review prior to commencement of work. Include coordination for shut-off, capping, and continuation of utility services as required.

- A. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of building uses.
- B. Coordinate continued occupancy with building tenants.

### **10-9.03 MATERIALS**

- Portland Cement Concrete for capping sewer piping conforming to the requirements of Section 90-2 "Minor Concrete" of the Standard Specifications with at least 505 pounds of cementitious material per cubic yard and 1-inch maximum graded coarse aggregate. No bagged mix is permitted. Hand mixing of Portland Cement Concrete for use in concrete surface improvements shall not be permitted. For concrete paving subjected to vehicular traffic, strength of concrete in place shall be 2,500 psi at 28 days. No admixtures shall be used without approval of the Engineer.

### **10-9.04 EXECUTION**

Provide a minimum of 72 hours advance notice of demolition activities to the Engineer.

Abandoning Sanitary Sewer Lines: Abandonment shall consist of cutting, removing a short section of pipe and capping or plugging the open end(s) of pipe with a 36-inch-long plug of concrete.

Portland Cement Concrete of "Concrete" for abandoning of sanitary sewer shall conform to the



requirements in Section of "Portland Cement Concrete" of these special provisions.

Whenever existing pipes are to be cut or abandoned, the open ends of said pipes shall be securely closed by a tight-fitting plug or wall of concrete not less than 0.5-foot thick, or by a tight brick wall 0.67-foot thick with cement mortar joints.

Stoppers for pipes and branches left unconnected shall be made of the same material as the pipe or of resilient joint material (Flexible compression joints in clay pipe and resilient joint materials to be used therein shall conform to the requirements of ASTM Designation: C-425). After placing the stopper, it shall be covered with a layer of sealant. The sealant shall be sufficiently fluid to insure free flow around the stopper.

Above-grade Pipe Removal: Contractor shall remove and dispose all pipe above grade as indicated in the plans. Contractor shall plug the ends of all pipe to be abandoned in place, as indicated in the plans.

Existing Lift Ejector Stations: Contractor shall remove and dispose all existing duplex pumps, pressurized plumbing, control panel, float assemblies, and conductors. Pressurized sewer laterals from existing pump stations shall be cut within 2 to 3 inches from the edge of the pump station and capped with same material as the pipe or of resilient joint material. The portions of existing pipe above grade shall be removed and disposed.

Concrete Removal: Concrete pavement removal shall be done in accordance with Section 15-1.03B, "Removing Concrete", of the Standard Specifications, these Specifications, the Contract Plans and as directed by the Engineer. This bid item also includes removal of base rock, as required for the improvements.

Asphalt Removal: Asphalt pavement removal shall be as indicated in the plans. Where indicated in the plans, roadway base and surfacing shall be removed in accordance with Section 39-3.05, "Remove Base and Surfacing," of the Standard Specifications and as directed by the Engineer. This bid item also includes removal of base rock, as required for the improvements.

Residue from cutting operations shall not be permitted to flow into storm drains or across lanes occupied by traffic and shall be removed from the pavement surface, concurrent with the cutting operation. All excavated material shall be removed and disposed of outside the street right of way in accordance with relevant sections of the State Standard Specifications.

Protection: Provide temporary barricades and other forms of protection as required to protect the general public from injury due to selective demolition work. Provide protective measures as required to provide free and safe passage of general public to and from occupied portions of building. Erect temporary covered passageways as required by authorities having jurisdiction.

Environmental Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

Selective Demolition: Perform selective demolition work in a systematic manner. Use methods required to complete work indicated on the Plans in accordance with demolition schedule and governing regulations. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

Traffic: Do not close, block or otherwise obstruct streets or other occupied or used facilities without written permission from the Engineer. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

Clean up: The Contractor shall perform daily cleanup operations to keep the job site and adjacent properties free from accumulation of waste materials and debris resulting from the Contractor's operations. The Contractor shall deposit waste material in on-site containers or at a legal disposal area away from the site at the end of each working day.

Damages: Attention is also directed to Section 15, "Existing Facilities," of the State Standard Specifications. If the Contractor damages an existing improvement, which is to remain, he/she shall promptly restore such improvement to as good a condition as existed before the damage or shall replace the improvement, when restoration is not acceptable, with an improvement of at least equal quality. Cost of such restorations or replacements shall be the Contractor's expense.

Disposals: The Contractor shall be responsible for disposal of material, which may include but is not limited to soil, concrete, asphalt, pipe, rock, and vegetation. The Engineer has made no arrangements for disposal of materials. All excess and unsuitable material shall be disposed of by the Contractor in accordance with Section 14-10 "Solid Waste Disposal and Recycling" of the Standard Specifications and this Section.

There is no analytical testing data available for soil within the project limits. All material shall be disposed of in an appropriate landfill with all-weather access. Contractor shall be responsible for testing soil as required by the disposal site. The Contractor shall dispose of material such as asphalt, concrete, organic, and wood in a recycling facility. All other materials shall be disposed in a legal facility.

#### **10-9.05 MEASUREMENT AND PAYMENT**

The contract lump sum price paid for "Demolition" (**Bid Item 4 & Bid Item 1.4**) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work complete in place, including removals, disposals, plugging inlet and outlet pipes, sawcutting, temporary asphalt plug, and other incidental work of the various materials necessary for abandonment as shown on the Plans, as specified in the Standard Specifications and these Specifications, and as directed by the Engineer.

### **SECTION 10-10 – SITE INVESTIGATION AND FINAL DESIGN**

#### **10-10.01 GENERAL**

It is not the intent of the Plans to show the exact location of all existing or relocated utilities and the Engineer assumes no responsibility therefor. The position of the utilities shown on the Plans is derived from records of utility owners and limited utility locating services. The Contractor shall immediately notify the Engineer as to any utility discovered by him/her in a different position than shown on the drawings or which is not shown on the drawings.

The Contractor shall conduct their own site investigations, including exploratory excavations, to determine the exact locations and type of existing utilities, including electrical and sewer service connections, prior to commencing work which may result in damage to existing utilities or other underground facilities. The project location includes steep terrain with limited access on private property. Work includes working within and near the San Francisco Bay and under existing car decks. Contractor shall provide shop drawings for sewer ejector station and electrical systems, if requested by the Engineer.

## **10-10.02 MEASUREMENT AND PAYMENT**

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

## **SECTION 10-11 – SEWER FLOW CONTROL AND BYPASS PUMPING**

### **10-11.01 DESCRIPTION OF REQUIREMENTS**

The existing sewers are currently and continuously receiving and conveying wastewater (sewage), and those functions shall not be interrupted except as specified herein. The Contractor shall coordinate the work to avoid any interference with normal operation. Contractor shall immediately correct any undesirable conditions, which result from bypassing or other operations.

Contractor shall provide labor, equipment, materials, and supervision to temporarily control flow around the Contractor's work during construction. Contractor shall not interrupt the functions of the existing sewers or cause sewer backups and is responsible for penalties and expenses in the event that their operations cause any violation of the City's discharge **permit or in the event their operations result in any sewage spills or loss of use of residential use.**

It shall be the Contractor's responsibility to always maintain, the sewer flows through the project site. A bypass shall be made by plugging existing upstream facilities of the Contractor's work and pumping the sewage to downstream sewer facilities of the Contractor's work. Pumps and bypass piping shall be adequately sized to handle the flows to be bypassed without surcharging the system. Pumping system shall be sized for normal to peak conditions. Contractor shall monitor the level in the upstream manhole at all times to prevent system surcharging. The bypassing system shall be subject to approval by the Engineer.

Bypass pumping shall be done in a manner that will not damage private or public property or create a nuisance. At no times shall a private lateral be used for bypass purposes. The pumped sewage shall be in an enclosed pipe or hose that is adequately protected from traffic and/or pedestrians and shall be redirected into the sanitary sewer system. A temporary tank of adequate capacity may also be proposed for bypass pump discharge. Discharging of sewage on private property, gutters, streets, sidewalks, or into storm sewers is prohibited. The Contractor shall be liable for all damages or fines (including fines imposed on the City as a result, of the Contractor's operations) associated with this work. After the work is completed, flow shall be restored to original conditions and temporary facilities shall be removed.

The Contractor shall provide 48-hour advance notice to the Engineer of the location and schedule of flow control. Contractor shall setup and test the bypass operation and demonstrate proper operation a minimum of 48-hours prior to disrupting flows in section to be bypassed.

The Contractor shall clean and repair without cost to the City any damage that may result from his negligence, inadequate or improper installation, maintenance and operation of bypassing and flow control system including mechanical or electrical failure.

The Contractor shall coordinate sewer bypass and flow interruptions with the City at least 14 days in advance and with the property owners and businesses at least 72 hours and again at 24 hours prior to disruption.

### **10-11.02 BYPASS PUMPING SUBMITTALS (AS APPLICABLE)**

A bypass pumping plan for sewage flow control as required for construction of new sewer system.

These plans shall be coordinated with the Traffic Control Plans and submitted for City approval. The Contractor shall submit bypass pumping plan for each bypass location at least 20 working days prior to pipe installation and/or rehabilitation. Submittals shall include:

1. Drawings showing location of temporary bulkheads, plugs, pumps, bypass piping (including diameter), discharge points, and all locations where pipelines will be buried or placed above grade. Include all provisions required to maintain access around/over bypass piping/pumping equipment.
2. Methods of controlling pipeline flow, including location where sewage flows are to be diverted, type of pipe to be used for bypass, and the method of lateral flow control.
3. Capacities of pumps and standby equipment.
4. As applicable, drawing and design of temporary bulkheads.
5. Emergency response plan to be followed in the event of a failure of the bypass pumping system or sewer pipeline being surcharged to an unacceptable level.
6. Identify and designate full-time responsible person for Contractor that shall be responsible for monitoring and correcting problems with the by-pass/diversion system(s).

### **10-11.03          JOB CONDITIONS**

Flow Data:

1. There is no flow data available. Contractor shall verify flows prior to construction and provide a bypass system capable of handling the flows.
2. The Contractor shall be responsible for design, construction, and operation of an adequate and properly functioning bypass system. Any testing or gathering of flow data is the responsibility of the Contractor. The Contractor shall coordinate all bypassing with the Construction Manager or Resident Engineer.
3. Where bypassing is required, the Contractor shall ensure that service for connecting laterals is not disrupted. The Contractor shall control all sewage flow around work site.

Protection:

1. Bypassing and dewatering operations resulting in discharges to the ground surface, streams, creeks, culverts, ditches, storm drains, or groundwater shall not be permitted. The Contractor shall perform work to protect both the public from potential health hazards and the environment from contamination.

### **10-11.04          MATERIAL**

Primary Flow Control Pumps and Generators

1. Provide suitable "trash-type" primary pump capable of bypassing all flows around the worksite.
2. A minimum of two pumps are required for each flow control system in a duty and standby configuration. Standby pump shall be plumbed and capable of automatically starting on failure of the duty pump.

Bypass Flow Control Piping

1. The flow control piping shall be completely leak free. Any drips or leaks shall be repaired by the Contractor immediately.

Temporary Bulkheads and Plugs

1. Design and provide bulkheads and plug to withstand anticipated upstream differential head without leakage or displacement.
2. A watertight seal is required to prevent sewage flows from entering the work area.
3. Design plugs to have an emergency deflate system so plugs can be removed at any time

without requiring confined space entry.

#### Standby Equipment

1. The Contractor shall have available on-site sufficient equipment and materials to ensure continuous and successful leak-free operation of the sewage flow control system.
2. Generator shall be always fueled. Generators shall be placed on spill guard mats or other approved double containment devices to eliminate the possibility of fuel spills to ground surface. Provide sound attenuated enclosures if required by the Engineer.

### **10-11.05 SEWER FLOW CONTROL AND BYPASS PUMPING EXECUTION**

#### Monitoring and Supervision of Sewage Flow Control Systems

1. The Contractor shall take all necessary precautions including constant monitoring (requires 24 hours per day, 7 days per week continuous monitoring by on-site Contractor personnel while sewage flow control systems are in place) of sewage flow control pumping and diversion plug or bulkhead to ensure that there are no spills, and no private properties are subjected to a backup.
2. The Contractor shall not shut down sewage flow control systems between shifts, on holidays or weekends, or during work stoppages without written permission from the Engineer.
3. The Contractor personnel responsible for monitoring the flow control and diversion shall inspect each bypass system a minimum of once per 4 hours.

#### Noise Control

1. All pumps and generators shall be enclosed within sound baffling to reduce noise level.
2. The Contractor is made aware that additional noise barriers, which may include an insulated plywood shield, shall be erected to enclose all pumps and generators at the request of the Construction Manager or Resident Engineer and at no additional cost to the Owner.
3. Contractor shall use noise attenuated pumps, motors, and generators.
4. Contractor shall locate pumps and generators away from residences to the maximum distance possible.

#### Odor Control

1. The Contractor is required to minimize to the extent possible all odor associated with this work. The Construction Manager may request additional odor reducing measures if complaints about odor are received, at no additional cost to the Owner.

#### Pedestrian and Vehicular Access

1. The flow control pumping systems shall be adequately protected from traffic and shall be located to minimize disruption to vehicle and pedestrian traffic.
2. At locations where sewage flow control piping crosses driveway entrances, cross streets, or pedestrian crosswalks, the piping shall be placed in trenches constructed by the Contractor and backfilled or plated to allow traffic to cross unimpeded. Contractor shall not install sewage flow control within trenches.
3. When moving bypass piping from one location to another the disruption to vehicle and pedestrian traffic shall be minimized. The Contractor shall not drag long lengths of pipe along improved right-of-way unless approved by the Construction Manager in writing. The piping shall be cleaned and plugged prior to moving to prevent fluid discharge.
4. Flow control piping on private property shall not interfere with parking, access, or movement of supplies and materials. Contractor shall obtain consent in writing from private property owners prior to using their property for storage of materials or when locating any portion of the bypass pumping operation on private property.
5. It is the Contractor's responsibility to contact, coordinate, and acquire written permission

from the private property owner for use of private property for location of flow control piping. The Contractor shall provide signed agreements to the Construction Manager prior to any work on the private property. Provide signed agreements with submittals.

#### Sewage Flow Control and Diversion

1. The Contractor shall set up and test the sewage flow bypassing systems for a minimum of 48-hours prior to removing the sewer from service for the start of the construction work. The Contractor shall correct any deficiencies in the system as required to provide a leak-free bypass system that will not cause overflows, backups or spills as specified.
2. The Contractor shall provide continuous flow control pumping and/or diversion of sewage flows for acceptable completion of the project. Where bypassing is required, the flows shall be redirected from a minimum of one manhole upstream of the start of the alignment into the system downstream of the work area.
3. The Contractor can discharge bypassed wastewater flow to other sewers. It is the Contractor's responsibility to determine the allowable flows that can be discharged to the sewers. The bypassed flows shall not cause overflows, deterioration, or any adverse conditions on the existing systems.
4. Dumping or free flow of sewage on private property, gutters, and streets, into storm sewer, creeks, or flood control channels is prohibited. No bypassing is permitted to ground surface, receiving waters, or which results in groundwater contamination or potential health hazards.
5. The Contractor shall be liable for all clean up damages and resultant fines and in the event of a sewage spill. Contractor shall repair without cost to the City any damage that may result from his negligence, inadequate or improper installation, maintenance and operation of bypassing and a dewatering system including mechanical or electrical failures.
6. The Contractor shall be liable for all clean up damages, and resultant fines in the event of a sewage spill.

### **10-11.06 MEASUREMENT AND PAYMENT**

Full compensation for providing "Sewer Flow Control and Bypass Pumping" shall include furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and placing aggregate base and compaction tests complete in place as shown on the Plans, as specified in the Standard Specifications and these Specifications, and as directed by the Engineer shall be considered as included in the contract prices for the various items of work and no additional compensation will be made therefor.

### **SECTION 10-12 – SANITARY SEWER FACILITIES**

#### **10-12.01 GENERAL**

Specifications for furnishing, installing, and testing sanitary sewer pipe as indicated.

#### **10-12.02 SUBMITTALS**

Contractor shall provide submittal for the Respective manufacturer's product data for manufactured products.

#### **10-12.03 MATERIALS**

- **SEWER LIFT EJECTOR STATION.** Lift stations shall conform to the Sausalito Marin City Sanitary District Standard plan SD 17 and as modified in the plans.

Pump vault shall be a 48-inch diameter fiberglass basin with anti-floatation encased in fiberglass with a 60-inch minimum height, AK Industries Model GB-48-401 or Engineer approved equal. Smaller, 30-inch diameter, pump vaults, may be approved on a case by case basis by the Engineer due to site constraints that prohibit safe installation.

Duplex submersible, grinder pumps shall be installed within each pump vault per the manufacturer's recommendation or as approved by the Engineer. Pumps shall be rated at 2 hp, 208/230 volts, 2 stage, 1 phase, 60 Hz, 3450 RPM. The unit shall produce 10 GPM at 120 feet of total dynamic head. The submersible pump shall be capable of handling residential sewage and grinding it to a fine slurry enabling it to be pumped over long distances in pipelines as small as 1.25" in diameter. Pumps shall be LSGX-Series 2-stage submersible pumps or an Engineer approved equal, with the exception of lift station serving 26, 28, 30 Edwards. The duplex pumps serving 26, 28, 30 Edwards shall be a Liberty PRG-Series (1 HP, 1 phase, 115V) or an Engineer approved equal.

The submersible pump shall be supplied with 25, 35 or 50 feet of multi-conductor power cord, as determined by the Contractor for each lift station. It shall be cord type SJOOW (1-phase) or SOOW (external capacitor models), capable of continued exposure to the pumped liquid. The power cord shall be sized for the rated full load amps of the pump in accordance with the National Electric Code. The power cable shall not enter the motor housing directly but will conduct electricity to the motor by means of a watertight compression fitting cord plate assembly with molded pins to conduct electricity. This will eliminate the ability of water to enter internally through the cord via a damaged or wicking cord.

#### Electrical Work and Controls:

All electrical wiring and installed cabling, conduit and controls from the lift station to be point of connection at the building breaker box shall meet NEC class 1, Division 2 requirements and conform to the requirements of the Sausalito Marin City Sanitary District Standard Plan SD 17. The electrical controls shall provide adequate protection for motor and equipment. The electrical control panel shall meet NEC and UL standards for safety. Outdoor panels shall be weather tight NEMA 4x. Indoor panels shall be NEMA 1 intrinsically safe with Thermal overload and seal fail options control panel NEC Class 1 Div.

#### Float switch assembly and high-water alarm:

A visible red light and audible high water alarm shall be provided. The high water alarm shall be activated by a dedicated float and shall have battery backup. All float switches shall have gas-tight mountings.

- **DUPLEX SEWER PUMING UNITS AND CONTROLS.** Contractor shall remove and replace existing duplex pumps, pressurized plumbing, control panel, float assemblies, and conductors in the existing sewer lift ejector stations.

Duplex submersible, grinder pumps shall be installed within the existing pump vault per the manufacturer's recommendation or as approved by the Engineer. Pumps shall be rated at 2 hp, 208/230 volts, 2 stage, 1 phase, 60 Hz, 3450 RPM. The unit shall produce 10 GPM at 120 feet of total dynamic head. The submersible pump shall be capable of handling residential sewage and grinding it to a fine slurry enabling it to be pumped over long distances in pipelines as small as 1.25" in diameter. Pumps shall be LSGX-Series 2-stage submersible pumps or an Engineer approved equal.

The submersible pump shall be supplied with 25, 35 or 50 feet of multi-conductor power cord, as determined by the Contractor for each lift station. It shall be cord type SJOOW (1-phase) or SOOW (external capacitor models), capable of continued exposure to the

pumped liquid. The power cord shall be sized for the rated full load amps of the pump in accordance with the National Electric Code. The power cable shall not enter the motor housing directly but will conduct electricity to the motor by means of a watertight compression fitting cord plate assembly with molded pins to conduct electricity. This will eliminate the ability of water to enter internally through the cord via a damaged or wicking cord.

**Electrical Work and Controls:**

All electrical wiring and installed cabling, conduit and controls from the lift station to be point of connection at the building breaker box shall meet NEC class 1, Division 2 requirements and conform to the requirements of the Sausalito Marin City Sanitary District Standard Plan SD 17. The electrical controls shall provide adequate protection for motor and equipment. The electrical control panel shall meet NEC and UL standards for safety. Outdoor panels shall be weather tight NEMA 4x. Indoor panels shall be NEMA 1 intrinsically safe with Thermal overload and seal fail options control panel NEC Class 1 Div.

**Float switch assembly and high-water alarm:**

A visible red light and audible high water alarm shall be provided. The high water alarm shall be activated by a dedicated float and shall have battery backup. All float switches shall have gas-tight mountings.

- **STANDARD CLEANOUT.** The standard cleanout shall be a two-way cleanout. Cleanout box shall be Christy B16 box with traffic rated precast concrete lid or approved equal. Boring existing concrete and/or rock wall under an existing car deck and installation of a 2-foot stub-out and thrust blocking shall be included in the unit cost for each standard cleanout and riser assembly.
- **STANDARD CLEANOUT AND BACKWATER PREVENTION DEVICE (BPD).** The standard cleanout and BPD as indicated in in Detail 2, Sheet SS5 with a Sewer Popper Model S62-304 in Christy model B9 Box with D&L Foundry V-09 grated cast iron lids or approved equal within hardscaped locations. In landscape or softscape areas, standard cleanout and BPD shall be Genplex - Kelly Backwater Device (No-Hub & IPS) or DDR Sewer Relief Device (SRD) or approved equal.
- **PRESSURE TO GRAVITY SEWER CLEANOUT.** The pressure to gravity sewer cleanout shall be per Sausalito Marin City Sanitary District standard plan SD 17. Cleanout box shall be a traffic rated Christy B24 box with cast iron lid or approved equal. Installation of a 2-foot stub-out shall be included in the unit cost.
- **CHECK VALVE ASSEMBLY.** A check valve assembly consisting of a Schedule 80 PVC true union check valve and gate valve shall be installed as indicated in the plans to protect from system pressures. All valves and fittings shall be rated for at least 200 PSI service. Boxes in non-traffic areas shall be Christy B09 box with D&L Cover I-2821-01 or approved equal. Boxes in traffic areas shall be Christy B16 box with precast concrete lid or approved equal. Three-quarter inch (3/4") crushed rock shall be uniformly graded with one hundred percent (100%) passing a three-quarter inch (3/4") sieve and not more than five percent (5%) passing a 1/4" sieve.
- **STANARD CLEANOUT AND RISER ASSEMBLY.** The standard cleanout and riser assembly shall be as indicated in Detail 5, Sheet SS4. Cleanout shall be a two-way cleanout. Cleanout box shall be Christy B16 box with traffic rated precast concrete lid or approved equal. Sewer lines and crushed rock shall be as indicated in the plans and these specifications. Boring existing concrete and/or rock wall under an existing car deck



and installation of a 2-foot stub-out and thrust blocking shall be included in the unit cost for each standard cleanout, riser, and check valve assembly.

- **STANDARD CLEANOUT, RISER, AND COMBINE CHECK VALVE ASSEMBLY.** The standard cleanout and riser assembly shall be as indicated in Detail 5, Sheet SS4. Cleanout shall be a two-way cleanout. A check valve assembly consist of up to (4) Schedule 80 PVC true union check valves and (4) gate valves as indicated in plans. All valves and fittings shall be rated for at least 200 PSI service. Check valve boxes shall be location in non-traffic areas and be Christy B30 box with Fibrelyte cover or approved equal. Cleanout box shall be Christy B16 box with precast concrete lid or approved equal. Sewer lines and crushed rock shall be as indicated in the plans and these specifications. Boring existing concrete and/or rock wall under an existing car deck and installation of a 2-foot stub-out and thrust blocking shall be included in the unit cost for each standard cleanout, riser, and check valve assembly.
- **POLYETHYLENE PIPE AND FITTINGS (HDPE PIPE) – FOR PRESSURIZED SEWER PIPES THAT ARE ABOVE GRADE.** Polyethylene pipe and fittings shall be Type III Category 5, Grade P34, with a DR=17. Joint type shall be butt-fusion welded, de-beaded, and accepted by the Engineer prior to pipe installation. The polyethylene resin shall contain 2% carbon black antioxidant, well dispersed, and be stabilized against ultraviolet degradation to provide protection during processing and subsequent weather exposure. The interior of the pipe shall be gray. All pipe fittings and specials shall be furnished by the same pipe manufacturer. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other deleterious faults. The supplier shall provide polyethylene pipe with a permanently imprinted manufacturer's brand name, pipe size, and other identification for tracing pipe quality to raw material source. The HDPE pipe shall also be identified with a green stripe. Sanitary sewer force main installed above ground shall be HDPE, utilizing mechanical joints restraints at all bends. Mechanical joints shall be Megalug by EBBA Iron or equal. All metal and fasteners shall be 316 Stainless Steel or as approved by the Engineer.
- **POLYVINYL CHLORIDE (PVC) – FOR PRESSURIZED SEWER PIPES BELOW GRADE.** ASTM D1785, Schedule 80, Type 1, Grade 1. Fittings: ASTM D1784, socket weld, same material and schedule as pipe, or meeting requirements of ASTM F439, as applicable. Joints: Socket welded with PVC solvent cement conforming to ASTM D564.
- **PLASTIC METALLIC TAPE.** Directly above the pipeline as shown on the plans, the Contractor shall install a continuous twelve (12) inch wide green plastic/metallic tape. Plastic tape to assist in easy location of the pipeline shall be Detectable tape as manufactured by Allen Systems, Inc, 108 East Wesley, Wheaton, IL, 60187, or Terra Tape as manufactured by Griffolyer Company, Div of Reef Industries, Inc, P O Box 33248, Houston, TX 77033, or approved equal. Legend printed on the tape shall be "CAUTION: SEWER MAIN BELOW"
- **POLYVINYL CHLORIDE PVC C-900 (RUBBER RING JOINTS) – FOR GRAVITY SEWER PIPES.** This specification designates general requirements for unplasticized polyvinyl chloride (PVC) Plastic Pipe with integral wall bell-and-spigot joints. All PVC pipe shall be white or green. PVC Pipe and Fittings shall conform to all the requirements of AWWA C-900 for pipe with a DR = 18. All pipe, fittings, and accessories shall be of the same manufacture in order that bell-and-spigot configurations will be identical. Pipe shall be made up with rubber ring joints to provide for expansion and contraction. The bell shall consist of an integral wall section stiffened with two PVC retainer rings which securely lock the solid cross section rubber ring into position. Methods of installation shall be in strict conformance with the recommendations of the manufacturer. The rubber ring gaskets shall consist of synthetic rubber compounds meeting the requirements of

ASTM F-477. All fittings for C-900 pipe shall be one piece and shall meet the requirements of ASTM D-1784. Fittings shall conform to requirements of DR 18. Bells shall be gasketed joint conforming to ASTM D-3139 with gaskets conforming to ASTM F-477.

- LOCATOR WIRE. The locator wire shall be Copperhead No. 12 AWG-Solid HS-CCS tracer wire, 30 mil HDPE, 30 volt as manufactured by Copperhead Industries, LLC or equal. Locator wire shall be terminated in manholes or in a precast concrete traffic box with a cast iron traffic lid. The continuity of the locator wire shall be tested prior to final paving. All wire connections shall be made with copper crimps wrapped with electrical tape.
- ADJUSTABLE REPAIR COUPLINGS. For connections of dissimilar side sewer lateral pipe materials, utilize Fernco, 5000 Series RC coupling with Type 316 Stainless Steel hardware or approved equal.
- CONCRETE PAVEMENT. See Section 10-15
- HOT MIX ASPHALT PAVEMENT. See Section 10-16

#### **10-12.04 EXECUTION**

##### OPEN TRENCH CONSTRUCTION

The Contractor is specifically cautioned as to the possibility of empty pipeline floating due to flooding of the excavation by groundwater, rainwater, or backfill consolidation. For this reason, "jetting" for backfill consolidation will not be allowed for plastic pipe materials. Should any pipe sections be floated by water in the excavation, that reach of pipeline shall be removed, and damaged pipe repaired, the area re-excavated, de-watered, and the pipe reinstalled at the Contractor's expense.

Pipe shall be loaded, off-loaded, and otherwise handled in accordance with AWWA M23 and the manufacturer's recommendations.

The interior of pipes shall be kept free from dirt and debris as the pipe laying progresses. Open ends shall be plugged watertight when work is stopped, or for any other reason work is left unattended. All openings in the pipeline shall be kept covered or always plugged. Care shall be taken to prevent excavation water from entering the pipeline during all stages of construction.

All pipes shall be laid and maintained to lines and grades shown on the plans. The cover shall be measured from the established street grade or the surface of the permanent improvement of the top of the pipe barrel. No deviation shall be made from the required line or grade except with written consent of the Engineer.

The installation of PVC pipe shall conform to ASTM D2321 and these Special Provisions. Pipe bedding, trench backfill, and relative compaction shall be in accordance with the Contract Plans and these Technical Provisions

Contractor shall protect pipe from damage during handling and installation per the manufacturer's recommendations. Pipe damaged because of impact shocks, free fall, or other event must be inspected and approved by the Engineer prior to installation. The Engineer may reject the entire piece of pipe or require the damaged portion to be removed and discarded.

Pipe shall be laid up-grade with the socket or collar ends of the pipe up-grade unless otherwise authorized by the Engineer. Pipe shall be laid to Plan line and grade, with uniform bearing under

the full length of the barrel of the pipe. Suitable excavation shall be made to receive the socket or collar, which shall not bear upon the subgrade or bedding. Any pipe which is not in true alignment or shows any undue settlement after laying shall be taken up and re-installed at the Contractor's expense.

Before joining bell and spigot PVC pipe, the plain end of the pipe shall be beveled to avoid damage to the rubber ring/gasket as the pipe is pushed home. The bell socket and the plain end of the entering pipe shall be clean and free of foreign material prior to the seating of the rubber ring. The ring groove shall be cleaned prior to inserting a clean rubber ring. The ring shall be seated evenly all around and be free from twists. The rubber rings should NOT be lubricated. The spigot end of the pipe shall be lubricated with lubricant recommended by the pipe manufacturer. No other lubricant shall be used.

Whenever the work ceases for any reason, the end of the pipe shall be securely closed with a tight-fitting plug or cover.

Whenever existing pipes are to be cut or abandoned, the open ends of said pipes shall be securely closed by a tight-fitting plug or wall of concrete not less than 0.5-foot thick, or by a tight brick wall 0.67-foot thick with cement mortar joints.

Stoppers for pipes and branches left unconnected shall be made of the same material as the pipe or of resilient joint material (Flexible compression joints in clay pipe and resilient joint materials to be used therein shall conform to the requirements of ASTM Designation: C-425). After placing the stopper, it shall be covered with a layer of sealant. The sealant shall be sufficiently fluid to insure free flow around the stopper.

Pipe will be inspected in the field before and after laying. If any cause for rejection is discovered in a pipe after it has been laid, it shall be rejected, at the sole discretion of the Engineer. Any corrective work shall be approved by the Engineer and shall be at no cost to the City.

When connections are to be made to any existing pipe, conduit, or other appurtenances, the actual elevation or position of which cannot be determined without excavation, the Contractor shall excavate for, and expose, the existing improvement before laying any pipe or conduit. The Engineer shall be given the opportunity to inspect the existing pipe or conduit before connection is made. Any adjustments in line or grade, which may be necessary to accomplish the intent of the Plans, will be made at no extra cost to the city.

All junctions connecting any pipe or fitting to a PVC sanitary sewer main shall be made with a "Wye" fitting. "Tee" connections or "Taps" will not be permitted on any new pipe.

Trench Tape Installation:

Install trench tape along the line of pipe approximately one (1) foot above and along the center line of the pipe. Where the tape is not continuous, the tape ends at the discontinuity shall be overlapped a minimum of twelve (12) inches.

### PIPE TESTING

The Contractor shall perform a video recorded inspection of the sewer mains after the installation/rehabilitation of a new sewer main in compliance with the NASSCO PACP reporting format and coding standards. Such inspection shall be performed by a firm who has been actively performing such services for a minimum of two (2) years and an operator who has completed NASSCO PACP certified training, or an equivalent training program subject to approval by the Engineer.

Prior to conducting closed circuit television inspection it shall be the responsibility of the Contractor to plug and monitor or bypass sewer flows around the work and to thoroughly clean the host pipe. The word 'clean' in this specification is defined as the removal of all accumulations including sludge, dirt, sand, rocks, asphalt, concrete, grease, roots, and any other solid or semisolid material in the pipe down to the parent material with 100 percent debris removal.

It will be the Contractor's responsibility to make as many cleaning passes as necessary to meet the above definition of "clean". Acceptance of the cleaning, as determined by the District or its appointed Representative, shall be based upon the subsequent video inspection of the sewer and the lining manufacturer's cleaning requirements.

Tree and plant roots shall be removed from within the sewers. Special attention should be used during the cleaning operation to assure removal of roots from the joints and laterals. Procedures may include the use of mechanical equipment such as rodding machines, root cutters, porcupines, and high-velocity jet cleaners.

Water Usage: The Contractor may use fire hydrants with temporary meters obtained from Marin Municipal Water District (MMWD) to supply water for this cleaning. The Contractor will be required to complete a hydrant meter application and obtain a fire hydrant flow meter and will be responsible for paying all applicable deposits and fees for use of the meter and water. The Contractor shall contact Joseph Eischens at (415) 945-1531, to obtain a fire hydrant flow meter.

Cleaning Equipment: Sewer line cleaning shall be performed with high-velocity jet equipment. When using a high-velocity jet machine, it shall not remain stationary while cleaning the sewer line. Selection of equipment shall be based on field condition such as access to manholes, quantity of debris, size of sewer, pipe bursting activities, and pipe lining activities. The equipment shall be capable of removing dirt, grease, rocks, sand, and other materials and obstructions from the sewer lines and manholes. During sewer cleaning operations, precautions shall be taken by the Contractor in the use of cleaning equipment to avoid any damage to the pipe.

Removal and Disposal of Material:

- Sludge, dirt, sand, rocks, grease, and other solids or semi-solid material resulting from the cleaning operation shall be removed at the downstream manhole of the section being cleaned. Passing materials to downstream sewer reaches is not permitted.
- Trucks hauling solids or semi-solids from the site shall be watertight so that no leakage or spillage will occur. Under no circumstances shall sewage or solids be dumped onto the ground surface, streets, in the sewer system, catch basins, or within storm drains.
- Material removed from the sewers during the cleaning operation shall be deposited in a sealed water-tight container and disposed legally by the Contractor at:

Redwood Landfill and Recycling Center  
8950 Redwood Highway  
Novato, CA 94948  
Tel. (415) 892-2851

All debris and containers shall be removed from the right-of-way at the end of each work day. The Contractor shall verify and coordinate with the Redwood Landfill and Recycling Center prior to delivering material. Acceptable material at the landfill includes grit and grease. Non-sewer material such as broken pipe, dirt, liner trimmings, etc. will not be accepted by the landfill. Contractor shall make his own arrangements to legally dispose of all items at their own expense.

It is the Contractor's responsibility to determine the quantity of debris and solids to be removed

during cleaning. Video recordings of a previous sewer inspection will be made available for the Contractor to examine. The tapes are for information only and the District does not guarantee the accuracy of the information provided.

Not less than ten (10) working days prior to performing a video recorded inspection of the sewer main, the Contractor shall submit to the Engineer the name and qualifications of the firm and personnel who will be performing the video inspection, the specifications of the video inspection system to be used, and the date of the proposed video inspection for review and approval by the Engineer.

**Video Equipment.** The video equipment shall include a multi-angle color video camera capable of spanning 360-degrees circumference and 270-degrees on horizontal axis to televise sewer lines 6-inch diameter or larger and focal distance shall be adjustable through a range of one (1) inch to infinity ( $\infty$ ). The video camera shall have a minimum of 400 lines of resolution, be specifically designed and constructed for operation in connection with sewer inspection, and for operation in sewers under 100% humidity conditions. The camera shall be mounted on a self-propelled wheel or track-mounted transporter. Lighting and camera quality shall produce a clear, in-focus picture of the entire periphery of the pipe for a minimum distance of six ( $\geq 6$ ) feet. The transporter and camera assembly shall be equipped with a slope measuring device (inclinometer) capable of detecting pipe grade variations  $\pm 5$  degrees from true horizontal ( $\pm 8.7\%$  grade) with a maximum error of  $\pm 0.1$  degree with readings taken at minimum intervals of two (2) feet. Inclinometer data shall be capable of being displayed in both numerical and graphical formats that can be printed or exported to an external database. The inclinometer data submitted shall be correlated with the proper footage and allow easy identification of any high and/or low sections.

**Inspection Procedures and Requirements.** The video recorded inspection shall be done with no flow in the sewer. The camera shall be moved through the pipeline in the downstream direction at a uniform rate, stopping when necessary to ensure proper documentation of the sewer's condition. In no case shall the television camera be pulled or propelled at a speed greater than thirty (30) feet per minute. The camera height shall be adjusted such that the camera lens is always centered in the pipe being inspected. The equipment shall have an accurate footage counter, which shall display on the monitor the exact distance of the camera from the centerline of the starting manhole. Unless otherwise required by the Engineer, footage measurements shall begin at the centerline of the upstream manhole.

The recorded video inspection shall be continuous and be of such quality to provide a clear, sharp, color image when played back. The image shall show sufficient detail and quality to determine the approximate size of cracks in the pipe, offset joints, leaking joints, sags, and other defects or flaws in the installed sewer main. The date, identification of sewer reach(es) by upstream and downstream manhole numbers, and manhole to manhole footage shall be always displayed on the video data view.

Video inspection logs submitted by the Contractor shall be typed or printed as a computerized report. The Engineer will provide the log format, or a sample copy may be submitted for approval. Data of significance includes the locations of service connections, types of upstream and downstream manhole structures, and any pipe defects.

The inspection video shall be submitted on either CD-ROM or DVD-R disks in either MPEG-2 (352x240 minimum) or MPEG-4 (640x480 minimum) format viewable on a standard PC running MS Windows with Windows Media Player. If a different video software is required to play the files on the submitted disk, a fully licensed version of that software shall be included with the submittal at no additional cost to the City. Each disk shall have a protective case and be permanently labeled with the Contractor's name, date recorded, project name, street name(s), identification of the sewer

reach(es) inspected, and run number. Labeling shall consist of either hand or computer printed information in non-water-soluble ink on a circular disk label that equally covers the surface of the disk. All video recordings shall become the property of the City.

All video recorded inspection shall be done in the presence of the Engineer. Upon completion of the video recording, the video shall be replayed for the Engineer. Any video recordings not meeting the quality standards stated above and as determined by the Engineer will be rejected and the video recording process repeated at no cost to the city.

After inspection of the video recording by the Engineer, the Contractor, at his/her own expense, shall replace or repair any materials or workmanship, which, in the opinion of the Engineer, do not meet the specification requirements. Upon completion of the repairs or replacements, the repairs shall be video inspected a second time and the process repeated until all the specification requirements are met.

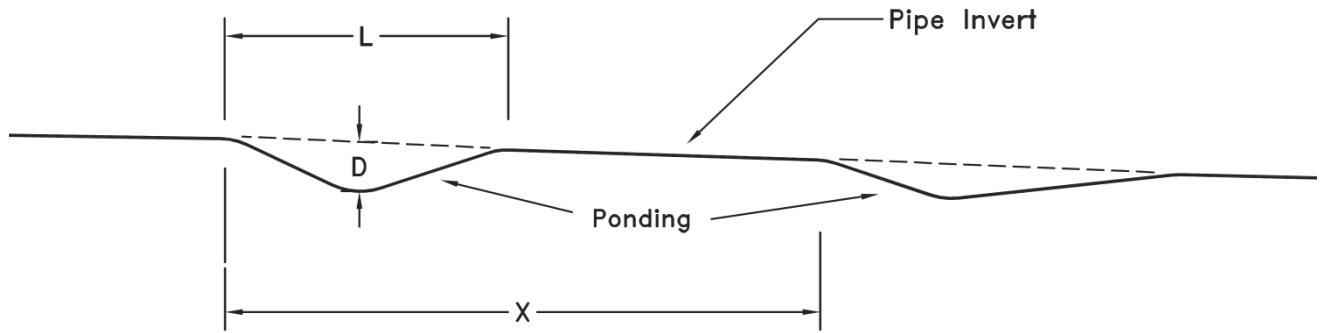
Construction Deficiencies. The following construction deficiencies shall be considered as in need of correction prior to acceptance of the work:

- Damaged pipes including cracks, gauges, and chipped ends of pipe sections.
- Slope less than the specified or absolute minimum slope.
- Changes in slope greater than  $\pm 0.05\%$  of the design slope.
- Low spots, sags or bellies that hold water (see limits below).
- Dropped, offset, or separated joints including failed welds.
- Excessive gap between pipe ends within a coupling or fitting (greater than 0.5" to 0.75", depending upon materials, size, and conditions).
- Oversized, raised or protruding internal weld beads including melted pipe material ( $\leq 0.25"$  for pipe  $\leq 8"$ ,  $\leq 0.50"$  for 10" to 18" pipe).
- Infiltration/leaking joints; or
- Other noted deficiencies.

Sags: The table below lists the allowable limits of sags (low spots, bellies, etc.) in sanitary sewer pipes. Newly constructed pipes that exceed these limits must be excavated and reinstalled or replaced if the pipe has been damaged. The allowable sag in pipes installed by trenchless methods is zero (0). For cured in place pipe lining and/or pipe bursting projects, all sags in existing pipes shall be removed by the Contractor prior to or during pipe bursting/lining operations, unless specifically allowed to remain by the Engineer.

**SAG LIMITS**

Nominal Pipe Size inch	Allowable Depth of Sag (D) inch	Allowable Length of Sag (L) feet	Allowable Distance between Sags (X) feet
Any Size by Trenchless	None	None	None
4" by Open Ex.	None	None	None
6" by Open Ex.	None	None	None
8" by Open Ex.	$\leq 0.25"$	$\leq 4'$	$\geq 40'$



## AIR TEST

All gravity lines shall be tested with air as the test medium, unless otherwise approved by the City.

Each section of new sewer and its appurtenant connected laterals shall be tested between successive manholes or structures by plugging and bracing all openings in the sewer lines. If any leaks are found, the air pressure shall be released, the leaks eliminated, and the test procedure re-started.

The pipeline shall be thoroughly cleaned prior to testing.

The Contractor shall test the air tightness of all new or rehabilitated gravity sanitary sewer pipelines. Testing shall be performed in the presence and under the direction of the District or its appointed Representative.

- PVC piping shall be tested in accordance with Uni-Bell PVC Pipe Association, B-6 Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe, latest edition and as specified herein.
- HDPE piping shall be tested in accordance with ASTM F 1417, Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air.

Air testing sewer mains, particularly larger diameter mains, can be very dangerous due to the very large forces developed. The Contractor shall be fully responsible and take all precautions necessary to ensure the safety of their workers. All plugs shall be adequately braced and restrained to support the full load developed. No workers shall be allowed in the excavation or manhole while the line is under pressure. The Contractor shall make provisions for reading the pressure at the ground surface and for safely releasing the air pressure without entering the manhole or excavation.

The following procedure shall be used for air testing:

- Plug all pipe outlets with suitable test plugs. Brace each plug securely.
- If the pipe to be tested is submerged in groundwater, insert a pipe probe by boring or jetting into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the backpressure due to groundwater submergence over the end of the probe. All gauge pressures in the test shall be increased by this amount.
- Add air slowly to the portion of the pipe being tested until the internal pressure is raised to 4.0 psig.

- Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any leakage is observed, bleed off air and make necessary repairs.
- After an internal pressure of 4.0 psig is obtained, allow at least two (2) minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure. After two (2) minute period, disconnect the air supply.
- Begin the test period. In no case shall the air pressure within the line be less than four (4) pounds per square inch at the beginning of the test period.
- Main Sewers:
  - If the pressure drop during the required test period equal to or less than 1 psi (6.9 kPa), the line has passed. If the pressure drop is greater than 1 psi (6.9 kPa) during the test time, the line has failed the test. Side Sewers: If the pressure remains constant during the test period, the line has passed. If the pressure drops during the test time, the line has failed the test.
  - The required test time shall be based on the diameter and length of pipe to be tested and in accordance with the following, or 10 minutes, whichever is greater:

**Minimum Test Time for Various Sewer Main Pipe Sizes**

Nominal Pipe Size (inches)	Test Time (min/100 ft)
6	0.7
8	1.2

- At the District's option, one half of the test time specified above may be used with a maximum pressure drop of 0.5 psi (3.45kPa), but in no case will a test time of less than 10 minutes be allowed.
- Side Sewers: Side sewers shall be tested for a minimum period of ten (10) minutes. If the pressure remains constant during the test period, the line has passed. If the pressure drops during the test time, the line has failed the test.

Hydrostatic testing of gravity pipelines may be performed in lieu of air testing if approved by the City, testing shall be in accordance with the following procedures:

- After installation of new sewer pipeline it shall be thoroughly cleaned prior to pressure testing. A section of sewer shall be prepared for testing between two structures by plugging the inlet side of the discharge manhole and all openings in the upstream manhole except the discharge opening. All plugs shall be properly braced against the manhole wall to withstand the forces of the test in order to prevent loss in the event of a failure.
- The section of the piping shall be tested by filling it with water to an elevation ten (10) feet above the top of pipe at the upstream end of the test section, or ten (10) feet above the existing groundwater elevation, whichever is greater. If the water level is maintained for a minimum of fifteen (15) minutes, the line has passed.

When leakage exceeds the amount allowed by the specifications, the Contractor shall locate the leaks, submit a repair procedure for the District review, make the necessary repairs, and re-test the segment at no additional cost to the District.

**10-12.05 MEASUREMENT AND PAYMENT**

The contract price paid per each "Sewer Lift Ejector Station (SD 17)" (**Bid item 5**) and shall include full compensation for furnishing all labor, materials, tools, equipment, testing and incidentals, and for doing all the work involved, including excavation, dewatering, all sewer and electrical connections, furnishing and placing anti-floatation materials, duplex pumps, floats and duplex control system, electrical conduits, electrical conductors, coordination with homeowners for lift station and duplex control panel location, complete in place, as shown on the plans and as



herein specified; and no additional compensation will be allowed therefor.

The contract price paid per each “Duplex Sewer Pumping Units and Controls” (**Bid Item 6**) and shall include full compensation for furnishing all labor, materials, tools, equipment, testing and incidentals, and for doing all the work involved, including removal and disposal of existing pump and control systems, all new sewer and electrical connections, new duplex pumps, floats and duplex control system, electrical conduits, electrical conductors, coordination with homeowners for duplex control panel location, complete in place, as shown on the plans and as herein specified; and no additional compensation will be allowed therefor.

The contract price paid per each “Standard Cleanout and Backwater Prevention Device” (**Bid Item 7**), “Pressure to Gravity Sewer Cleanout (SD-17)” (**Bid item 8 & Bid Item 1.5**), “Check Valve Assembly” (**Bid Item 9 & Bid Item 1.6**), “Standard Cleanout and Riser Assembly” (**Bid Item 10**), and “Standard Cleanout, Riser and Combined Check Valve Assembly” (**Bid Item 11 & Bid Item 1.7**) shall include full compensation for furnishing all labor, materials, tools, equipment, testing and incidentals, and for doing all the work involved, including saw-cutting, excavation, concrete and rock wall borings, dewatering, connections, furnishing and placing trench backfill materials, pavement restoration, utility boxes, coordination, complete in place, as shown on the plans and as herein specified; and no additional compensation will be allowed therefor.

The contract price paid per linear foot for “Sanitary Sewer Pressure Pipe (2” or 3” Diameter) (**Bid Item 12 & Bid Item 1.8**) shall include full compensation for furnishing all labor, materials, tools, equipment, testing and incidentals, and for doing all the work involved in construction of new sewer pipe above and below grade, complete in place, including saw-cutting, dewatering, trench excavation, furnishing and placing trench backfill materials, mounting above grade to existing facilities, connections, pavement restoration, cleaning and testing including video, in place, as shown on the plans and as herein specified; and no additional compensation will be allowed therefor.

The contract lump sum price paid for “Sanitary Sewer Gravity Pipe (4” or 6” Diameter) (**Bid Item 13**) shall include full compensation for furnishing all labor, materials, tools, equipment, testing and incidentals, and for doing all the work involved in construction of new sewer pipe, complete in place, included saw-cutting, dewatering, trench excavation, furnishing and placing trench backfill materials, connections, pavement restoration, cleaning and testing including video, in place, as shown on the plans and as herein specified; and no additional compensation will be allowed therefor.

## **SECTION 10-13 – SCARIFICATION**

### **10-13.01 GENERAL**

This work shall consist of the scarification and compaction of native soil underneath the new asphalt and concrete pavement sections as shown on the plans.

Upon excavation to subgrade depth in locations to receive new asphalt or concrete pavement, the soil shall be scarified to a minimum depth of 6 inches, moisture conditioned to within 2 to 5 percentage points above optimum moisture content, and compacted to a minimum relative compaction of 90 percent relative compaction to the maximum dry density as determined in the laboratory according to ASTM D1557.

The Contractor shall protect from damage all existing improvements, drainage facilities, sanitary sewage facilities, water facilities, traffic signal facilities, landscaped areas, trees and shrubbery that are not required to be removed during construction. Any existing improvements, drainage facilities, sanitary sewage facilities, water facilities, traffic signal facilities, landscaped areas, etc., damaged

as a result of the Contractor's construction activities shall be replaced by the Contractor at no cost to the City.

Shallow utilities may be located within the scarification area. The contractor shall identify these utilities and protect during scarification.

It is the Contractor's responsibility to plan the preparation of the subgrade with respect to weather conditions. If poor weather creates excessive moisture in the subgrade or the inability to meet minimum compaction standards, the Contractor shall implement alternative methods as approved by the Engineer to continue subgrade preparation in accordance with these Plans and Specifications.

**PAYMENT** - Full compensation for conforming to the provisions in this section, not otherwise provided for, shall be considered as included in prices paid for other elements of work and no additional compensation will be allowed therefor.

## **SECTION 10-14 – EXCAVATION AND BACKFILL**

### **10-14.01 GENERAL**

The Contractor shall perform all operations necessary to excavate whatever substance encountered, including earth, sand, gravel, rock, buried structures, pipes or debris, to the depth shown on the plans and required for the installation, to remove unsuitable material and replace with suitable material for bedding and backfill, and to restore the ground surface or pavement to conditions satisfactory to the Engineer.

### **10-14.02 SUBMITTALS**

The Contractor shall submit shop drawings to the Engineer of their proposed methods of sheeting, shoring and bracing as approved by the Division of Industrial Safety, per these specifications.

The Contractor shall submit to the Engineer samples of all materials proposed for use as pipe bedding and backfill. When requested by the Engineer, the Contractor shall submit a sieve analysis of the materials proposed to be used at no cost to the District.

### **10-14.03 MATERIALS**

- **CRUSHED ROCK.** Crushed rock shall be hard, sound and durable and shall not slake or disintegrate in water. One and one half inch (1½") crushed rock shall be uniformly graded with one hundred percent (100%) passing a one and one half inch (1½") sieve and not more than five percent (5%) passing a 3/8" sieve. Three-quarter inch (3/4") crushed rock shall be uniformly graded with one hundred percent (100%) passing a three-quarter inch (3/4") sieve and not more than five percent (5%) passing a ¼" sieve.
- **CLASS 2 AGGREGATE BASE.** Class 2 aggregate base shall be free from organic matter and other deleterious substances and shall be of such nature that it can be compacted readily with water and rolling to form a firm stable base. All class 2 aggregate base shall be virgin material with a sand equivalent of 25 and shall have the following gradation:

Sieve Size	Percentage passing
1"	100%
¾"	87-100

No. 4	30-65
No 30	5-35
No. 200	0-12

- CONTROL DENSITY FILL (CDF). CDF shall be flowable to fill the voids and self-leveling within the area to be backfilled. CDF shall be Shamrock Material Mix Number 1503 or approved equal.

#### **10-14.04 EXECUTION**

Pipe bedding shall be composed of that portion of the backfill material placed in the bottom of the trench for the pipe barrel to rest on.

Pipe zone backfill shall comprise that portion of the backfill surrounding the installed pipe, extending after compaction from the foundation to a level twelve (12) inches above the top of the pipe.

Intermediate backfill shall comprise the portion of the backfill from twelve (12) inches above the top of the pipe to the surface.

Sound earth shall mean most native soils, with the exception of highly organic spongy soils and fat, highly plastic expansive clays.

Sand with a maximum particle size of 3-inch, or gravel with a minimum grain size of 3-inch, or pea gravel, or crushed rock mixed with sand shall comprise sound granular soil.

Relative compaction shall be taken to mean field density values expressed as a percentage of the laboratory standard maximum density, as determined by the methods of ASTM D-1557-91 and D-1556-90 or ASTM D-2292-91 and D-3017-88 (Nuclear Method).

#### **BRACING AND SHEATHING**

The Contractor shall do and be solely responsible for all bracing, sheathing and shoring necessary to perform and protect all excavations as required for reasons of safety and to conform to governing laws. Where required by the Division of Industrial Safety, shoring shall be designed by a registered Civil Engineer. Excavations shall be supported so that the ground alongside the excavations will not slide, and all existing improvements, either on public or private property, will be fully protected from damage. Additional supports requested by the Engineer shall in no way relieve the Contractor of his/her responsibility for the sufficiency of his/her precautions.

All shoring, bracing and sheathing above the top of the pipe shall be removed from the trench or excavation. Sheathing which has been driven below the invert of the pipe must not be removed. Under wet soil conditions, sheathing shall be left in the trench up to the top of the pipe.

The cost of such bracing, shoring and sheathing shall be included in the unit price per lineal foot of pipeline and no additional allowance will be made therefor.

#### **CONTROL OF WATER**

The Contractor shall remove all water which may accumulate in the excavation during the progress of the work by pumping or other suitable methods so that all work can be done in the dry. Trenches and other excavations shall be kept free of water while the pipe or structures are being installed, while concrete is setting, and until backfill has progressed to a sufficient height to anchor the work against possible flotation or leakage. Water shall be disposed of in such a manner as to cause no injury to public or private property or be a menace to the public health.

Where water is encountered, the trench excavation shall be carried twelve (12) inches below the pipe invert in which case the pipe bedding material shall be one and one half inch (1½") crushed rock.

The cost of such removal of water and additional excavation and pipe bedding material shall be included in the unit bid price per lineal foot of pipeline and no additional allowance will be made therefor.

#### REMOVAL OF UNSTABLE MATERIAL

Where unstable soil is encountered or where the bearing capacity is unsatisfactory to the Engineer, the soil shall be removed to a depth of twelve (12) inches below the pipe barrel and replaced with one and one half inch (1½") crushed rock.

The Contractor shall not be relieved thereby of his/her responsibility otherwise to employ procedures necessary to keep the trench bottom in a workable condition and provide a firm and adequate bedding for the pipe.

The cost of trench stabilization shall be included in the price per lineal foot of pipeline and no additional payment will be allowed.

#### EXCAVATION

The excavation shall be made to enable the pipe to be laid to the grades and alignment shown on the plans. Excavated materials not required for fill or backfill shall be removed from the site of the work.

Trenches shall be excavated either by hand or by machine beginning at the outlet structure and proceeding upgrade, except as may otherwise be permitted by the Engineer. Hand excavation, tunneling, jacking or boring will be required when use of a machine will cause unnecessary destruction of trees, shrubs, lawns and existing structures above or below ground.

The narrowest practicable trench width which will allow proper densification of pipe zone backfill materials shall be maintained with vertical sidewalls from the foundation to at least the top of the pipe. Trench width at the top of the pipe shall not exceed the maximum trench width shown in the County Specifications. Where general conditions make this impractical, means must be provided, with the approval of the Engineer, for adequately supporting the increased load on the pipe which such widening will cause.

Where sheathing is required, the width of trench shall be increased sufficiently to accommodate the sheathing and timbers.

Excavation for manholes and other structures shall have twelve (12) inch minimum and twenty four (24) inch maximum clearance on all sides. Bell holes shall be excavated accurately to size by hand.

Excavation shall not be carried below the required level. Excess excavation below the required level shall be backfilled at the Contractor's expense with gravel, crushed rock or concrete, as directed by the Engineer, and thoroughly tamped.

In rock, excavation shall be carried six (6) inches below the bottom of the pipe and replaced with an approved material thoroughly tamped to provide a uniform support for the pipe. Permits for blasting shall be secured by the Contractor from the proper authorities. The cost of drilling and blasting shall be included in the unit bid price for lineal foot of pipeline and no additional allowance will be made therefor.

The bottom of all trenches shall be excavated accurately to the required grade with a firm bed to fit the barrel of the pipe. Minor adjustments in elevation required to produce the required invert slope shall be made by adequately bedding the pipe with sound granular pipe bedding materials, as hereinbefore defined, thoroughly compacted along the length of the pipe, underneath, and on both sides. It is essential that a uniform solid bearing be provided under the entire section of pipe.

For flexible pipe (PVC and polyethylene pipe), the pipe bedding (bottom of trench) shall be firm, but not hard, and shall consist of pipe zone backfill, free from stones or lumps exceeding one (1) inch in greatest dimension which might bear against the pipe. Suitable foundations shall be prepared by providing a one (1) inch minimum leveling course with loose bedding material graded uniformly in one plane for the full length of the pipe. Foundations shall provide uniform support under the haunches of the pipe up to the spring line along the full length of each pipe section.

### BACKFILL

After the pipelines and their appurtenances have been properly constructed and inspected and after joints, plaster and concrete have set sufficiently to prevent damage, backfilling shall be done with approved material free from large clods or stones. Unless otherwise specified all backfill shall be compacted to 90 percent relative compaction per ASTM 1557.

The Contractor's attention is called to the fact that it will be his/her responsibility to obtain an encroachment permit for all work to be done in streets, roads, highways or railroad rights-of-way from the proper agency having jurisdiction and that the method of backfilling of trenches must conform to the requirements of such agency. Where imported materials will be required, the cost of furnishing and placing such materials shall be included in his/her bid price for sewer construction and no additional allowance will be made therefor.

### PIPE ZONE BACKFILL

Backfill materials shall be so placed that the pipe will not be displaced, excessively deflected, or damaged. Materials placed as pipe zone backfill shall be free of stones or lumps exceeding one (1) inch in greatest dimension and shall be so placed as to prevent the formation of voids. Pipe zone backfill preparation shall be placed and compacted determined on the basis of local native soil conditions and such that vertical ring deflection of flexible pipe will be limited to five percent (5%) of the nominal pipe diameter.

In general, pipe zone backfill shall be placed immediately after laying the pipe, provided the pipe is true to line and grade.

### INTERMEDIATE BACKFILL

The backfill shall be blended sufficiently to secure the best practicable degree of compaction and stability.

Compaction may be performed by mechanical or hand tamping methods or by hydraulic methods as is necessary to achieve the required relative compaction.

Care shall be taken during compaction to prevent displacement of the pipe due to floating or shifting and to prevent hydrostatic or impact damage to the pipe and foundation. Heavy mechanical tamping or rolling equipment directly over the top of the pipe, such as might result in excessive reduction of the vertical diameter of the installed pipe, shall be avoided. Intermediate backfill above the pipe zone backfill shall not be placed until conformance with specified relative compaction of pipe zone backfill material has been confirmed.

## **10-14.05 MEASUREMENT AND PAYMENT**

Full compensation for providing "Excavation and Backfill" shall include furnishing all labor, materials, tools, equipment, testing, and incidentals, and for doing all the work involved complete in place as shown on the Plans, as specified in the Standard Specifications and these Specifications, and as directed by the Engineer shall be considered as included in the contract prices for the various items of work and no additional compensation will be made therefor.

## **SECTION 10-15 – CONCRETE PAVEMENT**

### **10-15.01 GENERAL**

The Contractor shall place concrete pavement and other elements to complete the project. All work in this section shall be done in accordance with Section 73 of the Standard Specifications, except as modified in these General and Supplemental Conditions. All concrete work shall be completed to the satisfaction of the Engineer prior to placement of pavement.

Concrete curb and gutter shall conform to the Uniform Construction Standard (UCS) plan 105 (Type "A") and as directed by the Engineer. All Work shall be done to the satisfaction of the Engineer.

Damage to the street, sidewalk, curbs and gutters from construction activities shall be repaired to the satisfaction of the Engineer.

### **10-15.02 SUBMITTALS**

The Contractor shall submit the concrete mix design and strength data to the Engineer for favorable review the following.

Supplier's certificates showing conformance with this specification shall be delivered to the Engineer with each shipment of materials delivered to the job site.

### **10-15.03 MATERIALS**

- Portland Cement Concrete for fixed form concrete surface improvements shall be minor concrete conforming to the requirements of Section 90-2 "Minor Concrete" of the Standard Specifications with at least 505 pounds of cementitious material per cubic yard and 1-inch maximum graded coarse aggregate. No bagged mix is permitted. Hand mixing of Portland Cement Concrete for use in concrete surface improvements shall not be permitted. For concrete paving subjected to vehicular traffic, strength of concrete in place shall be 4,000 psi at 28 days. No admixtures shall be used without approval of the Engineer.

Maximum slump of fresh concrete permitted in these items shall be 4 inches. Slump shall be determined by either ASTM C-143 or California Test Method No. 520 at the Engineer's discretion.

- Dowels, where noted or called for on the Plans or detail drawings, shall be smooth billet-steel bars conforming to the requirements of ASTM Designation A615 for Grade 40 bars.

### **10-15.04 EXECUTION**

The Plans provide the general location and description of the work to be performed. The Contractor shall review field conditions and layout the improvements consistent with the applicable City and CALTRANS standard drawings. The Contractor shall furnish sufficient measuring equipment to verify that grades are compliant with accessible standards. The Contractor shall discuss the proposed improvements with the Engineer and when approved, begin rough grading.

After removal of the existing concrete, the Contractor shall excavate and prepare the subgrade as to include scarification to 90% and placement of aggregate base to 95% relative compaction. The Contractor shall use extreme caution when excavating near tree roots and shall notify the City arborist if roots greater than 1-inch are encountered.

The Contractor shall take extra caution in areas where there is existing utilities under the existing sidewalk at the new curb ramp locations. The Contractor shall repair any damaged utilities at no additional cost to the project.

### **Concrete Placement**

All new concrete curb & gutter shall be doweled and epoxied into the existing concrete using #4 rebar at 18" O.C. (minimum of 2).

The Contractor shall install formwork and receive approval from the Engineer prior to ordering concrete. The Contractor shall have sufficient personnel on site to manage the placement of the concrete.

Immediately after the surface of the concrete is finished, application of curing compound shall be made in accordance with Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. The quality and quantity to be used shall be approved by the Engineer. The liquid compound shall contain a coloring matter which does not permanently alter the natural color of the concrete, but which will color sufficiently at the time of application to indicate readily the areas covered.

### **Time**

The Contractor shall replace removed concrete with the final improvements within five (5) calendar days.

### **Surface Restoration**

The Contractor shall grade the adjacent areas to conform to the existing conditions. This may include placing topsoil. Topsoil shall be procured and imported from a local supplier. The Contractor shall restore private property improvements. For conform grading within the public right of way, the Contractor shall place mulch once grading is complete.

## **10-15.05 MEASUREMENT AND PAYMENT**

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

## **SECTION 10-16 - HOT MIX ASPHALT (TYPE A)**

### **10-16.01 GENERAL**

Specifications are for providing asphaltic concrete paving as indicated on drawings. Contractor shall protect concrete pavements and walks, curbs and bases, and other improvements adjacent to the operations with suitable materials. The Contractor shall be responsible for any damage caused by the Contractor's employees or equipment and shall make necessary repairs. All damage caused by the Contractor's operations shall be prepared or replaced as required.

#### **10-16.02 SUBMITTALS**

Contractor shall submit Certificate of Compliance from manufacturer for approval prior to installation.

Contractor shall provide submittal for each Respective manufacturer's product data for manufactured products.

#### **10-16.03 MATERIALS**

- Hot Mix Asphalt shall be Type A using the Method process and shall conform to the provision in Section 39 "Hot Mix Asphalt" of the Standard Specifications and these Specifications. Hot Mix Asphalt shall be compacted to a relative compaction of not less than 95 percent.

Aggregate grading for the hot mix asphalt shall conform to the grading specified in Section 39-2.02B "Aggregate Gradations" of the Standard Specifications. The base and leveling courses shall be dense graded, 3/4-inch maximum aggregate size and the surface course shall be medium graded 1/2-inch maximum aggregate size. When material used in the surface course is to be hand raked, 3/8-inch maximum size shall be used.

The amount of asphalt binder to be mixed with the aggregate shall be between 4 percent and 6 percent by weight of the dry aggregate. The exact amount of asphalt binder to be mixed with the aggregate will be approved by the Engineer. The Contractor must submit mix design for approval to the Engineer.

Asphalt binder to be mixed with aggregate shall be a steam-refined asphalt conforming to the provisions in Section 92, "Asphalt Binders" and have a viscosity grade of PG 64-10. The pavement surface upon which hot mix asphalt is to be placed and all adjacent vertical surfaces of existing pavement, curbs, gutters, etc. shall be thoroughly cleaned prior to paving. The Contractor shall furnish and operate a self-loading motor sweeper with spray nozzles before and after paving operations where feasible. All other areas will require hand sweeping. The pavement shall be free of dust, dirt, water, and vegetation prior to paving.

- Asphaltic emulsion shall be applied to the surface of existing pavements preparatory to resurfacing with hot mix asphalt, and to all concrete surfaces which will be in contact with hot mix asphalt surfacing. Asphalt emulsion shall be SS-1H conforming to Section 37 of the Standard Specifications. The Contractor shall submit a copy of Certificate of Compliance for asphaltic emulsion

#### **10-16.04 EXECUTION**

The surfaces upon which HMA is to be placed shall be thoroughly cleaned of all dirt, vegetation, and debris. Prior to application of tack coat, the parking lot shall be cleaned with a vacuum street sweeper and be clean of all dust.

1. Placing Asphalt Concrete
  - a. The asphalt paving machine shall be equipped with an electronic "sonic ski" system with a minimum of three (3) sensors to be positioned a minimum of 10-foot in front, 10-foot behind and adjacent to the drum of the paving machine. The system shall be designed to optimize a smooth and consistent



road profile. All settings and inputs shall be programmed and adjusted to yield an average thickness equivalent to the paving thickness shown on the Plans. The engineer can cancel the use of the "sonic ski" system at any point without incurring any penalties by the contractor.

- b. Areas to be paved shall be covered with a layer of hot asphalt concrete surfacing not less than the thickness indicated after compaction. Where not indicated, compacted thickness shall three inches for roads, driveways, and aisles of parking areas.
- c. Paving asphaltic concrete shall be delivered, laid, rolled, and finished in accordance with Section 39 of the Caltrans Standard Specifications.
- d. Before placing asphalt concrete, a tack coat (paint binder) shall be applied to all vertical surfaces against which asphalt concrete surfacing will be placed. Asphaltic emulsion shall be applied to the surface of existing pavements at the approximate rate of one-sixteenth (1/16) gallon per square yard. Pools or unevenly distributed areas shall be redistributed by means of hand brooms. The emulsion shall be applied only so far in advance of the surfacing work that it has sufficient time to set, as required by the Engineer.
- e. After a tack coat of asphalt emulsion has been applied, hot mix asphalt shall be spread and compacted. It is contemplated that hot mix asphalt will be laid to a compacted thickness as specified. All loose material tracked out onto the new compacted surface shall be removed before an adjacent pass is made by the asphalt paver. All layers of hot mix asphalt shall be laid using an asphalt paving machine as specified in Section 39, Hot Mix Asphalt, of the Standard Specifications.
- f. The Contractor shall taper the new pavement thickness adjacent to the gutters in the streets designated by the Engineer. Tapering to the edge of the gutters shall be performed in such manner that adequate binding of the very fine asphalt material to the existing surface is obtained. Contractor shall, at the direction of the Engineer and pursuant to field conditions, apply additional binding material in these areas prior to the placement of the new hot mix asphalt, and shall adequately rake the coarse material so as to obtain the desired result. Crown heights may be adjusted at the direction of the Engineer. Aggregate segregation will be grounds for rejection.
- g. The location of all utility and City-owned structures that are covered over by the new pavement shall be legibly marked with paint on the new pavement and on the adjacent curb and/or sidewalk. In addition, the Contractor must make a list of each utility cover that is paved over and not raised to grade during the paving job (e.g. PG&E utility covers) and must notify the utility in writing of the location of said utility cover and the date that it was paved over. A copy of this written notification must be sent to the City. If utility cover is paved over and not raised to grade during the paving job, the pavement must be at least 1-1/2 inches thick over the utility cover and no depression in the roadway surface can be left over the utility cover. If 1-1/2 inches of pavement cannot be laid over a recessed utility cover, then the hot mix asphalt shall be feathered to the grade of the utility cover and arrangements with the utility must be made to raise it to grade. Hot mix asphalt rolled gutters shall be resurfaced as directed by the Engineer as part of the overlay resurfacing work and no additional payment will be made therefor.

- h. Hot mix asphalt shall not be placed when the atmospheric temperature is below 50 degrees F (10 degrees C) or during unsuitable weather.
  - i. Compaction of the asphalt shall be achieved using mechanical rollers. Rolling shall be performed in such a manner that cracking, shoving, or displacement will be avoided. Any displacement occurring as a result of reversing the direction of the roller or from any cause shall at once be corrected by the use of rakes and fresh asphalt mixture where required.
  - j. Areas inaccessible to the rollers shall be compacted by use of a power compactor of the high impact vibration plate type capable of attaining the same compaction as the rolled areas. An adequate number of rollers shall be used with each paving operation.
  - k. The completed surface shall be thoroughly compacted, smooth, and true to grade and cross section, free from ruts, humps, depression, irregularities, or segregated material.
  - l. Finish paving shall conform to finish elevations within plus or minus 0.01 of a foot and shall be level to within plus or minus 1/4 inch in 10 feet when measured with a 10 foot straightedge in any direction. Finish surface of the wearing course shall be thoroughly compacted, smooth, and free from ruts, humps, depressions, cold joints, or other irregularities.
  - m. Public traffic shall be permitted the use of the street area providing that such traffic does not interfere with the continuity of the paving operations. When street operations are suspended, all equipment shall be removed from portions of the streets that are to be used by the public traffic. Where work is unfinished at a pedestrian crosswalk at the end of a working day, the edge of the paved surface to said crosswalk shall be feathered to provide a smooth pathway for foot traffic. The pavement shall be protected from traffic until thoroughly cooled and set. Hot mix asphalt rolled gutters shall be compacted as directed by the Engineer as part of the overlay resurfacing work and no additional payment will be made therefor.
  - n. Any rollers shall be equipped with pads and water systems that prevent sticking of asphalt mixtures to the steel-tired wheels. A parting agent, which will not damage the asphalt mixture, as determined by the Engineer, may be used to aid in preventing the sticking of the mixture to the wheels.
  - o. The finished surface shall be cat-tracked within 24 hours of completion of paving work. Final striping shall be applied within one week of completion of paving work.
  - p. Pavement fabric shall be installed per Manufacturer's recommendation.
2. Field Quality Control
- a. The Contractor shall control the quality of the work and shall provide adequate testing to assure compliance with these Specifications.
  - b. After completion of paving work, all paving shall be inspected. Any resulting "ponds" shall be ringed with chalk. Such hollows shall be corrected with addition of asphalt paving materials and rerolling until all paving is completely level and free from hollows and high spots.

- c. As part of its quality control program, Contractor shall employ a competent qualified testing subcontractor to perform in-place density and compaction tests of the completed pavement in accordance with California Test 375 to determine compliance with specified requirements. A minimum of: three (3) tests shall be performed at each roadway location and/or as directed by the Engineer to verify compliance. Contractor shall provide all test results to the Engineer by the end of the next business day.

The HMA shall be placed in 3-inch maximum lifts. Conform sections shall be squared off and hand raked to a neat straight line. Edges at curb shall be hand raked and rolled with a small roller or tamper when larger roller cannot be used.

Finished pavement shall be free from ripping, ruts, humps, depressions, improper conforms, and other irregularities per the State Standard Specifications. Unacceptable paving shall be removed by cold planing and repaved 1-inch deep.

#### **10-16.05 MEASUREMENT AND PAYMENT**

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

### **SECTION 10-17 – AGGREGATE BASE**

#### **10-17.01 GENERAL**

Specifications for furnishing, spreading, and compacting aggregate base course for pavements as indicated.

Damage to the street, sidewalk, curbs and gutters from construction activities shall be repaired to the satisfaction of the City Engineer.

#### **10-17.02 SUBMITTALS**

Contractor shall provide submittal for the Respective manufacturer's product data for manufactured products.

#### **10-17.03 MATERIALS**

Aggregate base shall be Class 2, 3/4" maximum. When the aggregate base is constructed in more than one layer, the previously constructed layer shall be cleaned of loose and foreign matter by sweeping with power sweepers or power brooms, except that hand brooms may be used in areas where power cleaning is not practicable. Adequate drainage shall be provided during the entire period of construction to prevent water from collecting or standing on the area to be covered with aggregate base.

#### **10-17.04 EXECUTION**

1. Examination
  - a. Call for an inspection by the Engineer and obtain written acceptance of the prepared subgrade or subbase before proceeding with the placement of aggregate base course.

- b. The subgrade or subbase to receive aggregate base course, immediately prior to spreading, shall conform to the compaction and elevation tolerances indicated for the material involved and shall be free of standing water and loose or extraneous material.
2. Installation Standards
- a. Aggregate base course shall be applied over the prepared subgrade or subbase and compacted in accordance with Section 26 of the Caltrans Standard Specifications or as approved by the Geotechnical Engineer.
  - b. Aggregate base course shall be minimum uniform thickness after compaction of dimensions indicated. Where not indicated, compacted thickness shall be six inches for driveways/sidewalks and eight inches for roadways.
  - c. All compaction expressed in percentages in this section refers to the maximum dry density as determined by California Test Method No. 216.
3. Spreading of Material
- a. Aggregate for base course shall be delivered as uniform mixture of fine and coarse aggregate and shall be spread in layers without segregation.
  - b. Aggregate base course material shall be free from pockets of large and fine material. Segregated materials shall be remixed until uniform.
  - c. Aggregate base material shall be moisture-conditioned to near optimum moisture content in accordance with the applicable requirements of Section 10 of the Caltrans Standard Specifications.
  - d. Aggregate base course six inches and less in thickness may be spread and compacted in one layer. For thicknesses greater than six inches, the base course aggregate shall be spread and compacted in two or more layers of uniform thickness not greater than six inches each.
4. Compacting
- a. Relative compaction of each layer of compacted aggregate base material shall be not less than 95 percent based on maximum dry density as determined by California Test Method No. 216 or as noted in the design plan.
  - b. Thickness of finished base course shall not vary more than 3/4 inch from the indicated thickness at any point. Base which does not conform to this requirement shall be reshaped or reworked, watered, and recompact to achieve compliance with specified requirements.
  - c. The surface of the finished aggregate base course at any point shall not vary more than 3/4 inch above or below the indicated grade.
5. Field Quality Control
- a. Perform field tests in accordance with ASTM D2922 or ASTM D1557 as directed by the Geotechnical Engineer to determine compliance with specified requirements for density and compaction of aggregate base material, and with ASTM D3010 to determine moisture-content compliance of the installed base course.

## **10-17.05 MEASUREMENT AND PAYMENT**

Full compensation for providing "Aggregate Base" shall include furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and placing aggregate base and compaction tests complete in place as shown on the Plans, as specified in the Standard Specifications and these Specifications, and as directed by the Engineer shall be considered as included in the contract prices for the various items of work and no additional compensation will be made therefor.

## **SECTION 10-18 - DISPOSAL OF MATERIALS**

The Engineer has not arranged for disposal of materials associated with construction. These materials may include, but are not limited to, general debris, soil, plastic, concrete, asphalt, pipe of various types, rock, and vegetation. The Contractor shall comply with the following:

- Dispose of all debris and waste materials in a safe and legal manner.
- Not burn and/ or bury waste materials within the project area.
- Allow any dirt, refuse, excavated material, surplus concrete or mortar, or any associated washings, to be disposed of onto streets, into the bay, or into a private storm drain system.

The Contractor shall dispose of specific material as follows:

- All concrete and asphalt in a recycling facility.
- Wood and metal in a recycling facility.
- All other materials in a suitable landfill.

The Engineer has no analytical testing data available for soil within the project limits. The Contractor shall assume that all soil has levels of contamination that exceeds environmental screening levels listed by the California Regional Water Quality Control Board for residential land use or commercial/industrial land use but is non-regulated and non-hazardous in accordance with Sections 25316 and 25317 of the State of California Health and Safety Code.

If requested by the Engineer, the Contractor shall be responsible for completing testing of the soil to be disposed to the satisfaction of the receiver of the soil. These tests could include, but are not limited to, heavy metals (CAM 17 metals), TPH (gas, diesel, and motor oil), semi-volatile organic compounds, pesticides, and polychlorinated biphenyls (PCBs). The Contractor shall submit to the Engineer copies of all waste manifests provided by the receiver of the soil.

The Contractor shall not stockpile and mix soil that originates from different locations of the work area or project elements. If the Contractor mixes soil, they shall be responsible for all disposal costs, including management of hazardous materials.

The Contractor shall schedule disposal of materials such that inclement weather does not impair access to the disposal facility.

Should the Contractor encounter asbestos as defined in Labor Code Section 6501.7 or a hazardous substance as defined in Health & Safety Code Section 25316 and § 25317 immediately stop working in the area of discovery and notify the Engineer. All work with hazardous substances shall be completed in accordance with Section 22 of the California Code of Regulations Division 4.5. The Engineer considers this work as a change in conditions.

PAYMENT - Full compensation for conforming to the provisions in this section, not otherwise provided for, shall be considered as included in prices paid for other elements of work and no additional compensation will be allowed therefor.

**SECTION 10-19 - REMOVAL OF HAZARDOUS SUBSTANCES**

If the Contractor encounters materials, which the Contractor reasonably believes to be asbestos or a hazardous substance, the Contractor shall stop work and report the discovery to the Engineer in accordance with Section 14-11.02 "Discovery of Unanticipated Asbestos and Hazardous Substances" of the Standard Specifications.

PAYMENT – This shall be paid as change order work.