

TOWN OF HILLSBOROUGH, CALIFORNIA

INVITATION FOR INFORMAL BIDS

FOR THE

**MOSELEY ROAD
SEWER REPLACEMENT PROJECT
CIP # 615.47**

Bid Due: 2 p.m., Wednesday, September 26, 2018

Town of Hillsborough
1600 Floribunda Avenue
Hillsborough, CA 94010

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NOTICE TO BIDDERS

Informal Bids are hereby requested by the Town Hall, Town of Hillsborough for the:

MOSELEY ROAD SEWER REPLACEMENT PROJECT

Scope: The scope of work to be performed consists of furnishing all labor and materials, equipment, tools and services necessary to replace approximately 338 linear feet of the existing sanitary sewer mainline from existing manhole on Moseley Road in Hillsborough. The existing alignment will be maintained and the new sewer line will be installed via pipe reaming. Other related works include, but not limited to, potholing of existing utilities, restoration of existing lateral connections, soil excavation, shoring, backfilling and soil compaction, and final cleaning and video inspection.

Details are presented in Exhibit A and B attached to this Request for Bids.

Bid Timing: Sealed bids must be received by the Office of the City Clerk, Town Hall, Town of Hillsborough 1600 Floribunda Avenue, Hillsborough, California 94010, **by 2:00 p.m. on Wednesday, September 26, 2018.**

Project Duration: Time for Completion will be **twenty (20) working days** from the date of contract execution.

Proposal Format and Submittal: All bids must be on the forms in this package or on photocopies of these forms. Forms to be included in submittal are the below Bid Schedule and Exhibit "E" Public Works Contractor Registration Certification Form. Subsequent to Bid Opening, all proposals must remain valid for 90 days and may be subject to acceptance by the Town. A Bid Bond, as described below, must be submitted with the Bid.

Contractor Qualifications: A California "Class A" General Engineering contractor's license is required to bid this project. The Contractor must provide proof of successful completion of at least three (3) other projects similar in size and scope to the work specified herein within the last two (2) years. The Contractor may be disqualified if they cannot provide this proof of experience. Any work performed by subcontractors for the Contractor will not be considered.

Pursuant to Labor Code section 1725.5, no contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations. To be considered qualified to bid on this project, the Contractor must be registered with the

Department of Industrial Relations and must furnish their Contractor Registration Number to the Town.

Bonds: A bidders bond, in the amount of 10% of the bid total is required to be submitted with the bid proposal.

See Exhibit “F” for payment and performance bonding requirements.

Pre-Bid Site Investigations: Bidders shall be responsible for examining the designated sites to note existing conditions and to take measurements, prior to submission of their bids. No allowance or additional payment will be subsequently made for any site condition that could have been ascertainable by making this site investigation.

Questions regarding this Invitation to Bid may be directed to Kathy Kim at (650) 375-7538.

AWARD AND REJECTION OF BIDS

In determining to whom the award is to be made, the Town may consider, in addition to the bid prices received, such other factors as the experience of the bidder for the particular service sought, the quality of work that the bidder has done, the quality of the product or materials provided by the bidder, the ability of the bidder to complete the project in a timely manner, the safety compliance record of the bidder, and the insurance carried by the bidder.

The Town may reject any or all bids. The Town shall reject a bid submitted by an entity that includes any party that has been delinquent or unfaithful in any former contract with the Town. The Town also reserves the right to waive any irregularities or informalities in any bid or in the bidding procedures. All bidders shall be notified of the award.

BID SCHEDULE

MOSELEY ROAD SEWER REPAIR PROJECT

Base Bid Schedule

ITEM #	BID ITEM	QTY.	UNIT	UNIT PRICE	TOTAL
1.	Mobilization	1	LS		
2.	Replace SS with 8-inch HDPE, Pipe Reaming	338	LF		
3.	Rehabilitate Existing Manhole	2	EA		
4.	Restoration Connection of Lateral	2	EA		
5.	Post-Installation Video of Completed Sewer Section	338	LF		
TOTAL BASE BID PRICE:					
The TOTAL BASE BID amount described in words is: _____					
_____ and _____ /100 DOLLARS					

***NOTE:** The Town of Hillsborough shall determine the lowest bid on the basis of the Total of the Base Bid Schedule. The Total Base Bid Price is the total for all materials, equipment, tools, labor and incidentals necessary to complete the work, including necessary insurance cost and bond requirements. In case of discrepancy between the item unit price and total set forth for the item, the item unit price shall prevail.*

NAME OF BIDDER:

licensed in accordance with an act for the registration of Contractors, and with license number: _____ Expiration: _____.

Contractor's Representative:

_____ (Name/Title)

_____ (Contact email)

_____ (Phone Number)

TOWN OF HILLSBOROUGH
CONSTRUCTION CONTRACT

MOSELEY ROAD SEWER REPLACEMENT PROJECT

1. PARTIES AND DATE.

This Contract is made and entered into this [***INSERT DAY***] day of [***INSERT MONTH***], [***INSERT YEAR***] by and between the Town of Hillsborough, a public agency of the State of California (“Town”) and [***INSERT NAME***], a [***INSERT TYPE OF ENTITY - CORPORATION, PARTNERSHIP, SOLE PROPRIETORSHIP OR OTHER LEGAL ENTITY***] with its principal place of business at [***INSERT ADDRESS***] (“Contractor”). Town and Contractor are sometimes individually referred to as “Party” and collectively as “Parties” in this Contract.

2. RECITALS.

2.1 Town. Town is a public agency organized under the laws of the State of California, with power to contract for services necessary to achieve its purpose.

2.2 Contractor. Contractor desires to perform and assume responsibility for the provision of certain construction services required by the Town on the terms and conditions set forth in this Contract. Contractor represents that it is duly licensed and experienced in providing replacement of the existing sanitary sewer mainline from existing manholes related construction services to public clients, that it and its employees or subcontractors have all necessary licenses and permits to perform the services in the State of California, and that it is familiar with the plans of Town. The following license classifications are required for this Project: A California “Class A” General Engineering contractor’s license.

2.3 Project. Town desires to engage Contractor to render such services for the Moseley Road Sewer Replacement Project (“Project”) as set forth in this Contract.

2.4 Project Documents & Certifications. Contractor has obtained, and delivers concurrently herewith, a performance bond, a payment bond, and all insurance documentation, as required by the Contract.

3. TERMS

3.1 Incorporation of Documents. This Contract includes and hereby incorporates in full by reference the following documents, including all exhibits, drawings, specifications and documents therein, and attachments and addenda thereto:

- Services/Schedule (Exhibit “A”)
- Plans and Specifications (Exhibit “B”)
- Special Conditions (Exhibit “C”)
- Contractor’s Certificate Regarding Workers’ Compensation (Exhibit “D”)
- Public Works Contractor Registration Certification (Exhibit “E”)
- Payment and Performance Bonds (Exhibit “F”)
- Federal Requirements (Exhibit “G”)
- Addenda

- Change Orders executed by the Town
- 2009 Edition of the Standard Specifications for Public Works Construction (The Greenbook), Excluding Sections 1-9
- Notice Inviting Bids, if any
- Instructions to Bidders, if any
- Contractor's Bid

3.2 Contractor's Basic Obligation; Scope of Work. Contractor promises and agrees, at its own cost and expense, to furnish to the Town all labor, materials, tools, equipment, services, and incidental and customary work necessary to fully and adequately complete the Project, including all structures and facilities necessary for the Project or described in the Contract (hereinafter sometimes referred to as the "Work"), for a Total Contract Price as specified pursuant to this Contract. All Work shall be subject to, and performed in accordance with the above referenced documents, as well as the exhibits attached hereto and incorporated herein by reference. The plans and specifications for the Work are further described in Exhibit "B" attached hereto and incorporated herein by this reference. Special Conditions, if any, relating to the Work are described in Exhibit "C" attached hereto and incorporated herein by this reference.

3.2.1 Change in Scope of Work. Any change in the scope of the Work, method of performance, nature of materials or price thereof, or any other matter materially affecting the performance or nature of the Work shall not be paid for or accepted unless such change, addition or deletion is approved in writing by a valid change order executed by the Town. Should Contractor request a change order due to unforeseen circumstances affecting the performance of the Work, such request shall be made within five (5) business days of the date such circumstances are discovered or shall waive its right to request a change order due to such circumstances. If the Parties cannot agree on any change in price required by such change in the Work, the Town may direct the Contractor to proceed with the performance of the change on a time and materials basis.

3.2.2 Substitutions/"Or Equal". Pursuant to Public Contract Code Section 3400(b), the Town may make a finding that designates certain products, things, or services by specific brand or trade name. Unless specifically designated in this Contract, whenever any material, process, or article is indicated or specified by grade, patent, or proprietary name or by name of manufacturer, such Specifications shall be deemed to be used for the purpose of facilitating the description of the material, process or article desired and shall be deemed to be followed by the words "or equal."

Contractor may, unless otherwise stated, offer for substitution any material, process or article which shall be substantially equal or better in every respect to that so indicated or specified in this Contract. However, the Town may have adopted certain uniform standards for certain materials, processes and articles. Contractor shall submit requests, together with substantiating data, for substitution of any "or equal" material, process or article no later than thirty-five (35) days after award of the Contract. To facilitate the construction schedule and sequencing, some requests may need to be submitted before thirty-five (35) days after award of Contract. Provisions regarding submission of "or equal" requests shall not in any way authorize an extension of time for performance of this Contract. If a proposed "or equal" substitution request is rejected, Contractor shall be responsible for providing the specified material, process or article. The burden of proof as to the equality of any material, process or article shall rest with Contractor.

The Town has the complete and sole discretion to determine if a material, process or article is an "or equal" material, process or article that may be substituted. Data required to substantiate requests for substitutions of an "or equal" material, process or article shall include a signed affidavit from Contractor stating that, and describing how, the substituted "or equal" material, process or article is equivalent to that specified in every way except as listed on the affidavit. Substantiating data shall include any and all illustrations, specifications, and other relevant data including catalog information which describes the requested substituted "or equal" material, process or article, and substantiates that it is an "or equal" to the material, process or article. The substantiating data must also include information regarding the durability and lifecycle cost of the requested substituted "or equal" material, process or article. Failure to submit all the required substantiating data, including the signed affidavit, to the Town in a timely fashion will result in the rejection of the proposed substitution.

Contractor shall bear all of the Town's costs associated with the review of substitution requests. Contractor shall be responsible for all costs related to a substituted "or equal" material, process or article. Contractor is directed to the Special Conditions (if any) to review any findings made pursuant to Public Contract Code section 3400.

3.3 Period of Performance and Liquidated Damages. Contractor shall perform and complete all Work under this Contract within twenty (20) working days, beginning the effective date of the Notice to Proceed ("Contract Time"). Contractor shall perform its Work in strict accordance with any completion schedule, construction schedule or project milestones developed by the Town. Such schedules or milestones may be included as part of Exhibits "A" or "B" attached hereto, or may be provided separately in writing to Contractor. Contractor agrees that if such Work is not completed within the aforementioned Contract Time and/or pursuant to any such completion schedule, construction schedule or project milestones developed pursuant to provisions of the Contract, it is understood, acknowledged and agreed that the Town will suffer damage. Pursuant to Government Code Section 53069.85, Contractor shall pay to the Town as fixed and liquidated damages the sum of One Thousand Dollars (\$1,000) per day for each and every calendar day of delay beyond the Contract Time or beyond any completion schedule, construction schedule or Project milestones established pursuant to the Contract.

3.4 Standard of Performance; Performance of Employees. Contractor shall perform all Work under this Contract in a skillful and workmanlike manner, and consistent with the standards generally recognized as being employed by professionals in the same discipline in the State of California. Contractor represents and maintains that it is skilled in the professional calling necessary to perform the Work. Contractor warrants that all employees and subcontractors shall have sufficient skill and experience to perform the Work assigned to them. Finally, Contractor represents that it, its employees and subcontractors have all licenses, permits, qualifications and approvals of whatever nature that are legally required to perform the Work, including any required business license, and that such licenses and approvals shall be maintained throughout the term of this Contract. As provided for in the indemnification provisions of this Contract, Contractor shall perform, at its own cost and expense and without reimbursement from the Town, any work necessary to correct errors or omissions which are caused by Contractor's failure to comply with the standard of care provided for herein. Any employee who is determined by the Town to be uncooperative, incompetent, a threat to the safety of persons or the Work, or any employee who fails or refuses to perform the Work in a manner acceptable to the Town, shall be promptly removed from the Project by Contractor and shall not be re-employed on the Work.

3.5 Control and Payment of Subordinates; Contractual Relationship. Town retains Contractor on an independent contractor basis and Contractor is not an employee of Town. Any additional personnel performing the work governed by this Contract on behalf of Contractor shall at all times be under Contractor's exclusive direction and control. Contractor shall pay all wages, salaries, and other amounts due such personnel in connection with their performance under this Contract and as required by law. Contractor shall be responsible for all reports and obligations respecting such additional personnel, including, but not limited to: social security taxes, income tax withholding, unemployment insurance, and workers' compensation insurance.

3.6 Town's Basic Obligation. Town agrees to engage and does hereby engage Contractor as an independent contractor to furnish all materials and to perform all Work according to the terms and conditions herein contained for the sum set forth above. Except as otherwise provided in the Contract, the Town shall pay to Contractor, as full consideration for the satisfactory performance by Contractor of the services and obligations required by this Contract, the below-referenced compensation in accordance with compensation provisions set forth in the Contract.

3.7 Compensation and Payment.

3.7.1 Amount of Compensation. As consideration for performance of the Work required herein, Town agrees to pay Contractor the Total Contract Price of _____ Dollars (\$_____.00) ("Total Contract Price") provided that such amount shall be subject to adjustment pursuant to the applicable terms of this Contract or written change orders approved and signed in advance by the Town.

3.7.2 Payment of Compensation. If the Work is scheduled for completion in thirty (30) or less calendar days, Town will arrange for payment of the Total Contract Price upon completion and approval by Town of the Work. If the Work is scheduled for completion in more than thirty (30) calendar days, Town will pay Contractor on a monthly basis as provided for herein. On or before the fifth (5th) day of each month, Contractor shall submit to the Town an itemized application for payment in the format supplied by the Town indicating the amount of Work completed since commencement of the Work or since the last progress payment. These applications shall be supported by evidence which is required by this Contract and such other documentation as the Town may require. The Contractor shall certify that the Work for which payment is requested has been done and that the materials listed are stored where indicated. Contractor may be required to furnish a detailed schedule of values upon request of the Town and in such detail and form as the Town shall request, showing the quantities, unit prices, overhead, profit, and all other expenses involved in order to provide a basis for determining the amount of progress payments.

3.7.3 Prompt Payment. Town shall review and pay all progress payment requests in accordance with the provisions set forth in Section 20104.50 of the California Public Contract Code. However, no progress payments will be made for Work not completed in accordance with this Contract. Contractor shall comply with all applicable laws, rules and regulations relating to the proper payment of its employees, subcontractors, suppliers or others.

3.7.4 Contract Retentions. From each approved progress estimate, five percent (5%) will be deducted and retained by the Town, and the remainder will be paid to Contractor. All Contract retention shall be released and paid to Contractor and subcontractors pursuant to California Public Contract Code Section 7107.

3.7.5 Other Retentions. In addition to Contract retentions, the Town may deduct from each progress payment an amount necessary to protect Town from loss because of: (1) liquidated damages which have accrued as of the date of the application for payment; (2) any sums expended by the Town in performing any of Contractor's obligations under the Contract which Contractor has failed to perform or has performed inadequately; (3) defective Work not remedied; (4) stop notices as allowed by state law; (5) reasonable doubt that the Work can be completed for the unpaid balance of the Total Contract Price or within the scheduled completion date; (6) unsatisfactory prosecution of the Work by Contractor; (7) unauthorized deviations from the Contract; (8) failure of Contractor to maintain or submit on a timely basis proper and sufficient documentation as required by the Contract or by Town during the prosecution of the Work; (9) erroneous or false estimates by Contractor of the value of the Work performed; (10) any sums representing expenses, losses, or damages as determined by the Town, incurred by the Town for which Contractor is liable under the Contract; and (11) any other sums which the Town is entitled to recover from Contractor under the terms of the Contract or pursuant to state law, including Section 1727 of the California Labor Code. The failure by the Town to deduct any of these sums from a progress payment shall not constitute a waiver of the Town's right to such sums.

3.7.6 Substitutions for Contract Retentions. In accordance with California Public Contract Code Section 22300, the Town will permit the substitution of securities for any monies withheld by the Town to ensure performance under the Contract. At the request and expense of Contractor, securities equivalent to the amount withheld shall be deposited with the Town, or with a state or federally chartered bank in California as the escrow agent, and thereafter the Town shall then pay such monies to Contractor as they come due. Upon satisfactory completion of the Contract, the securities shall be returned to Contractor. For purposes of this Section and Section 22300 of the Public Contract Code, the term "satisfactory completion of the contract" shall mean the time the Town has issued written final acceptance of the Work and filed a Notice of Completion as required by law and provisions of this Contract. Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon. The escrow agreement used for the purposes of this Section shall be in the form provided by the Town.

3.7.7 Title to Work. As security for partial, progress, or other payments, title to Work for which such payments are made shall pass to the Town at the time of payment. To the extent that title has not previously been vested in the Town by reason of payments, full title shall pass to the Town at delivery of the Work at the destination and time specified in this Contract. Such transferred title shall in each case be good, free and clear from any and all security interests, liens, or other encumbrances. Contractor promises and agrees that it will not pledge, hypothecate, or otherwise encumber the items in any manner that would result in any lien, security interest, charge, or claim upon or against said items. Such transfer of title shall not imply acceptance by the Town, nor relieve Contractor from the responsibility to strictly comply with the Contract, and shall not relieve Contractor of responsibility for any loss of or damage to items.

3.7.8 Labor and Material Releases. Contractor shall furnish Town with labor and material releases from all subcontractors performing work on, or furnishing materials for, the Work governed by this Contract prior to final payment by Town.

3.7.9 Prevailing Wages. Contractor is aware of the requirements of California Labor Code Section 1720 et seq., and 1770 et seq., as well as California Code of Regulations, Title 8, Section 16000 et seq., ("Prevailing Wage Laws"), which require the payment of

prevailing wage rates and the performance of other requirements on “public works” and “maintenance” projects. Since the Services are being performed as part of an applicable “public works” or “maintenance” project, as defined by the Prevailing Wage Laws, and since the total compensation is \$1,000 or more, Contractor agrees to fully comply with such Prevailing Wage Laws. Town shall provide Contractor with a copy of the prevailing rates of per diem wages in effect at the commencement of this Contract. Contractor shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to execute the Services available to interested parties upon request, and shall post copies at Contractor’s principal place of business and at the project site. Contractor shall defend, indemnify and hold the Town, its officials, officers, employees and agents free and harmless from any claim or liability arising out of any failure or alleged failure to comply with the Prevailing Wage Laws. Contractor and any subcontractor shall forfeit a penalty of up to \$200 per calendar day or portion thereof for each worker paid less than the prevailing wage rates.

3.7.10 Apprenticeable Crafts. When Contractor employs workmen in an apprenticeable craft or trade, Contractor shall comply with the provisions of Section 1777.5 of the California Labor Code with respect to the employment of properly registered apprentices upon public works. The primary responsibility for compliance with said section for all apprenticeable occupations shall be with Contractor. The Contractor or any subcontractor that is determined by the Labor Commissioner to have knowingly violated Section 1777.5 shall forfeit as a civil penalty an amount not exceeding \$100 for each full calendar day of noncompliance, or such greater amount as provided by law.

3.7.11 Hours of Work. Contractor is advised that eight (8) hours labor constitutes a legal day’s work. Pursuant to Section 1813 of the California Labor Code, Contractor shall forfeit a penalty of \$25.00 per worker for each day that each worker is permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week, except when payment for overtime is made at not less than one and one-half (1-1/2) times the basic rate for that worker.

3.7.12 Payroll Records. Contractor and each subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. The payroll records shall be certified and shall be available for inspection at all reasonable hours at the principal office of Contractor in the manner provided in Labor Code section 1776. In the event of noncompliance with the requirements of this section, Contractor shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects such Contractor must comply with this section. Should noncompliance still be evident after such 10-day period, Contractor shall, as a penalty to Town, forfeit not more than \$100.00 for each calendar day or portion thereof, for each worker, until strict compliance is effectuated. The amount of the forfeiture is to be determined by the Labor Commissioner. A contractor who is found to have violated the provisions of law regarding wages on Public Works with the intent to defraud shall be ineligible to bid on Public Works contracts for a period of one to three years as determined by the Labor Commissioner. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from progress payments then due. The responsibility for compliance with this section is on Contractor. The requirement to submit certified payroll records directly to the Labor Commissioner under Labor Code section 1771.4 shall not apply to work performed on a public works project that is exempt pursuant to the small project exemption specified in Labor Code Section 1771.4.

3.7.13 Contractor and Subcontractor Registration. Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work. Contractor is directed to review, fill out and execute the Public Works Contractor Registration Certification attached hereto as Exhibit "E" prior to contract execution. Notwithstanding the foregoing, the contractor registration requirements mandated by Labor Code Sections 1725.5 and 1771.1 shall not apply to work performed on a public works project that is exempt pursuant to the small project exemption specified in Labor Code Sections 1725.5 and 1771.1.

3.7.14 Labor Compliance; Stop Orders. This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. It shall be the Contractor's sole responsibility to evaluate and pay the cost of complying with all labor compliance requirements under this Contract and applicable law. Any stop orders issued by the Department of Industrial Relations against Contractor or any subcontractor that affect Contractor's performance of Work, including any delay, shall be Contractor's sole responsibility. Any delay arising out of or resulting from such stop orders shall be considered Contractor caused delay subject to any applicable liquidated damages and shall not be compensable by the Town. Contractor shall defend, indemnify and hold the Town, its officials, officers, employees and agents free and harmless from any claim or liability arising out of stop orders issued by the Department of Industrial Relations against Contractor or any subcontractor.

3.8 Performance of Work; Jobsite Obligations.

3.8.1 Water Quality Management and Compliance.

3.8.1.1 Water Quality Management and Compliance. Contractor shall keep itself and all subcontractors, staff, and employees fully informed of and in compliance with all local, state and federal laws, rules and regulations that may impact, or be implicated by the performance of the Work including, without limitation, all applicable provisions of the Federal Water Pollution Control Act (33 U.S.C. §§ 1300); the California Porter-Cologne Water Quality Control Act (Cal Water Code §§ 13000-14950); local ordinances regulating discharges of storm water; and any and all regulations, policies, or permits issued pursuant to any such authority regulating the discharge of pollutants, as that term is used in the Porter-Cologne Water Quality Control Act, to any ground or surface water in the State.

3.8.1.2 Compliance with the Statewide Construction General Permit. Contractor shall comply with all conditions of the most recent iteration of the National Pollutant Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, issued by the California State Water Resources Control Board ("Permit"). It shall be Contractor's sole responsibility to file a Notice of Intent and procure coverage under the Permit for all construction activity which results in the disturbance of more than one acre of total land area or which is part of a larger common area of development or sale. Prior to initiating work, Contractor shall be solely responsible for preparing and implementing a Storm Water Pollution Prevention Plan (SWPPP) as required by the Permit. Contractor shall be responsible for procuring, implementing and complying with the provisions of the Permit and the SWPPP, including the standard provisions, and monitoring and reporting requirements as required by the Permit. The Permit requires the SWPPP to be a "living document" that changes as necessary to meet the conditions and requirements of the job site

as it progresses through different phases of construction and is subject to different weather conditions. It shall be Contractor's sole responsibility to update the SWPPP as necessary to address conditions at the project site.

3.8.1.3 Other Water Quality Rules Regulations and Policies. Contractor shall comply with the lawful requirements of any applicable municipality, drainage Town, or local agency regarding discharges of storm water to separate storm drain systems or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs.

3.8.1.4 Cost of Compliance. Storm, surface, nuisance, or other waters may be encountered at various times during construction of The Work. Therefore, the Contractor, by submitting a Bid, hereby acknowledges that it has investigated the risk arising from such waters, has prepared its Bid accordingly, and assumes any and all risks and liabilities arising therefrom.

3.8.1.5 Liability for Non-Compliance. Failure to comply with the Permit is a violation of federal and state law. Pursuant to the indemnification provisions of this Contract, Contractor hereby agrees to defend, indemnify and hold harmless the Town and its officials, officers, employees, volunteers and agents for any alleged violations. In addition, Town may seek damages from Contractor for any delay in completing the Work in accordance with the Contract, if such delay is caused by or related to Contractor's failure to comply with the Permit.

3.8.1.6 Reservation of Right to Defend. Town reserves the right to defend any enforcement action brought against the Town for Contractor's failure to comply with the Permit or any other relevant water quality law, regulation, or policy. Pursuant to the indemnification provisions of this Contract, Contractor hereby agrees to be bound by, and to reimburse the Town for the costs (including the Town's attorney's fees) associated with, any settlement reached between the Town and the relevant enforcement entity.

3.8.1.7 Training. In addition to the standard of performance requirements set forth in paragraph 3.4, Contractor warrants that all employees and subcontractors shall have sufficient skill and experience to perform the Work assigned to them without impacting water quality in violation of the laws, regulations and policies described in paragraph 3.8.1. Contractor further warrants that it, its employees and subcontractors will receive adequate training, as determined by Town, regarding the requirements of the laws, regulations and policies described in paragraph 3.8.1 as they may relate to the Work provided under this Agreement. Upon request, Town will provide the Contractor with a list of training programs that meet the requirements of this paragraph.

3.8.2 Safety. Contractor shall execute and maintain its work so as to avoid injury or damage to any person or property. Contractor shall comply with the requirements of the specifications relating to safety measures applicable in particular operations or kinds of work. In carrying out its Work, Contractor shall at all times be in compliance with all applicable local, state and federal laws, rules and regulations, and shall exercise all necessary precautions for the safety of employees appropriate to the nature of the Work and the conditions under which the Work is to be performed. Safety precautions as applicable shall include, but shall not be limited to, adequate life protection and lifesaving equipment; adequate illumination for underground and night operations; instructions in accident prevention for all employees, such as machinery guards, safe walkways, scaffolds, ladders, bridges, gang planks, confined space

procedures, trenching and shoring, fall protection and other safety devices, equipment and wearing apparel as are necessary or lawfully required to prevent accidents or injuries; and adequate facilities for the proper inspection and maintenance of all safety measures. Furthermore, Contractor shall prominently display the names and telephone numbers of at least two medical doctors practicing in the vicinity of the Project, as well as the telephone number of the local ambulance service, adjacent to all telephones at the Project site.

3.8.3 Laws and Regulations. Contractor shall keep itself fully informed of and in compliance with all local, state and federal laws, rules and regulations in any manner affecting the performance of the Contract or the Work, including all Cal/OSHA requirements, and shall give all notices required by law. Contractor shall be liable for all violations of such laws and regulations in connection with Work. If Contractor observes that the drawings or specifications are at variance with any law, rule or regulation, it shall promptly notify the Town in writing. Any necessary changes shall be made by written change order. If Contractor performs any work knowing it to be contrary to such laws, rules and regulations and without giving written notice to the Town, Contractor shall be solely responsible for all costs arising therefrom. Town is a public entity of the State of California subject to certain provisions of the Health & Safety Code, Government Code, Public Contract Code, and Labor Code of the State. It is stipulated and agreed that all provisions of the law applicable to the public contracts of a municipality are a part of this Contract to the same extent as though set forth herein and will be complied with. Contractor shall defend, indemnify and hold Town, its officials, officers, employees and agents free and harmless, pursuant to the indemnification provisions of this Contract, from any claim or liability arising out of any failure or alleged failure to comply with such laws, rules or regulations.

3.8.4 Permits and Licenses. Contractor shall be responsible for securing Town permits and licenses necessary to perform the Work described herein, including, but not limited to, any required business license. While Contractor will not be charged a fee for any Town permits, Contractor shall pay the Town's business license fee, if any. Any ineligible contractor or subcontractor pursuant to Labor Code Sections 1777.1 and 1777.7 may not perform work on this Project.

3.8.5 Trenching Work. If the Total Contract Price exceeds \$25,000 and if the Work governed by this Contract entails excavation of any trench or trenches five (5) feet or more in depth, Contractor shall comply with all applicable provisions of the California Labor Code, including Section 6705. To this end, Contractor shall submit for Town's review and approval a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the shoring system standards, the plan shall be prepared by a registered civil or structural engineer.

3.8.6 Hazardous Materials and Differing Conditions. As required by California Public Contract Code Section 7104, if this Contract involves digging trenches or other excavations that extend deeper than four (4) feet below the surface, Contractor shall promptly, and prior to disturbance of any conditions, notify Town of: (1) any material discovered in excavation that Contractor believes to be a hazardous waste that is required to be removed to a Class I, Class II or Class III disposal site; (2) subsurface or latent physical conditions at the site differing from those indicated by Town; and (3) unknown physical conditions of an unusual nature at the site, significantly different from those ordinarily encountered in such contract work. Upon notification, Town shall promptly investigate the conditions to determine whether a change order is appropriate. In the event of a dispute, Contractor shall not be excused from any scheduled completion date and shall proceed with all Work to be performed under the Contract,

but shall retain all rights provided by the Contract or by law for making protests and resolving the dispute.

3.8.7 Underground Utility Facilities. To the extent required by Section 4215 of the California Government Code, Town shall compensate Contractor for the costs of: (1) locating and repairing damage to underground utility facilities not caused by the failure of Contractor to exercise reasonable care; (2) removing or relocating underground utility facilities not indicated in the construction drawings; and (3) equipment necessarily idled during such work. Contractor shall not be assessed liquidated damages for delay caused by failure of Town to provide for removal or relocation of such utility facilities.

3.8.8 Air Quality. Contractor must fully comply with all applicable laws, rules and regulations in furnishing or using equipment and/or providing services, including, but not limited to, emissions limits and permitting requirements imposed by the California Air Resources Board (CARB). Although CARB limits and requirements are more broad, Contractor shall specifically be aware of their application to "portable equipment", which definition is considered by CARB to include any item of equipment with a fuel-powered engine. Contractor shall indemnify Town against any fines or penalties imposed by CARB, or any other governmental or regulatory agency for violations of applicable laws, rules and/or regulations by Contractor, its subcontractors, or others for whom Contractor is responsible under its indemnity obligations provided for in this Agreement.

3.8.9 State Recycling Mandates. Contractor shall comply with State Recycling Mandates. Any recyclable materials/debris collected by the contractor that can be feasibly diverted via reuse or recycling must be hauled by the appropriate handler for reuse or recycling.

3.9 Completion of Work. When Contractor determines that it has completed the Work required herein, Contractor shall so notify Town in writing and shall furnish all labor and material releases required by this Contract. Town shall thereupon inspect the Work. If the Work is not acceptable to the Town, the Town shall indicate to Contractor in writing the specific portions or items of Work which are unsatisfactory or incomplete. Once Contractor determines that it has completed the incomplete or unsatisfactory Work, Contractor may request a reinspection by the Town. Once the Work is acceptable to Town, Town shall pay to Contractor the Total Contract Price remaining to be paid, less any amount which Town may be authorized or directed by law to retain. Payment of retention proceeds due to Contractor shall be made in accordance with Section 7107 of the California Public Contract Code.

3.10 Claims; Government Code Claim Compliance.

3.10.1 Intent. Effective January 1, 1991, Section 20104 et seq., of the California Public Contract Code prescribes a process utilizing informal conferences, non-binding judicial supervised mediation, and judicial arbitration to resolve disputes on construction claims of \$375,000 or less. Effective January 1, 2017, Section 9204 of the Public Contract Code prescribes a process for negotiation and mediation to resolve disputes on construction claims. The intent of this Section is to implement Sections 20104 et seq. and Section 9204 of the California Public Contract Code. This Section shall be construed to be consistent with said statutes.

3.10.2 Claims. For purposes of this Section, "Claim" means a separate demand by the Contractor, after a change order duly requested in accordance with the terms of this Contract has been denied by the Town, for (A) a time extension, (B) payment of money or

damages arising from Work done by or on behalf of the Contractor pursuant to the Contract, or (C) an amount the payment of which is disputed by the Town. Claims governed by this Section may not be filed unless and until the Contractor completes all procedures for giving notice of delay or change and for the requesting of a time extension or change order, including but not necessarily limited to the change order procedures contained herein, and Contractor's request for a change has been denied in whole or in part. Claims governed by this Section must be filed no later than the date of final payment. The claim shall be submitted in writing to the Town and shall include on its first page the following in 16 point capital font: "THIS IS A CLAIM." Furthermore, the claim shall include the documents necessary to substantiate the claim. Nothing in this Section is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims, including all requirements pertaining to compensation or payment for extra Work, disputed Work, and/or changed conditions. Failure to follow such contractual requirements shall bar any claims or subsequent lawsuits for compensation or payment thereon.

3.10.3 Supporting Documentation. The Contractor shall submit all claims in the following format:

3.10.3.1 Summary of claim merit and price, reference Contract Document provisions pursuant to which the claim is made

3.10.3.2 List of documents relating to claim:

- (A) Specifications
- (B) Drawings
- (C) Clarifications (Requests for Information)
- (D) Schedules
- (E) Other

3.10.3.3 Chronology of events and correspondence

3.10.3.4 Analysis of claim merit

3.10.3.5 Analysis of claim cost

3.10.3.6 Time impact analysis in CPM format

3.10.4 Town's Response. Upon receipt of a claim pursuant to this Section, Town shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the Contractor a written statement identifying what portion of the claim is disputed and what portion is undisputed. Any payment due on an undisputed portion of the claim will be processed and made within 60 days after the public entity issues its written statement.

3.10.4.1 If Town needs approval from its governing body to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 45 days or within the mutually agreed to extension of time following receipt of a claim sent by registered mail or certified mail, return receipt requested, Town shall have up to three days following the next duly publicly

noticed meeting of the governing body after the 45-day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.

3.10.4.2 Within 30 days of receipt of a claim, Town may request in writing additional documentation supporting the claim or relating to defenses or claims Town may have against the Contractor. If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of Town and the Contractor.

3.10.4.3 Town's written response to the claim, as further documented, shall be submitted to the Contractor within 30 days (if the claim is less than \$50,000, within 15 days) after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

3.10.5 Meet and Confer. If the Contractor disputes Town's written response, or Town fails to respond within the time prescribed, the Contractor may so notify Town, in writing, either within 15 days of receipt of Town's response or within 15 days of Town's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand, Town shall schedule a meet and confer conference within 30 days for settlement of the dispute.

3.10.6 Mediation. Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion of the claim remains in dispute, Town shall provide the Contractor a written statement identifying the portion of the claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after Town issues its written statement. Any disputed portion of the claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with Town and the Contractor sharing the associated costs equally. Town and Contractor shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing, unless the parties agree to select a mediator at a later time.

3.10.6.1 If the Parties cannot agree upon a mediator, each Party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each Party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator.

3.10.6.2 For purposes of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the Parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

3.10.6.3 Unless otherwise agreed to by Town and the Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

3.10.6.4 The mediation shall be held no earlier than the date the Contractor completes the Work or the date that the Contractor last performs Work, whichever is earlier. All unresolved claims shall be considered jointly in a single mediation, unless a new unrelated claim arises after mediation is completed.

3.10.7 Procedures After Mediation. If following the mediation, the claim or any portion remains in dispute, the Contractor must file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the Contractor submits his or her written claim pursuant to subdivision (a) until the time the claim is denied, including any period of time utilized by the meet and confer conference or mediation.

3.10.8 Civil Actions. The following procedures are established for all civil actions filed to resolve claims subject to this Section:

3.10.8.1 Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to non-binding mediation unless waived by mutual stipulation of both parties or unless mediation was held prior to commencement of the action in accordance with Public Contract Code section 9204 and the terms of these procedures.. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court.

3.10.8.2 If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1114.11 of that code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

3.10.8.3 In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, (A) arbitrators shall, when possible, be experienced in construction law, and (B) any party appealing an arbitration award who does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, also pay the attorney's fees on appeal of the other party.

3.10.9 Government Code Claims. In addition to any and all contract requirements pertaining to notices of and requests for compensation or payment for extra work, disputed work, claims and/or changed conditions, Contractor must comply with the claim procedures set forth in Government Code sections 900 et seq. prior to filing any lawsuit against the Town. Such Government Code claims and any subsequent lawsuit based upon the Government Code claims shall be limited to those matters that remain unresolved after all procedures pertaining to extra work, disputed work, claims, and/or changed conditions have been followed by Contractor. If no such Government Code claim is submitted, or if any prerequisite contractual requirements are not otherwise satisfied as specified herein, Contractor shall be barred from bringing and maintaining a valid lawsuit against the Town. A Government Code claim must be filed no earlier than the date the work is completed or the date the Contractor last performs work on the Project, whichever occurs first. A Government Code claim shall be inclusive of all unresolved claims unless a new unrelated claim arises after the Government Code claim is submitted.

3.10.4 Non-Waiver. Town's failure to respond to a claim from the Contractor within the time periods described in this Section or to otherwise meet the time requirements of this Section shall result in the claim being deemed rejected in its entirety. Town's failure to

respond shall not waive Town's rights to any subsequent procedures for the resolution of disputed claims.

3.11 Loss and Damage. Except as may otherwise be limited by law, Contractor shall be responsible for all loss and damage which may arise out of the nature of the Work agreed to herein, or from the action of the elements, or from any unforeseen difficulties which may arise or be encountered in the prosecution of the Work until the same is fully completed and accepted by Town. In the event of damage proximately caused by an Act of God, as defined by Section 7105 of the Public Contract Code, the Town may terminate this Contract pursuant to Section 3.17.3; provided, however, that the Town needs to provide Contractor with only one (1) day advanced written notice.

3.12 Indemnification.

3.12.1 Scope of Indemnity. To the fullest extent permitted by law, Contractor shall defend, indemnify and hold the Town, its officials, employees, agents and authorized volunteers free and harmless from any and all claims, demands, causes of action, suits, actions, proceedings, costs, expenses, liability, judgments, awards, decrees, settlements, loss, damage or injury of any kind, in law or equity, to property or persons, including wrongful death, (collectively, "Claims") in any manner arising out of, pertaining to, or incident to any alleged acts, errors or omissions, or willful misconduct of Contractor, its officials, officers, employees, subcontractors, consultants or agents in connection with the performance of the Contractor's services, the Project or this Agreement, including without limitation the payment of all consequential damages, expert witness fees and attorneys' fees and other related costs and expenses. Notwithstanding the foregoing, to the extent required by Civil Code section 2782, Contractor's indemnity obligation shall not apply to liability for damages for death or bodily injury to persons, injury to property, or any other loss, damage or expense arising from the sole or active negligence or willful misconduct of the Town or the Town's agents, servants, or independent contractors who are directly responsible to the Town, or for defects in design furnished by those persons.

3.12.2 Additional Indemnity Obligations. Contractor shall defend, with counsel of Town's choosing and at Contractor's own cost, expense and risk, any and all Claims covered by this section that may be brought or instituted against Town or its officials, employees, agents and authorized volunteers. In addition, Contractor shall pay and satisfy any judgment, award or decree that may be rendered against Town or its officials, employees, agents and authorized volunteers as part of any such claim, suit, action or other proceeding. Contractor shall also reimburse Town for the cost of any settlement paid by Town or its officials, employees, agents and authorized volunteers as part of any such claim, suit, action or other proceeding. Such reimbursement shall include payment for Town's attorney's fees and costs, including expert witness fees. Contractor shall reimburse Town and its officials, employees, agents and authorized volunteers, for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. Contractor's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by the Town, its officials, employees, agents and authorized volunteers.

3.13 Insurance.

3.13.1 Time for Compliance. Contractor shall not commence Work under this Contract until it has provided evidence satisfactory to the Town that it has secured all insurance required under this section. In addition, Contractor shall not allow any subcontractor

to commence work on any subcontract until it has provided evidence satisfactory to the Town that the subcontractor has secured all insurance required under this section. Failure to provide and maintain all required insurance shall be grounds for the Town to terminate this Contract for cause.

3.13.2 Minimum Requirements. Contractor shall, at its expense, procure and maintain for the duration of the Contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Work hereunder by Contractor, its agents, representatives, employees or subcontractors. Contractor shall also require all of its subcontractors to procure and maintain the same insurance for the duration of the Contract. Such insurance shall meet at least the following minimum levels of coverage:

3.13.2.1 Minimum Scope of Insurance. Coverage shall be at least as broad as the latest version of the following: (1) *General Liability:* Insurance Services Office Commercial General Liability coverage (occurrence form CG 00 01) OR Insurance Services Office Owners and Contractors Protective Liability Coverage Form (CG 00 09 11 88) (coverage for operations of designated contractor); (2) *Automobile Liability:* Insurance Services Office Business Auto Coverage form number CA 00 01, code 1 (any auto); and (3) *Workers' Compensation and Employer's Liability:* Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance. Policies shall not contain exclusions contrary to this Contract.

3.13.2.2 Minimum Limits of Insurance. Contractor shall maintain limits no less than: (1) *General Liability:* \$1,000,000 per occurrence and \$2,000,000 aggregate for bodily injury, personal injury and property damage; (2) *Automobile Liability:* \$1,000,000 per accident for bodily injury and property damage; and (3) *Workers' Compensation and Employer's Liability:* Workers' compensation limits as required by the Labor Code of the State of California. Employer's Liability limits of \$1,000,000 each accident, policy limit bodily injury or disease, and each employee bodily injury or disease. Defense costs shall be available in addition to the limits. Notwithstanding the minimum limits specified herein, any available coverage shall be provided to the parties required to be named as additional insureds pursuant to this Contract.

3.13.3 Insurance Endorsements. The insurance policies shall contain the following provisions, or Contractor shall provide endorsements (amendments) on forms supplied or approved by the Town to add the following provisions to the insurance policies:

3.13.3.1 General Liability. (1) Such policy shall give the Town, its officials, employees, agents and authorized volunteers additional insured status using ISO endorsements CG20 10 10 01 plus CG20 37 10 01, or endorsements providing the exact same coverage, with respect to the Work or operations performed by or on behalf of Contractor, including materials, parts or equipment furnished in connection with such work; (2) all policies shall waive or shall permit Contractor to waive all rights of subrogation which may be obtained by the Contractor or any insurer by virtue of payment of any loss or any coverage provided to any person named as an additional insured pursuant to this Contract, and Contractor agrees to waive all such rights of subrogation; and (3) the insurance coverage shall be primary insurance as respects the Town, its officials, employees, agents and authorized volunteers, or if excess, shall stand in an unbroken chain of coverage excess of Contractor's scheduled underlying coverage. Any insurance or self-insurance maintained by the Town, its officials, employees, agents and authorized volunteers shall be excess of Contractor's insurance and shall not be called upon to contribute with it.

3.13.3.2 Automobile Liability. (1) Such policy shall give the Town, its officials, employees, agents and authorized volunteers additional insured status with respect to the ownership, operation, maintenance, use, loading or unloading of any auto owned, leased, hired or borrowed by Contractor or for which Contractor is responsible; (2) all policies shall waive or shall permit Contractor to waive all rights of subrogation which may be obtained by the Contractor or any insurer by virtue of payment of any loss or any coverage provided to any person named as an additional insured pursuant to this Contract, and Contractor agrees to waive all such rights of subrogation; and (3) the insurance coverage shall be primary insurance as respects the Town, its officials, employees, agents and authorized volunteers, or if excess, shall stand in an unbroken chain of coverage excess of Contractor's scheduled underlying coverage. Any insurance or self-insurance maintained by the Town, its officials, employees, agents and authorized volunteers shall be excess of Contractor's insurance and shall not be called upon to contribute with it in any way.

3.13.3.3 Workers' Compensation and Employer's Liability Coverage. The insurer shall agree to waive all rights of subrogation against the Town, its officials, employees, agents and authorized volunteers for losses paid under the terms of the insurance policy which arise from work performed by Contractor.

3.13.3.4 All Coverages. Each insurance policy required by this Contract shall be endorsed to state that: (1) coverage shall not be suspended, voided, reduced or canceled except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the Town; and (2) any failure to comply with reporting or other provisions of the policies, including breaches of warranties, shall not affect coverage provided to the Town, its officials, employees, agents and authorized volunteers.

3.13.4 Separation of Insureds; No Special Limitations. All insurance required by this Section shall contain standard separation of insureds provisions. In addition, such insurance shall not contain any special limitations on the scope of protection afforded to the Town, its officials, employees, agents and authorized volunteers.

3.13.5 Deductibles and Self-Insurance Retentions. Any deductibles or self-insured retentions must be declared to and approved by the Town. Contractor shall guarantee that, at the option of the Town, either: (1) the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Town, its officials, employees, agents and authorized volunteers; or (2) the Contractor shall procure a bond or other financial guarantee acceptable to the Town guaranteeing payment of losses and related investigation costs, claims and administrative and defense expenses.

3.13.6 Acceptability of Insurers. Insurance is to be placed with insurers with a current A.M. Best's rating no less than A:VII, licensed to do business in California, and satisfactory to the Town. Exception may be made for the State Compensation Insurance Fund when not specifically rated.

3.13.7 Verification of Coverage. Contractor shall furnish Town with original certificates of insurance and endorsements effecting coverage required by this Contract on forms satisfactory to the Town. The certificates and endorsements for each insurance policy shall be signed by a person authorized by that insurer to bind coverage on its behalf, and shall be on forms supplied or approved by the Town. All certificates and endorsements must be received and approved by the Town before work commences. The Town reserves the right to require complete, certified copies of all required insurance policies, at any time.

3.13.8 Subcontractors. All subcontractors shall meet the requirements of this Section before commencing Work. Contractor shall furnish separate certificates and endorsements for each subcontractor. Subcontractor policies of General Liability insurance shall name the Town, its officials, employees, agents and authorized volunteers as additional insureds using form ISO 20 38 04 13 or endorsements providing the exact same coverage. All coverages for subcontractors shall be subject to all of the requirements stated herein except as otherwise agreed to by the Town in writing.

3.13.9 Reporting of Claims. Contractor shall report to the Town, in addition to Contractor's insurer, any and all insurance claims submitted by Contractor in connection with the Work under this Contract.

3.14 Bond Requirements.

3.14.1 Payment Bond. If required by law or otherwise specifically requested by Town in Exhibit "C" attached hereto and incorporated herein by reference, Contractor shall execute and provide to Town concurrently with this Contract a Payment Bond in an amount required by the Town and in a form provided or approved by the Town. If such bond is required, no payment will be made to Contractor until the bond has been received and approved by the Town.

3.14.2 Performance Bond. If specifically requested by Town in Exhibit "C" attached hereto and incorporated herein by reference, Contractor shall execute and provide to Town concurrently with this Contract a Performance Bond in an amount required by the Town and in a form provided or approved by the Town. If such bond is required, no payment will be made to Contractor until the bond has been received and approved by the Town.

3.14.3 Bond Provisions. Should, in Town's sole opinion, any bond become insufficient or any surety be found to be unsatisfactory, Contractor shall renew or replace the effected bond within (ten) 10 days of receiving notice from Town. In the event the surety or Contractor intends to reduce or cancel any required bond, at least thirty (30) days prior written notice shall be given to the Town, and Contractor shall post acceptable replacement bonds at least ten (10) days prior to expiration of the original bonds. No further payments shall be deemed due or will be made under this Contract until any replacement bonds required by this Section are accepted by the Town. To the extent, if any, that the Total Contract Price is increased in accordance with the Contract, Contractor shall, upon request of the Town, cause the amount of the bond to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the Town. If Contractor fails to furnish any required bond, the Town may terminate the Contract for cause.

3.14.4 Surety Qualifications. Only bonds executed by an admitted surety insurer, as defined in California Code of Civil Procedure Section 995.120, shall be accepted. If a California-admitted surety insurer issuing bonds does not meet these requirements, the insurer will be considered qualified if it is in conformance with Section 995.660 of the California Code of Civil Procedure, and proof of such is provided to the Town.

3.15 Warranty. Contractor warrants all Work under the Contract (which for purposes of this Section shall be deemed to include unauthorized work which has not been removed and any non-conforming materials incorporated into the Work) to be of good quality and free from any defective or faulty material and workmanship. Contractor agrees that for a period of one year (or the period of time specified elsewhere in the Contract or in any guarantee or warranty provided by any manufacturer or supplier of equipment or materials incorporated into the Work,

whichever is later) after the date of final acceptance, Contractor shall within ten (10) days after being notified in writing by the Town of any defect in the Work or non-conformance of the Work to the Contract, commence and prosecute with due diligence all Work necessary to fulfill the terms of the warranty at its sole cost and expense. Contractor shall act sooner as requested by the Town in response to an emergency. In addition, Contractor shall, at its sole cost and expense, repair and replace any portions of the Work (or work of other contractors) damaged by its defective Work or which becomes damaged in the course of repairing or replacing defective Work. For any Work so corrected, Contractor's obligation hereunder to correct defective Work shall be reinstated for an additional one year period, commencing with the date of acceptance of such corrected Work. Contractor shall perform such tests as the Town may require to verify that any corrective actions, including, without limitation, redesign, repairs, and replacements comply with the requirements of the Contract. All costs associated with such corrective actions and testing, including the removal, replacement, and reinstatement of equipment and materials necessary to gain access, shall be the sole responsibility of Contractor. All warranties and guarantees of subcontractors, suppliers and manufacturers with respect to any portion of the Work, whether express or implied, are deemed to be obtained by Contractor for the benefit of the Town, regardless of whether or not such warranties and guarantees have been transferred or assigned to the Town by separate agreement and Contractor agrees to enforce such warranties and guarantees, if necessary, on behalf of the Town. In the event that Contractor fails to perform its obligations under this Section, or under any other warranty or guaranty under this Contract, to the reasonable satisfaction of the Town, the Town shall have the right to correct and replace any defective or non-conforming Work and any work damaged by such work or the replacement or correction thereof at Contractor's sole expense. Contractor shall be obligated to fully reimburse the Town for any expenses incurred hereunder upon demand.

3.16 Employee/Labor Certifications.

3.16.1 Contractor's Labor Certification. By its signature hereunder, Contractor certifies that he is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for Worker's Compensation or to undertake self-insurance in accordance with the provisions of that Code, and agrees to comply with such provisions before commencing the performance of the Work. A certification form for this purpose, which is attached to this Contract as Exhibit "D" and incorporated herein by reference, shall be executed simultaneously with this Contract.

3.16.2 Equal Opportunity Employment. Contractor represents that it is an equal opportunity employer and that it shall not discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, sex, age or other interests protected by the State or Federal Constitutions. Such non-discrimination shall include, but not be limited to, all activities related to initial employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination.

3.16.3 Verification of Employment Eligibility. By executing this Contract, Contractor verifies that it fully complies with all requirements and restrictions of state and federal law respecting the employment of undocumented aliens, including, but not limited to, the Immigration Reform and Control Act of 1986, as may be amended from time to time, and shall require all subcontractors and sub-subcontractors to comply with the same.

3.17 General Provisions.

3.17.1 Town's Representative. The Town hereby designates the General Manager, or his or her designee, to act as its representative for the performance of this Contract ("Town's Representative"). Town's Representative shall have the power to act on behalf of the Town for all purposes under this Contract. Contractor shall not accept direction or orders from any person other than the Town's Representative or his or her designee.

3.17.2 Contractor's Representative. Before starting the Work, Contractor shall submit in writing the name, qualifications and experience of its proposed representative who shall be subject to the review and approval of the Town ("Contractor's Representative"). Following approval by the Town, Contractor's Representative shall have full authority to represent and act on behalf of Contractor for all purposes under this Contract. Contractor's Representative shall supervise and direct the Work, using his best skill and attention, and shall be responsible for all construction means, methods, techniques, sequences and procedures and for the satisfactory coordination of all portions of the Work under this Contract. Contractor's Representative shall devote full time to the Project and either he or his designee, who shall be acceptable to the Town, shall be present at the Work site at all times that any Work is in progress and at any time that any employee or subcontractor of Contractor is present at the Work site. Arrangements for responsible supervision, acceptable to the Town, shall be made for emergency Work which may be required. Should Contractor desire to change its Contractor's Representative, Contractor shall provide the information specified above and obtain the Town's written approval.

3.17.3 Termination. This Contract may be terminated by Town at any time, either with or without cause, by giving Contractor three (3) days advance written notice. In the event of termination by Town for any reason other than the fault of Contractor, Town shall pay Contractor for all Work performed up to that time as provided herein. In the event of breach of the Contract by Contractor, Town may terminate the Contract immediately without notice, may reduce payment to Contractor in the amount necessary to offset Town's resulting damages, and may pursue any other available recourse against Contractor. Contractor may not terminate this Contract except for cause. In the event this Contract is terminated in whole or in part as provided, Town may procure, upon such terms and in such manner as it may determine appropriate, services similar to those terminated. Further, if this Contract is terminated as provided, Town may require Contractor to provide all finished or unfinished documents, data, diagrams, drawings, materials or other matter prepared or built by Contractor in connection with its performance of this Contract.

3.17.4 Contract Interpretation. Should any question arise regarding the meaning or import of any of the provisions of this Contract or written or oral instructions from Town, the matter shall be referred to Town's Representative, whose decision shall be binding upon Contractor.

3.17.5 Anti-Trust Claims. This provision shall be operative if this Contract is applicable to California Public Contract Code Section 7103.5. In entering into this Contract to supply goods, services or materials, Contractor hereby offers and agrees to assign to the Town all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (Chapter 2, commencing with Section 16700, of Part 2 of Division 7 of the Business and Professions Code) arising from purchases of goods, services, or materials pursuant to the Contract. This assignment shall be made and become effective at the time the Town tender final payment to Contractor, without further acknowledgment by the Parties.

3.17.6 Notices. All notices hereunder and communications regarding interpretation of the terms of the Contract or changes thereto shall be provided by the mailing thereof by registered or certified mail, return receipt requested, postage prepaid and addressed as follows:

CONTRACTOR:

[***INSERT CONTRACTOR NAME AND ADDRESS***]
Attn: [***INSERT CONTRACTOR REP. NAME AND TITLE***]

TOWN:

Town of Hillsborough
1600 Floribunda Ave.
Hillsborough, CA 94010
Attn: Kathy Kim

Any notice so given shall be considered received by the other Party three (3) days after deposit in the U.S. Mail as stated above and addressed to the Party at the above address. Actual notice shall be deemed adequate notice on the date actual notice occurred, regardless of the method of service.

3.17.7 Time of Essence. Time is of the essence in the performance of this Contract.

3.17.8 Assignment Forbidden. Contractor shall not, either voluntarily or by action of law, assign or transfer this Contract or any obligation, right, title or interest assumed by Contractor herein without the prior written consent of Town. If Contractor attempts an assignment or transfer of this Contract or any obligation, right, title or interest herein, Town may, at its option, terminate and revoke the Contract and shall thereupon be relieved from any and all obligations to Contractor or its assignee or transferee.

3.17.9 No Third Party Beneficiaries. There are no intended third party beneficiaries of any right or obligation assumed by the Parties.

3.17.10 Laws, Venue, and Attorneys' Fees. This Agreement shall be interpreted in accordance with the laws of the State of California. If any action is brought to interpret or enforce any term of this Agreement, the action shall be brought in a state or federal court situated in the County of San Mateo, State of California.

3.17.11 Counterparts. This Contract may be executed in counterparts, each of which shall constitute an original.

3.17.12 Successors. The Parties do for themselves, their heirs, executors, administrators, successors, and assigns agree to the full performance of all of the provisions contained in this Contract.

3.17.13 [Reserved]

3.17.14 Solicitation. Contractor maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working solely for Contractor, to solicit or secure this Contract. Further, Contractor warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working

solely for Contractor, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Contract. For breach or violation of this warranty, Town shall have the right to terminate this Contract without liability.

3.17.15 Conflict of Interest. Contractor maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working solely for Contractor, to solicit or secure this Agreement. Further, Contractor warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for Contractor, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement. For breach or violation of this warranty, Town shall have the right to rescind this Agreement without liability. For the term of this Contract, no official, officer or employee of Town, during the term of his or her service with Town, shall have any direct interest in this Contract, or obtain any present or anticipated material benefit arising therefrom. In addition, Contractor agrees to file, or to cause its employees or subcontractors to file, a Statement of Economic Interest with the Town's Filing Officer as required under state law in the performance of the Work.

3.17.16 Certification of License.

3.17.16.1 Contractor certifies that as of the date of execution of this Contract, Contractor has a current contractor's license of the classification indicated below under Contractor's signature.

3.17.16.2 Contractors are required by law to be licensed and regulated by the Contractors' State License Board which has jurisdiction to investigate complaints against contractors if a complaint regarding a patent act or omission is filed within four (4) years of the date of the alleged violation. A complaint regarding a latent act or omission pertaining to structural defects must be filed within ten (10) years of the date of the alleged violation. Any questions concerning a contractor may be referred to the Registrar, Contractors' State License Board, P.O. Box 26000, Sacramento, California 95826.

3.17.17 Authority to Enter Contract. Each Party warrants that the individuals who have signed this Contract have the legal power, right and authority to make this Contract and bind each respective Party.

3.17.18 Entire Contract; Modification. This Contract contains the entire agreement of the Parties with respect to the subject matter hereof, and supersedes all prior negotiations, understandings or agreements. This Contract may only be modified by a writing signed by both Parties.

3.17.19 Non-Waiver. None of the provisions of this Agreement shall be considered waived by either party, unless such waiver is specifically specified in writing.

3.17.20 Town's Right to Employ Other Contractors. Town reserves right to employ other contractors in connection with this Project or other projects.

[SIGNATURES ON NEXT PAGE]

**SIGNATURE PAGE FOR CONSTRUCTION CONTRACT
BETWEEN THE TOWN OF HILLSBOROUGH
AND [***INSERT CONTRACTOR NAME***]**

IN WITNESS WHEREOF, the Parties have entered into this Agreement as of the _____
day of _____, _____.

TOWN OF HILLSBOROUGH

[Contractor Name]

By: _____
Kathy Leroux
City Manager

By: _____
Its: _____

Printed Name: _____

ATTEST:

By: _____
City Clerk

Approved as to Form: _____, _____ 20____

By: _____
City Attorney

EXHIBIT "A"

SERVICES / SCHEDULE

BID ITEM DESCRIPTIONS

Bid Item 1 – Mobilization – Mobilization shall be paid on a lump sum basis. The lump sum price shall include full compensation for furnishing all labor, materials, tools, equipment, and other incidentals necessary to mobilize/demobilize the necessary forces to complete the project within the time specified in these specifications.

Fifty percent of the Bid Item amount will be paid upon satisfactory completion of mobilization to the worksite, and the remaining 50% distributed evenly throughout construction activity.

This bid item includes payment for obtaining all bonds, all Contractor acquired permits, licenses, agreements, certifications, notices of intent, and temporary easements; moving onto the site of all equipment, materials and staff including obtaining and set up of Contractor's staging area/yard; furnishing and erecting all needed construction facilities; additional locating and protecting existing utilities; construction survey; temporary controls, fencing, project signage; project security, demobilization, progress schedules and reports, contract meetings, and record drawings.

Payments for the lump sum item for "Mobilization" shall be determined based on the percentage of the bid item work completed, in accordance with the description above, and as determined by the Engineer at the time the progress payment is prepared. The amount of this Bid Item shall not exceed 8% of the Total Bid Price.

Bid Item 2 – Replace SS with 8-inch HDPE, Pipe Reaming - These bid items shall be paid at the unit price bid per foot of installed pipe measured from center of manhole to center of manhole within streets or easements.

The Contractor shall be responsible for paying any necessary royalty or patent compliance fees associated with the pipe reaming technology. It is the Contractor's responsibility to ensure legal obligations and fees are followed and complied with.

Provision and installation of high-density polyethylene (HDPE) gravity sewer pipe using the pipe reaming method shall include: submittals; pipe materials, locating and protecting existing utilities; surveying; pre-installation CCTV; saw cutting; surface demolition; excavating for pits; localized excavation and exposing existing underground utilities; removing and replacing portions of storm drain where necessary, locating all active and inactive laterals, excavation and disconnection of all service laterals before pipe bursting; temporary support of existing utilities in excavations; removal and proper disposal of concrete, asphalt, and asphalt containing reinforcing fabric; excavation; spoil handling and proper disposal; over-excavation in pit areas and placement of foundation materials including geotextile fabric and crushed rock; connecting and sealing pipe ends in structures; dust control, dewatering the excavation as needed; wastewater bypass pumping and rerouting; furnish and install sewer pipe and saddles for

connection of laterals; testing; backfill and compact access pits and excavations, place and compact surface restoration and paving, including sidewalks, driveways, concrete paving, curbs, gutters, edge grinding and pavement reinforcing fabric; restoration of landscaping including tree impacts, removals, and replacements; restoration of striping and pavement markings, resetting valve boxes, monuments, traffic signal loops, and other surface features disturbed by the work; cleaning; record drawings; including furnishing all equipment, materials and personnel associated therewith, and in accordance with the contract documents.

Bid Item 3 – Rehabilitate Existing Manhole - This bid item shall be paid at the unit price bid per each manhole rehabilitated regardless of depth or configuration within streets or easements. The work to be completed is the rehabilitation of existing brick or concrete sanitary sewer manhole per the contract documents. The Contractor shall also replace the manhole frame and cover per the Town Standard Detail.

This bid item includes submittals; wastewater bypassing and rerouting; interior manhole cleaning; cutting steps or rungs and drilling out minimum 1-inch into manhole wall, filling voids with 100% solids epoxy Sikadur or approved equal; furnish and install manhole rehabilitation materials; furnish and install new manhole frame and cover; dust control; testing; protecting and reinstating pipe ends in structures; cleaning; record drawings; including furnishing all equipment, materials

Bid Item 4 – Restoration Connection of Lateral - This bid item shall be paid at the unit price bid per each sanitary sewer service lateral connections replaced via open cut construction, regardless of length. The work to be completed is the replacement and construction of a sewer service lateral as shown on the Town's Standard Details.

This bid item includes submittals; locating and protecting existing utilities; surveying; verification that lateral is active via testing, including, potentially dye testing of property; saw cutting, grinding, surface demolition; removal and proper disposal of concrete, asphalt, and asphalt containing reinforcing fabric; trenching; dust control; spoil handling and proper disposal; excavation; dewatering the trench as needed; wastewater bypassing and rerouting; locating and exposing existing sewer lateral; removing all roots in portions of laterals to remain between property line and main, furnish and install sewer lateral pipe between main and cleanout at property line or limit of easement by open cut method, connection of the service lateral with a fused wye or saddle on the main sewer line, furnishing and installation of a cleanout at property line if not present, replacement of existing cleanout if present, furnish and install threaded cap and utility box, a stainless steel banded rubber coupling connection at cleanout; prepare and compact pipe sub base; place and compact pipe bedding; place and compact trench backfill; place and compact surface restoration and paving, including sidewalks, driveways, concrete paving, curbs, gutters, edge grinding and pavement reinforcing fabric; restoration of striping and pavement markings, resetting disturbed utility boxes, fences, landscape, hardscape, irrigation, and other surface features disturbed by the work; cleaning; record drawings; including furnishing all equipment, materials and personnel associated therewith, and in accordance with these Specifications.

Bid Item 5 – Post Installation Video of Completed Sewer Section - This bid item shall be paid at the unit price bid per foot of televised pipe inspection measured from inside wall of manhole to inside wall of manhole and not including pipe within the manhole.

The bid item includes color video inspection of all completed sewer sections with pan and tilt camera that pans 275 degrees and rotates 360 degrees for close up viewing of the completed work; close up views of all joints; provision of two copies of video on DVD to Engineer; wastewater bypassing and rerouting (as required); including furnishing all equipment, materials, and personnel associated therewith, and in accordance with the contract documents

EXHIBIT “B”
PLANS AND SPECIFICATIONS

TECHNICAL SPECIFICATIONS

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SECTION 01505

MOBILIZATION

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Mobilization shall conform to the applicable provisions in Section 11, “Mobilization” of the State Standard Specifications.
- B. Mobilization shall include, but not be limited to the following items:
 - 1. Locating a Construction Staging area at the Contractor’s expense.
 - 2. Moving on to the site all of Contractor’s equipment required for first month operations.
 - 3. Having all OSHA required notices and establishment of safety programs.
 - 4. Having the Contractor’s superintendent at the job site full time.
 - 5. Submitting initial submittals.
 - 6. other work and operations which must be performed or costs incurred prior to beginning work on the various contract items on the project site.
- C. Contractor is advised that there may be insufficient area within the construction zone to provide parking, staging for material and storage of equipment. Contractor shall be responsible for securing area for laydown.
- D. Mobilization shall not exceed eight (8) percent of the contract total compensation amount or as defined otherwise in the Contract Documents.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

****END OF SECTION****

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SECTION 01560
TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section describes the requirements for temporary controls, such as dust, rubbish, drainage, erosion and sediment, and pollution control in order to execute work expeditiously.

1.02 DUST CONTROL

- A. Dust control shall conform to the provisions in Section 10, "Dust Control," of the State Standard Specifications and these Technical Specifications. No separate payment will be made for any work performed or material used to control dust resulting from public traffic within the right-of-way.
- B. The Contractor shall furnish all labor, equipment and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property or causing nuisance as defined by the Engineer.
- C. The Contractor shall be responsible for any damage resulting from any dust originating from its operations.
- D. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Engineer.
- E. The use of water shall not be permitted as a substitute for sweeping or other methods of dust control. Only dry sweeping is allowed.
- F. Contractor shall sweep daily. The work area shall be left in a neat and presentable condition at the end of each workday.

1.03 RUBBISH CONTROL

- A. Through all phases of construction, including suspension of work and until final acceptance of the project, the Contractor shall keep the worksite and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish and debris.
- B. Contractor shall properly dispose of all excess earth, concrete, asphaltic concrete and debris off job site and clean up the work area at the end of each workday. The work area shall be left in a neat and presentable condition.

- C. The Contractor shall keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Care shall be taken to prevent spillage on haul routes. Contractor shall obtain all required truck route permits. Any such spillage shall be removed immediately and the area cleaned by the Contractor.
- D. Disposal of all rubbish and surplus materials shall be off the site of construction, at the Contractor's expense, all in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and the requirements of the OSHA Safety and Health Standards for Construction.

1.04 DRAINAGE CONTROL

- A. Provide for the drainage of stormwater and any water applied or discharged on the site in performance of the work.
- B. All stormwater discharged to storm drains shall be clean. Washing mud into storm drains will not be allowed.
- C. Provide adequate drainage facilities to prevent damage to the work, the site, and adjacent property.
- D. Maintain excavations free of water to prevent puddling or running water.
- E. Supplement existing drainage channels and conduits as necessary to carry all increased runoff from construction operations.
- F. Contractor is responsible for the flooding of property due to his work under this project. Contractor is also responsible to make right any damages to work in progress that is caused by flooding. The means and methods the Contractor employs to meet the above requirements are at his discretion.

1.05 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage. Minimize the amount of bare soil exposed at one time.
- B. Provide temporary measures such as berms, dikes, silt fences, sediment traps, and drains, to prevent water flow.
- C. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures should erosion and sedimentation be detected.
- D. Perform control in accordance with State and local rules and regulations.
- E. If erosion occurs to trenches or work areas prior to restoration by the Contractor, the Contractor shall be responsible for repair of eroded areas.

1.06 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by the construction operations.
- B. Do not permit sanitary wastes to enter any drain or watercourse other than sanitary sewer.
- C. Do not permit sediment, debris or other substances to enter sanitary or storm sewer.

1.07 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

- A. The Contractor shall be responsible for all storm water pollution prevention. Before starting any work on the project, the Contractor shall submit a SWPPP or Water Pollution Control Plan (WPCP).

1.08 BEST MANAGEMENT PRACTICES

- A. Contractor shall implement best management practices identified in SWPPP to meet the specifications listed in this section.
- B. Provide inlet protection per Caltrans Standard Plans T62 and T64 (2006 Edition).
- C. Provide fiber roll per Caltrans Standard Plan T56 (2006 Edition).
- D. Contractor shall provide and maintain acceptable BMPs appropriate for the work, as necessary to control and prevent stormwater pollution for the duration of the project.
- E. Contractor shall properly dispose of all wastes and excess materials in a legal manner to the satisfaction of the Engineer.
- F. Upon completion of the project, Contractor shall remove all BMPs to the satisfaction of the Engineer.

1.09 PERMANENT EROSION CONTROL

- A. Contractor shall install permanent erosion control at locations which do not require landscaping or hardscaping replacement due to the work.
- B. Contractor shall provide erosion control blanket and fiber roll dams on slopes to prevent erosion after the completion of pipe replacement.
- C. Contractor shall submit cut sheets and samples of permanent erosion control measures (erosion control blanket and fiber rolls).
- D. Permanent erosion control shall be included in the unit price bid for open cut pipe, pipe bursting, pipe reaming, and other items of work.

PART 2 - PRODUCTS

2.01 PERMANENT EROSION CONTROL BLANKET

- A. Erosion control blanket shall be a machine-produced mat consisting of 100 percent coconut fiber. The blanket shall be of consistent thickness with the coconut fiber evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with heavyweight jute netting and an approximate 5/8-inch by 5/8-inch mesh, and on the bottom side with a lightweight jute netting with an approximate 1/2-inch by 1/2-inch mesh. The blanket shall be sewn together on 1.5-inch centers with biodegradable thread.
- B. The erosion control blanket shall have the following properties:
 - Coconut Fiber: 100 percent by approximately .50 lb/sq. yd weight;
 - Netting: Top side heavyweight jute netting approximately 3lb/1,000 sq. feet weight;
 - Bottom side lightweight with approximately 1.64lb/1,000 sq. feet weight;
 - Thread: Biodegradable
- C. Staples shall be designed to safely and effectively secure erosion control blankets for temporary and permanent applications. Staples shall be composed of high compression corn starch and biodegradable polymer.
- D. Erosion control blanket shall be provided impregnated with seed. Seed shall be appropriate for the location and climate in which it will be installed, shall not be an invasive species, shall not be sterile, and shall be submitted to the Engineer for approval.

2.02 PERMANENT FIBER ROLL

- A. Permanent fiber roll shall last at least one year after installation.
- B. Permanent fiber roll shall be biodegradable and conform to the requirements of the State Standard Specifications.

PART 3 - EXECUTION

- 3.01 Permanent erosion control blanket shall be secured to the underlying ground soil via staples appropriate for this use. Installation shall conform to the methods and details cited in the State Standard Specifications, the latest version of the Best Management Practices Construction Handbook, California Stormwater Quality Association and the Construction Best Management Practices (BMPs), San Mateo Countywide Water Pollution Prevention Program.
- 3.02 Permanent fiber rolls shall be installed in conformance with the methods and details cited in the State Standard Specifications, the latest version of the Best Management Practices Construction Handbook, California Stormwater Quality Association and the Construction Best Management Practices (BMPs), San Mateo Countywide Water Pollution Prevention Program. If fiber roll is to be placed overlapping with erosion control blanket, erosion control blanket shall be installed before fiber roll.

****END OF SECTION****

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SECTION 01561
SITE INVESTIGATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section pertains to pre-construction site inspection prior to replacing and/or constructing the sewer project.
- B. The Contractor shall conduct site inspection prior to construction to check that the proposed pipe alignments and elevations conform to the Contract Drawings, familiarize themselves with all site conditions, and identify potential obstructions.
- C. Prior to the start of construction, the Contractor shall walk the project sites with the Engineer and shall take sufficient preconstruction digital photos or DVDs to document existing improvements and provide to the Town. At a minimum, one photograph must be obtained for each 100 feet of construction area with special attention given to environmentally critical areas and areas outside of the public right-of-way. Take additional photographs as necessary to adequately document the condition of existing improvements to remain. Photographs shall be labeled by station so that upon completion of the construction, or during construction, if necessary, subsequent photographs can be taken from the same control points.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not used.

****END OF SECTION****

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SECTION 01720
SEWER OUTAGE NOTIFICATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section describes the requirements for notification of the Town, Residents, and Businesses for sewer outages.

1.02 GENERAL

- A. The requirements of this section shall be used in coordination with all related technical specification sections, the Contract Documents, and Town of Hillsborough requirements.

1.03 RELATED SECTIONS

- A. SECTION 01560, TEMPORARY CONTROLS
- B. SECTION 01730, PUBLIC AND AGENCY NOTIFICATIONS
- C. SECTION 02145, SEWAGE FLOW CONTROL
- D. SECTION 02739, BUILDING SEWER (LATERAL) CONSTRUCTION AND REINSTATEMENT
- E. SECTION 02800, TRAFFIC CONTROL

1.04 PROJECT REQUIREMENTS

- A. Provide labor, materials, and supervision as required to prepare and deliver sewer outage and construction notifications and to respond to affected residents and businesses.
- B. Contractor shall maintain a local telephone number of contact person for inquiries or complaints.

1.05 SUBMITTALS

- A. Within five (5) days of Notice to Proceed and at least fourteen (14) days prior to a planned sewer outage, submit a detailed Public Notification Plan to the Engineer consisting of schedules, sample notices, contact personnel, contact phone numbers, and a detailed timeframe of when notices will be delivered.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 PUBLIC NOTIFICATION

- A. Maintain service usage with the exception of planned outages throughout duration of project.
 - 1. Maximum amount of no service: 8 hours for any property served by the sewer. Any service out longer than 8 hours shall be bypassed to a sanitary sewer.
- B. Public Notification Program
 - 1. Notify the Engineer at least four (4) days prior to any outage. Update notifications to the Engineer as required to reflect the current work.
 - 2. Deliver written notices on the Contractor's letterhead to each home or business 72 hours before commencement of work being conducted on section of sewer, including telephone number of Contractor contact for inquires or complaints.
 - 3. Notifications shall provide instructions to homes and businesses to minimize discharge to the sewer during scheduled work to avoid back-ups.
 - 4. Notices shall include a summary of the work to be completed, purpose and location of the outage, and the time and duration of service interruption to building.
 - 5. The Contractor shall communicate verbally with the homeowner/ business owner the day prior to the beginning of work conducted on the section relative to the homeowners/business owners.
 - 6. The Contractor shall contact any home or business that cannot be reconnected within the time stated in written notice.
- C. Service interruptions shall be strictly limited to the hours of 8:00 AM to 5:00 PM, Monday through Friday.
- D. The Contractor shall coordinate traffic control notifications as required in SECTION 02800 of the Technical Specifications where feasible with the sewer outage notifications.

****END OF SECTION****

SECTION 01730

PUBLIC AND AGENCY NOTIFICATIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section describes the requirements for providing advanced notification of Construction Activities to Town Departments, Local Agencies, Residents, and Businesses.

1.02 GENERAL

- A. The requirements of this section shall be used in coordination with all related Technical Specification sections, the Contract Documents, and Town of Hillsborough requirements.

1.03 RELATED SECTIONS

- A. SECTION 01560, TEMPORARY CONTROLS
- B. SECTION 01720, SEWER OUTAGE NOTIFICATION
- C. SECTION 02800, TRAFFIC CONTROL

1.04 PROJECT REQUIREMENTS

- A. Provide labor, materials, and supervision as required to prepare and deliver professionally prepared construction notices to affected residents and businesses.
- B. Contractor shall maintain a local telephone number of contact person for inquiries or complaints.

1.05 SUBMITTALS

- A. Within five (5) days of Notice to Proceed and at least fourteen (14) days prior to a planned sewer outage, submit a detailed Public Notification Plan to the Engineer consisting of schedules, sample notices, contact personnel, contact phone numbers, and a detailed timeframe of when notices will be delivered.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 PUBLIC NOTIFICATION

- A. In addition to specific project notifications as required in other sections of the project Technical Specifications and Contract Documents, the Contractor shall give Two Week and 48 Hour Advanced Project Construction Notification to entities and individuals that will be affected by project construction. The following entities and individuals shall be notified in writing of the general construction activities:
 - 1. All Residents on Town Blocks where work will be occurring.
 - 2. All Residents where backyard or side yard access will be necessary where work will be occurring.
 - 3. Central County Fire Department
 - 4. Town of Hillsborough Police Department.
 - 5. Town of Hillsborough Department of Public Works, Street Division (650) 375-7444.
- B. NOT USED.
- C. Public Notification Program
 - 1. Deliver written notices on the Contractor's letterhead to each home, business, agency, or department Two Weeks before commencement of construction activities.
 - 2. Notices shall include a project name, a summary of the work to be completed, the location of the work, the expected duration of the work, the hours of work, and a telephone number of Contractor contact for inquires or complaints.
 - 3. A second notice shall be delivered to each home, business, agency, or department 48 Hours before commencement of construction activities providing the same information detailed in the above item.
- D. Address Town correspondence to: 1600 Floribunda Avenue, Hillsborough CA, 94010.

****END OF SECTION****

SECTION 02050

DEMOLITION, ABANDONMENT, AND REMOVAL

PART 1 - GENERAL

1.01 SUMMARY

- A. This specification addresses demolition, removal and abandonment of facilities and associated debris generated in the execution of the contract work.
 - 1. Do not begin demolition until authorization is received from the Engineer.
 - 2. Remove rubbish and debris from the job site daily.
 - 3. Store materials that cannot be removed daily in the Contractor's approved laydown and storage areas, following all requirements established by the property owner and associated permitting jurisdiction.
 - 4. Properly dispose of materials and debris removed from the Project. Disposal shall comply with all federal, state and local regulations.
- B. Related Sections
 - 1. Section 01560, TEMPORARY CONTROLS
 - 2. Section 02800, TRAFFIC CONTROL

1.02 REFERENCES

- A. Town of Hillsborough
 - 1. Standard Details for Public Works Projects (latest edition)
- B. American National Standards Institute (ANSI)
 - 1. ANSI A10.6 – Demolition Operations-Safety Requirements

1.03 SUBMITTALS

- A. Submit to the Engineer the following in accordance with the contract documents.
 - 1. Demolition Plan, including proposed demolition and removal procedures. Demolition Plan shall include a detailed description of methods and equipment to be used for each operation and of the sequence of operations.

2. A plan and coordinated construction schedule for removal of existing active sewer facilities and reconnecting existing system elements to the permanent facilities as shown on the drawings.

1.04 WORK AND SAFETY REQUIREMENTS

Comply with federal, state, and local hauling and disposal regulations. Work safety requirements shall conform with ANSI A10.6, "Demolition Operations – Safety Requirements."

1.05 DUST AND DEBRIS CONTROL

- A. Prevent the spread of dust and debris, and avoid the creation of a nuisance or hazard in the surrounding area.
- B. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, flooding or pollution.
- C. Dry-sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to vehicles.

1.06 PROTECTION

- A. Traffic Control Signs - Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Refer to the Contract Documents for additional requirements.
- B. Existing Work - Protect existing work which is to remain in place. Repair items which are to remain, and which are damaged during performance of the work to their pre-construction condition, or replace with new. Do not overload or damage pavements to remain; only rubber tired excavation equipment will be allowed. Provide new supports and reinforcement for existing construction weakened by demolition or removal work. Repairs, reinforcement, or structural replacement must have Engineer approval. Refer to the contract documents for additional requirements.
- C. Facilities - Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Refer to the contract documents for additional requirements.

1.07 BURNING AND EXPLOSIVES

Burning and the use of explosives will not be permitted.

1.08 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair items to be relocated which are damaged or replace damaged items with new undamaged items as approved by the Engineer and governing jurisdiction.

PART 2 - PRODUCTS

2.01 MATERIAL FOR FACILITY ABANDONMENT

- A. Slurry for abandonment shall be 1 ½ - 90 pound sack of Portland Cement per cubic yard of sand slurry.

PART 3 - EXECUTION

3.01 EXISTING FACILITIES TO BE REMOVED

- A. Removal of Existing Pipes, Manholes and Related Equipment
 - 1. Remove indicated existing sanitary sewer mains, manholes, cleanouts and laterals to the horizontal limits shown on the drawings. Existing alignment is shown based on record information. Actual locations of existing utilities may be different from that shown.
- B. Paving and Slabs
 - 1. Remove asphaltic concrete paving and slabs, and concrete paving and slabs, including aggregate base in areas subject to proposed work.
 - 2. Trench wing (T-Cut) width shall be in accordance with typical trench and surface restoration details. Asphalt concrete paving shall be removed a distance from the edge of trench on both sides of the trench as specified in the typical trench and surface restoration details. Where the distance from the lip of concrete gutter to the saw cut edge of the trench is within the width specified in the typical trench and surface restoration details, the remaining pavement between the saw cut edge of the trench and the lip of the concrete gutter shall also be removed and replaced during this work.
 - 3. Provide neat sawcuts at limits of pavement removal as indicated.
 - 4. Contractor shall comply with all environmental regulations and local codes and dispose of all material at State approved recycling facilities or landfills identified by the Contractor.
 - 5. Asphalt concrete paving and slabs may contain pavement reinforcing fabric. Pavement reinforcing fabric is not anticipated, however if any is encountered, the cost of removing and disposing of the pavement reinforcing fabric shall be on a per square yard basis.

3.02 DISPOSITION OF MATERIAL

A. Title to Materials

1. Except where specified in other sections, or on the drawings, all materials and equipment removed shall become the property of the Contractor and shall be removed.
2. Title to materials resulting from demolition, and materials and equipment to be removed, is vested in the Contractor upon approval by the Engineer of the contractor's demolition and removal procedures, and authorization by the Engineer to begin demolition.
3. The Town will not be responsible for the condition or loss of, or damage to, such property after notice to proceed.

3.03 CLEANUP

A. Debris and Rubbish

1. Remove and transport debris and rubbish in a manner that will prevent spillage on pavements, streets or adjacent areas.
2. Clean up spillage from pavements, streets and adjacent areas.

3.04 PIPELINE ABANDONMENT

- A. Pipelines being replaced with parallel line shall be abandoned in place, per the Drawings. Open ends of pipe shall be plugged with concrete, and pipe shall be filled with 1 ½ 90-lb sack cement per cubic yard of sand slurry.
- C. Plugs shall be troweled smooth on the manhole interiors and shall not impede flows through the manhole. Apply concrete sealant to plugs within manholes to remain in service. Sealant material shall be Tegaproof, Xypex, Bituminous material, or approved equal.

3.05 MANHOLE ABANDONMENT

A. NOT USED

3.06 CLEARING AND GRUBBING

- A. All work shall conform to the Caltrans Standards Specifications Section 16, as they reasonably apply to this work except for measurement and payment requirements.
- B. Contractor shall review onsite conditions prior to commencing work.
- C. Limits of clearing and grubbing shall be submitted and reviewed for approval by the Engineer prior to any clearing and grubbing activities.

- D. Contractor shall be responsible for proper and legal disposal of materials resulting from clearing and grubbing activities.

****END OF SECTION****

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies earthwork which consists of excavation, filling, grading, and disposal of excess material, including contaminated materials.
- B. Related Sections
 - 1. SECTION 01560, TEMPORARY CONTROLS
 - 2. SECTION 02350, EXCAVATION SUPORT SHORING AND BRACING
 - 3. SECTION 02500, ASPHALT CONCRETE PAVING
 - 4. SECTION 02800, TRAFFIC CONTROL
 - 5. SECTION 03600, GROUT
 - 6. SECTION 15050, GENERAL PIPING

1.02 REFERENCES

- A. Town of Hillsborough
 - 1. Standard Details for Public Works Projects (latest edition).
- B. Project Geotechnical Report
- C. American Society for Testing and Materials (ASTM)
 - 1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
 - 2. ASTM C150 - Standard Specification for Portland Cement
 - 3. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete
 - 4. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete
 - 5. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
 - 6. ASTM D2487 - Classification of Soils for Engineering Purposes

7. ASTM D2922 - Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
8. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.03 DEFINITIONS

- A. Backfill: Material, native or foreign, used in refilling a cut, trench or other excavation. For this project, all backfill beneath surfaces to be paved (streets, driveways, walkways, patios, etc.) shall be imported material. The area between the main, the sides of the trench, and 12" above the main, unless otherwise noted on the plans. Pipe backfill shall consist of furnishing, placing and compacting backfill material above the main or other specified material as shown on the project drawings and as specified herein.
- B. Clear Width of Trench: Width of trench as measured at the top of the pipe or conduit.
- C. Compaction: The process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. "Degree of Compaction" is expressed as a percentage of the maximum density obtained by the test procedure described in California Test Method 216 for general soil types.
- D. Fine Grading Material: Material placed at the bottom of the excavated trench prior to installation of pipe, conduit or pipeline accessories.
- E. Excavation: All of the below ground surface work (including cutting and removal of pavement and stockpiling topsoil) necessary to install the sewer line and structures.
- F. Excavation Slope: An inclined surface formed by removing material from below existing grade.
- G. Hard Material: Weathered rock, dense consolidated deposits, or conglomerate materials (excluding man made materials such as concrete) which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.
- H. Imported Material: Fill material that is processed at an off-site facility, purchased by the Contractor and hauled to the site for use as backfill material.
- I. Initial Backfill: See definition of Pipe Zone.
- J. In-Place Density of Compacted Backfill: Density determined in the field in accordance with ASTM D 2922 and ASTM D 3017.
- K. In-Situ Soil: Existing in place soil.
- L. Lift: A layer (or course) of soil placed on top of subgrade or a previously prepared or placed soil in a fill or backfill.
- M. Maximum Density (Caltrans Method): Wet density obtained in the laboratory when tested in accordance with Caltrans Test Method 216.
- N. Native Material: Natural soils that exist below surficial fill material, generally consisting of fine-grained silts and clays with medium to high plasticity.

- O. Optimum Moisture Content (Caltrans method): The ratio, expressed as a percentage, of the weight of the water in the soil material to the weight of the solids which occurs at the maximum wet density as determined by Caltrans Test Method 216.
- P. Pipe Bedding (Bedding): The area between the bottom of the main and the depth of permeable material below the bottom of the main. Depth of bedding shall conform to Town Standard Detail "C16" in the Contract Drawings. Pipe bedding shall consist of leveling the bottom of the trench and furnishing, placing, and compacting bedding material as shown on the project drawings and as specified herein.
- Q. Pipe Foundation: The pipe foundation shall be the material below the sewer subgrade. Sewer subgrade is defined as a horizontal plane located below the bottom of the pipe barrel, as shown on the Drawings.
- R. Pipe Zone: Pipe Zone shall mean that portion of the material placed within the trench from four (4) inches below the bottom of the pipe barrel, to a point six (6) inches above the outside top of the pipe barrel. The Pipe Zone shall include pipe bedding.
- S. Relative Compaction (Caltrans Method): The ratio expressed as a percentage, of the wet density of the backfill material as compacted in the field, to the maximum wet density of the same material determined in the laboratory by Caltrans Test Method 216.
- T. Subgrade: The material in excavation (cuts) and fills (embankments) immediately below any subbase, base, pavement, or other improvement. Also, as a secondary definition, the level below which work above is referenced.
- U. Trench Backfill: Trench backfill is considered to be all material placed in the trench between the pipe zone material and the road bed or ground surface.
- V. Unsatisfactory Material: In-Situ soil or other material which can be identified as having insufficient strength characteristics or stability to carry intended loads in the trench without excessive consolidation or loss of stability. Also backfill material which contains refuse, frozen material, large rocks, debris, soluble particles, and other material which could damage the pipe or cause the backfill not to compact. Materials classified as PT, OH, or OL by ASTM D 2487 are unsatisfactory.
- W. Unstable or Unsuitable Material: Material in the trench bottom which lacks firmness to maintain alignment and prevent joints from separating in the pipe, conduit, or appurtenance structure during backfilling. This may be material otherwise identified as satisfactory which has been disturbed or saturated.

1.04 SUBMITTALS

- A. For all proposed pipe embedment material, and trench backfill material, imported backfill material, and other materials required by this section, submit:
 1. Material source.
 2. Gradation.
 3. Moisture-density curves.
 4. Name of testing laboratory and lab qualifications and certifications.

1.05 QUALITY CONTROL

- A. The Contractor shall take samples and perform moisture content, gradation, compaction, and density tests during placement of backfill materials to check compliance with these specifications.
- B. Remove backfill and trench surface material at locations designated by the Engineer and provide sampling and testing. The Engineer may direct the Contractor to construct inspection trenches in compacted or consolidated backfill to determine that the Contractor has complied with these specifications.
- C. Representative material samples for gradation conformance testing will be required as follows:
 - 1. One sample every 500 feet along the pipeline alignment.
 - 2. Two samples whenever a change in character of the imported trench backfill and bedding material is observed.
 - 3. One sample when directed by the Engineer.
- D. Compaction testing of pipe zone and trench backfill will be required as follows:
 - 1. One field compaction test for every 2 vertical feet of pipe embedment material plus trench backfill depth at no more than 300 feet spacing along the pipeline alignment.
 - 2. Compaction testing for ¾" crushed rock is not required.
- E. The Contractor shall be responsible for all costs associated with testing and retesting materials for the project.
- F. If compaction fails to meet specified requirements, perform remedial work by one of the following methods:
 - 1. Remove and replace trench backfill at proper density.
 - 2. Bring density up to specified level by other means acceptable to the Engineer.
- G. Compaction tests for re-tests shall be twice as frequent as the frequency specified for the initial confirmation tests, and shall be paid by the Contractor.
- H. Provide excavation and any and all safety devices including and not limited to shoring at the locations and depths required to verify that the required compaction is being obtained. Compaction testing shall be performed by the Contractor.
- I. Flooding and/or jetting will not be allowed as a method of compaction.

1.06 REGULATORY REQUIREMENTS

- A. Materials and workmanship specified herein with reference to State Standard Specifications shall be in accordance with the referenced articles, sections, and paragraphs of the standard except that contractual and payment provisions do not apply.
- B. Excavations shall be shored and braced as specified in Section 02350.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store materials in a manner to prevent contamination, segregation, freezing, and other damage.

1.08 PROTECTION

- A. Only rubber tired excavation equipment will be allowed on existing paved surfaces.
- B. Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk.
- C. Perform work adjacent to existing utilities as indicated in accordance with procedures outlined by utility company.
- D. Excavation made with power-driven equipment is not permitted within two feet of known utility or subsurface construction.
- E. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand.
- F. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured.
- G. Support uncovered lines or other existing work affected by the contract excavation until the Engineer grants approval for backfill.
- H. Report damage to utility lines or subsurface construction immediately to the Engineer and the utility owner.

PART 2 - PRODUCTS

2.01 SUBGRADE MATERIAL

- A. Subgrade material shall be free from organic matter and dirt, and shall be graded with sufficient fines to prevent movement of the foundation into bedding material. All such material shall be compacted in place to provide a stable foundation for construction of the pipe bedding. Subgrade material shall conform to the following gradation requirements:

Sieve Size	Percent Passing
1 ½ - inch	100
¾ - inch	45-90
No. 30	10-25

2.02 BEDDING MATERIAL

- A. Bedding Material shall be Class I, Type A, permeable material, aggregate, conforming to Section 68-2.02F, “Permeable Material” of the Caltrans Standard Specifications.

2.03 AGGREGATE BASE

- A. Aggregate base shall conform to the requirements of Section 26 of the Caltrans standard specifications. Grading requirements shall be for 3/4", Class 2 material, lime treated.

2.03 CONTROLLED DENSITY FILL (CDF)

- A. Aggregate base shall conform to the requirements of Section 26 of the Caltrans standard.

2.02 GEOTEXTILE FABRIC

- A. Geotextile fabric shall be used at overexcavation locations and/or where groundwater is encountered in the pipe zone. Geotextile fabric shall be a nonwoven material consisting of polyester, nylon, poly-propylene filaments formed into a stable network. The fabric shall be permeable, not act as a wicking agent, be inert to commonly encountered chemicals, be rot-proof, and resistant to ultraviolet light.

The geotextile fabric shall also conform to the following physical properties:

Property	Test value	Test method
Weight	4.4 oz/yd ² (min.)	ASTM D3776/D5261
Grab tensile strength	120 lb (min.)	ASTM D4632
Elongation at break	50% (max.)	ASTM D4632
CBR Puncture strength	310 lb (min.)	ASTM D6241
Burst strength	300 psi (min.)	ASTM D3786
Apparent opening size	#70 (max.)	ASTM D4751
Permitivity	1.7 sec-1 (min.)	ASTM D4491
UV resistance	70% (min.)	ASTM D4355

The geotextile fabric shall be Mirafi 140N or equal.

2.03 SOIL MATERIALS

- A. Soils having maximum particle size not exceeding three (3) inches that is free debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, ice, or other deleterious and objectionable materials. Soil is allowed only in landscaped areas or as approved by the Engineer.
- B. Unsuitable Materials
1. Existing material which in the opinion of the Engineer is unsuitable as a foundation, includes but is not limited to unstable material, ground water, vegetal matter, garbage and junk piles; and materials classified in ASTM D 2487 as PT, OH, and OL.

2. Unsatisfactory materials also include "bay mud", man-made fills, refuse, and unsuitable backfills from previous construction, either on the surface or buried.
3. Unsuitable material shall also be materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

PART 3 - EXECUTION

3.01 CONTRACTOR'S RESPONSIBILITY

- A. Attention is called to the various Safety Orders of the California State Industrial Accident Commission which are adopted by reference as part of these Specifications. See Contract Documents for additional requirements.
- B. The excavation shall be made to enable the sewer to be laid to the grade and alignment designed on the Drawings. The Contractor shall avoid pipes or other man-made obstructions identified by Underground Service Alert (USA), or private utility laterals, or other obstructions as identified through the location of above-ground surface structures.
- C. It shall be the responsibility of the Contractor to conform to all the requirements of all permits obtained from all agencies and to make the construction site safe against injury to people and/or animals by erection of adequate posted barricades and/or temporary fences and covering the excavations with plating.
- D. Free access shall be maintained to all fire hydrants, water gates, meters, and private driveways. Flow of clean water in gutters shall not be blocked.
- E. Any pavement, curb, or sidewalk constructed or reconstructed which is subsequently damaged due to activity under this Contract shall be removed and replaced by the Contractor at no additional cost to the Town. For a period of one (1) year following the date of final acceptance of the work, the Contractor shall promptly patch, maintain, repair, and/or replace any pavement, curb, or sidewalk which settles or becomes damaged due to settlement or defective materials or workmanship. If settlement has occurred, the pavement, curb, or sidewalk shall be removed and the subbase and/or base course restored to proper grade before restoration of the surface course.
- F. Any landscaping, trees, bushes, ground cover, walkways, driveways, and other soft- and hardscaping shall be protected from damage. Any damaged facilities shall be replaced and restored to pre-construction conditions before acceptance of work.
- G. Shoring and sheeting shall be in conformance with the Contract Documents.

3.02 OFFHAUL

- A. Contractor is responsible for obtaining all required haul route permits.
- B. A spoil disposal area has not been identified and no area is indicated on the Drawings. It is Contractor's responsibility to identify spoil disposal areas that may be used and to negotiate any agreements that are needed with land owners.
- C. Remove all excavated material from the construction site and dispose off site in accordance with applicable ordinances and environmental requirements. Submit

authorization of disposal site or sites prior to beginning excavation, and dispose of all material in a lawful manner at the designated location.

- D. Prior to offhaul, excavated materials shall not obstruct the flow of runoff, streams, endanger a partly finished structure, impair the efficiency or appearance of any facilities, or be detrimental to the completed work.
- E. When hauling is done over highways or Town streets, the loads shall be trimmed and the vehicle shelf areas shall be cleaned after each loading. The loads shall be watered and covered after trimming to eliminate dust.

3.03 SURFACE PREPARATION

- A. Cutting Pavement, Curbs, and Gutters
 - 1. Saw cut with neat, parallel, straight lines one foot wider than trench width on each side of trenches and one foot beyond each edge of pits.
- B. Removing Existing Pavement
 - 1. In cutting and breaking up surfacing, the Contractor shall not use equipment that will damage the adjacent pavement.
 - 2. Score all pavement surfaces with concrete sawing equipment and remove to clean, straight lines. If a strip of existing pavement less than half of the trench width is left, it shall be removed and new pavement placed in accordance with Town Standard Specification and Details.
 - 3. Concrete sidewalks, curbs and gutters required to be removed in connection with the work shall be cut to the nearest score mark and shall be replaced with the same kind or better by the Contractor in accordance with Town Standard Specifications and Details.
 - 4. During subsequent trench excavation and backfill activities, minimize disturbance of the adjoining pavement.
 - 5. Replace asphalt concrete in accordance with the requirements of the Contract Documents.

3.04 DEWATERING

- A. Furnish, install, and maintain all pumping, ditching or other approved measures for the removal of groundwater or exclusion of water, including stormwater and wastewater reaching the site of the work from any source, so as to prevent damage to the work or adjoining property. The intent of this requirement is that the Contractor shall at his cost provide all dewatering facilities required to enable pipe and structure installation in excavations that are free from standing or flowing water.
- B. Contractor shall submit dewatering plan to Engineer for approval should dewatering be necessary.
- C. Design the dewatering system with consideration given to the groundwater levels and soil conditions indicated in the project Geotechnical Data Report. The dewatering system shall be designed specifically for use with the sheeting, shoring, and bracing system selected for use by the Contractor on the project.
- D. The dewatering system and shoring system shall work together to meet all the following minimum performance requirements:
 - 1. Provide stable excavation walls and bottom.

2. Provide reasonably dry base of excavation.
 3. Filter native soil and prevent loss of ground through dispersion and erosion.
 4. Prevent piping (boiling) of the excavation bottom.
 5. Preserve the undisturbed bearing capacity of the subgrade soils at the bottom of the excavation.
 6. Where shoring is not designed to resist hydrostatic pressure, the dewatering system shall draw down the groundwater level below and beyond the excavation sidewalls.
 7. Where shoring is not designed to resist hydrostatic pressure, Contractor shall provide monitoring wells located midway between dewatering points to demonstrate that groundwater level is lowered as required.
- E. Where shoring is not designed to resist hydrostatic pressure and where shoring has insufficient toe embedment to ensure excavation base stability, demonstrate that groundwater is drawn down to a minimum of 3 feet below the trench bottom prior to and during the excavation to maintain the undisturbed state of natural soils and allow the placement of fill to the specified depth.
 - F. Obtain any and all permits required in conjunction with dewatering operations, Contractor shall NOT discharge water from the dewatering operation directly to the storm drainage facilities.
 - G. The Contractor is advised that groundwater control represents a significant construction consideration.
 - H. Have on hand pumping equipment and machinery in good working condition for emergencies and shall have workmen available for its operation. Dewatering systems shall operate continuously until backfill has been completed to 1 foot above the normal static groundwater level.
 - I. Release of groundwater to its static level shall be controlled to prevent disturbance of the natural foundation soils or compacted fill and to prevent flotation or movement of structures or pipelines.
 - J. Dispose of water in accordance with all dewatering permit conditions, in a manner which causes no damage to public health or safety and prevents damage to adjacent public and private property and silting of existing drains and structures. Dewatering operations may include construction of sedimentation basins or sedimentation traps. Drainage of water from any excavation through the pipeline under construction or an existing sanitary sewer is prohibited.
 - K. Dewatering piping shall not interfere with traffic. Under no circumstances shall dewatering water be allowed to flood streets or otherwise cause hazardous conditions for traffic.
 - L. After construction, clean all storm drain protection, and underlying storm drains affected by the construction operations to the satisfaction of the Engineer.
 - M. Any damage resulting from the dewatering operations shall be the responsibility of the Contractor and shall be repaired in a manner satisfactory to the Engineer, at the Contractor's expense.
 - N. For trench type dewatering systems where a permanent drain pipe is installed, the drain pipe shall be abandoned after construction by filling with grout in accordance with the contract documents.
 - O. To minimize noise levels, obtain electrical power from PG&E in lieu of providing power by portable generator. If use of utility power is not practicable, generator power may be provided by sound-attenuated electrical generators provided with sound barriers or enclosures. Diesel generators shall not be utilized unless they are

provided with sound barriers or enclosures, as necessary to comply with local ordinances.

- P. For dewatering pumping outside normal working hours, engines shall be equipped and/or shielded in a manner to keep noise to a minimum. Testing is required to show compliance with local ordinances. Conduct all work to minimize the impact of construction noise on nearby residential neighborhoods. Noise Ordinance will be enforced.

3.05 GENERAL EXCAVATION AND TRENCHING

- A. Use of track mounted excavation equipment will not be allowed.
- B. Keep excavations free from water while construction is in progress. Notify the Engineer immediately in writing if it becomes necessary to remove rock or hard, unstable, or otherwise unsatisfactory material to a depth greater than indicated. Notification does not in itself indicate a changed condition.
- C. Make trench sides as nearly vertical as practicable. Sides of trenches shall not be sloped from the bottom of the trench up to the elevation of the top of the pipe. Excavate ledge rock, boulders, and other unyielding material to an overexcavated depth at least 6 inches below the bottom of the pipe and appurtenances unless otherwise indicated or specified. Blasting will not be permitted.
- D. Excavated materials may include rock, hard material, soil, and obstructions. No changes in the Contract Price or Contract Time will be authorized for excavation and removal of this material, and off-site disposal of such material, if indicated in the contract documents or through visible surface features.
- E. Provide protection for roots over one inch in diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt or other acceptable coating formulated to use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.
- F. Do not construct fill and backfill when weather conditions detrimentally affect the quality of the finished course. Do not construct fill and backfill in the rain or on saturated subgrades.
- G. Place fill and backfill only if the atmospheric temperature is above freezing in the shade and is rising.
- H. If weather conditions are windy, hot or arid, with high rate of evaporation, schedule the placement in cooler portions of the day and furnish equipment to add moisture to the fill or backfill during and after placement

3.06 OPEN TRENCHING

- A. The maximum length of trench excavation in advance of the pipe laying operation shall be 20 feet, and the maximum amount of trench remaining open without backfill shall be 20 feet. No trench in public areas shall be left open during periods when the Contractor is not at the site of work. Trenches in these areas shall either be backfilled and temporarily paved, where applicable, or covered with steel trench plates as specified in this Section.
- B. In addition, only the length of trench that can be backfilled with the pipe installed by the end of the day shall be excavated. At the end of each working day, temporarily

- plug the open end of the pipe with a close-fitting stopper, fully backfill trenches and place temporary asphalt patch over removed pavement.
- C. Open trench during nonworking hours shall not be permitted. Open trench that is not backfilled shall be covered with steel plates as specified in this Section.
 - D. At Contractor's option, the last 20 feet of excavated trench can remain open. Install heavy steel trench plates entirely covering the excavation and adequately install bracing against the trench walls to prevent collapse of the face of the excavation.
 - E. Maintain six-inch minimum and nine-inch maximum clearance between the outer wall of the pipe barrel and the shoring or bracing, unless otherwise approved by the Engineer.
 - F. Excavate trench to a level section and to such elevation as will give a uniform bearing and true flow line elevation when the sewer pipe is laid. All loose dirt in the bottom of the trench must be removed.
 - G. Extract all sheets/shoring extending no deeper than the bottom of the excavation by static pull only, without the use of vibratory equipment.

3.07 TRENCH PLATES

- A. When backfilling trenches and excavations, whether transverse or longitudinal, and the work cannot be properly completed within the same working day, trench plates with non-skid surface treatment will be required to maintain all vehicular, bicycle and pedestrian traffic flow. The following conditions shall apply:
 1. All trench plates shall have a skid resistant surface treatment having a minimum coefficient of friction equivalent to 0.35 per California Test Method 342.
 2. For trenches and excavation with spans greater than four feet (4'), a structural design shall be prepared by a Civil Engineer licensed by the State of California. Designs shall be submitted to the Engineer.
 3. A Rough Road Sign (W33) shall be used in advance of all trench plates.
 4. All trench plating shall be designed for HS20-44 Truck loading per the Caltrans Bridge Design Manual.
 5. All steel trench plates shall extend beyond the edge of the trench wall a minimum of twelve inches (12").
 6. All steel trench plates shall be fully supported around the perimeter to prevent tipping.
 7. Trenches and excavations shall be adequately shored or braced to withstand highway traffic loads.
 8. All trench plates shall be tack welded together at the end of each day.
 9. All trench plates shall be pinned in each corner to prevent movement.
 10. Temporary paving or cold-mix asphalt concrete (cutback) shall be placed around all edges of the trench plates.
 11. A maximum of fifty (50) lineal feet of trench plating shall be allowed unless otherwise approved in writing by the Engineer.
 12. Trench plates shall be minimum 1 ¼ inches thick.
 13. Steel trench plate deformation may occur during loading; however, if a steel plate is deformed without loading to at least ½-inch per 8 feet of length, the plate shall be removed and replaced.

3.08 OVEREXCAVATION

- A. Where shown on the plans or if the bottom of excavation is found to consist of soft or unstable material which is incapable of properly supporting pipe, the Engineer will direct the Contractor to overexcavate to adequate supporting soils.
- B. The excavated space shall be filled to 18-inch below trench bottom with foundation material wrapped with geotextile fabric. The quantity and placement of additional foundation material and fabric shall be paid for in the bid item identified for this work. The foundation material shall be compacted mechanically using two to four passes of a Vibraplate 220Y Wacker with a 12-inch-square shoe, or equal.
- C. If the necessity for over excavation has been required by an act or failure to act on the part of the Contractor, or is required for the control of groundwater, the Contractor shall bear the expense of the additional excavation and bedding. Any other overexcavation not directed by the Engineer will be at the Contractor's own expense.
- D. Where bursting pits are saturated excavate minimum 24-inches and install crushed rock wrapped in geotextile fabric as foundation below pipe bedding.

3.09 DISTURBED SUBGRADE

- A. Where disturbed and loosened soils are present at the bottom of any excavation as a result of Contractor's operation, they shall be removed or compacted to at least ninety percent (90%) relative compaction prior to placing pipe foundation materials or pit slab foundation materials. The Contractor shall receive no extra compensation for such work.
- B. Disturbed subgrade resulting from inadequate dewatering of trench and pit excavations shall be removed as directed by the Engineer and restored to grade with crushed rock and compacted mechanically using two to four passes of a Vibraplate 220Y Wacker with a 12-inch-square shoe, or equal. The Contractor shall receive no extra compensation for such materials or work.

3.10 SUBGRADE FOR PAVEMENT

- A. The trench backfill beneath the pavement shall be compacted to at least ninety-five percent (95%) of the maximum density as determined by Caltrans Test Method 216.

3.11 EARTHWORK FOR STRUCTURES

- A. For Manholes, Vaults and Other Pipeline Accessories, provide excavations sufficient to leave at least twenty-four (24) inches clear between their outer surfaces and the face of the excavation or any shoring, which may be used to support the face of the embankment.

3.12 EARTHWORK FOR PIPELINES AND CONDUITS

- A. The bottom of the trench shall be carried to the specified lines and grades with proper allowance for pipe thickness and for bedding as specified.
- B. Pipe Zone, and Trench Backfill
 - 1. All material shall be imported fill.
 - 2. All material shall be placed in uniform lifts not to exceed six (6) inches per compacted lift using mechanical compaction and/or vibration. No jetting or flooding shall be allowed. Trench or pit excavations shall be backfilled with materials as shown on the drawings.
 - 3. Contractor shall take necessary precautions in placement and compaction of Bedding Material to prevent displacement of piping. In the event there is movement of the pipe, re-excavate re-lay, and backfill the pipe.
 - 4. Water-settling methods will not be allowed for consolidating Pipe Zone or Trench Backfill Material.
- C. Pipe Zone
 - 1. The Contractor shall not proceed with backfill placement in excavated areas until the subgrade has been inspected by the Engineer. All pipe shall have a minimum thickness of pipe bedding material below the barrel of the pipe as shown on the drawings. Pipe bedding material shall be placed in the bottom of the trench, leveled and compacted to a minimum of ninety percent (90%) relative compaction at or near optimum moisture content.
 - 2. Depressions for Assembly of Joints
 - a. Dig holes for bell or coupling assembly after pipe embedment material has been placed at the trench bottom and fine graded to the design elevation.
 - b. Create sufficient width and depth to provide ample room for inspecting joints, and completing joint assembly activities.
 - c. Excavate holes only as necessary in making joints. Ensure that pipe rests upon prepared trench bottom and is not supported by any portion of the joint.
 - 3. No backfill shall be deposited over a sewer line and/or appurtenances until placed pipe has been inspected and approved for backfilling operations.
 - 4. That portion from the sewer subgrade to a point six-inch minimum, nine-inch maximum above the outside top of the pipe shall be pipe zone material. This import shall be installed in two stages.
 - a. STAGE ONE – Pipe bedding shall be from the sewer subgrade to the outside bottom of the sewer pipe. Grade the imported fill so that the pipe can be laid to proper line and grade. Seat the pipe embedment material by mechanically compacting.
 - b. STAGE TWO – After the pipe has been installed to the proper line and grade, install the pipe zone material around the pipe, in 6-inch maximum compacted lifts, from the outside bottom of the pipe to a point six-inch minimum, nine-inch maximum above the outside top of the pipe barrel. Hand shovel slice the pipe zone material around the pipe before compaction to ensure the absence of voids beneath the

- pipe haunches. Mechanically compact the pipe zone material as required to meet specified compaction.
- c. Place pipe zone material simultaneously on both sides of the pipe, keeping the level of backfill the same on each side. Carefully place and compact around the pipe to ensure that the pipe barrel is completely supported and that no voids or uncompacted areas are left beneath the pipe. Use particular care in placing material on the underside of the pipe to prevent lateral movement during backfilling.
 - d. Place pipe zone material in layers the full width of the trench and compact as specified.
 - e. Impact tampers shall not be used directly above the pipe to mitigate damaging the pipe in accordance with pipe manufacturer's recommendations. Each 6-inch lift shall be placed to support the pipe on all sides.
5. Trench Backfill
- a. Trench backfill material, placement and compaction above the pipe zone shall be as specified. Backfill above the pipe zone shall not commence until pipe zone material has been inspected and accepted by the Engineer.
 - b. In paved areas, compact the specified trench backfill material to a minimum of ninety-five percent (95%) relative compaction. Relative compaction in paved areas to be determined by Caltrans California Test 216. The moisture content of the trench backfill material being placed shall be at or above optimum moisture content to achieve required compaction.
 - c. Place trench backfill in horizontal layers no thicker than 6 inches uncompacted. Each layer shall be moistened, if necessary, tamped, rolled or otherwise compacted to the density shown on the Drawings.
 - d. Compaction testing of trench materials within paved areas shall be done in accordance with the requirements of the State Standard Specifications and referenced standard tests. The compaction tests shall be California Test 216. Compaction testing of trench materials within unpaved areas shall be done in maximum or relative densities refer to dry soil densities obtainable at optimum moisture content.
 - e. Specified Trench Backfill material shall be used in the trench zone under all paved and unpaved roadways and paved and unpaved roadway shoulders, roadway embankments, in all public right-of-ways and easements, parking lots or other paved areas. Backfill trench to an elevation which will permit the placement of the specified surface or paving. Paving shall be as specified in Section 02500. Other surfaces shall be restored, including compaction, to the condition existing prior to construction including restoration of yard areas.

3.13 EXPLOSIVES AND BLASTING

- A. Blasting or use of explosives shall not be permitted.

3.14 CONTAMINATED MATERIALS

- A. No contaminated materials are known to exist within the trench excavation areas in the Project area. Contaminated materials are defined as those materials that require disposal at a RCRA Subtitle C treatment, storage, and disposal facility. If contaminated materials are encountered, a change of condition will be addressed in accordance with the extra work provisions in the Contract Documents.
- B. Activities involving contaminated materials, should they be encountered, shall be in accordance with:
 1. California Hazardous Water Control Law (HWCL), Health and Safety Code, Sections 25100 through 25249
 2. California Code of Regulations, Title 22, Division 4, Chapter 30, Minimum Standards for Management of Hazardous and Extremely Hazardous Wastes
 3. Federal Resources Conservation and Recovery Act (RCRA), 42 USC, Sections 6901 through 6987.
 4. Federal Hazardous and Solid Waste Amendments (HSWA), PL 98-6 16.
 5. California State Water Resources Control Board Regulations, California Code of Regulations, Sections 2501 through 2610
 6. California Code of Regulations, Title 8, General Industry Safety Orders, Section 5194, Hazard Communication
 7. California Labor Code, Chapter 2.5, Hazardous Substances Information and Training
 8. California Occupational Safety and Health Administration (CAL/OSHA) regulations (Title B, CCR, Section 5192).
 9. Bay Area Air Quality Management District, Regulation 8, Rule 40.
 10. Town of Hillsborough Fire Department Regulations and Permitting Procedures.
 11. Other codes and regulations related to the scope of work.
- C. If contaminated materials are encountered during construction, the Contractor shall stop work immediately in this area, and shall sufficiently secure the work area such that contaminated materials or potentially contaminated materials are not exposed to public. This shall be accomplished through temporary backfilling, trench plating, covering exposed areas with plastic sheeting, or other means. The Contractor shall immediately notify the Engineer of his findings, shall secure the area, and then shall continue work in another area away from the area in question. The Contractor shall not continue work in the potentially contaminated area until directed by the Engineer. Stopping work in a potentially contaminated area and moving to another work area will be considered part of the change of condition.

3.15 FINISH OPERATIONS

- A. Finishing Subgrades Under Structures and Pavements
 1. Finish surface of top lift of fill or top of subgrade to the elevation and cross section indicated.
 2. Finished surface shall be smooth and of uniform texture.

3. Lightly scarify or blade the finished surface to bring the finished surface to within 0.05 feet of the indicated grade and to eliminate imprints made by compaction and shaping equipment.
4. Surface shall show no deviations in excess of 3/8 inch when tested with a 10-foot straightedge.

****END OF SECTION****

SECTION 02350**EXCAVATION SUPPORT SHORING AND BRACING****PART 1 - GENERAL**

1.01 SUMMARY

- A. This Section includes design and construction parameters for Contractor-designed temporary shoring as necessary for trenches or structures.
- B. Shoring refers to providing all components of the excavation support system, including, but not limited to, bracing, steel soldier piles or sheet piles, struts, wales, or any other support including internal bracing, where applicable. Use other methods of support only when approved by the Engineer. Shoring shall be designed, provided, maintained, and where applicable, removed by the Contractor, in accordance with this Section and the Contract Documents.
- C. As required by Section 6705 of the California Labor Code and in addition thereto, whenever work under the contract involves the excavation of any trench or trenches five (5) feet or more in depth, including temporary construction pits and manhole excavations, the Contractor shall submit to the Engineer a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plans vary from the shoring system standards established by the Construction Safety Orders of the Division of Industrial Safety, in Title 8, Subchapter 4, Article 6, California Code of Regulations, the plans shall be prepared and signed by a registered civil or structural engineer employed by the Contractor.
- D. Shoring system plans for pits or other large excavations in excess of five (5) feet or more in depth shall be prepared and signed by a civil or structural engineer, registered in California and employed by the Contractor. All costs therefore shall be included in the bid price named in the contract for completion of the work as set forth in the contract documents.
- E. Nothing in this Section shall be deemed to allow the use of a shoring, sloping or other protective system less effective than that required by the Construction Safety Orders. Nothing in this Section shall be construed to impose tort liability on the Town, Design Consultant, or any of their officers, agents, representatives, or employees.
- F. Horizontal strutting below the barrel of a pipe and the use of pipe as support are not acceptable.
- G. The sheeting, shoring, and bracing system shall be designed and constructed to meet all of the following minimum performance requirements:
 - 1. Protect personnel that enter excavations.
 - 2. Assure worker safety and optimal conditions for pipe installation.
 - 3. Protect adjacent existing utilities, pipelines, pavements, and structures.
 - 4. Installation of support system shall not cause settlement or heave of the ground surface nor produce construction vibrations that could damage adjacent utilities or structures.
 - 5. Prevent lateral movement of excavation walls and associated loss of adjacent ground support and adjacent ground lateral shifting/settlement.

6. Prevent heaving of the excavation bottom.
 7. When removal is permitted, allow for the removal of support system in a manner that does not damage the pipeline, cause settlement or heave of the ground surface, nor produce construction vibrations that cause damage to adjacent utilities or structures.
- H. Related Sections
1. SECTION 02200, EARTHWORK
 2. SECTION 03600, GROUT
 3. SECTION 15050, GENERAL PIPING

1.02 REFERENCE

- A. Town of Hillsborough
1. Standard Details for Public Works Projects (latest edition).
- B. Project Geotechnical Report

1.03 SYSTEM DESCRIPTION

- A. Design Requirements
1. Design and construct the shoring system in accordance with all applicable codes, and in accordance with the specific requirements described herein.
 2. At all times furnish, install, and maintain sufficient shoring and bracing in trenches and pits to insure safety of the workmen and to protect and facilitate the work. System shall be designed and constructed in accordance with the Contract Documents. The Contractor shall:
 - a. Design each member or support element to support the maximum lateral earth pressures, hydrostatic pressures, lateral loads from traffic, construction equipment, and spoils loads that can occur during construction with appropriate safety factors.
 - b. Design the support system to prevent raveling, running, and flowing of excavation walls and associated loss of adjacent ground and adjacent ground surface settlement or existing trench material at utility crossings. Design the support system to retain non-cohesive granular soils subject to raveling, flowing, and/or running upon vibration from construction equipment including compaction of backfill.
 - c. Prevent heave and/or piping (boiling) of the excavation bottom.
 - d. Design excavation support systems in accordance with all CAL/OSHA, and OSHA, requirements.
 - e. Take into account all surcharge loadings. Surcharge loadings can be due to such items as material or soil stockpiles, sloping ground adjacent to shoring, and adjacent building foundations. Contractor shall assure that his assumed conditions and loadings are not exceeded in the field during construction.

- f. Design shoring to withstand any construction loading.
 - g. The design of shoring shall conform to accepted engineering practice in this field. The Engineer's approval of the Contractor's plans and methods of construction does not relieve the Contractor of his responsibility for the adequacy of this support.
- B. Performance Criteria
- 1. The Contractor shall be solely responsible for, and bear the sole burden of cost for, any and all damages resulting from improper shoring or failure to shore.
 - 2. The safety of workmen, the protection of adjacent structures, property and utilities, and the installation of adequate supports for all excavations shall be the sole responsibility of the Contractor.
 - 3. The design, planning, installation, (and removal, if required) of all shoring shall be accomplished in such a manner as to maintain stability of the required excavation and to prevent movement of soil and rock that may cause damage to adjacent shoring systems, structures and utilities, damage or delay the work, or endanger life and health.

1.04 SUBMITTALS

- A. Shop Drawings
- 1. Submit plans for shoring to the Engineer for review at least ten (10) working days prior to commencement of work. No excavations shall be started until the Engineer has reviewed the Contractor's shoring design. The shoring and bracing system plans shall be in accordance with the Contract Documents and to permit the Engineer to review the overall completeness and effectiveness of the proposed system. Review of the shoring and bracing plans by the Engineer in no way relieves the Contractor of complete responsibility for providing effective and safe shoring and bracing of the construction area and/or pipeline under construction. Shoring and bracing submittals shall demonstrate coordination with the dewatering method and submittal.
 - 2. Include:
 - a. Design assumptions, analyses, calculations, and information on Contractor's proposed method of installation (and removal, if required) of all shoring. The design and calculations shall be performed by, sealed by and signed by a professional engineer registered in the State of California and experienced in the design of earth retaining structures.
 - b. The maximum design load to be carried by the various members of the support system.
 - c. Detailed excavation support drawings, showing all pertinent dimensions, spacings, and relationships among the components of the shoring, as well as construction sequence and scheduling.
 - d. The method of bracing.
 - e. The full excavation depth and depth(s) below the main excavation to which the support system will be installed.

- f. Detailed sequence of construction and bracing removal and backfilling.
 - g. Detailed drawings and descriptions of the method to be used by the Contractor to monitor shoring and adjacent ground/structure movements.
 - h. Demonstrate coordination with interior (sump pumps) and exterior (dewatering wells) dewatering methods and dewatering submittal.
 - i. Calculations demonstrating that shoring has been designed for hydrostatic pressures if external dewatering wells are not planned to fully draw down the groundwater level behind the shoring to a minimum of 3 feet below the excavation bottom.
- B. Quality Control Submittals
 - 1. Submit proof of experience and qualifications required in this Section.
 - C. Permits
 - 1. Contractor shall have up to date CAL/OSHA annual/construction activity permit for Trench and Excavation construction.

1.05 QUALITY ASSURANCE

- A. Work of this Section shall be performed by an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field) for at least five (5) years, which is regularly engaged in, and which maintains a regular force of workmen skilled in design, installation and maintenance of shoring.
- B. All welding shall be done by skilled welders, welding operators, and tackers who have had adequate experience in the type of materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 by an independent local approved testing agency not more than six (6) months prior to commencing work; unless having been continuously employed in similar welding jobs since last certification. Machines and electrodes similar to those used in the work shall be used in qualification tests. The Contractor shall furnish all material and bear the expense of qualifying welders.

1.06 PROJECT CONDITIONS

- A. Existing Ground and Groundwater Conditions
 - 1. Refer to the included boring logs provided in the Project Geotechnical Report, which is available upon request.
- B. Existing Utilities
 - 1. Contract Drawings do not show all utilities. Contractor shall notify the Underground Service Alert (USA) and field-check locations of utilities prior to commencing work. The Contractor shall protect any overhead wires and any sewer, water, gas, electric or other pipelines or conduits uncovered during work from damage caused by the work of this contract.

- a. Where utilities are anticipated or encountered unexpectedly, excavate by hand or other excavation methods acceptable to the utility owner.
- b. If existing utilities identified interfere with Contractor's proposed method of support, any required modification or relocation shall be performed at no additional cost to the Town.

PART 2 - PRODUCTS

To be selected by the Contractor within the guidelines described in this Section.

PART 3 - EXECUTION

3.01 EXAMINATION

In accordance with Title 8, Construction Safety Orders, Section 15041.1, "Requirements for Protective Systems, Appendix A", "Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C." A 'Competent Person' is one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."

- A. Verify Surface Conditions and utility locations. Protect utilities and improvements, as called for in the Contract Documents, or required by the Utility Company(s).
- B. Verify field measurements indicated on Drawings.
- C. Verify layout of work before beginning installation.

3.02 EXCAVATION

- A. Protect or repair utilities damaged by operations of this Section. Protect adjacent structures and property from damage and disfiguration.
- B. Provide necessary groundwater control and drainage in accordance with the Contract Documents. Contractor should expect that dewatering will be required to allow placement of shoring in soil under "dry" conditions and to prevent flowing, raveling, or running of soil, prior to shoring placement.
- C. The methods of constructing the temporary shoring are at the option of the Contractor and subject to review by the Engineer. Excavations shall be made to the lines, grade, and dimensions shown on the Contractor's Shop Drawings. If the excavation is found to be deviating from the true lines and grade, the Contractor shall immediately make the necessary changes in operation to bring the operation back to the correct position. Any excess deviation beyond that specified herein shall be remedied by the Contractor at their own expense.
- D. All materials encountered shall be regarded as unclassified and shall be excavated, regardless of the nature thereof, and all excavated material must be removed and disposed of as described in the Contract Documents.
- E. Complete excavation in such manner as to provide adequate support at all times to adjacent conduits, structures, or roads and so as to offer no hazard to train, truck or automobile operations. Bracing and shoring shall be substantial and safe, and all work shall be done in full conformity and subject to the inspection of all affected

parties. If and when required and to the degree necessary, the Contractor shall provide additional support as may be necessary at no additional cost.

- F. Take every precaution to prevent the entry of water, mud and foreign matter into the excavation at all times. It is the intention of these Specifications that all construction work described herein shall be carried out under dry conditions. The Contractor shall promptly and continuously control water inflow and dispose of all water from any source that may accumulate in the excavation. This shall include all necessary pumping, bailing, draining and sedimentation prior to discharge.
- G. Any and all excess excavation or over-excavation performed by the Contractor for any purpose or reason, except as may be ordered in writing by the Town, shall be at the expense of the Contractor. Any damage done to the work by the Contractor's operations shall be repaired by and at the expense of the Contractor and in a manner approved by the Engineer.
- H. Excavate only as much as can safely stand unsupported prior to installing shoring, but in no case more than 4 feet shall be left unsupported at any time. Install lagging immediately after excavation.

****END OF SECTION****

SECTION 02500

ASPHALT CONCRETE PAVING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section addresses the installation of asphalt concrete and striping for roadways in which pipeline construction is performed, as required in these Contract Documents. Other roadway or pavement areas requiring asphalt concrete as indicated on the Contract Drawings or to be determined later, shall also be governed by these specifications.
- B. Related Sections
 - 1. SECTION 02200, EARTHWORK

1.02 REFERENCES

- A. Town of Hillsborough
 - 1. Standard Details for Public Works Projects (latest edition)
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM C136 - Sieve Analysis of Fine and Coarse Aggregates
 - 2. ASTM D1557 - Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
 - 3. ASTM D2041 – Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
 - 4. ASTM D2172 - Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
- C. State of California, Department of Transportation (Caltrans)
 - 1. California Test Method 304 – Preparation of Bituminous Mixtures for Testing.
 - 2. California Test Method 339A – Determination of Distributor Spread Rate.

1.03 SUBMITTALS

- A. Submit the following in accordance with the Contract Documents.
 - 1. Job-mix formula for each type of asphaltic concrete 14 days before asphalt concrete placement. Ensure formula is within the specified design range.
 - 2. Copies of weighmaster's certificates or certified delivery tickets for each truck load of material.
- B. Certificates
 - 1. Aggregates for base course and asphalt concrete
 - 2. Asphalt cement

3. Liquid asphalt
4. Asphaltic emulsion
5. Paint

1.04 QUALITY ASSURANCE

- A. Materials and workmanship specified herein with the referenced State Standard Specifications shall be in accordance with the referenced articles, sections and paragraphs of the Standard, except that contractual and payment provisions do not apply.

1.05 TESTING

- A. Testing will be conducted by the Contractor to determine compliance with the specified degree of compaction and moisture content.

1.06 ENVIRONMENTAL CONDITIONS

- A. Install hot mix asphaltic concrete in accordance with Town of Hillsborough Standard Details.
- B. Apply striping to clean, dry surfaces and unless otherwise approved by the Engineer.

1.07 EQUIPMENT

- A. Mixing Plant and Construction Equipment shall comply with Section 39 of State Standard Specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Aggregates
 1. Base Course: In accordance with Section 26 of State Standard Specifications, Class 2, 3/4-inch maximum size gradation.
 2. Asphalt Concrete: In accordance with Section 39 of State Standard Specifications, Type A for individual test result conforming to 1/2-inch maximum size gradation, medium.
- B. Asphalt Materials
 1. Asphalt Cement: In accordance with Section 92 of State Standard Specifications, PG 64-10
 2. Liquid Asphalt: In accordance with Section 93 of State Standard Specifications, Grade SC-70.

3. Asphaltic Emulsion: In accordance with Section 94 of State Standard Specifications, Grade SS-1h.
4. Asphalt Concrete: Asphalt concrete shall be hot mix and conform to Section 39-2.02 of State Standard Specifications. Asphalt Binder shall be viscosity graded asphalt in accordance with Section 92 of the State Standard Specifications
 - a. All streets:
 - 1) Aggregate: Type A ½-inch maximum medium grading
 - 2) Asphalt Binder: PG 64-10
 - 3) Asphalt binder mixed with aggregate shall be such that the air void content of the resulting asphalt concrete shall be not less than 3 percent nor more than 5 percent.
 - 4) Stabilometer value as determined by California Test Method No. 304 shall be 38 minimum.

PART 3 - EXECUTION

3.01 PREPARATION

A. Subgrade

1. Requirements for subgrade are specified in Section 02200.
2. Prior to construction of base course, clean previously constructed subgrade or subbase of foreign substances.

B. Asphalt Concrete Preparation

1. Uniformly mix mineral aggregate with bituminous material in a central plant in accordance with Section 39 of State Standard Specifications.
2. The percentage of asphalt cement binder shall be between five and seven percent.

C. Striping

1. Allow new pavement surfaces to cure for at least 2 days before striping.
2. Clean pavement surfaces immediately prior to striping by power vacuuming. Power brooming, or power blowing using compressed air will not be permitted.
3. Thoroughly clean pavement surface of water, oil, grease or other objectionable matter.
4. Do not use solvent material that will damage pavement.

3.02 INSTALLATION

A. Base and Subbase Course Installation

1. Place aggregate base in accordance with requirements of Sections 25 and 26 of State Standard Specifications.

2. Grade and compact in 6-inch layers to at least ninety-five percent (95%) of maximum density, ASTM D 1557 Method D.
 3. Maintain base course in proper condition until asphaltic concrete is in place, including drainage, rolling, shaping, and watering.
 4. Maintain sufficient moisture at the surface to prevent a dusty condition by light sprinkling with water.
 5. Recondition, reshape, and recompact areas of completed base course damaged by freezing in accordance with the specified requirements.
- B. Prime Coat
1. Prior to application of asphaltic concrete, apply a prime coat.
 2. Apply by pressure distributors.
 3. Allow sufficient time before placing asphalt concrete to permit prime coat to penetrate base.
 - a. Liquid Asphalt Application: Apply liquid asphalt on prepared compacted base in accordance with Section 39 of State Standard Specifications.
 - b. Asphalt Emulsion Application: Apply emulsion at a rate of 0.10 gallon per square yard.
- C. Tack Coat - Apply asphaltic emulsion to the existing pavement surfaces in accordance with Section 39-4 of State Standard Specifications.
- D. Asphalt Concrete Installation
1. Placing - Deliver bituminous mixtures to the roadbed at temperatures specified in Section 39 of State Standard Specifications. Spread in accordance with Section 39-6 of State Standard Specifications.
 2. Compaction - Initial or breakdown rolling and the final rolling of the uppermost layer of the asphalt concrete shall be in accordance with Section 39 of State Standard Specifications. Compaction by vehicular traffic shall not be permitted.
 3. Joining Pavement - Carefully make joints between old and new pavements and of successive days' work in such manner as to ensure a continuous bond between old and new sections of the course. Expose and clean edges of existing pavement. Cut edge to straight, vertical surfaces. Paint joints with a uniform coat of tack coat before the fresh mixture is placed. Prepare joints in the new pavement in accordance with Section 39-6 of State Standard Specifications.
- E. Striping Pavements
1. Application
 - a. Traffic striping and pavement marking shall conform to the Section 02765, "Traffic Stripes and Pavement Markings," of these Special Provisions.

- b. Work shall include placing thermoplastic stop bars, stop messages, center striping, lane lines, and other existing pavement markings affected by project construction and as directed by Engineer.
- c. Any damage to the existing or newly installed markings due to the failure of the Contractor to protect the work shall be repaired by the Contractor at no additional cost to the Town.

3.03 FIELD QUALITY CONTROL

All field quality control tests shall be performed by the Contractor. Testing frequency may differ from condition listed below. Where finished work does not meet specified requirements and follow up testing is required, Contractor will be responsible for all follow up testing costs for that item.

A. Base Course Finish Surface

- 1. Surface tolerance shall conform to Section 26 of State Standard Specifications.
- 2. When base course is constructed in more than one layer, specified smoothness requirements apply only to top surface.

B. Pavement Smoothness

- 1. Test wearing course in accordance with Section 39-6 of State Standard Specifications.
- 2. Make one test for each 300 square yards of pavement.

C. Pavement Thickness

- 1. Pavement thickness shall be as shown on the Drawings. At a minimum, a pavement thickness of 6 inches asphalt concrete on 8 inches of aggregate base shall be provided. If existing asphalt is 6-inches thick or greater, the asphalt shall be one inch thicker than existing. Where asphalt concrete is 6 inches thick or greater, aggregate base thickness shall match existing.
- 2. One test for each 300 square yards of completed pavement will be taken.
- 3. Contractor shall replace pavement where samples are removed.

D. Gradation

1. Base Course Gradation

- a. Base course gradation tests will be completed in accordance with ASTM C 136.
- b. One test for each 100 tons of material will be taken.

2. Asphalt Concrete Gradation

- a. Asphalt concrete gradation tests will be completed in accordance with ASTM C136.
- b. One test for each 50 tons of material will be taken.

E. Base Course Density

1. ASTM D 1557, Method D. In place density tests will be performed in accordance with ASTM D 1556.
2. One maximum density test for each gradation will be taken.
3. One set of two tests each for in place density for each three hundred (300) square yards of surface area will be taken.

F. Asphalt Content of Asphalt Concrete

1. Percent asphalt content by extraction will be measured in accordance with ASTM D 2172, Method A.
2. One test for each fifty (50) tons of material will be taken.

3.04 PROTECTION OF PAVEMENT

- A. After final rolling, the Contractor shall not permit vehicular traffic on the pavement until pavement has cooled and hardened and in no case less than six (6) hours.
- B. Additional requirements are as shown in the Contract Documents.

3.05 TEMPORARY PAVEMENT

- A. All temporary surfacing shall be laid within one (1) day after backfilling or as specified. Before the trenching area is opened for traffic, all excess dirt, rock and debris shall be removed and the street surface shall be swept clean. Temporary surfacing shall be constantly maintained so that at no time will there be any mudholes, nor shall the surface settle below one inch (1") or be raised more than one inch (1") from the existing pavement grade.
- B. Prior to working in adjacent easement areas, Contractor shall remove temporary pavement, and install permanent asphalt pavement.

3.06 FINAL PAVEMENT

- A. Final paving shall be laid within two (2) weeks of completion of work within an area. Work includes, but is not limited to, pipe, manhole, and laterals installation.

****END OF SECTION****

SECTION 02643

PIPE REAMING

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This specification defines the method and material for replacing existing sanitary sewer main by pipe reaming methods. Pipe reaming is a proprietary trenchless replacement method accomplished using HDD equipment and specialized tooling. Pipe installation shall consist of furnishing all labor, equipment and materials for a complete and gravity operational pipeline in accordance with the Contract Documents.

The Contractor has the option, if deemed feasible, to pipe burst sanitary sewer mains in accordance with Section 02642, upon written acceptance of the Engineer.

The Contractor shall be responsible for paying any and all royalty fees associated with the pipe reaming technology. The Contractor shall comply with all legal obligations and fees for the use of this technology.

B. Related Sections

1. SECTION 01560, TEMPORARY CONTROLS
2. SECTION 02145, SEWAGE FLOW CONTROL
3. SECTION 02735, SANITARY SEWER SYSTEM TESTING AND CLEANING
4. SECTION 02736, CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION OF SANITARY SEWER SYSTEM
5. SECTION 02800, TRAFFIC CONTROL
6. SECTION 15050, GENERAL PIPING
7. SECTION 15066, HIGH DENSITY POLYETHYLENE (HDPE) PIPE

1.02 DEFINITIONS

- A. Reamer
A cutting tool pushed or pulled through the borehole in order to enlarge the hole to a diameter sufficient for installation of the product (carrier) pipe.
- B. Bent Sub

A short threaded piece of pipe with an axial offset or angle used in a pipe string to produce leading edge asymmetry.

- C. Bottom Hole Assembly (BHA)
The combination of bit, downhole motor, subs, survey probe, and nonmagnetic collars assembled at the leading edge of a drill string.
- D. Dimension Ratio (DR)
The ratio of the specified outside diameter to the specified minimum wall thickness that is common for all pipe sizes of specific dimension ratio series.
- E. Drill Pipe
Tubular steel conduit fitted with special threaded ends called tool joints. The drill pipe connects the HDD rig with the bit or reamer and facilitates both pumping drill fluid and advancing or retracting the bit or reamer.
- F. Drill String
The total length of drill pipe in a drill borehole, including bottom hole assembly.
- E. Drilling Fluid/ Mud
A mixture of water, a viscosifier (typically bentonite), and/or polymers that is pumped to the drill bit or reamer to facilitate cutting, to transport drilled spoil, to stabilize the borehole, to cool and clean cutters, and to reduce friction between the product (carrier) pipe and the wall of the hole
- F. Entry/ Exit Angle
The angle relative to the horizontal plane at which the drill string enters or exits the ground surface during pilot hole drilling.
- G. Ground Mat
Metal mats rolled out on either side of drill rack for operator and crew to stand on during operation to give grounding protection in case of electrical strike.
- H. Grout
A pumpable mixture, typically composed of water, cement, fine sand, fly ash, bentonite, and/or chemical components which is commonly used to fill voids or annular spaces, strengthen incompetent soil or rock, or prevent the flow of groundwater.
- I. Horizontal Directional Drilling (HDD)
A trenchless excavation method accomplished in three phases. The first phase consists of drilling a small diameter pilot hole along a designed directional path. The second phase consists of enlarging the pilot hole to a diameter suitable for installation of the pipe string. The third phase consists of pulling the product pipe into the enlarged hole. HDD is accomplished using specialized HDD rig with ancillary tools and equipment.
- J. Locator
An electronic instrument used to determine the position and strength of electro-

magnetic signals emitted from a transmitter sonde in the pilot head of a directional drilling system. Sometimes referred to as a walkover system.

- K. Marsh Funnel Viscosity
A measure of the flow rate of a fluid through a calibrated funnel. A Marsh funnel is typically used to measure drilling fluid and slurry viscosity, in seconds per quart (sec/qt) of fluid. The Marsh funnel viscosity of water is 26 seconds per quart..
- L. Obstruction
Any hard object laying completely or partially within the design pathway of the bore and pipeline that prevents further advancement of the drill bit, pre-reamer, reamer, and/or pipe.
- M. Ovality
There are two options: a) the difference between the maximum and mean diameter divided by the mean diameter, and b) the difference of the mean and minimum divided by the mean, at any one cross section of a pipe, generally expressed as a percentage.
- N. Pilot hole
A small diameter hole directionally drilled along a designed path in advance of reaming operations and pipe installation.
- O. Product (carrier) Pipe (ASCE 36-15)
Pipe for conveyance of water, gas, sewage, or other products or services.
- P. Pull- Back
The act of installing a product pipe in a HDD drilled hole by pulling it to the HDD rig from the end hole opposite the rig
- Q. Pull Back Force
The tensile load applied to a drill string during the pull-back process.
- R. Sonde or Transmitter Housing
Integral unit in the directional drill head which also houses the sonde radio sending unit.
- S. Stakedown Plate
A plate staked to the ground to stabilize the forward end of the drill rack.
- T. Sub
A short threaded piece of pipe used in a drill string to perform a special function.
- U. Survey Tools
Download equipment and instruments used to determine the position of a bore in directional drilling.
- V. Walkover System
See locator.

- W. Wash Pipe
A drill pipe that is run, or rotated, concentrically over a smaller drill pipe so that the small (internal) pipe can be freely moved or rotated..
- X. Work Plan
A document including any and all obligations, duties and responsibilities necessary to the successful completion of the project assigned to or undertaken by contractor under the contract documents, including all labor, materials, equipment and other incidentals, and the furnishing thereof.

1.03 SUBMITTALS

- A. The Contractor shall not initiate pipe reaming until all submittals are received, reviewed, and accepted by the Engineer.
- B. Submit scaled/dimensional layout drawings that include the planned equipment, equipment setup areas, pipe layout areas, excavations, entry and exit pits, utilities, and drilling fluid containment items. The Contractor shall limit its operations to the areas shown on the Drawings, or as otherwise accepted in writing by the Engineer. Drill entrance and exit angles shall be as shown on the submitted reaming plan and as approved by the Engineer, unless otherwise approved in writing by the Engineer. Submit drawing showing configuration of reaming head within existing pipe and with pipe string over existing pipe.
- C. The Contractor shall provide a work plan including pipe layout, spoils handling; certifications, shop drawings and samples for all materials specified for use on the project.
- D. The Contractor shall submit a detailed schedule with all major construction activities and durations, with beginning and completion dates shown. The schedule shall include:
1. Rig mobilization and setup
 2. Pilot hole drilling
 3. Method of centralizing reaming tool within existing pipe
 4. Layout and thermal butt-fusing of pipe
 5. Pressure testing of pipe prior to pullback
 6. Reaming and pullback of pipe
 7. Pressure testing of pipe after installation
 8. Cleanup and restoration
- E. Submit bore plan.
- F. Submit detailed descriptions of methods, equipment, and materials to be used for the pipeline installation. Descriptions of materials shall be accompanied by Material

Safety Data Sheets (MSDS) and manufacturer's descriptions and warranties. Descriptions of equipment shall include manufacturer's specifications, calibrations, appropriate drawings, photographs, and descriptions of any modifications since manufacture.

- G. The submittal shall include calculation of the loads and materials stresses imposed by the pipe reaming process during the pipe installation and adequacy of the pipe material and thickness to withstand the stresses without incurring long-term deflection of the pipe cross section or exceeding the allowable stresses for the pipe material. Calculations shall be:
 - 1. Signed and sealed by a Professional Civil Engineer registered in the State of California;
 - 2. Clearly identify all parameters used;
 - 3. State all assumptions made in the calculations;
 - 4. Identify all sources of information;
 - 5. All sources of information shall be widely accepted industry standard and
 - 6. Acceptable to the Engineer.
- H. The Contractor shall provide Material Safety Data Sheets (MSDS) for all drilling fluid additives used or on site.
- I. Submit examples of the daily logs and records for acceptance by Engineer.
- J. Submit methods and procedures for filling the pipe with fluid during pull back.
- K. Submit expected mud and/or drilling fluid weights and viscosity for stabilization of the bore hole.
- L. Submit methods for disposal of waste materials resulting from the pipeline construction, including drilling fluids, cuttings, waste oil, fuel, discharge water, etc. The Contractor shall identify the disposal site and submit a letter from the licensed disposal facility indicating willingness and legal authority to accept the described and anticipated waste products.
- M. Submit contingency plans for remediation of potential problems that may be encountered during the drilling operations. The contingency plans shall address the observations that would lead to the discovery of the problem, the methods that would be used to mitigate the problem, and estimated time and cost to mitigate the problem and resume the installation. Potential problems that shall be addressed include:
 - 1. Obstructions encountered.
 - 2. Inadvertent drilling fluid returns (frac-out).
 - 3. Loss of circulation.

4. Inability to advance drill stem or pipe.
 5. Drill stem or pipe twisted off or broken off in borehole.
 6. Pipe collapse.
- N. Traffic protection equipment for the pipe layout area.

1.04 QUALITY ASSURANCE

- A. The Contractor shall measure and record drilling fluid viscosity and density at least three (3) times per shift with at least two (2) hours between readings, using calibrated Marsh funnel and mud balance. These measurements shall be included in daily logs submitted to the Engineer. The Contractor shall document modifications to the drilling fluids, by noting the types and quantities of drilling fluid additives and the dates and times when introduced. The reason for the addition of drilling fluid additives or other modifications shall be documented and reported.
- B. The drilling fluid pressures shall be monitored at the pump discharge. These measurements shall be made during pilot hole drilling, reaming, and pullback operations. Certificates, dated within six months of use and current throughout use, shall be:
1. Pressure gauge is accurate to ± 0.5 psi.
 2. Volumetric totalizer meter is accurate to ± 0.1 cubic feet.

1.05 EXPERIENCE

- A. The pipe reaming Contractor shall have three (3) years demonstrated successful experience installing pipelines using horizontal directional boring on at least three (3) projects with similar pipe diameter, pipe material, drive lengths, ground type, and groundwater conditions. The Contractor shall submit evidence of successful experience with pipe reaming including at least (3) projects listed with project name, owner or owner's representative, location, diameter, total length, maximum drive length, depth, ground and groundwater conditions, drill rig, pipe, and problems encountered and how resolved, any claims and how resolved. Owner or owner's representative shall be listed with address and telephone number. The Contractor shall demonstrate proof of instruction by the licensor, or provide on-site services of the licensor until such time the contractor's competency to perform the work is satisfactory to the Owner and/or Engineer.
- B. The pipe reaming Contractor superintendent(s) and directional drilling equipment operator(s) shall each have at least three (3) years' experience using directional drilling equipment on at least 3 projects with similar diameters, drive lengths, and ground and groundwater conditions. The Contractor shall submit resumes for the superintendent(s) and boring machine operator(s) that will be on site for the duration of the boring process. Personnel experience shall include project names, locations, type and diameter of pipe installed, total length, maximum drive length, depth,

ground and groundwater conditions and owner or owner's representative shall be listed with address and telephone number. The drill rig operator and locator listed in the submittal shall be on site during all construction related activities required for the pipe reaming installation.

- C. Contractor's engineer shall be a Professional Engineer registered in the State of California. Experience shall include design calculations on three (3) pipe reaming projects for at least three (3) years with similar diameters, drive lengths, and ground and groundwater conditions

PART 2 – PRODUCTS

2.01 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

- A. Pipe shall be solid wall high density polyethylene (HDPE) pipe in accordance with Section 15066 High Density Polyethylene (HDPE) pipe.
- B. Handling and Storage: The Contractor shall exercise special care during the unloading, handling, and storage of all polyethylene pipe to ensure that the pipe is not cut, gouged, scored or otherwise damaged. Any pipe that has cuts in the pipe wall exceeding 5 percent of the wall thickness shall not be used and shall be removed from the site and replaced at the Contractor's cost. The pipe shall be stored so that it is not deformed axially or circumferentially. |

2.02 DIRECTIONAL DRILLING EQUIPMENT

- A. The Contractor shall provide all equipment, materials, and personnel necessary for completing the installation as shown on the Drawings and specified herein. The equipment and materials shall include but are not limited to:
 - 1. Directional drilling rig with all ancillary equipment, including drill pipes, cutting bits reaming bits, swivels, motors, pumps, hoses, missing equipment, drilling fluid processing equipment (cutting separation equipment), downhole survey equipment, fluid pressure and flow rate monitoring equipment, spare parts, pipe handling equipment, crane, backhoe, roller, side boom tractors, control cabin, control equipment, and office equipment.
 - 2. Drilling fluid and additives. All fluid additives shall be NSF/ANSI 60 certified other than soda ash.
- B. The capacity of the directional drilling system used by the Contractor shall be adequate to install the specified pipeline as required in this Section

2.03 WATER

- A. Potable water shall be used.

2.04 INSTRUMENTATION AND MONITORING

- A. At all times during the pilot bore the Contractor shall provide and maintain an instrumentation and monitoring system that is capable of accurately locating the position of the drill head in the x, y and z, axes within one (1) to two (2) inches, maximum.. The Contractor shall provide and maintain equipment that is capable of monitoring and recording drilling fluid pressures, drilling fluid flow rates, and drill pipe thrust, torque, and pullback loads.
1. Drill Head Locator System: Contractor shall monitor and record x, y, and z coordinates of the drill head relative to an established surface survey bench mark. Deviations between the recorded and design bore path shall be calculated and reported on the daily log. If the deviations exceed tolerances specified elsewhere, such occurrences shall be reported immediately to the Engineer.
 2. Drill Pipe Thrust and Torque: Drill pipe thrust and torque shall be measured and recorded at least once per drill pipe length or at 30 feet or 30-minute intervals, whichever is most frequent. Loss of circulation or sudden increases in torque or thrust shall be reported to the Engineer immediately. All thrust and torque measurements shall be made during pilot hole drilling, pre-reaming, reaming, and pullback, and shall be submitted with daily logs. Instances of thrust, torque, or pullback exceeding allowable limits shall be reported immediately to the Engineer.

2.05 DRILLING FLUIDS

- A. Drilling fluid pressures and flow rates shall be continuously monitored and recorded by the Contractor. The drilling fluid pressures shall be monitored per the requirements of this section.

2.06 DRILL RODS/DRILL STEM

- A. The Contractor shall provide high quality drill pipes that the Contractor has inspected and determined are adequate for the project requirements. Bent, cracked, or fatigued drill pipes shall not be used. Threads must be in good condition. The lengths of drill pipes should be measured and recorded meeting the requirements of ASTM F714 Polyethylene (PE) Plastic Pipe SDR (17) based on outside diameter, ASTM D1248 and ASTM D3350.

2.07 FRAC OUT SUPPLIES

- A. Before drilling is allowed to begin, the Contractor shall procure adequate equipment and supplies to contain hydrofractures. At a minimum the following must be on site.
1. Vacuum truck or tank.
 2. 40 Sand Bags (20 filled, 20 empty).

3. 2 Hand Shovels.
4. Push Broom.
5. Bucket.

Before drilling is allowed to begin, the Contractor shall construct a 6-inch high berm around the exit area. The berm shall be constructed out of a straw wattles and temporary asphalt. The berm shall enclose an area no smaller than 10 feet wide and 20 feet long.

PART 3 – EXECUTION

3.01 MOBILIZATION

- A. The Contractor shall mobilize all equipment, materials, and personnel necessary to construct the HDPE pipeline using the pipe reaming process at the locations shown in the Drawings.
- B. Entry Area: The Contractor shall set up temporary workspace in the areas approved by the Engineer. Appropriate precautions and measures shall be employed by the Contractor to prevent erosion, surface drainage, and spillage of drilling fluids or other materials that could adversely impact the environmental quality of the site. Hay bales or other suitable materials shall be used to line the work area to minimize erosion and contain any spillage or runoff.
- C. Exit Area: The exit area shall have a drilling fluid pit for containing drilling fluids and cuttings. Suitable materials combined with temporary asphalt berms shall be used to berm the exit area to minimize drilling fluid runoff.
- D. Pipe Layout Area: The Contractor shall indicate the pipe layout area in the engineering submittals. Traffic barricades shall be used to protect traffic and the pipe. A pipe launcher or roller system shall be provided by the Contractor to facilitate pipe pullback.
- E. The Contractor shall conduct walkover site inspection recording by Station, noting potential sources of interferences prior to commencing drilling operations.

3.02 GENERAL REQUIREMENTS

- A. The Contractor shall not exceed approved insertion rate or force at any time.
- B. Pipe Damage: All pipe damaged before, during or after installation shall not be used and shall be removed from the site by the Contractor and replaced at his cost to the satisfaction of the Engineer. The Contractor shall inspect the pipe prior to installation to ensure that there is no damaged pipe.
- C. All utilities crossing within (3) feet (radially) of the pipe shall be exposed prior to the start of pipe reaming operations. Utilities damaged by pipe reaming shall be repaired at the expense of the Contractor.

- D. Existing pipe may be bedded and backfilled in gravel. Contractor should calculate pull forces based upon this condition assumption as well as consideration of pipe length.
- E. Only fusion joining equipment designed for this purpose and approved by the pipe manufacturer or supplier and the Engineer shall be used for assembly of pipe fittings to ensure proper installation. The heater plate shall be equipped with accurate temperature gages to measure the temperature of the plate surfaces and to assure uniform heating such as thermometers or pyrometers. Fusion joining and other procedures necessary for correct assembly of the polyethylene pipe shall be done only by personnel trained in those skills to the satisfaction of the Engineer and the pipe supplier.
- F. Sections of polyethylene pipe shall be joined into continuous lengths on the job site above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. Threaded or solvent-cement joints and connection are not permitted. Fusion equipment used in the joining procedure shall be capable of meeting all conditions recommended by the pipe manufacturer, including but not limited to, fusion temperature, alignment, and fusion pressure. Electrofusion may be used for field closures as necessary.
- G. A fire retardant bag or suitable enclosure shall be used with the heater plate to facilitate control of the heating process and to protect the heater plate surfaces from dirt and other debris when not in use. The heater plate surfaces shall be cleaned regularly as needed to prevent accumulation of fusion welding residues or other substances that may result in faulty pipe joining.
- H. Butt fusion shall conform to ASTM D2657 and pipe manufacturer's criteria for the type of joining. Joint strength shall be equal to that of the adjacent pipe.
- I. The inside and outside of pipe ends shall be cleaned with a cotton or non-synthetic cloth to remove dirt, water, grease, and other foreign materials. The pipe ends shall be cut square and carefully aligned just prior to heating.
- J. After achieving the proper melt pattern, the pipe ends shall be brought together in a firm, rapid motion applying sufficient pressure to form a pipe bead (1/8-inch to 3/16-inch in height) around and inside the entire circumference of the pipe.
- K. The butt-fused joint shall be in true alignment and shall have uniform rollback beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe. All defective joints shall be cut out and replaced at the expense of the Contractor.
- L. The inside weld bead shall be removed by cutting the bead away without scoring the inside wall of the pipe. The Contractor shall submit to the Engineer, for review as part of the submittal requirements, a debearing process for use in removing the internal bead for the newly joined HDPE pipe sections.

3.03 INSTALLATION OF PIPE

- A. After the sewage diversion/bypass is in effect and prior to pipe reaming, the

Contractor shall flush and clean all parts of the system by removing all accumulated debris, rocks, gravel, sand, silt, and other foreign material from the pipe per the Contract Documents.

- B. Televising the mains for abnormality that could prevent pipe reaming construction and to determine the locations of the laterals that are in service. If any abnormality that could prevent the pipe reaming operation is found, the Contractor shall inform the Engineer immediately for direction.
- C. Prior to pipe installation, Contractor shall determine if point repairs are required for proper installation of pipe. Separate payment for this work, in conformance with the 20-Foot Point Repair bid item, will be made and it is not considered incidental to the pipe reaming process.
- D. For spot repairs installed after sewer cleaning and televising has occurred, the Contractor shall conduct a follow-up PACP CCTV inspection prior to pipe reaming.
- E. Perform test roll of locating equipment on surface to ensure correct readings. Perform test roll at the start of the pipe replacement to ensure accuracy and note discrepancies. Include here: Record and submit test roll data.
- F. The Contractor shall maintain the work area in a manner that shall minimize adverse impacts to private property and on other public use activities. The Contractor shall proceed with work in a safe, orderly manner, while maintaining the work site free of debris and unnecessary equipment and materials.
- G. The Contractor shall provide adequate control of surface water drainage and runoff, and provide adequate erosion control measures in accordance with Section 01560 Temporary Controls.
- H. The Contractor shall control operational pressures, drilling fluid spillage. This includes any spillages or returns at entry and exit locations or at any intermediate point. All inadvertent returns or spills shall be promptly cleaned up. The Contractor shall maintain in site mobile spoil containment and removal equipment during all drilling, reaming, and pullback operations and shall be capable of quickly containing and removing spoils. The Contractor shall immediately notify Engineer of any inadvertent returns or spills and immediately clean up the return or spill. The Contractor shall provide equipment and materials on-site to contain and clean up any drilling fluid returns or frac-outs and shall prevent drilling fluids from entering any creeks or storm drains.
- I. The Contractor shall select mixture proportions to ensure borehole stability, reduce drag on the pipe, and completely fill the annular space between the bore and the pipe to control settlement. Management and disposal of drilling fluids shall be the Contractor's responsibility.
- J. Pipe installation sections shall be scheduled to maximize installation lengths and minimize the number of insertion pits required. Insertion pits shall be located over manhole replacement locations, if possible, to minimize surface disturbance.

- K. The pilot hole shall follow the design path of the bore shown on the Contract Drawings.
1. Horizontal and Vertical Tolerances
Approximately 50% of diameter maximum or 50% of difference of pipe ID and drill steel OD, one (1) to two (2) inches, maximum.
- L. The pilot bore in combination with the existing pipe (host pipe) shall be reamed using equipment and methods submitted by the Contractor. All measurements called for during the pilot boring operation except tracking shall also be made and recorded during the reaming operations, and submitted on the daily logs.
- M. Pipe Pullback
1. The pipe shall be installed by pulling it into the reamed bore path in a continuous operation, behind a final reaming tool selected by the Contractor.
 2. Pull detection wire along with HDPE pipe.
 3. The pipe shall be isolated from excessive torsional and axial stresses by a swivel device with a pre-established breakaway tensile capacity that is lower than the allowable tensile strength of the pipe.
 4. The Contractor shall monitor and repair damaged pipe roller during the pullback operation to avoid damage to the pipe.
 5. Contractor shall cease operation if the pipe is damaged and shall repair the pipe using the manufacturer's recommended procedure before resuming installation.
- N. Pipe shall immediately follow the reamer. The reamer overcut should not exceed the maximum diameter of the replacement product by more than 3 inches.
- O. Termination: The pulling operation will tend to stretch the pipe, excessive stretching of 1.5 percent will not be allowed. On reaching the exit point, the pipe shall be pulled beyond this point to compensate for the stretching. A 12-hour minimum relaxation period is required before the sewer is cut to length, attached to manholes or structures, and before laterals can be attached to the new sewer. The Contractor shall provide bypass pumping during construction and the relaxation period.
- P. The Contractor shall anchor the pipe to concrete structures or manholes after the pipe has been installed along the length of sewer main replaced. The Contractor shall use a Fernco manhole adaptor or approved equal, as supplied by the pipe manufacturer, which is firmly seated perpendicular to the pipe axis, around the pipe exterior and cast into the structure base or near the structure wall center as shown in the details.
- Q. Slurry generated by the installation shall be disposed of in accordance with all applicable local, state and federal regulations.

3.04 SAFETY

- A. Combustible materials (fuel, oil, lubricants, etc.) shall be stored in a well-ventilated storage facility as required by law..
- B. The Contractor shall procure and maintain all temporary lighting needed for Contractor's operations, safety, testing, and inspection. Temporary lighting shall be removed after completion of construction.
- C. The Contractor shall erect appropriate barriers, warning lights, and signs, painted with approved colors, warnings, and graphics as required to ensure adequate warning to personnel and the public.
- D. Install an enclosure fence around the work areas. The enclosure fence shall include a lockable gate and should be adequate to prevent entry of animals and people from unauthorized entry.

3.05 ADVANCED NOTICE AND INSPECTIONS

- A. The Contractor shall provide at least 2 work days advance written notice to the Engineer of the planned inception of major drilling activities, including pilot hole launch, prereaming, reaming, and pipe pullback. The Contractor shall immediately notify the Engineer, in writing, when any significant problems are encountered or if ground conditions are construed by the Contractor as being materially and significantly different than the conditions presented in the Geotechnical Report and the Contract Documents. All work by the Contractor shall be performed in the presence of the Engineer, unless Engineer grants prior written approval to perform such work in Engineer's absence.
- B. The Contractor shall undertake the following steps prior to commencing drilling operations:
 - 1. Notify USA at least three (3) working days prior to commencing drilling operations.
 - 2. Positively locate and stake all existing lines, cables, or other underground facilities including exposing any crossing or parallel facilities which are located within 10 feet of the design drill path.
 - 3. Modify drilling practices and downhole assemblies to prevent damage to existing facilities.
 - 4. Pothole utilities as described in the Contract documents and report any possible conflicts to Engineer.

Contractor shall be responsible for all losses and repairs occasioned by damage to underground facilities resulting from drilling operations.
- C. The Contractor shall notify the Engineer immediately in the event that any obstruction is encountered that prevents further advancement of the drill stem, or pullback of the pre-reamer, reamer and/or pipe. The Contractor and Engineer shall

investigate the cause and together determine and appropriate response. Appropriate response may include revisions to equipment or methods, retraction and re-drilling of a portion of the bore, or abandonment of the hole. If abandonment is deemed necessary, the Contractor shall recover, to the extent practical, any drill pipe and tools in the bore, and properly abandon the bore, unless otherwise directed in writing by the Engineer.

If the bore is abandoned, the Contractor shall pressure-grout the abandoned bore with a lean cement-sand grout mixture, or approved materials. If the bore is abandoned, the Contractor shall be allowed to begin a second attempt to install the pipeline at an alternate location approved in writing by the Engineer. The Contractor shall take all reasonable actions to complete the installation with minimal delays. The extra costs and payments associated with encountering the obstruction shall be negotiated between the Town and Contractor, based on reasonable time and materials.

3.06 DAILY LOGS AND RECORDS

- A. Daily logs and records shall be maintained by the Contractor, documenting drilling lengths, location of drill head, drilling fluid pressures and flow rates, drilling fluid losses, inadvertent returns, drilling times required for each pipe joint, any instances of retraction and re-drilling of the pilot bore of segments thereof, and any other relevant observations. These records shall be maintained and updated daily, or more frequently, as directed by the Engineer. The position of the drill head shall be continuously tracked if work deviates from existing pipe alignment. Submit complete, legible, written daily logs and records within one (1) working day of the date to which the records correspond.

3.07 NOTIFICATIONS

- A. Submit written notification at least three (3) working days prior and profile of the bore path and the location shown on the plans and specifications herein. Notify the Engineer immediately upon discovery of any deviations.
- B. Document any variations between the actual plan and profile of the bore path and the location shown on the plans and specifications herein. Notify the Engineer immediately upon discovery of any deviations.

3.08 REMOVAL OF TEMPORARY FACILITIES

- A. At the completion of construction, Contractor shall remove all temporary facilities installed by the Contractor. Unused soil, aggregate, and other materials shall be removed and disposed of at approved sites. Any damage to streets, lawns, common areas, and sidewalks shall be repaired to their original or better conditions at no additional cost to the City.

3.09 INSPECTION AND TESTING

- A. Cleaning and Video Inspection

After pipe reaming installation, the pipes shall be cleaned and tested by the Contractor in accordance with the requirements of Section 02735 Sanitary Sewer System Testing and Cleaning.

B. Mandrel Test

Damage to the pipe resulting from excessive pullback, bending, torsional stresses, or external pressure during installation is the responsibility of the Contractor, including costs for replacement and labor and materials. To confirm no damage to the pipe, upon completion of insertion and pull back, the Contractor shall perform a mandrel test.

At least seven (7) days after installation, the completed pipe installed by pipe reaming methods shall be mandrel tested. The total deflection of the installed pipe shall not exceed 7-1/2% of the inside pipe diameter.

The vertical deflection shall be checked by manually pulling a go/no-go deflection testing mandrel through the pipe. The mandrel shall be specifically designed for this purpose, and the Contractor shall submit shop drawings to the Engineer detailing the type of mandrel to be used. The mandrel shall be as manufactured by Armco In., or approved equal, and shall have the specified accuracy in all positions of rotation. If the mandrel cannot pass through the pipe, it shall be considered collapsed and damaged.

The Contractor shall conduct all deflection testing in the presence of the Engineer. Should any pipe section exceed the maximum deflection specified, the Contractor shall undertake any remedial action as required to relieve the stress on the pipe and restore the cross section.

Following installation, the first four feet of the new carrier pipe shall be cut-off and inspected as to cuts and gouges. All cuts and gouges shall be less than the maximum allowed by the pipe manufacturer.

C. The pipe shall be tested with low pressure air in accordance with the requirements of Section 02735 Sanitary Sewer System Testing and Cleaning.

If the pipe fails the air test, the Contractor shall locate the source(s) of the leak and repair the defect(s). The pipe shall then be retested until a satisfactory result is obtained.

Despite any previous testing, any leaks developed before the end of the 1-year guarantee period shall be expeditiously repaired by the contractor at no expense to the town.

3.10 SPOT REPAIRS AFTER INSTALLATION

- A. TV inspection shall be performed after hydraulic cleaning has been completed and shall conform to the provisions in Section 02736, Closed Circuit Television (CCTV) Inspection of Sanitary Sewer System. Construction deficiencies considered in need of correction prior to acceptance of the work are stated in Section 15050 General Piping.

3.11 AS-BUILT INFORMATION

- A. Submit As-Built bore logs.

- B. Submit an as-built survey of the pilot hole within two (2) work days of completion of the pilot hole.
- C. Submit as-built drawings showing plan and profile views of the installed pipeline, correctly referenced to project benchmarks, and major site features. The actual depths and horizontal offset of installed sanitary sewer lines shall be shown on the as-built plans at intervals of 20 feet or less. Final profiles with existing pipe depth and other location information shall be shown on the as-built plans. In addition, all pothole excavation locations and data shall be shown on the as-built plans.

****END OF SECTION****

SECTION 02735

SANITARY SEWER SYSTEM TESTING AND CLEANING

PART 1 - GENERAL

1.01 SUMMARY

- A. Contractor shall perform all pipeline flushing and testing, complete, for sanitary sewerage system in accordance with the Contract Documents.
- B. Contractor shall be responsible for obtaining, conveying, and properly disposing of water used in the testing operations.
- C. Related Sections
 - 1. SECTION 02736, CCTV INSPECTION OF SANITARY SEWER SYSTEM
 - 2. SECTION 15050, GENERAL PIPING

1.02 REFERENCES

- A. Town of Hillsborough
 - 1. Standard Details for Public Works Projects (latest edition)
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM C828-03 – Standard Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Lines
 - 2. ASTM C1244-05 – Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
- C. Uni-Bell PVC Pipe Association
 - 1. Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe, current Uni-B-6 pamphlet

1.03 CONTRACTOR SUBMITTALS

- A. In accordance with the Contract Documents, a testing schedule shall be submitted in writing to the Engineer for approval a minimum of seventy-two (72) hours before testing is to start.
- B. Calibration certifications for test gauges used on this project shall be submitted.

PART 2 - PRODUCTS

2.01 MATERIALS REQUIREMENTS

- A. Furnish compressors, piping, hosing, valves, test gages, test plugs, joint test apparatus, power, stop watch, and personnel required for conducting the test.
- B. Test gauge shall be 0 to 15 psi with max 0.5 psi increments.

- C. Furnish a valved connection for the Town to attach a gauge. The Engineer will witness the test.
- D. Provide temporary valves, bulkheads, plugs, and other pressure-testing equipment materials subject to the Engineer's review.
- E. No materials shall be used which would be injurious to the public, personnel, adjacent improvements, nor the pipeline structure and future function. Air test gauges shall be laboratory-calibrated test gauges and shall have been recalibrated by a certified laboratory, within three (3) months, prior to the leakage test for this project. Any necessary recalibration for gauges that do not have calibration certificates within three (3) months of leakage testing shall be done at the Contractor's expense.

PART 3 - EXECUTION

3.01 GENERAL

- A. All pipelines shall be cleaned by balling, flushing, and/or other approved methods prior to testing. Debris shall be removed from the downstream manhole until all pipelines are clean.
- B. All testing operations shall be performed in the presence of the Engineer.

3.02 TESTING OF PIPING

- A. General: All gravity sewer pipes and service laterals shall be tested for exfiltration and or infiltration and deflection, as specified. All manholes shall be tested for leakage, as specified. Manholes shall be tested prior to backfill placement, whereas all pipe shall be backfilled prior to testing. All leakage tests shall be completed and approved prior to placing of permanent resurfacing. When leakage or infiltration exceeds the amount allowed by the Contract Documents, the Contractor at its expense, shall locate the leaks, submit a repair procedure(s) for the Engineer's review, and make the necessary repairs or replacements in accordance with the Contract Documents to reduce the leakage or infiltration to the specified limits. Any individually detectable leaks shall be repaired, regardless of the results of the tests. Pipe joint leakage repair solely with cement grout will not be permitted.
- B. Leakage Tests
 - 1. The Contractor shall, in the presence of the Engineer, test the water tightness of all main sewer lines in accordance Contract Documents. The test will be made between each adjacent structure.
 - 2. The Contractor shall use the Air Test as described below.
 - a. When Tested:
 - 1) The pressure test shall be made after the backfill is satisfactorily compacted.
 - 3. The test, as noted in item 1 or 2, above, is considered the "official test." However, preliminary testing is strongly recommended and may be conducted by the Contractor at any time prior to the "official test."

- a. AIR TEST REQUIREMENTS: A sudden expulsion of a poorly installed plug during air testing can be dangerous. The Contractor shall meet the following requirements:
 - 1) The Contractor shall be fully responsible and take all precautions necessary to ensure the safety of their workers.
 - 2) All plugs shall be adequately braced to support the full load developed.
 - 3) 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.
 - 4) Each section of sewer main shall be tested between successive manholes 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 started over again.
 - 5) The final leakage test of the sewer main line shall be conducted in the presence of the Engineer.

4. Leakage Test Acceptance

- a. Where the actual leakage exceeds the allowable, the Contractor shall determine the cause and remedy it before the pipeline is accepted. For the purpose of this subarticle, a section of pipeline is defined as the length of pipe between successive manholes or special structures.
- b. The Contractor shall correct any visible leaks in the pipeline or manholes.
- c. The Contractor shall dispose of all water so as not to cause a public nuisance and as acceptable to the Engineer.
- d. If any cleanup activities or fines ensue from a failed leakage test, any associates costs incurred by the Town will be deducted from payment to the Contractor.
- e. In no case shall the Contractor place the newly constructed sewer in operation without the approval of the Engineer.

3.03 TESTING OF MANHOLES

- A. Vacuum Testing: All new manholes shall be vacuum tested in accordance with Contract Documents. Vacuum test procedures and requirements shall be as follows:
 - 1. After completion of the manhole barrels but prior to backfilling and grade ring installation, all openings in the manholes shall be sealed with plugs and a rubber ring "donut" type plug inserted inside the opening of the cone.
 - 2. A small vacuum pump shall be attached to a hose connected to the plug and 10 inches Hg of vacuum applied.
 - 3. The vacuum is permitted to stabilize for 1 minute; then the test shall begin.

4. The time shall be measured for the vacuum to drop to 9 inches Hg. The manhole must maintain vacuum such that no greater than 1 inch Hg of vacuum is lost during the specified test period.
5. The specified test period is as follows:

Manhole Depth (Feet)	Test Period Based On Manhole Size (seconds)		
	48 inch Diameter	60 inch Diameter	72 inch diameter
Up to 8	20	26	33
10	25	33	41
12	30	39	49

6. The manhole is acceptable if the time for the vacuum reading to drop from 10 inches Hg to 9 inches Hg is greater than the test period. Manholes that fail the test shall be patched as required and retested.
7. A vacuum regulator shall be provided on the vacuum pump such that no greater than 10.5 inches Hg vacuum can be applied to the manhole during the test.
8. All manholes that do not meet the leakage test, or are unsatisfactory from visual inspection, shall be repaired to the satisfaction of the Engineer and retested at no additional cost to the Owner.

3.04 NOT USED

3.05 CLEANING

- A. After the sewers have satisfactorily passed the tests required in this Section, and before CCTV inspection required in the Contract Documents, the Contractor, in the presence of the Engineer, shall clean each section of the sewer in the following manner after placing a wire screen with a one-quarter of an inch (1/4") mesh or smaller in the downstream manhole to catch debris and to prevent any debris from being washed into the existing sewer system.
- B. Hydraulic Cleaning
 1. All hydraulic cleaning equipment shall be truck mounted. Water jet cleaning equipment shall include a water tank, auxiliary engine, pumps, and hydraulically driven hose reel.
 2. Cleaning shall remove all grit, sludge, rocks, debris, roots, grease accumulations, and obstructions from the sewer. Sewer cleaning method shall be water jetting.
- C. Debris Removal
 1. During cleaning operations, the Contractor shall provide a means of catching and removing the dislodged debris conveyed downstream with the sewer flow. The method chosen shall not allow the transport of debris to downstream sewer reaches.
 2. All debris removed from the sewer may be stored until the day's end, whereupon the Contractor shall be responsible for its proper disposal off site.

D. Recleaning

1. If television inspection indicates that the sewer is not adequately cleaned, the Contractor shall remove all equipment or materials from the sewer and reclean the sewer at no additional expense to the Town.

3.06 DISCHARGE OF CLEANING WATER

- A. Water used for cleaning the lines may be discharged to the existing sewer system after screening and removal of solids, and as approved by the Engineer.

****END OF SECTION****

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SECTION 02736

CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION OF SANITARY SEWER SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

- A. All sewers to be replaced by pipe reaming shall be cleaned and visually inspected by means of closed-circuit television (CCTV) and video recorded before and after spot repairs are completed and prior to pipe bursting or pipe reaming to assure that existing pipe conditions are acceptable for pipe bursting or pipe reaming, to locate and verify size of all active and inactive lateral connections, and locate other points of significance such as locations of: unusual conditions, roots, sags, storm gravity pipe connections, and broken pipe. Points of significance shall be noted.
- B. All sewers installed as shown in the Contract Documents shall be visually inspected by means of closed-circuit television (CCTV) and video recorded after testing and cleaning activities.
- C. The inspections shall be completed one sewer section at a time. A section may be from one manhole to another or a section may be an individual sewer lateral.
- D. Flows shall be controlled as specified herein while the inspection work is in progress.
- E. Related Sections
 - 1. SECTION 02735, SANITARY SEWER SYSTEM TESTING
 - 2. SECTION 02739, BUILDING SEWER (LATERAL) CONSTRUCTION AND REINSTATEMENT
 - 3. SECTION 15050, GENERAL PIPING

1.02 REFERENCES

- A. Town of Hillsborough
 - 1. Standard Details for Public Works Projects (latest edition)

1.03 SUBMITTALS

- A. Furnish two (2) copies of a color video recording on DVD, with audio, for each section of main sewer and building sewer inspected, and prints of all photographs taken during the inspection. The Contractor shall submit copies for both pre- and post-construction videos.
- B. The recording shall show the date the work was performed and the location / street name and Town designation of the entry manhole.
- C. The recording shall indicate cumulative footage from the entry manhole, as verified by the camera-mounted transmitter and receiver.
- D. Furnish a report and photos indicating the location of all laterals and connections encountered, the location of any breaks, obstructions, offsets, high points, sags or

other major defects, and the condition of manholes. All entries in the report shall be in NASSCO PACP format.

1. The Contractor shall review the videos and logs prior to submittal. The submittal shall include a listing of requested changes, for the Town's approval. For example, if the Contractor feels that a point repair is not necessary to perform the work, this request for change shall be cited on a list provided as part of the CCTV submittal.
- E. Pre and post video reports shall include rating for sag severity:
 - 0 = less than 1 inch
 - 1 = 1 inch – 1/4 pipe
 - 2 = 1/4 – 1/2 pipe
 - 3 = > 1/2 pipe
- F. All reports shall be neatly typed.
- G. Prior to commencement of the Work, the Town shall review in detail the contents of the pre-construction videos.
- H. Post construction video reports shall be submitted within two weeks after completion of each segment.
- I. The Town shall have ten (10) working days for review of the CCTV data.

1.04 SAFETY

- A. Have a documented safety program in place which meets all applicable occupational safety and health standard, rules, regulations and orders established by the State of California.

1.05 EXPERIENCE

- A. The person conducting the CCTV inspection shall have a minimum of five years of experience in the television inspection of sanitary sewers.
- B. The recordings shall be reviewed by a person having a minimum of five years of experience in evaluating and repairing problems in sanitary sewers.

PART 2 - PRODUCTS

2.01 TELEVISION CAMERAS

- A. The television camera used for inspection work shall be color format, specifically designed and constructed for use in sewers. Pan and tilt camera shall pan 275 degrees and rotate 360 degrees for close up viewing.
- B. Lighting and camera quality shall allow a clear, in-focus picture of the entire periphery of the pipe for a minimum distance of six feet.
- C. The camera shall have a 350 line per inch, or greater resolution.
- D. The camera shall be operative under 100 percent humidity conditions.

- E. Cameras for use in sewers 8-inches in diameter and larger shall be of the “articulating head” type to allow laterals and defects to be viewed directly.
- F. To ensure acceptable picture quality under all possible conditions that may be encountered during the inspection, a variable intensity control for lighting, and a remote adjustment for camera focus, shall be provided for the operator.
- G. The camera, television monitor, and other components of the video system shall be capable of producing a color picture of quality adequate to identify major defects and locate laterals accurately.
- H. A push camera with color display shall be available for use at all times during construction to inspect laterals or otherwise inaccessible pipelines.

2.02 CLEANING EQUIPMENT

- A. Cleaning may be accomplished by jetting, however, contractor shall have mechanical cleaning equipment available for use at all times to remove hardened deposits or large objects.

PART 3 - EXECUTION

3.01 REQUIRED FREQUENCY OF CCTV INSPECTION

- A. For pipe bursting or pipe reaming; after cleaning of the sewer segment and prior to any construction activities for the segment.
- B. After any point repairs are completed prior to bursting or reaming.
- C. After open cut, pipe burst, or pipe reaming is complete, after final air or leakage testing, cleaning, and after the "subbase" or "base" material portion of the paving is satisfactorily compacted but before pavement is installed.
- D. Laterals shall be inspected as directed by the Engineer.
- E. Sewer laterals to be replaced by pipe bursting or pipe reaming shall be video inspected as specified in Section 02739.

3.02 CLEANING FOR PIPE BURSTING OR PIPE REAMING SEGMENTS

- A. Clean the gravity pipe to be sure the pipe is clean and free of obstructions so as not to prohibit pipe bursting or pipe reaming operations.

3.04 CLEAN

- A. “Clean” in this specification is defined as the removal of all accumulations including sludge, dirt, sand, rocks, asphalt, concrete, grease, roots and any other items that might be found in the sewer.

3.05 FLOW CONTROL

- A. General
 - 1. When sewer line depth of flow at the upstream manhole of the section being inspected is above the maximum allowable depth shown under “Allowable Depth of Flow,” the flow shall be reduced by operation of pump stations, temporarily plugging or blocking of the flow, or by pumping and bypassing of the flow.

2. Allowable Depth of Flow – No flow shall be allowed from the upstream manhole into the sewer being televised.
3. Plugging or Blocking
 - a. A sewer plug shall be inserted into the line upstream of the section being inspected.
 - b. The plug shall be so designed that all or any portion of the sewage can be released.
 - c. During CCTV inspection, flow shall be reduced to the limits specified herein.
 - d. After the work has been completed, flow shall be restored to normal.
4. Flow Control Precautions
 - a. When flow in a sewer is plugged, blocked, or bypassed, precautions shall be taken to protect all sewers from damage that might result from sewer surcharging.
 - b. Precautions shall also be taken to ensure that flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.

3.06 INSPECTION PROCEDURES

- A. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the condition of the sewer.
- B. In no event will the television camera be pulled at a speed greater than 30 feet per minute.
- C. Manual winches, power winches, TV cable, and power rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line.
- D. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be set up between the two manholes of the section being inspected to ensure good communications between members of the crew.
- E. The importance of accurate distance measurements is emphasized.
- F. Measurement for location of defects shall be made by means of a camera-mounted transmitter and aboveground receiver.
- G. Marking on the cable, which requires interpolation for depth of the manhole, will not be permitted.
- H. To establish criteria for video picture quality to be maintained throughout the project, the Contractor shall furnish a recording of a previous sewer inspection that meets these specifications for quality. This recording shall become the property of the Town. It will be used as a standard to judge the acceptability of recordings produced on this project.

- I. The audio portion of the inspection report, recorded at the time of inspection, shall be intelligible in its entirety. The information contained on the audio recording shall include (1) the location of the sewer, (2) the Town's designation for the manholes involved, (3) the direction of travel, (4) a description of conditions in the sewer as they are encountered, and (5) the location and entrance condition of service laterals.
- J. The video shall include legible on-screen continuous indications of the following items during the entire inspection (1) date and time of inspection, (2) upstream and downstream manhole designations and direction of travel related to flow, (3) current location footage, and (4) sewer diameter.

3.07 PAYMENT FOR ADDITIONAL INSPECTION

- A. Any portion of the sewer found not to conform with these Specifications shall be corrected by the Contractor. Sewers so corrected shall be reinspected by Contractor in accordance with this Section at no additional cost to the Town.

****END OF SECTION****

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SECTION 02739

BUILDING SEWER (LATERAL) CONSTRUCTION AND REINSTATEMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. The Contractor shall be responsible for locating and connecting to existing building sewers (laterals).
- B. This work will include replacing portions of the existing building sewer and extending the existing building sewer to connect with the new or rehabilitated main sewer installed under this Contract.
- C. The Contractor shall install 4-inch laterals (minimum) at all impacted residential dwellings, as shown on the Contract Documents.
- D. The Contractor shall install 6-inch laterals (minimum) at all impacted multi-family dwellings (4 or more units) and at all industrial and commercial properties, as shown on the Contract Documents.
- E. The Contractor shall provide written notification of work activities and sewer outages to all local users in accordance with the project Technical Specifications.
- F. The Contractor may work with residents and businesses to minimize discharge to the sewer and may utilize temporary plugging or flow stoppage from the building sewers (laterals) during the work period if no adverse back up of sewage occurs at connected buildings, otherwise the Contractor shall actively bypass pump from building sewer (lateral) connections and/or cleanouts.
- G. Sewer lateral connections shall be reestablished to each user as quickly as possible, and shall not exceed eight (8) hours from the initial disconnection of the building sewer from the sewer main or from the initial service interruption to the user.
- H. Related Sections
 - 1. SECTION 01720, SEWER OUTAGE NOTIFICATIONS
 - 2. SECTION 02145, SEWAGE FLOW CONTROL
 - 3. SECTION 15050, GENERAL PIPING

1.02 REFERENCES

- A. Town of Hillsborough
 - 1. Standard Details for Public Works Projects (latest edition)

PART 2 - PRODUCTS

2.01 PIPELINE MATERIALS

- A. When the new main is HDPE pipe, if pipe bursting or pipe reaming option is selected by the Contractor and approved by the Engineer, the laterals shall be HDPE pipe. The Contractor shall excavate to expose the existing sewer lateral connection locations. The new laterals shall be connected to the new sewer HDPE main by use of a heat

fused saddle in accordance with the pipe manufacturer's recommendations. Saddle connections shall be tested prior to connection of sewer laterals.

PART 3 - EXECUTION

- A. Private building sewers currently in service shall be connected to the sewer lateral. The excavation process shall be completed by mechanical means as defined in the Contract Documents and by hand digging as required.
- B. The Contractor may construct sewer laterals in accordance with Town standard Details or by pipe bursting or pipe reaming. If the Contractor proposes to construct laterals by pipe bursting or pipe reaming, he shall submit to the Engineer for approval the materials and methods to be used to complete construction of the laterals. During pipe bursting or pipe reaming of laterals, the Contractor's methods shall not place loads on the main, shall not deform or damage the main, and shall not create sags in the main. If deformation, damage or sags in the main or laterals are created by the Contractor's operations, the Contractor shall repair or replace the affected pipe to the satisfaction of the Engineer at no additional cost to the Town.
- C. Connection to existing service laterals shall be made after the existing sewer main has been replaced and successfully tested. It is the Contractor's responsibility to make sure that all service connections are reconnected.
- D. Reconnection of existing services to the sanitary system shall be completed as described below:
 - 1. All building sewers shall be connected to the sanitary sewer main line at a wye (PVC pipe) or fusion coupling (HDPE) installed on the main line. The connection of the new building sewer pipe to the existing building sewer will be made with suitable adapters or couplings with stainless steel bands.
- E. It is the Contractor's responsibility to locate building sewers and to determine lateral sizes, and whether building sewers are live or have been abandoned.
- F. All efforts have been made to show existing service building sewers on the drawings, however, the Town cannot ensure that there may be others not shown or shown in other locations. Some project sewer line videos are available on request to aid the Contractor in locating all building sewers; however, the Town does not guarantee the completeness or accuracy of the video logs. Sewers to be replaced by pipe bursting or pipe reaming shall be video inspected at the Contractor's expense prior to construction.
- G. The existing building sewer connections to the main sewer may be encased in mortar, concrete or reinforced concrete. There will be no additional compensation for demolition of this material.

****END OF SECTION****

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SECTION 02800
TRAFFIC CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes requirements for traffic control
- B. Related Sections
 - 1. SECTION 02200, EARTHWORK
 - 2. SECTION 15050, GENERAL PIPING

1.02 REFERENCES

- A. Town of Hillsborough
 - 1. Standard Details for Public Works Projects (latest edition)
 - 2. Temporary Traffic Control Guidelines (latest edition)
- B. Caltrans
 - 1. Standard Plans and Standard Specifications (latest edition)

1.03 DEFINITIONS

- A. Traffic Control Devices: Signs, signals, markings and other devices placed on or adjacent to a road to regulate, warn or guide traffic.
- B. Traffic Control Measures: Elements of the Traffic Control Plan including traffic control devices, personnel, materials, and equipment used to control traffic through the work Zone.
- C. Traffic Control Plan: A written and drawn plan for handling traffic on a specific roadway through the Work Zone.
- D. Work Zone: A traveled area within the construction used by vehicles, bicyclists and pedestrians.

1.04 TRAFFIC CONTROL REQUIREMENTS

- A. Provide and maintain temporary traffic control measures to provide for the safe passage of vehicular and pedestrian traffic through and within the Project site.
- B. Under some circumstances, construction may temporarily prevent access into private driveways. The Contractor's attention is directed to the fact that access to all driveways and entrance roads shall be maintained at all times, except during the time such driveways or entrance roads are being restored or repaired as part of this contract. Such work shall be completed and vehicular access shall be restored to each driveway or entrance road within six (6) hours after commencement of such work. The Traffic Control Plan shall specifically identify these occurrences and provide a plan for minimizing the temporary condition.

1.05 TRAFFIC CONTROL PLAN AND ENCROACHMENT PERMIT

- A. Prepare and submit detailed Traffic Control Plans to the Engineer for approval. The Traffic Control Plans shall show proposed traffic control measures, signage and other traffic control devices, barricade locations, lane width reductions and lane shutdowns that will be implemented by the Contractor to maintain a safe work site.
 - 1. Town shall have 10 working days to review traffic control plans and submittals.
- B. Selection of protective devices and directional measures that will be used, including the timing for their use and specific locations, is the responsibility of the Contractor.
- C. The Contractor shall not start work within a Work Zone until the Traffic Control Plans have been approved by the Town Engineer.
- D. All traffic control shall conform to California Manuals of Uniform Traffic Control Devices (CaMUTCD).

1.06 PUBLIC NOTICE

- A. Notify the Engineer in person or by telephone at least five (5) working days before implementing the approved Traffic Control Plan. In addition, the Contractor shall notify these agencies in writing at least 3 days in advance of the implementation of any road closures or other restrictions that could cause delay to emergency vehicles:
 - 1. Town of Hillsborough Police Department
 - 2. Central County Fire Department
- B. Notify local residents by door hanger at least seventy-two (72) hours in advance of obstructions and inconvenience due to construction activities, including:
 - 1. Obstruction of private driveways.
 - 2. Elimination of on-street parking in front of private residences.
 - 3. Any other similar inconvenience that may impact local residents.

Door hangers shall include Town and Contractor contact information and shall be approved by the Engineer prior to use.

1.07 TEMPORARY SIGNS

- A. Erect informational signs advising pending work and lane closures two weeks in advance of actual work, as required by the Town. Information on the signs shall be readable to both directions of travel.
- B. Erect signs advising of rough road conditions when temporary pavement has been placed, or when plates are in use.
- C. When needed to advise traffic of approaching conditions, Contractor shall use electronic signs with sequential arrow or changeable message.
 - 1. Electronic sign shall be installed beyond the outside shoulder of the roadway or behind an existing barrier or guardrail.
 - 2. The sign shall display the entire message within 7.5 seconds.
- D. Temporary signs shall be one sided, and shall be wooden or metal with tripod supports. The Contractor shall add sandbags to support legs for ballast.

- E. Signs that will remain in place at night must have reflective florescent orange sheeting.
- F. Changeable message signs and/or arrow boards may be required at any or all locations.

1.08 TEMPORARY BARRICADES

- A. Temporary barricades in good condition, as approved by the Engineer, are required to protect vehicles from areas with drop-offs.
- B. Use pin-and-loop type concrete barriers conforming to Caltrans Standards.
- C. Wooden Barricades shall follow industry standard with reflective devices and an 8-inch diameter amber flashing light using one, 50-watt, 12-volt, battery operated incandescent lamp. The flash shall be visible for 1,200 feet. Failed bulbs shall be promptly replaced.

1.09 FLAGGERS

- A. The Contractor's flaggers must wear orange, yellow, or yellow-green reflective vests and orange, yellow, yellow-green or white hardhats at all times.
- B. Utilize highly visible STOP/SLOW sign paddles with reflective sheeting.
- C. Utilize portable, self-contained two-way radios when more than one flagger is required for traffic control.
- D. Employ properly trained persons that have completed an approved traffic control and flagging course.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install, operate and maintain temporary traffic control devices in accordance with the Traffic Control Plan.
- B. Traffic control devices shall be promptly moved as construction progresses, and removed when no longer required.
- C. Turn, cover, or remove existing permanent traffic control devices when these devices conflict with approved temporary devices.
- D. The Contractor shall prosecute the work in such a manner as not to damage any private property. All equipment and material shall be stored by the Contractor off the traveled way during non-working hours. Should any such structures or property be damaged during the operation of the Contractor, it shall immediately notify the proper owners or authorities and shall arrange for immediate repair of same at its expense.
- E. Existing pedestrian facilities shall be maintained in a safe condition through construction areas within the project right-of-way at all times. In local residential areas, the requirement for paved walkway area may be waived if other suitable and safe surface is available and is approved by the Engineer. All pedestrian facilities

provided through or around construction areas shall be accessible for persons with disabilities in conformance with the requirements of the Americans with Disabilities Act and implementing laws and regulations.

3.02 LANE CLOSURES

- A. Do not close any lane until the area is signed in accordance with the approved Traffic Control Plan.
- B. Two-way traffic shall be maintained whenever possible. When one lane must be closed, one-way traffic must be controlled by a flagger in each direction of traffic at all times.
- C. At the end of each workday, restore conditions to allow two-way traffic. Install temporary paving or cover open excavations with heavy steel trench plates, as appropriate for the conditions, to provide a minimum 11-foot wide traveled roadway in both directions. Provide signs indicating rough road conditions when using temporary pavement.
- D. Do not stop or hold vehicles for more than ten (10) minutes.
- E. Allow emergency vehicles immediate passage at all times.

3.03 TEMPORARY BARRICADES

- A. Concrete Barriers shall be installed as follows.
 - 1. Flare the leading end at a flare rate of 14:1.
 - 2. When placing concrete barriers, maintain a minimum of 24-inches from face of barrier to edge of traffic lane.

3.04 FLAGGERS

- A. Provide flaggers to safely control movement of vehicles and pedestrians around areas disrupted by the Work
- B. Flaggers shall be located in positions that provide sufficient time for motorists to respond to the flagger's instructions, and these positions shall be designated on the traffic control plan.

****END OF SECTION****

SECTION 03123

CONTROLLED LOW STRENGTH MATERIAL

PART 1 - GENERAL

1.01 REQUIREMENTS

- A. The Contractor shall provide Controlled Low Strength Material (CLSM), also known as controlled density fill (CDF), complete and in place, in accordance with the Contract Documents.
- B. CLSM shall consist of a mixture of aggregate, Portland cement, mineral admixtures, water, and at the option of the Engineer, chemical accelerating admixtures.
- C. CLSM shall be placed where indicated and may be used, if the Engineer approves, for the following purposes:
 - 1. Normal CLSM with high slump, non-segregating consistency that readily flows and fills voids and difficult to reach places: pipe zone fill, trench zone fill, existing utility support, pipe abandonment, structure backfill, and structure cavity fill.

1.02 CONTRACTOR SUBMITTALS

- A. Shop Drawings:
 - 1. CLSM mix designs which show the proportions and gradations of all materials proposed for each type of CLSM indicated. Each mix design shall be accompanied by independent laboratory test results of the indicated properties.
 - 2. If the Contractor proposes to provide lower strength CLSM with aggregates that do not conform to ASTM C 33 - Concrete Aggregate, Shop Drawings shall include a testing program that will be used to control the variability of the aggregates. The testing program shall be acceptable to the Engineer.

1.03 QUALITY ASSURANCE

- A. All testing will be done by a testing laboratory selected by the Town at the Town's expense, except as otherwise indicated.
- B. If tests of the CLSM show non-compliance with the specifications, the Contractor shall make changes as may be required to achieve compliance. Performing and paying for subsequent testing to show compliance shall be the Contractor's responsibility.
- C. Correlation Tests:

1. The Contractor shall perform a field correlation test for each mix of CLSM used in pipe zone, trench zone, existing utility support or backfill used in amounts greater than 100 cubic yards or when CLSM is required to support traffic or other live loads on the fill less than 7 days after placing CLSM.
2. Field correlation tests shall be performed in a test pit similar in cross section to the Work and at least 10-feet long at a location near the Work. The proposed location shall be acceptable to the Engineer.
3. Laboratory and field tests shall be performed on samples taken from the same CLSM batch mix. All tests shall be performed by a laboratory at the Contractor's expense.
4. Testing shall be performed once each 2 hours during the first 8 hours, once each 8 hours during the first week, and once each 24 hours until the CLSM mix reaches the maximum design strength.
 - a. Compression testing shall be in accordance with ASTM D 4832 - Preparation and Testing of Soil-Cement Slurry Test Cylinders.
 - b. Setting test shall be in accordance with ASTM C 403 - Time of Setting of Concrete Mixtures by Penetration Resistance.
 - c. Density tests shall be in accordance with ASTM C 138 - Unit Weight, Yield and Air Content (Gravimetric) of Concrete.

PART 2 - PRODUCTS

2.01 CONTROLLED LOW STRENGTH MATERIAL

- A. CLSM shall be a mixture of cement, pozzolan, coarse and fine aggregate, admixtures, and water, mixed in accordance with ASTM C 94 - Ready Mixed Concrete.
- B. Composition: The following parameters shall be within the indicated limits and as necessary to produce the indicated compressive strengths.
 1. Mix proportions as necessary.
 2. Entrained air content shall be between 10 to 20 percent.
 3. Water reducing agent content as necessary.
- C. Properties:
 1. Density shall be between 120 PCF minimum and 145 PCF maximum.
 2. Slump shall be 5 to 8 inches.
 3. CLSM shall have a compressive strength no less than 100 or greater than 200 psi at 28 days.

2.02 CEMENT

- A. Cement shall be Type II Modified in accordance with ASTM C 150 - Portland Cement. Mineral admixtures shall be not be substituted for Portland cement.

2.03 AGGREGATE

- A. Aggregate shall conform to the quality requirements of Caltrans Section 90-2.02, "Aggregates" and of these Specifications. Aggregate shall be well graded from coarse to fine. Aggregate shall have a Sand Equivalent, as tested by California Test 217, of not less than 40. Aggregate shall be of such size and gradation that, when mixed with Type II modified Portland cement and mineral admixtures, and tested in accordance with ASTM C 39, the compressive strength of a sample will not be less than 100 or greater than 200 pounds per square inch at 28 days. The Contractor shall notify the Engineer, in writing, of the source and grading of the aggregate to be used in the CLSM. If material supplier is not approved by the Town for CLSM, Contractor shall make such material available to the Engineer for sampling and testing at least 45 days prior to scheduled placing of the fill. Should the Contractor change his source of supply, he shall notify the Engineer in writing of the new source and grading, and make that material available for sampling and testing at least 45 days prior to intended use.

2.04 ADMIXTURES

- A. Air entraining admixtures shall be in accordance with ASTM C 260 - Air-Entraining Admixtures for Concrete.
- B. Water reducing admixtures (Type E) shall be in accordance with ASTM C 494 - Chemical Admixtures for Concrete.
- C. Accelerating admixtures (Type C) shall be in accordance with ASTM C494.

2.05 WATER

- A. Water shall be potable, clean, free from objectionable quantities of silt, organic matter, alkali, salt, and other impurities.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Subgrade and compacted fill to receive CLSM shall be prepared according to Section 02200 - Earthwork.

3.02 BATCHING, MIXING AND DELIVERY

- A. NOT USED.
- B. Batching, mixing, and delivery of CLSM shall conform to ASTM C 94. CLSM shall be mixed at a batch plant acceptable to the Engineer and shall be delivered in standard transit mix trucks.

- C. The Portland cement content of the CLSM shall be not less than 47 pounds per cubic yard except that, after testing samples of the Contractor's proposed supply, the Engineer may order an increase in cement content, if necessary to meet the compressive strength requirement specified above. Proportioning for CLSM shall conform to the requirements for proportioning concrete mixes except that dividing of aggregate into sizes will not be required.
- D. CLSM shall contain a non-calcium chemical accelerating admixture of at least 2% to decrease curing time. The actual mix proportions shall be submitted by the supplier of the CLSM, indicating the minimum and maximum compressive strengths and is subject to review and approval by the Engineer. The Contractor shall submit the CLSM mix to the Engineer.

3.03 PLACEMENT

- A. CLSM shall be placed by tailgate discharge, conveyor belts, pumped, or other means acceptable to the Engineer. CLSM shall be directed in place by vibrator, shovel, or rod to fill all crevices and pockets. Avoid over-consolidation which causes separation of aggregate sizes.
- B. CLSM shall be continuously placed against fresh material unless otherwise approved by the Engineer. When new material is placed against existing CLSM, the placement area shall be free from all loose and foreign material. The surface of the existing material shall be soaked a minimum of one hour before placement of fresh material but no standing water shall be allowed when placement begins.
- C. Temperature of the CLSM shall be between 50 and 90 degrees F, when placed. CLSM shall not be placed when the air temperature is below 40 degrees F. No CLSM shall be placed against frozen subgrade or other materials having temperature less than 32 degrees F.

3.04 FINISHING

- A. The finish surface shall be smooth and to the grade indicated or directed by the Engineer. Surfaces shall be free from fins, bulges, ridges, offsets, and honeycombing. Finishing by wood float, steel trowel, or similar methods is not required.

3.05 CURING

- A. CLSM shall be allowed to cure for at least 72 hours prior to placing asphalt concrete pavement of other surface material over it.

3.06 PROTECTION

- A. CLSM shall be protected from freezing for 72 hours after placement.
- B. If the placement of the CLSM is not completed early enough to allow for placement of temporary paving, the Contractor shall provide no-skid steel plates to the span of

the trench to accommodate traffic until the temporary pavement can be placed.

- C. No fill or loading shall be placed on CLSM until probe penetration resistance, as measured in accordance with ASTM C 803 - Standard Test Method for Penetration Resistance of Hardened Concrete, exceeds 650 psi.
- D. CLSM shall be protected from running water, rain, and other damage until the material has been accepted and final fill completed.

****END OF SECTION****

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SECTION 03600

GROUT

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This Section specifies grout for structural and miscellaneous uses.
- B. Related Sections 1. SECTION 03300, CAST-IN-PLACE CONCRETE

1.02 QUALITY ASSURANCE

- A. QUALITY CONTROL BY CONTRACTOR:
 - 1. To verify conformance with the specified requirements for grout, the Contractor shall engage the services of an independent testing laboratory which complies with the requirements of ASTM E329. The testing laboratory shall sample and test grout materials as required in this Section.

1.03 REFERENCES

- A. Town of Hillsborough
 - 1. Standard Details for Public Works Projects (latest edition)
- B. American Society of Testing and Materials (ASTM)
 - 1. ASTM C33 - Concrete Aggregates
 - 2. ASTM C40 – Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
 - 3. ASTM C88 - Organic Impurities in Fine Aggregates for Concrete
 - 4. ASTM C117 - Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate Material Finer Than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing
 - 5. ASTM C136 REV A - Sieve Analysis of Fine and Coarse Aggregates
 - 6. ASTM C150 – Portland Cement
 - 7. ASTM C289 - Potential Reactivity of Aggregates (Chemical Method)
 - 8. ASTM C494 - Chemical Admixtures for Concrete
 - 9. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate

10. ASTM E329 REV C - Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction

1.04. SUBMITTAL

- A. Contractor shall submit grout, mix designs, recent test data for the submitted mixes, and test data for mix components confirming that the mixes meet the requirements of this Section.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Cement:
 1. Portland cement shall be ASTM C150, Type II or Type V, low alkali, containing less than 0.60 percent alkalies.
- B. Aggregate:
 1. GENERAL: Aggregate shall be nonreactive and shall be washed before use. When sources of aggregate are changed, test reports shall be provided for the new material. The tests specified shall be performed prior to commencing grout work.
 2. FINE AGGREGATE: Fine aggregate shall be hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine and shall conform to ASTM C33 as modified herein. When tested in accordance with ASTM C136, gradation shall be such that 100 percent by weight will pass a standard No. 8 mesh sieve and no less than 45 percent by weight will pass a standard No. 40 mesh sieve.
 3. Variation from the specified gradations in individual tests will be acceptable if the average of three consecutive tests is within the specified limits and the variation is within the permissible variation listed below:

<u>U.S. standard sieve size</u>	<u>Permissible variation in individual tests, percent</u>
30 or coarser	2
50 or finer	0.5

4. Other tests shall be in accordance with the following specifications:

Test	Test method	Requirements
Organic Impurities	ASTM C40	Color lighter than standard
Amount of Material Passing No. 200 Sieve	ASTM C117	3% maximum by weight
Soundness	ASTM C88	10% maximum loss with sodium sulfate
Reactivity	ASTM C289	Innocuous aggregate
Sand Equivalent	ASTM D2419	Minimum 80

C. Admixtures:

- Admixtures shall be compatible with the grout. Calcium chloride or admixtures containing calcium chloride are not acceptable. Admixtures shall be used in accordance with the manufacturer's recommendations and shall be added separately to the grout mix.

D. Water:

- Water for washing aggregate, for mixing and for curing shall be free from oil and deleterious amounts of acids, alkalis, and organic materials; shall not contain more than 1000 mg/1 of chlorides as Cl, nor more than 1300 mg/1 of sulfates as SO₄; and shall not contain an amount of impurities that may cause a change of more than 25 percent in the setting time of the cement nor a reduction of more than 5 percent in the compressive strength of the grout at 14 days when compared with the result obtained with distilled water. Additionally, water used for curing shall not contain an amount of impurities sufficient to discolor the grout.

E. Grout:

- NONSHRINK GROUT: Shall be nonmetallic aggregate grout: Five Star Products, Inc. Five Star Grout, Master Builders Masterflow 713, Burke Company Non-Ferrous, Non-Shrink Grout, or equal.
- EPOXY GROUT FOR CRACK REPAIR: Epoxy grout shall be a high modulus, two-component, moisture insensitive, 100 percent solids, thermosetting modified polyamid epoxy compound. The consistency shall be a paste form capable of not sagging in horizontal or overhead anchoring configurations. Material shall conform to ASTM C881, Type 1, Grade 3, such as Master Builders Technologies Concesive series, Sika Corporation Sikadur Hi-Mod Series, Adhesive Technology Corporation Solidbond 200, or equal, and shall have a heat deflection temperature in excess of 130 degrees F. Epoxy for pressure grouting/crack injection shall be a two-component, moisture insensitive, high modulus, injection grade, 100 percent solids, blend of epoxy-resin compounds. The consistency shall be as required to achieve complete penetration in hairline cracks and larger. Material shall conform to

ASTM C881, Type 1, Grade 1, such as Sika Corporation Sikadur 52, Adhesive Technology Corporation SLV 300 series, or equal.

PART 3 – EXECUTION

3.01 NONSHRINK GROUT

- A. Nonshrink, nonmetallic aggregate grout shall be used for the bearing surfaces of machinery and equipment bases, column base plates and bearing plates.

3.02 EPOXY GROUT

- A. Epoxy grout shall be used for repairing cracks by pressure grouting or gravity flow, and repairing structural concrete. Concrete shall be primed in accordance with the grout manufacturer's instructions.

****END OF SECTION****

SECTION 03930

MANHOLE REHABILITATION

PART 1 - GENERAL

1.01 SUMMARY

This specification defines the method and material for the rehabilitation of sanitary sewer manholes utilizing a spray or trowel applied calcium aluminate cementitious structural rehabilitation system. The purpose of this work is to obtain a dense and durable concrete lining that is resistant to biosulfuric acid attack and meets the strength requirements described elsewhere in this specification. The work covered in this specification consists of furnishing all labor, equipment, materials, and supervision necessary to accomplish the rehabilitation as specified. When complete the rehabilitated structure shall:

- A. Provide for a uniformly smooth surface of specified thickness.
- B. Minimize, if not eliminate sources of inflow/infiltration (I/I).
- C. Provide a service life that is supported by documented test analysis.

The Contractor's sequence of operation relative to structural rehabilitation shall include, but not be limited to the following:

- A. Eliminate all sources of groundwater infiltration and voids in manhole walls and bases.
- B. Rehabilitate all interior surfaces including walls, and floors in accordance with the specification and the nature of the sub-surfaces to which the cementitious structural rehab system is to be applied.
- C. Provision to "cure" the installed lining material.
- D. Provision to "test" lining and structural rehabilitation materials.

1.02 SUBMITTALS

The Contractor shall furnish detailed and complete data pertaining to the surfaces of the structure to be rehabilitated, the rehabilitation product, surface preparation and installation to the Engineer for approval. The submission of this data shall be made in accordance with Special Provisions Section 6, "Submittals". At the request of the Engineer, the Contractor shall test for adverse chemical conditions that may hinder overall product performance.

Prior to initiating the work, the Contractor shall submit specific technical data with complete physical properties of the structure to be rehabilitated and the proposed product for the rehabilitation of the structure, as well as a specific plan for sub-surface preparation.

- A. Proof of work crew's qualifying experience as described in Section 3.01A.
- B. A work plan.
- C. A Safety Plan. It is the contractor's responsibility to comply with OSHA standards and all regulations pertaining to the work including confined space entry.
- D. Lining materials shall be SewperCoat and shall be applied by either Nor-Cal Pipeline Services or Michels Corp., or approved Contractors.

- E. Related Sections
1. SECTION 02145, SEWAGE FLOW CONTROL
 2. SECTION 02739, BUILDING SEWER (LATERAL) CONSTRUCTION AND REINSTATEMENT
 3. SECTION 03600, GROUT

1.03 REFERENCES

- A. Town of Hillsborough
1. Standard Details for Public Works Projects (latest edition)

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Lining material furnished under this specification shall be a prepackaged mortar mix, including all cement, aggregates, and any required additives. It is the intent of this specification that the Contractor only be required to add the proper amount of potable water so as to produce concrete suitable for spray application. Do not add Portland cement, other aggregates, or any admixtures whatsoever to lining material. Typical package weights shall not be less than 50 lbs and shall be identical for all material furnished on this project.
- B. The chemical composition of the cement portion as well as the aggregates of the mortar mix shall meet or exceed the following:

Al ₂ O ₃	CaO	FeO + Fe ₂ O ₃	SiO ₂
39-44%	35-39%	9-14%	5-7%

- C. The properties of the mortar mix shall meet or exceed the following:

Compressive Strength (ASTM C109)	> 3,000 psi	24 hours
Flexural Strength (ASTM C293)	> 535 psi	24 hours
Splitting Tensile Strength (ASTM C496)	> 330 psi	24 hours
Slant Shear test (ASTM C882)	> 1,200 psi	24 hours
Shrinkage at 28 days (ASTM C596)	< 0.08% cured @ 90% relative humidity	
Freeze/Thaw after 300 Cycles (ASTM C666)	No visible damage after 300 cycles	

- D. The mortar mix shall be either “SewperCoat PG” or “SewperCoat 2000HS Regular”, both as manufactured by Kerneos Inc., Mainstay (ML-72 with DS-5) or approved equal.
- E. Selected mortar mix must have at least seven (10) years of successful performance in similar applications and be supplied by an ISO 9001 certified manufacturer. Manufacturer’s ISO 9001 certificate shall be submitted to engineer and owner.
- F. In addition, the mortar mix shall be designed to withstand long-term exposure to a bacterially corrosive hydrogen sulfide environment that may be expected to produce a pH of 1 on normal Portland cement based concrete or typical brick and mortar surfaces.
- G. Water used in mixing shall be fresh, clean, potable water, free from injurious amounts

of oil, acid, alkali, vegetable, sewage and/or organic matter. Water shall be considered as weighing 8.32 pounds per gallon.

- H. Mortar mix shall be stored with adequate provisions for the prevention of absorption of moisture. It shall be stored in a manner that will permit easy access for inspection and identification of each shipment.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Qualification of Work Crew

1. The lining material Manufacturer shall maintain a listing of competent contractors that have demonstrated requisite skill and training to be qualified applicators of their materials.
2. The Contractor or Subcontractor must appear on the lining material manufacturer's listing of applicators that have demonstrated the skill and training required to be qualified to apply the rehabilitation products. Qualified firms in Northern California include:
 - a. Nor-Cal Pipeline Services, Yuba City CA (916) 442-5400
 - b. Michels Pipeline Construction, Salem OR (503) 364-1199
3. Prior to project commencement, the Contractor must satisfy the Engineer that all Contractor's work crew personnel have performed satisfactory work in similar capacities elsewhere for a sufficient period of time to be fully qualified to properly perform the work in accordance with the requirements of the related specifications. Certifications for the following experience requirements shall be submitted with the shop drawings for the cured-in-place materials.
4. Foreman shall have at least 4 years of experience with similar work and project conditions.
5. Nozzlemen shall be qualified by having had a minimum of two (2) years similar work experience.
6. Work Crew responsibilities prior to application of lining material shall include the following:
 - a. Surface preparation as discussed in section 3.01B.
 - b. Ensure the operating air pressure is uniform and provides adequate nozzle velocity for proper compaction.
 - c. Continuously regulate the water content so that the applied materials consistently achieve proper compaction with a low percentage of rebound and no visible "sag".
 - d. Ensure that the installation equipment nozzle is held at the proper distance away from and as nearly perpendicular to the prepared sub-surface as the working conditions will permit to secure maximum material compaction with minimum rebound and no visible "sag".
 - e. Follow a sequence routine that will fill corners with adequately

- compacted material applied at a maximum practicable layer thickness.
- f. Determine necessary operating procedures for placement in confined spaces, extended distances or around unusual obstructions where placement velocities and mix consistency may need to be adjusted.
 - g. Direct the crew as to when to start and stop the flow of materials during installation and to immediately stop all work when material is not arriving uniformly at the nozzle.
 - h. Ensure that slough pockets are removed and prepared for installation of replacement material.
 - i. Bring the installed materials to established finished elevations in a neat and timely manner and within established tolerances.
6. Applicator's job foreman shall operate the mixing/placing equipment and direct the work of mixing crew personnel. Applicator's work crew shall also maintain proper line pressures throughout the mixing/placing equipment to ensure the necessary consistent nozzle velocity. Applicator's work crew shall further see that all material fed to the nozzle is uniformly fed through this equipment.

B. Surface Preparation

1. Prior to surface preparation, Contractor shall remove manhole rungs, if present, in accordance with the Contract Documents.
2. Contractor shall ensure all sub-surfaces are clean and free of laitance, loose material, residue and all existing coating and lining materials by spray washing. See Section 3.01E for Inflow and Infiltration Prevention.
3. Sub-surfaces shall be thoroughly saturated with water prior to the application of the lining materials. In no instance shall shotcrete be applied in an area where running water exists. It is the intent of this specification that the existing surface be saturated and free of any running water just prior to installation – or SSD, “saturated surface dry condition.” To achieve this condition it may be necessary to presoak the sub-surface for at least 24 hours.

C. Operations

1. The Contractor shall provide all equipment necessary to individually gauge, control, and monitor the actual amounts of all component materials necessary to complete the lining installation. The type of equipment and methods used to gauge, control, and monitor component materials shall be subject to approval by the Engineer and Manufacturer.
2. All lining materials shall be thoroughly mixed by mechanical means to ensure all agglomerated particles are reduced to original size or removed prior to placement into the application equipment (i.e. the hopper). Each batch of material should be entirely discharged before recharging with fresh material. Mixing equipment shall be cleaned at regular intervals to remove all adherent materials.
3. The addition of water to the mix shall be in strict accordance with the Manufacturer's recommendations.

4. Re-mixing or tempering shall not be permitted. Rebound materials shall not be reused.

D. Protection of Adjacent Surfaces

During progress of the work, adjacent areas or grounds which may be permanently discolored, stained or otherwise damaged by dust and rebound material, shall be adequately protected and, if contacted, shall be cleaned by early scraping, brushing or washing as the surroundings permit.

E. Inflow and Infiltration Prevention

1. If inflow or infiltration is observed within the structure after surface preparation is complete, a rapid setting crystalline enhanced hydraulic cement product specifically formulated for infiltration control shall be used to stop minor infiltration flows in accordance with the manufacturer's recommendations. The material shall meet the following strength requirements:

Compressive Strength (ASTM C597B)	600 psi	(24 hours)
	1,000 psi	(7 days)
Bond Strength (ASTM C321)	30 psi	(1 hour)
	80 psi	(1 day)

1. The material shall be Thoroc Plug, Octocrete, Burke Plug or Engineer approved equal. Where infiltration flows are more severe, pressure grouting may be required. The material for pressure grouting shall be Avanti A-220, DeNeef or Engineer approved equal installed in accordance with the manufacturer's written instructions.
2. All materials, labor, equipment, and incidentals required to correct inflow and infiltration conditions will be considered incidental to rehabilitation.

F. Equipment

Equipment shall be of spray type and approved by the material manufacturer. Alternate equipment may be utilized provided it meets the performance requirements of the specification. All equipment must be kept in operating condition and good repair.

G. Application of Materials

1. Lining material shall not be applied to a frozen surface or to a surface that may freeze within 24 hours of application. Frozen conditions shall be defined as ambient temperatures of 32 degrees Fahrenheit or below.
2. Sequence of application may be from bottom to top or vice versa if rebound is properly removed.
3. Application shall be from an angle as nearly perpendicular to the surface as practicable, with the nozzle held at least 1 foot from the working sub-surface (except in confined control). If the flow of material at the nozzle is not uniform and slugs, sand spots, or wet sloughs result, the nozzleman shall direct the nozzle away from the work until the faulty conditions are corrected. Such defects shall be replaced as the work progresses.

4. Application shall be suspended if:
 - a. Air velocity separates the cement from the aggregate at the nozzle.
 - b. Ambient temperature approaches freezing and the newly placed SewperCoat, Mainstay (ML-72 with DS-5) or approved equal, cannot be protected and insulated.
5. The time interval between successive layers of material application must be sufficient to allow “tackiness” to develop but not final set. If final set does occur, this surface shall be prepared in accordance with Sections 3.01B of this document.
6. Construction joints within a manhole shall be avoided. In the event a construction joint is necessary and approved by the Engineer, it shall be sloped off to a thin, clean, regular edge, at a 45-degree angle. Prior to placement of the adjoining materials, the sloped portion and adjacent applied material shall be thoroughly cleaned as necessary, then moistened and scoured with an air jet.
7. Nozzleman shall bring the material to an even plane and to well-formed corners.
8. After the body coat has been placed, the surface shall be trued with a thin-edge screed to remove high areas and expose low areas. Low areas shall be properly filled with additional material to insure a true, flat surface as specified herein.
9. For manhole applications, the minimum thickness of SewperCoat, Mainstay (ML-72 with DS-5) or approved equal, shall be a ½-inch cover over all surfaces.

H. Curing

If the material has been applied and furnished in accordance to the specifications, and it has been determined that the environment is not moist enough for natural curing, the contractor will be required to apply a curing compound to all coated surfaces. Curing compound shall meet the requirements of ASTM C309 and have the approval of the lining material Manufacturer and the Engineer prior to use.

Moist curing may also be used in lieu of curing compound. If moist curing is selected, it should be implemented just after the notice of uniform heat generation of the installed lining. Moist curing can consist of the use of soaker hoses, water sprinklers, or vapor/misting machines. Regardless of delivery method, moist curing should continue for a minimum of 18 hours.

3.02 SAMPLING AND TESTING

- A. A recognized independent testing laboratory shall test mortar materials used on the project. The Manufacturer, instead of an independent laboratory, may test project sample specimens, provided the Owner, Engineer, and Manufacturer are in agreement of this testing method prior to project commencement. Specific materials recommended by the Engineer shall then be tested.
- B. The cost of sampling and testing of the mortar mix during placement and the surface to which it is applied shall be borne by the Contractor. Other testing required

showing conformance with these specifications shall be the responsibility of the Contractor. Certified test reports and certificates, when so directed, shall be submitted in duplicate to the Engineer and to such other agencies or persons the Engineer may designate.

- C. Any materials failing to meet the requirements of these specifications shall not be incorporated into the work plan.

3.03 WARRANTY

- A. Lining shall have a ten (10) year warranty for both materials and labor.

****END OF SECTION****

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SECTION 05541

MANHOLE FRAMES AND COVERS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies manhole frames and covers
- B. Related Sections
 - 1. SECTION 02701, PRECAST CONCRETE STRUCTURES

1.02 REFERENCES

- A. Town of Hillsborough
 - 1. Standard Details for Public Works Projects (latest edition)
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM A48 - Standard Specification for Gray Iron Castings

1.03 SUBMITTALS

- A. Submit the following in accordance with the Contract Documents.
 - 1. Manufacturer's catalog data showing specific items to be supplied for these specifications including:
 - a. Manhole frames
 - b. Manhole covers

PART 2 - PRODUCTS

2.01 ACCEPTABLE PRODUCTS

- A. Manhole frames and covers shall be by Phoenix Iron Works (24 inch opening), or approved equal, in accordance with Town Standard Details.
- B. Manhole frames and covers shall be Neenah R-1755-E1, as noted on the plans.

2.02 MATERIALS

- A. The materials for manhole frames and covers shall be cast iron in accordance with ASTM A48, Class 30.

2.03 FABRICATION

- A. Manhole frames and covers in traffic areas shall be the heavy-duty type designed for H-20 highway loading. Cover pattern, vent holes, and pick holes shall be as identified in Town of Hillsborough Standard Details, Sewer Structure Frame and Cover. Bearing and wedging surfaces shall be machined to ensure a tight fit and to prevent rocking.
- B. Manhole frames and covers in non-traffic or easement areas shall be as identified in Town of Hillsborough Standard Details, Standard Manhole Frame and Cover. Cover pattern, vent holes, and pick holes shall be as identified in Town of Hillsborough

Standard Details, Sewer Structure Frame and Cover. Bearing and wedging surfaces shall be machined to ensure a tight fit and to prevent rocking.

- C. Manufacturer's name, initials, or logo type is to be cast in frame and cover. The bearing surfaces of the frame and cover shall be machined, and the cover shall seat firmly without rocking. Before leaving the foundry, all castings shall be protected with an asphalt coating as follows:
 - 1. The surface to be protected shall be clean, uncoated cast iron free of oil, grease, scale, or rust.
 - 2. The castings shall be cleaned and dipped twice in a preparation of asphalt or coal tar and oil applied at a temperature of not less than 290 degrees or more than 310 degrees Fahrenheit to form a firm and tenacious coating.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Existing and new manhole frames and covers shall not be set to final grade until the pavement has been completed, unless otherwise approved by the Engineer. The manhole frame and cover shall be permanently set when so authorized by the Engineer. The frame shall be centered on the manhole shaft and laid on mortar to final grade. The mortar shall be neatly struck.
- B. Set manhole frames and covers in paved or improved areas flush with the surrounding surfaces unless otherwise specified. Manhole frames and covers in unimproved areas/fields shall be set no less than 6 inches and no more than 12 inches above grade.

****END OF SECTION****

SECTION 15050
GENERAL PIPING

PART 1 - GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish, install, test, and complete the piping in accordance with the Contract Documents.
- B. Related Sections
 - 1. SECTION 02200, EARTHWORK
 - 2. SECTION 02735, SANITARY SEWER SYSTEM TESTING
 - 3. SECTION 02735, SANITARY SEWER SYSTEM TESTING
 - 4. SECTION 02736, CLOSED CIRCUIT TELEVISION INSPECTION (CCTV) OF SANITARY SEWER SYSTEM
 - 5. SECTION 02739, BUILDING SEWER (LATERAL) CONSTRUCTION AND REINSTATEMENT
 - 8. SECTION 02800, TRAFFIC CONTROL
 - 9. SECTION 15066, HIGH DENSITY POLYETHYLENE PIPE

1.02 QUALITY ASSURANCE

- A. Like items of materials provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance and manufacturer's service.
- B. To assure uniformity and compatibility of piping components in grooved-end piping systems, fittings and couplings shall be furnished by the same manufacturer.

1.03 REFERENCES

- A. Town of Hillsborough
 - 1. Standard Details for Public Works Projects (latest edition)

1.04 GENERAL

- A. All sewer construction materials proposed to be used shall be new materials.
- B. Where material specification numbers are used herein, they shall refer to the latest revision thereof.

1.05 SUBMITTALS

- A. Submit, in accordance with the Contract Documents, installation instructions and details of all pipe, joints, fittings, metallic pipeline marking tape, and appurtenances to be used in the work including the following.
 - 1. Catalog cuts showing all piping, manholes, and fittings

2. Dimensioned layout drawings, including piping, building sewers, and manholes
 3. Installation procedures and sequencing
 4. Staging and lay-down areas
 5. Security plans and fencing
 6. Sewer Bypassing Plan in accordance with the Contract Documents
 7. Traffic Control Plan in accordance with the Contract Documents
 8. Connection details for all building sewers and existing systems
- B. The review of procedures and equipment by the Engineer shall not relieve the Contractor of his responsibility nor modify any of the provisions of the contract.
1. Furnish shop drawings for pipe in accordance with the requirements of the Contract Documents as follows.
 - a. Details of the pipe to be used. Submit shop drawings indicating the details of all thickness, joints, materials, and procedures, as applicable. Indicate the required fabrication tolerances for the pipe.
 - b. Information indicating that pipe manufacturer meets the experience requirements specified.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Provide all required piping and fittings in accordance with the individual piping sections.

2.02 BURIED WARNING AND IDENTIFICATION TAPE AND TRACER WIRE

- A. Warning tape shall be installed with all sewer constructed by open cut method.
- B. Use polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines.
- C. Provide tape on rolls, 12-inch-minimum width, color coded as specified below. Color and printing shall be permanent, unaffected by moisture or soil.
- D. Minimum thickness of the tape shall be 0.004 inch.
- E. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise.
- F. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep.
- G. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.
- H. Warning tape shall consist of green metallic warning tape with the words "Caution: Sewer Line Buried Below" printed continuously along its length with letters approximately $\frac{3}{4}$ inch high at maximum intervals of two (2) feet.

- I. Samples of the marking tape shall be submitted in accordance with the Contract Documents.
- J. Tracer wire shall be a continuous #10 copper wire placed along the centerline of the top of the pipe for all non-metallic pipe material.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Trenching and trench dewatering requirements shall comply with the requirements of the Contract Documents.
- B. Sewer bypassing and dewatering requirements shall comply with the requirements of the Contract Documents.
- C. Layout of Controls
 - 1. Establish line and grade control and staking in accordance with the Contract Documents.
 - 2. The grades and alignment of the sewer so staked must be approved by the Engineer prior to start of sewer construction.
 - 3. Construction staking
 - a. A registered land surveyor engaged by the Contractor shall be responsible for setting stakes and preparing cut sheets. Submit the name, license number and expiration date of the surveyor in charge of the survey work prior to construction.
 - b. At least five (5) working days before the start of any sewer construction requiring staking, submit three copies of cut sheets to the Engineer. Cut Sheets will be reviewed and one approved copy will be furnished to the Contractor for use in construction. Stakes must not be marked with cuts prior to Engineer's approval of cut sheets.
 - c. The Contractor shall be responsible for preserving all required benchmarks, reference points and construction stakes in the area and will be responsible for any cost incurred in replacing any such benchmarks, reference points or construction stakes which are destroyed as a result of his activities.
 - d. The Contractor shall be responsible for maintaining the legibility and refreshing of paint marks as long as needed, including maintenance during idle time and/or inclement weather.
 - e. Unless otherwise required by the Engineer, locate sewer construction stakes at 50-foot maximum intervals except that on horizontal curves and on sewers with a slope flatter than 0.003 foot per foot the maximum spacing will be 25 feet. The maximum spacing of construction stakes on vertical curves shall be 10 feet. Additional sewer construction stakes shall be located at angle points, grade breaks, and structures.

- f. Offset stakes from the centerline of the sewer at a safe distance from the excavation but in no case greater than 10 feet unless authorized by the Engineer. The stakes will be marked with offset distance and station only.
- D. Surveying Instruments or Lasers: When laying main sewers 6 inches and larger in diameter, unless otherwise approved by the Engineer, a commercial Laser grade setting system shall be used. The following requirements and conditions must be met:
 - 1. The Contractor shall have the responsibility of providing an instrument operator who is qualified and trained in the operation of the Laser, and said operator must adhere to the provisions of the State of California Construction Safety Orders issued by the Division of Industrial Safety. Attention is particularly directed to Section 1514, and Sections 1800 through 1801 of said orders for applicable requirements.
 - 2. When using a Laser, the Laser shall be an in-line Laser or be connected firmly to a tripod, set firmly on compacted soil. The Laser height of instrument shall be taken from one offset hub and checked with at least two more hubs. This shall be done every time the Laser is set up, or disturbed.
 - 3. The Laser shall be properly calibrated at all times. If any Laser is found to be out of calibration, the Laser shall be removed from the job site until it has been properly calibrated.
- E. Line and Grade
 - 1. The horizontal controls for this project are the control points and base lines as shown on the plan. The vertical controls for this project are the benchmarks as shown on the plan.
 - 2. It is the responsibility of the Contractor to check these benchmarks at the beginning of the contract period and report any errors or discrepancies to the Engineer.
 - 3. When satisfied that all benchmarks are correct, the Contractor shall use these benchmarks to furnish and maintain all reference lines and grades for sewer construction. Contractor shall not disturb benchmarks with construction equipment, materials or by dewatering operations.
 - 4. Submit to the Engineer copies of field notes used to establish all lines and grades. The Contractor remains fully responsible for the accuracy of his work and the correction of it, if required.
- F. Verification of Existing Sewer Connection at New Manhole
 - 1. Where connection is to be made to an existing sewer with a new manhole, said existing sewer shall be uncovered and checked for location and elevation prior to submitting cut sheets. Any discrepancy between the Plans and field information shall be reported immediately to the Engineer.
 - 2. Where construction requires removal of any existing sewer or structure from service, the work shall be conducted in accordance with the Contract Documents.

- G. Sewer Pipe Plugs: Sewer pipe stubs, or other open ends, which are not to be connected for service under this contract, shall be plugged or capped with standard watertight plugs or caps, as submitted by the Contractor and approved by the Engineer for use in the particular installation.
- H. Handling of Pipe
 - 1. All pipe and accessories shall be carefully lowered into the trench in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the excavation.
 - 2. Pipe shall be protected against impact shocks during handling. Prior to making pipe joints, all surfaces of the portion of the pipe to be joined shall be cleaned, dried and otherwise repaired in accordance with the manufacturer's installation instructions. The interior of all pipe shall be kept free from all dirt and foreign matter as the work progresses.
 - 3. At the close of each day's work, and at such other times when pipe is not being installed or utilized for service, the ends of all open pipes shall be closed with a watertight plug or cap.
- I. Field Cutting Pipe
 - 1. Use whole lengths of pipe wherever possible. Short lengths or cut pieces shall be allowed only to complete connections to manholes and structures, wye branches, and other required fittings.
 - 2. Unless otherwise permitted by the Engineer, pipes that must be cut in the field shall be cut as recommended by the pipe manufacturer.

3.02 EXCAVATION AND TRENCHING

- A. Perform all excavations for pipelines and appurtenances, of whatever substances encountered, to the depths indicated in the Contract Documents and in accordance with the Contract Documents.

3.03 INSTALLATION

- A. General
 - 1. Each pipe and fitting shall be carefully inspected before the pipe or fitting is installed. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after laying.
 - 2. Clean out fittings and pipe sections before installing. Clean joint contact surfaces immediately prior to joining. Use joint lubricants and joining methods as recommended by the pipe manufacturer.
 - 3. Furnish and assemble pipe and fittings to provide accurate alignment for joints.
 - 4. Make all joints watertight.
- B. Every precaution shall be taken to prevent foreign material from entering the pipe during installation. No debris, tools, clothing, or other materials shall be placed in the pipe. Whenever pipe laying is stopped, the open end of the pipe shall be closed with an end board closely fitting the end of the pipe to keep sand and earth out of the pipe.

The end board shall have several small holes near the bottom to permit water to enter the pipe and prevent flotation in the event of flooding of the trench.

- C. Use proper implements, tools, and facilities for the safe and proper protection of the pipe. Carefully handle pipe in such a manner as to avoid any physical damage to the pipe. Do not drop or dump pipe into trenches under any circumstances.
- D. Buried Pipe
 - 1. Commencement of New Sewer Pipeline
 - a. Unless otherwise specified or authorized by the Engineer, the laying of the pipe by open-cut methods in finished trenches shall be commenced at the lowest point of the project and continued in an upstream manner until completion. Spigot ends shall point in the direction of the flow except as noted or otherwise specified. The joints shall be carefully centered so that when laid to proper grade and alignment as designated on the Drawings, they will form a sewer with a uniform invert.
 - 2. Pipe Installation
 - a. The sewer trench shall be dewatered to enable pipe installation under dry conditions per the Contract Documents.
 - b. Backfill material shall not be dropped directly on the pipe, and chutes or deflectors shall be utilized to protect the pipe
 - c. Adequate backfill shall be deposited on pipe to prevent floating of pipe. Any pipe which has floated shall be removed from the trench, cleaned, and reinstalled in an acceptable manner. No pipe shall be installed when, in the opinion of the Engineer, the trench conditions or weather are unsuitable for such work.
 - d. The Contractor shall exercise special care during backfilling and compaction around the pipe to ensure that the pipe is not cut, gouged, scored or otherwise damaged, or deformed axially or circumferentially. Caution shall be exercised to avoid compression, damage, or deformation to the pipe joints and barrel during installation. If deformation, damage or sags in the pipe are created by the Contractor's operations, the Contractor shall repair or replace the affected pipe to the satisfaction of the Engineer at no additional cost to the Town.
 - 3. Control of Line and Grade
 - a. Total horizontal deviation of the sewer from the line shown on the Drawings shall be not more than 1 inch. The sewer grade shall not deviate from the profile shown on the Plans by more than 1/4 inch, measured at the pipe invert, and the grade shall be maintained during and after backfilling operations. Sewer grades exceeding this amount shall be removed and replaced at Contractor's expense.
 - b. If deviations less than 1/4 inch from the design grade occurs, pipe joints shall be deflected to bring the invert back to grade. Grade

corrections shall be made gradually to prevent ponding in the pipe invert at low spots. Pipe shall be installed to be free draining (no sags) between any two points. No reverse (adverse) grade will be allowed.

4. Joint Deflections: The deflection in the joint between any two successive pipe sections shall not exceed 50 percent of the maximum deflection as recommended by the pipe manufacturer. The minimum allowable radius shall be 300 feet unless otherwise shown. Minimum 2-foot pipe lengths may be supplied or pipe may be cut, if approved joint material is available, to install short radius curves and conform with the joint deflection limitations. When short lengths are to be used, it shall be as shown on the Plans.
5. General
 - a. When the pipe laying is not in progress, including break hours, the open ends of pipe shall be closed by approved means, and no trench water, animals, or foreign material shall be permitted to enter the pipe.
 - b. All buried pipe shall be prepared as herein before specified and shall be laid on the prepared pipe embedment material in accordance with the Contract Documents to ensure uniform bearing. No pipe shall be laid in water or when, in the opinion of the Engineer, trench conditions are unsuitable.
 - c. All sewer mains and building sewers installed by open cut methods shall be installed with green metallic marking tape indicating the presence of the buried sewer. The tape shall be located at the lower of the two following depths:
 - 1) 3 feet above the sewer pipe
 - 2) 6 inches below the finished subgrade

3.04 FITTINGS

- A. Fittings shall be sized to receive the type of pipe specified. Installation of fittings will be in accordance with manufacturer's recommendations. Fittings and wyes shall be of the same material as that of the pipe it is connecting to.

3.05 DELIVERY, STORAGE, AND HANDLING

- A. Materials delivered to site shall be inspected for damage and accepted by the Contractor.
- B. Pipe materials shall be stored in strict accordance with the manufacturer's requirements. Typical requirements for pipe storage include:
 1. Pipe shall be stored, if possible, at the job site. Caution shall be exercised to avoid compression, damage, or deformation to the pipe joints and barrel. Pipe supports and straps installed by the manufacturer shall be maintained in place during storage.
 2. When pipelines are stacked, insure that weight or upper units do not cause damage to pipe in lower units.

3. Pipes shall be supported by struts, racks or dunnage to prevent damage to the bottom during storage.
4. When long-term storage with exposure to direct sunlight is unavoidable, pipe shall be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excessive heat accumulation.
5. Pipe shall not be stored close to heat sources or hot objects such as heaters, boilers, steam lines, engine exhaust, etc.
6. Pipe shall not be stored directly on the ground, and shall be kept free of dirt and debris.
7. Protect gaskets from excessive exposure to heat and sunlight.

3.06 PIPE COUPLINGS

- A. Approved pipe couplings shall be used to join pipes of unlike materials and to join pipes of like materials when a splice is made. Couplings shall be installed as recommended by the coupling manufacturer. Couplings shall have Type 316 stainless steel bands and hardware.

3.07 TESTING

- A. Testing shall be completed in accordance with the Contract Documents.

3.08 CLEANING

- A. Care shall be exercised during fabrication to prevent the accumulation of pipe cuttings, and filings, gravel, cleaning rags, etc., within piping sections. All piping shall be examined to assure removal of these and other foreign objects prior to assembly. Shop cleaning may employ any conventional commercial cleaning method if it does not damage, deform, swell, or otherwise alter the physical properties of the material being cleaned.

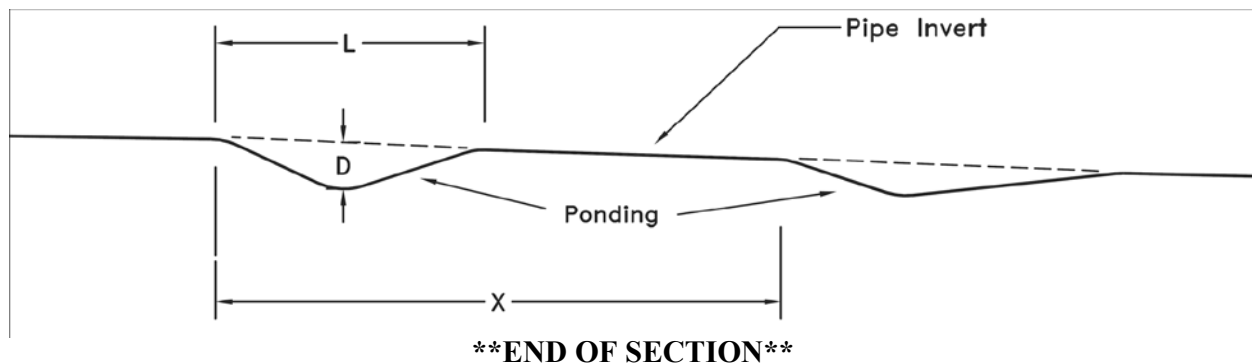
3.09 FIELD QUALITY CONTROL

- A. Field tests and inspections including air pressure tests and cleaning shall be in accordance with the Contract Documents and the following specifications herein.
- B. TV inspection shall be performed after hydraulic cleaning has been completed and shall conform to the provisions in Section 02736, Closed Circuit Television (CCTV) Inspection of Sanitary Sewer System.
- C. The following construction deficiencies shall be considered as in need of correction prior to acceptance of the work:
 1. Damaged pipes including cracks, gouges and chipped ends of pipe sections.
 2. Slope less than the specified.
 3. Changes in slope greater than ± 0.05 percent of the design slope.
 4. Low spots, sags or bellies that hold water (see limits below).
 5. Dropped, offset or separated joints.

6. Excessive gap between pipe ends within a coupling or fitting (greater than 0.5 inch unless approved by the Engineer).
7. Infiltration/leaking joints.
8. Other noted deficiencies.

D. Sags (low spots, bellies, etc.) in pipes that hold water after all flow has been stopped in the pipe are typically the result of settlement or consolidation of the bedding material and/or the native material below it in response to loading on the pipe from backfill operations and/or surface loading. The table below lists the allowable limits of sags in sanitary sewer pipes. Newly constructed pipes that exceed these limits must be excavated and relayed, including replacing the pipe if damaged, at Contractor's expense.

Nominal Pipe Size	Allowable Depth of Sag (D)	Allowable Length of Sag (L)	Allowable Distance between Sags (X)
4-inch	None	None	None
6-inch	None	None	None
8-inch	≤ 1.25 inch	≤ 4 feet	≥ 40 feet
10-inch	≤ 1.5 inch	≤ 6 feet	≥ 60 feet
12-inch	≤ 1.75 inch	≤ 8 feet	≥ 80 feet
>12-inch	≤ 2.25 inch	≤ 10 feet	≥ 100 feet



SECTION 15066

HIGH-DENSITY POLYETHYLENE (HDPE) PIPE

PART 1 - GENERAL

1.01 SUMMARY

- A. The Contractor shall furnish, install, and test, complete and in place, high-density polyethylene (HDPE) pipe and fittings, in accordance with the Contract Documents. The HDPE pipe and fittings specified herein shall be used only in association with trenchless construction methods, unless otherwise approved by the Engineer.
- B. Related Sections
 - 1. SECTION 02200, EARTHWORK
 - 2. SECTION 02735, SANITARY SEWER SYSTEM TESTING AND CLEANING

1.02 REFERENCES

- A. Commercial Standards:
 - 1. ASTM D 638 - Test Method for Tensile Properties of Plastics
 - 2. ASTM D 696 - Test Method for Coefficient of Linear Thermal Expansion of Plastics
 - 3. ASTM D 746 - Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
 - 4. ASTM D 1238 - Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer
 - 5. ASTM D 1248 - Specification for Polyethylene Plastics Molding and Extrusion Materials
 - 6. ASTM D 1505 - Test Method for Density of Plastics by the Density-Gradient Technique
 - 7. ASTM D 1525 - Test Method for Vicat Softening Temperature of Plastics
 - 8. ASTM D 1603 - Test Method for Carbon Black in Olefin Plastics
 - 9. ASTM D 1693 - Test Method for Environmental Stress-Cracking of Ethylene Plastics
 - 10. ASTM D 1928 - Test Method for Preparation of Compression-Molded Polyethylene Test Sheets and Test Specimens
 - 11. ASTM D 2240 - Test Method for Rubber Property, Durometer Hardness
 - 12. ASTM D2321 - Practice for Underground Installation of thermoplastic pipe for sewers and other gravity-flow applications.
 - 13. ASTM D 2657 - Practice for Heat Joining of Polyolefin Pipe and Fittings

14. ASTM D 2837 – Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
15. ASTM D3035 - Polyethylene Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter
16. ASTM D 3261 - Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
17. ASTM D 3350 - Specification for Polyethylene Plastic Pipes and Fittings Materials
18. ASTM F 585 - Practice for Insertion of Flexible Polyethylene Pipe into Existing Sewers
19. ASTM F 714 - Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
20. Plastics Pipe - Renewing Sewers with Polyolefin Pipe

1.03 CONTRACTOR SUBMITTALS

- A. Submit, in accordance with the Contract Documents, installation instructions and details of all pipe, joints, fittings, metallic pipeline marking tape, and appurtenances to be used in the work including the following.
- B. The Contractor shall furnish documents to the Engineer certifying that the pipe furnished hereunder is in compliance with the requirements of the Project Documents.
- C. The Contractor shall submit a 1-foot segment of each pipe diameter from the pipe supply delivered to the project. The pipe segment shall include a weld joint performed by the operator using the fusing equipment on the project. The sample shall be submitted and reviewed by Engineer prior to installation of any HDPE pipe.
- D. Submit a list of pipe and fittings to be used, which includes the following information where applicable:
 1. Pipe and fittings to be used
 2. Manufacturer
 3. Model number, if applicable
 4. Size and Sizing System
 5. Materials
 6. Pressure rating
 7. Catalog data
 8. Pipe joining methods and equipment, including specific procedures for fusion welding (pipe end cleaning, facing, joining, control of heating plate operation, documentation of jointing, debanding, etc.).
- E. The Contractor shall furnish to the Engineer quality control records.
- F. Quality assurance procedures shall be performed by the pipe manufacturer fully in accordance with the requirements of this specification. The certification shall include

certified laboratory data confirming that said tests have been performed on a sample of the pipe to be provided under this contract, or pipe from that production run, and that satisfactory results were obtained.

PART 2 - PRODUCTS

2.01 MATERIAL REQUIREMENTS

- A. Referenced pipe sizes on drawings are nominal inside pipe diameters.
- B. All materials delivered to the job site shall be new, free from defects, and marked to identify manufacturer, material, class, and other appropriate information.
- C. The Contractor shall provide polyethylene pipe as specified. The pipe shall be made to diameter and tolerances in accordance with ASTM D3035. All pipe shall be made from virgin grade material. The pipe shall be of the diameter and class shown or specified and shall be furnished complete with all fabricated fittings, flanged joints and other appurtenances as necessary for a complete and functional system.
- D. Acceptance of materials will be subject to strength and quality testing, in addition to inspection of the completed product. Acceptance of installed piping system will be based on inspection and leakage tests.

2.02 PIPING MATERIALS

- A. Pipe and fittings shall be high density, high molecular weight polyethylene, as defined in ASTM D 3350. In addition, the material shall be listed by the Plastic Pipe Institute with a designation of PE 3408 and shall be classified as a Type III, Class D, Category 5, Grade P34 material, as defined in ASTM D 1248.
- B. Fittings shall be of the same material and class as the pipe. Identification of pipe and fittings shall be in accordance with ASTM D 3350. Pipe and fittings shall be made from virgin material. No rework compound, except that obtained from the manufacturer’s own production of the same formulation, shall be used. Pipe and fittings shall be homogeneous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults.
- C. Dimensions of pipe and fittings shall be in accordance with ASTM F 714. The pipe and fittings shall be DR 17 or as approved by the Engineer, with a minimum pressure rating of 125 psi at 73.4°F, and shall be Iron Pipe Size (IPS)
- D. The inside diameter of the new pipe shall meet the following minimum requirements:

Nominal Size Shown on Drawings (inches)	Actual Minimum Inside Diameter (inches)
6	5.80

- E. The pipe and fittings shall have a **WHITE OR LIGHT GRAY COLORING ON THE INTERIOR.**
- F. The high-density polyethylene pipe and fittings shall be provided by the following manufacturer, or approved equal:
 - 1. DriscoPlex, Division of Chevron Phillips Chemical Co., Piano, TX, 4600 Series pipe for Industrial and Municipal Sewer Trenchless application.

- G. Provide rubber Fernco waterstop gaskets, or approved equal, at the entry of all HDPE pipe into manhole bases and modified manhole wall connections. Cast-in-place in new manhole bases and grout in place in manholes openings modified to facilitate pipe bursting or pipe reaming.

2.03 JOINTS

- A. Joints in HDPE pipe shall be made using thermal butt-fusion welding equipment designed for the specific purpose of permanently connecting HDPE pipes. This equipment shall be capable of squarely facing the pipe ends to be joined, properly heating each pipe end to the temperature range specified by the pipe manufacturer, and applying and sustaining the appropriate pressure, as recommended by the pipe manufacturer.
- B. The butt-fusion welding machine shall be outfitted with a measuring and recording unit that documents the conditions existing during the fusion of each individual weld. A printout that includes the date and time each joint was made, the joint number, the initials of the machine operator, the platen temperature at the time of mating, the pressure during the heating cycle, the time period for the heating cycle, the pressure during the soak cycle, and the time period of the soak cycle shall be machine-generated and delivered to the Engineer at the end of each work shift. The recording unit shall be a DataLogger, as manufactured by McElroy Manufacturing, Inc., or approved equal.
- C. Fusion equipment shall be operated by technicians who have been certified by a major gas public utility such as Pacific Gas and Electric, Southern California-Edison or pipe manufacturer or supplier for operation of such equipment. Furthermore, all technicians performing butt-fusion welding on this project shall have a minimum of two (2) years experience operating the same equipment used hereon.
- D. Butt-fusion welding equipment shall be as follows, or approved equal:
 - 1. McElroy No. 412 Hydraulic Fusion Machine, McElroy Manufacturing, Tulsa, Oklahoma
 - 2. Proweld Field 12 (315)-R, Asahi/America, Malden, Massachusetts

2.04 FITTINGS

- A. The Contractor shall provide fabricated fittings where required. Fabricated fittings shall be of fitting is in-line with the pipeline (i.e., a flange adapter), then the I.D. of the fitting shall be the same as the pipe. If the fitting is off-line (i.e., a tee), then the fitting shall have an I.D. in accordance with the Project Documents. Unless otherwise required, all fittings shall be butt-fusion welded.

PART 3 - EXECUTION

3.01 HANDLING AND STORAGE

- A. All pipe, fittings, etc., shall be carefully handled and protected against damage, impact shock, free fall, and scoring. All pipe handling equipment shall be acceptable to the Engineer. Pipe shall be stored in a manner that protects the pipe against injury or damage. Stacking of polyethylene pipe will not be allowed.
- B. The Contractor shall inspect each pipe and fitting prior to butt-fusion welding and again prior to installation. Any damaged pipe or fittings shall be repaired or replaced

by the Contractor, at no additional expense to the District and to the satisfaction of the Engineer. Damage shall include, but not be limited to, gouges, cuts, or scratches of a depth greater than five percent (5%) of the pipe wall.

- C. Prior to butt-fusion welding or installation, each pipe or fitting shall be thoroughly cleaned of any foreign substance that may have collected thereon and shall be kept clean at all times thereafter. The material used to clean the pipe and fittings shall be as recommended by the pipe manufacturer.

3.02 BUTT-FUSION WELDING

- A. Only technicians who have been certified in accordance with the requirements of paragraph 2.03.C shall be allowed to operate the butt-fusion welding equipment.
- B. Butt-fusion welds shall be performed in accordance with manufacturer's instructions. The butt-fusion welding procedures are summarized below:
 - 1. Clean each pipe end with a clean cotton cloth to remove dirt, oil, grease, and other foreign materials.
 - 2. Square (face) the mating surfaces of each of the pipes to be fused.
 - 3. Bring the two (2) pipe ends together and adjust the pipe locations to ensure proper alignment.
 - 4. Verify that the surface temperature of the heater plate is within manufacturer's recommended temperature range and then clean the heater surface with a clean cotton cloth.
 - 5. Insert the heater plate between the pipe ends, bring the ends into firm contact with the heater plate without applying pressure, and achieve a proper melt pattern.
 - 6. After achieving the proper melt bead, remove the heater plate and quickly examine the pipe ends for complete melt.
 - 7. Once complete melt has been accomplished, rapidly bring the pipe ends together and apply pressure as recommended by the pipe manufacturer.
 - 8. Hold the pressure constant and at the proper level throughout the cooling period, for the minimum time period recommended by the pipe manufacturer or as necessary to achieve proper cooling.
- C. The Contractor shall mark each joint with the individual joint number, corresponding to the joint identification number appearing on the printout of the data logger attached to the butt-fusion welding machine. The printout shall be attached to the pipe near the joint for collection by the Engineer.
- D. The Contractor shall remove both the internal and external melt bead from the welded joint. Bead removal shall be accomplished in a manner that does not score or gouge the pipe.

3.03 INSTALLATION

- A. HDPE pipe shall be used for pipe bursting or pipe reaming applications only, unless indicated otherwise in the Project Documents or approved by the Engineer. The

Contractor shall insert the pipe through properly prepared insertion and receiving pits, in accordance with the requirements of ASTM F 585.

- B. The maximum pulling force that may be applied to any pipe shall be calculated as follows:

$$F = SA$$

where:

F = maximum pulling force on pipe (lb.)

S = maximum allowable stress (1,000 psi)

A = cross-sectional area of pipe wall (square inches)

The cross-sectional area of the pipe wall shall be calculated as follows:

$$A = \pi(D-t)t$$

where:

D = outside diameter (in)

t = minimum wall thickness (in)

- C. The Contractor shall take care not to drag the pipe over rocks or rough surfaces that may damage the pipe. An appropriate pulling head shall be attached to the end of the pipe and shall be used for pulling the pipe at all times. Pulling the pipe by the flanged end will not be allowed.
- D. Manhole connections shall be made by attaching a collar to the end of the pipe and encasing the collar in the manhole wall using grout, in accordance with the Project Documents. The collar shall not be used for pulling the pipe into the horizontal boring.
- E. Following installation, the insertion and receiving pits, and any other excavations used, shall be backfilled in accordance with the requirements of Section 02200, "Earthwork."

3.04 FIELD COUPLINGS

- A. Fittings/Joints that are to be assembled after pipe bursting or pipe reaming has been completed shall be butt fused where accessible. An electrofusion coupling shall be used on inaccessible locations. Electrofusion couplings shall be Frialen Electrofusion couplings, as manufactured by Friatec, Inc., or approved equal.

3.05 TESTING

- A. A. Field testing of sanitary sewer system shall conform to the requirements of Section 02735, "Sanitary Sewer System Testing."

****END OF SECTION****

EXHIBIT "C"

SPECIAL CONDITIONS

ARTICLE 1. BONDS

Within ten (10) calendar days from the date the Contractor is notified of award of the Contract, the Contractor shall deliver to the Town four identical counterparts of the Performance Bond and Payment Bond on the forms supplied by the Town and included as Exhibit "F" to the Contract. Failure to do so may, in the sole discretion of Town, result in the forfeiture of Contractor's bid security. The surety supplying the bond must be an admitted surety insurer, as defined in Code of Civil Procedure Section 995.120, authorized to do business as such in the State of California and satisfactory to the Town. The Performance Bond and the Payment Bond shall be for one hundred percent (100%) of the Total Contract Price.

EXHIBIT "D"

**CERTIFICATION
LABOR CODE - SECTION 1861**

I, the undersigned Contractor, am aware of the provisions of Section 3700, et seq., of the California Labor Code which require every employer to be insured against liability for Worker's Compensation or to undertake self-insurance in accordance with the provisions of the Code, and I, the undersigned Contractor, agree to and will comply with such provisions before commencing the performance of the Work on this Contract.

[*INSERT CONTRACTOR NAME***]**

By: _____
Signature

Name (Print)

Title (Print)

EXHIBIT "E"

PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION

Pursuant to Labor Code sections 1725.5 and 1771.1, all contractors and subcontractors that wish to bid on, be listed in a bid proposal, or enter into a contract to perform public work must be registered with the Department of Industrial Relations. See <http://www.dir.ca.gov/Public-Works/PublicWorks.html> for additional information.

No bid will be accepted nor any contract entered into without proof of the contractor's and subcontractors' current registration with the Department of Industrial Relations to perform public work.

Contractor hereby certifies that it is aware of the registration requirements set forth in Labor Code sections 1725.5 and 1771.1 and is currently registered as a contractor with the Department of Industrial Relations.¹

Name of Contractor: _____

DIR Registration Number: _____

DIR Registration Expiration: _____

Small Project Exemption: _____ Yes or _____ No

Unless Contractor is exempt pursuant to the small project exemption, Contractor further acknowledges:

- Contractor shall maintain a current DIR registration for the duration of the project.
- Contractor shall include the requirements of Labor Code sections 1725.5 and 1771.1 in its contract with subcontractors and ensure that all subcontractors are registered at the time of bid opening and maintain registration status for the duration of the project.
- Failure to submit this form or comply with any of the above requirements may result in a finding that the bid is non-responsive.

Name of Contractor _____

Signature _____

Name and Title _____

Dated _____

¹ If the Project is exempt from the contractor registration requirements pursuant to the small project exemption under Labor Code Sections 1725.5 and 1771.1, please mark "Yes" in response to "Small Project Exemption."

EXHIBIT "F"

PAYMENT AND PERFORMANCE BONDS

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the Town of Hillsborough (hereinafter referred to as "Town") has awarded to _____, (hereinafter referred to as the "Contractor") _____ an agreement for _____ (hereinafter referred to as the "Project").

WHEREAS, the work to be performed by the Contractor is more particularly set forth in the Contract Documents for the Project dated _____, (hereinafter referred to as "Contract Documents"), the terms and conditions of which are expressly incorporated herein by reference; and

WHEREAS, the Contractor is required by said Contract Documents to perform the terms thereof and to furnish a bond for the faithful performance of said Contract Documents.

NOW, THEREFORE, we, _____, the undersigned Contractor and _____ as Surety, a corporation organized and duly authorized to transact business under the laws of the State of California, are held and firmly bound unto the Town in the sum of _____ DOLLARS, (\$_____), said sum being not less than one hundred percent (100%) of the total amount of the Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that, if the Contractor, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the Contract Documents and any alteration thereof made as therein provided, on its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill all obligations including the one-year guarantee of all materials and workmanship; and shall indemnify and save harmless the Town, its officers and agents, as stipulated in said Contract Documents, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a condition precedent to the satisfactory completion of the Contract Documents, unless otherwise provided for in the Contract Documents, the above obligation shall hold good for a period of one (1) year after the acceptance of the work by Town, during which time if Contractor shall fail to make full, complete, and satisfactory repair and replacements and totally protect the Town from loss or damage resulting from or caused by defective materials or faulty workmanship, Surety shall undertake and faithfully fulfill all such obligations. The obligations of Surety hereunder shall continue so long as any obligation of Contractor remains. Nothing herein shall limit the Town's rights or the Contractor or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

Whenever Contractor shall be, and is declared by the Town to be, in default under the Contract Documents, the Surety shall remedy the default pursuant to the Contract Documents, or shall promptly, at the Town's option:

- (1) Take over and complete the Project in accordance with all terms and conditions in the Contract Documents; or
- (2) Obtain a bid or bids for completing the Project in accordance with all terms and conditions in the Contract Documents and upon determination by Surety of the lowest responsive and responsible bidder, arrange for a Contract between such bidder, the Surety and the Town, and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by the Town under the Contract and any modification thereto, less any amount previously paid by the Town to the Contractor and any other set offs pursuant to the Contract Documents.
- (3) Permit the Town to complete the Project in any manner consistent with local, California and federal law and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Contractor by the Town under the Contract and any modification thereto, less any amount previously paid by the Town to the Contractor and any other set offs pursuant to the Contract Documents.

Surety expressly agrees that the Town may reject any contractor or subcontractor which may be proposed by Surety in fulfillment of its obligations in the event of default by the Contractor.

Surety shall not utilize Contractor in completing the Project nor shall Surety accept a bid from Contractor for completion of the Project if the Town, when declaring the Contractor in default, notifies Surety of the Town's objection to Contractor's further participation in the completion of the Project.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project to be performed thereunder shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project, including but not limited to the provisions of sections 2819 and 2845 of the California Civil Code.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20__).

(Corporate Seal)

Contractor/ Principal

By _____

Title _____

(Corporate Seal)

Surety

By _____
Attorney-in-Fact

Signatures of those signing for the Contractor and Surety must be notarized and evidence of corporate authority attached.

(Attach Attorney-in-Fact Certificate) Title _____

The rate of premium on this bond is _____ per thousand. The total amount of premium charges, \$_____.
(The above must be filled in by corporate attorney.)

THIS IS A REQUIRED FORM

Any claims under this bond may be addressed to:

(Name and Address of Surety) _____

(Name and Address of Agent or Representative for service of process in California, if different from above) _____

(Telephone number of Surety and Agent or Representative for service of process in California) _____

NOTE: A copy of the Power-of-Attorney authorizing the person signing on behalf of the Surety to do so must be attached hereto.

Notary Acknowledgment

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA
COUNTY OF _____

On _____, 20____, before me, _____, Notary Public, personally appeared _____, who proved to me on the basis of satisfactory

evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature of Notary Public

OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

CAPACITY CLAIMED BY SIGNER

- Individual
- Corporate Officer

_____ Title(s)

- Partner(s) Limited
- General

- Attorney-In-Fact
- Trustee(s)
- Guardian/Conservator
- Other:

Signer is representing:
Name Of Person(s) Or Entity(ies)

DESCRIPTION OF ATTACHED DOCUMENT

_____ Title or Type of Document

_____ Number of Pages

_____ Date of Document

_____ Signer(s) Other Than Named Above

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS That

WHEREAS, the Town of Hillsborough (hereinafter designated as the "Town"), by action taken or a resolution passed _____, 20__ has awarded to _____ hereinafter designated as the "Principal," a contract for the work described as follows:

_____ (the "Project"); and

WHEREAS, the work to be performed by the Principal is more particularly set forth in the Contract Documents for the Project dated _____ ("Contract Documents"), the terms and conditions of which are expressly incorporated by reference; and

WHEREAS, said Principal is required to furnish a bond in connection with said contract; providing that if said Principal or any of its Subcontractors shall fail to pay for any materials, provisions, provender, equipment, or other supplies used in, upon, for or about the performance of the work contracted to be done, or for any work or labor done thereon of any kind, or for amounts due under the Unemployment Insurance Code or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of said Principal and its Subcontractors with respect to such work or labor the Surety on this bond will pay for the same to the extent hereinafter set forth.

NOW THEREFORE, we, the Principal and _____ as Surety, are held and firmly bound unto the Town in the penal sum of _____ Dollars (\$_____) lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, his or its subcontractors, heirs, executors, administrators, successors or assigns, shall fail to pay any of the persons named in Section 9100 of the Civil Code, fail to pay for any materials, provisions or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department or Franchise Tax Board from the wages of employees of the contractor and his subcontractors pursuant to Section 18663 of the Revenue and Taxation Code, with respect to such work and labor the Surety or Sureties will pay for the same, in an amount not exceeding the sum herein above specified.

This bond shall inure to the benefit of any of the persons named in Section 9100 of the Civil Code so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

It is further stipulated and agreed that the Surety on this bond shall not be exonerated or released from the obligation of this bond by any change, extension of time for performance, addition, alteration or modification in, to, or of any contract, plans, specifications, or agreement pertaining or relating to any scheme or work of improvement herein above described, or pertaining or relating to the furnishing of labor, materials, or equipment therefore, nor by any change or modification of any terms of payment or extension of the time for any payment

pertaining or relating to any scheme or work of improvement herein above described, nor by any rescission or attempted rescission of the contract, agreement or bond, nor by any conditions precedent or subsequent in the bond attempting to limit the right of recovery of claimants otherwise entitled to recover under any such contract or agreement or under the bond, nor by any fraud practiced by any person other than the claimant seeking to recover on the bond and that this bond be construed most strongly against the Surety and in favor of all persons for whose benefit such bond is given, and under no circumstances shall Surety be released from liability to those for whose benefit such bond has been given, by reason of any breach of contract between the owner or Town and original contractor or on the part of any obligee named in such bond, but the sole conditions of recovery shall be that claimant is a person described in Section 9100 of the Civil Code, and has not been paid the full amount of his claim and that Surety does hereby waive notice of any such change, extension of time, addition, alteration or modification herein mentioned and the provisions of sections 2819 and 2845 of the California Civil Code.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20__.

(Corporate Seal)

Contractor/ Principal

By _____

Title _____

(Corporate Seal)

Surety

By _____

Attorney-in-Fact

Title _____

Signatures of those signing for the Contractor and Surety must be notarized and evidence of corporate authority attached. A Power-of-Attorney authorizing the person signing on behalf of the Surety to do so must be attached hereto.

NOTE: A copy of the Power-of-Attorney authorizing the person signing on behalf of the Surety to do so must be attached hereto.

Notary Acknowledgment

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA
 COUNTY OF _____

On _____, 20____, before me, _____, Notary Public, personally appeared _____, who proved to me on the basis of satisfactory

evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

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