City of Millbrae

Department of Public Works
Engineering Division

Part II
Technical Provisions
For Public Works Construction

March 2024

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TECHNICAL PROVISIONS

SECTION 1
GENERAL REQUIREMENTS

1.01 DEFINITIONS. Whenever in these Technical Provisions the following terms, names or pronouns are used, the intent and meaning shall be interpreted as follows:

A. "City" shall mean the City of Millbrae, California.

B. "City Council" shall mean the City Council of the City of Millbrae, California.

C. "Contractor" shall mean the person or persons, co-partnership or corporation who have entered into a contract with the City of Millbrae, California and is licensed by the State of California to contract for work within his/her license class. A contractor may or may not be under contract to the City.

D. "Engineer" shall mean the City Engineer of the City of Millbrae, California, acting either directly or through properly authorized agents acting within the scope of the particular duties delegated to them.

1.02 REFERENCE TO OTHER SPECIFICATIONS. Wherever in these Technical Provisions or on the plans reference is made to the State of California Standard Specifications, the State Standard Specifications or the State Specifications, it shall mean the Standard Specifications, State of California, Department of Transportation, latest edition.

Whenever in the Standard Specifications the following terms are used, they shall be understood to mean and refer to the following:

A. Department of Public Works shall mean the City of Millbrae Department of Public Works.

B. Director of Public Works shall mean the City of Millbrae Director of Public Works.

C. Engineer shall mean the City of Millbrae City Engineer or his/her appointed designee.

D. State shall mean the State of California.

1.03 APPLICATION. These City of Millbrae Technical Provisions are to be used in conjunction with City of Millbrae Standard Drawings and may be modified or supplemented by Special Provisions as approved by the City Engineer.

1.04 NOTIFICATIONS. The Contractor shall notify the City Engineer at least two (2) working days prior to commencing work, unless otherwise provided, and shall keep the Millbrae Police Department and Fire Department informed daily regarding excavations, barricades and detours in roadway areas. Barricades with flashers shall be placed at all excavations and as directed by the Engineer.

The Contractor shall notify Underground Service Alert (USA) 811 , at least three (3) working days in advance of the start of any excavation.

1.05 PERMISSION TO WORK IN PUBLIC RIGHT OF WAY. No work shall be started in public streets, easements, or rights of way until such time as; the City Engineer of the City of Millbrae issues a valid Encroachment Permit.

SECTION 2
EARTHWORK AND GRADING

2.01 GENERAL. Earthwork and grading shall be in accordance with Section 19, paragraphs 19-1 through 19-6, inclusive, of the State Standard Specifications except as modified herein.

2.02 CLEARING AND GRUBBING. Clearing and grubbing shall be in accordance with paragraphs 16-1.01 through 16-1.03 inclusive of the State Standard Specifications.

2.03 GRADING AND GRADING PERMITS. Permits shall be obtained as required by Millbrae Municipal Code Title 9, Building and Fire Regulations, Chapter 9.45, Grading.

2.04 BLASTING. Blasting shall not be permitted.

2.05 EROSION CONTROL AND LANDSCAPING. Erosion control and landscaping shall be done in accordance with requirements of City's National Pollution Discharge Elimination System (NPDES) Permit and Section 20 of the State Standard Specifications. In case of conflict between NPDES requirements and the State Standard Specifications, NPDES requirements shall take precedence.

SECTION 3
STREETS AND ROADWAYS

3.01 GENERAL. Streets and Roadways shall generally be subject to State Standard Specifications and plans except as otherwise modified by these specifications or other directions by the City.

3.02 AGGREGATE BASE. Aggregate base shall be Class 2, ¾-inch maximum gradation in accordance with Section 26 of the State Standard Specifications unless otherwise specified or noted on the plans. Watering shall be included in the price for Aggregate Base and no separate payment or allowance shall be allowed therefor.

3.03 ASPHALT CONCRETE. Asphalt Concrete shall be Type B, ½-inch maximum, medium gradation, in accordance with Section 39 of State Standard Specifications as modified in these Technical Provisions and the Special Conditions.

3.04 ASPHALT CONCRETE OVERLAY. Asphalt concrete for overlay of all streets shall conform to Type B, ½-inch maximum, medium gradation in accordance with Section 39 of the State Standard Specifications

Paving asphalt to be mixed with mineral aggregate shall be steam refined, AR-4000, in accordance with Section 92 of the State Standard Specifications.

Conform cuts shall be made at pavement conforms as shown on plans. Cuts shall be made with a "cold planer" type machine. Conform cuts shall be a minimum of ¾-inch deep and shall be a minimum of 42 inches wide unless otherwise detailed on the Plans.

Spreading and compacting equipment shall be in accordance with Section 39-2 of State Standard Specifications. Wearing courses shall be spread with a paving machine.

Spreading and compacting shall be in accordance with Section 39-2 of State Standard Specifications.

Upon completion, pavement shall be true to grade and cross section. When a ten-foot straightedge is laid on the finished surface parallel to the centerline of roadway, the surface shall not vary from edge of straightedge more than 1/8 inch, except at intersections and changes of grade.

Any areas not within the tolerance shall be brought to grade immediately following the initial rolling. However, if paving material has cooled below lower limits of spreading temperature prescribed in Section 39 of State Standard Specifications, surface of pavement shall be brought to a true grade and cross section by removing paving material in area to be replaced by an approved method to provide a minimum uniform laying depth of one inch of new A.C. paving material. Repairs shall not be made to pavement surfaces by feather edging of joints.

Asphalt concrete overlay shall be 1-inch thick unless shown otherwise on the plans or specified in the Technical Provisions and shall be constructed on road surface as hereinbefore specified for wearing course.

Compaction shall be 95% relative density per California Test Method No. 308.

Prior to application of tack coat and A.C. overlay, existing pavement shall be thoroughly cleaned. Cleaning shall be accomplished by use of power brooms. If, in the opinion of the Engineer, pavement still appears dirty after initial cleaning, pavement shall be recleaned.

Immediately before Asphalt Concrete is placed, tack coat of Grade RS-1, SS-1 or SS-1H emulsified asphalt shall be spread at rate of 0.10 to 0.12 gallons per square yard. If, in the opinion of the Engineer, pavement appears too dry after applying tack coat, another application of tack coat shall be applied by the Contractor.

3.05 ADJUSTING MANHOLE FRAMES AND STREET MONUMENTS. All existing sanitary sewer and storm manhole frames and covers, street monuments, water valves, etc., shall be raised and adjusted to final surface grade not more than five days after AC overlay paving has been completed. It shall be the Contractor's responsibility to locate and reference all items to be adjusted to grade. Adjustment rings will be permitted only if proper fit can be obtained with no rattling. All raised covers shall be free of any asphaltic material.

3.06 DAMAGE TO EXISTING SURFACE OR PAVEMENT MARKERS AND MARKINGS. Damage to street surface or damage to existing pavement markers and markings outside the limits of AC overlay shall be repaired by Contractor to Engineer's satisfaction at no additional expense to City.

3.07 PAVEMENT MARKING AND STRIPING. Pavement marking and striping consisting of raised pavement markers, painted or thermoplastic crosswalks, stop bars, ASTOP@ messages and other markings shall be applied to the resurfaced pavement as designated on the Plans and Specifications. New blue reflective pavement markers shall be installed two to three feet (2' to 3') off street centerline opposite each fire hydrant. Marker offset shall be on the same side of centerline as the fire hydrant.

Application of pavement markers and painted and thermoplastic pavement markings shall be in accordance with Section 84 Markings of the State Standard Specifications. Where references to "Detail___" is made on the plans, such reference shall be to Detail number(s) as shown in State Standard Plans A20A through A24H , inclusive, most recent edition.

3.08 FIRE APPARATUS ACCESS ROAD REQUIREMENTS. Fire apparatus access roads are roads that designed and constructed to provide vehicular access to one (1) or more structures on a single parcel, and are greater than 150 feet in length from the edge of a public right-of-way road surface. Fire apparatus roads shall be designed and maintained to support the imposed loads of fire apparatus with a relative compaction of not less than 95% and shall be provide with a surface as to permit all weather driving capabilities.

The structural section for fires roads shall be based on a T.I. of 4.0 (3 inches of asphalt on 6 inches of Class II aggregate base material). All roads to have a 20 foot minimum width with all weather surfacing. Adequate drainage shall be provided and shall be shown on the roadway plans. Minimum vertical clearance over all roadway shall be 13 feet, 6 inches. All roadway shall have a minimum 150 foot centerline curve radius.

SECTION 4
CONCRETE

4.01 GENERAL. Concrete structures including manholes, inlets, catch basins, headwalls, inlets, outlets and retaining walls shall be constructed in accordance with applicable City of Millbrae Standard Plans and conform to the applicable provisions of Section 51 of the State Standard Specifications. Finishes shall be ordinary surface finish unless a higher class finish is required by the Plans and Specifications for the work.

4.02 CONCRETE. Concrete shall be Class A Portland Cement Concrete as specified in Section 90 of the State Standard Specifications unless otherwise specified in the Plans and Specifications. Concrete shall be mixed, placed, cured and protected in accordance with the applicable provisions of Section 90 of the State Standard Specifications.

4.03 REINFORCEMENT. Reinforcement for concrete structures shall conform to Sections 51 -1.01 through 51 -1.08F, inclusive, of the State Standard Specifications except that Butt Welded Splices shall not be permitted.

4.04 CONCRETE CURB AND GUTTER. SIDEWALK AND DRIVEWAY. Concrete curb and gutter, sidewalk and driveway shall be constructed in accordance with applicable City of Millbrae Standard Plans or State Standard Plans and Section 73 of the State Standard Specifications and as specified herein.

SECTION 5
CONSTRUCTION OF UNDERGROUND UTILITIES

5.01 GENERAL. The terms "excavation" and "trenching" as used herein shall include all material excavated or otherwise removed in the performance of specified work and in connection with the excavation, removal, and subsequent handling and disposal of such material. Excavation and trenching shall include clearing, subgrade preparation, pipe bell hole preparation, all sheeting, shoring, bracing of excavations of five feet (5') or deeper, dewatering of trenches and other excavations, protection of adjacent property, backfilling, including backfill consolidation, disposal of excess material and other work necessary or required.

5.02 CONTROL OF WATER. Contractor shall furnish, install and operate all necessary machinery, appliances and equipment to keep excavations and trenches reasonably free from water during construction and shall dispose of water so as not to cause injury to public or private property, or to cause a nuisance or menace to the public, or would otherwise not be in compliance with NPDES regulations. Contractor shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies, and shall have available at all times competent mechanics for the operation of all pumping equipment. During pouring of concrete and until concrete has set, and during the laying of pipe, excavations shall be kept free of water.

5.03 DISPOSAL OF EXCESS MATERIAL. Excess excavated material shall be disposed of at an off-site location in accordance with local, state and federal laws and regulations. Excavated material suitable for backfill shall be stored temporarily in such manner as will facilitate work under the Contract. The contractor shall make all arrangements with the Owner of the property where the material will be stored or disposed of and shall secure all grading and hauling permits and pay all fees and costs thereof.

5.04 SHORING, SHEETING AND BRACING. Where shoring, sheeting, bracing or other supports are necessary, they shall be furnished, placed, maintained and removed by Contractor. The Construction Safety Orders of the California Division of Industrial Safety and OSHA shall be strictly adhered to at all times with respect to excavation and construction operations.

5.05 INTERFERENCE WITH UTILITIES. The Contractor shall not interfere with the operation of water, gas and electrical distribution and telecommunications systems. Where it is necessary to shut off existing utility services to make connections to such distribution system facilities, each person having service connections affected by the shutoff must be notified at least twenty-four hours (24) hours in advance of the time that the service will be shutoff.

No material or other obstruction shall be placed within 15 feet of a fire hydrant. Fire hydrants shall be maintained readily accessible to the Millbrae Fire Department at all times.

A. Known Interferences: Any data shown on the drawings, or imparted to the Contractor by the Engineer, relative to the location, dimensions, type or character of any pipes, conduits and/or other structures potentially affecting the work is offered solely for the convenience of the Contractor and shall be verified by the Contractor at his expense and to his satisfaction. The City assumes no responsibility for the accuracy or completeness of such data.

The Contractor's attention is directed to Section 1.04 of these Technical Provisions regarding the notification to Underground Service Alert (USA) and the marking of utilities prior to the start of any excavation.

Where pipes, conduits, sewers, or other structures or obstructions are encountered in the excavation of the trench or trenches in the location or locations shown on the diagrams or drawings, or such modifications thereof as may have been ordered by the Engineer, the Engineer may order additional excavation, either in deepening or widening the trench, or he may require the relocation of such portion of the trench as may be necessary to provide for passing the obstruction.

B. **Unknown Interferences:** If unknown underground facilities are encountered in the course of the work, they shall be bypassed by deepening, widening, or relocating the trench. If, in the opinion of the Engineer, the interfering utilities cannot be easily bypassed they shall be relocated.

5.06 PAVEMENT REMOVAL. The amount of pavement cut or removed shall not exceed the width of trench specified. The pavement shall not be removed for more than 50 linear feet ahead of the trench excavation at the end of each working day except as approved by the Engineer. Pavement removal across intersecting streets will not be permitted overnight. The edges of the trench cut in existing pavement shall be sawn with an abrasive cutting wheel prior to removal of the pavement.

5.07 CONTROL OF DUST. Contractor shall keep roads clear of material such that traffic or construction operations will not cause an objectionable amount of dust. Clearing or cleaning of roads using watering methods shall be conducted in such a manner to control discharge of waters with suspended solid particles from discharging directly into storm drains. If the contractor elects, watering methods utilizing sediment basins, filtration, or other approved methods complying with NPDES discharge requirements shall be implemented.

5.08 TRENCH EXCAVATION. Contractor shall not open more trench in advance of pipe laying than necessary to expedite work. Amount of open trench and length of pipe not backfilled shall be determined by the Engineer. The material excavated from the trench shall be placed so as to not obstruct the sidewalk and to minimize possible obstruction to street traffic. Gutters shall be kept clear or other proper provisions made for handling the street drainage.

5.09 MINIMUM COVER OVER PIPE. All pipe lines shall be located on alignment shown on approved plans to the specified grade or elevation unless otherwise approved by the Engineer to meet field conditions. All pipe shall be installed to provide a minimum depth of cover between top of pipe barrel and elevation of original ground surface or finish grade of not less than 3 feet, or as shown on plans.

5.10 LIMITING TRENCH WIDTHS. Trenches shall be of sufficient width to provide ample working space for installing pipe and for proper embedment and backfill. However, width of the trench below an elevation 6 inches above the top of installed pipe shall not exceed nominal pipe size plus 24 inches.

In no case shall trench width in the pipe zone of the trench be greater than at the top except as required to accommodate successive lifts of sheeting, shoring or bracing. Where necessary to prevent sliding or

caving of trench walls which cannot be effectively braced because of the character of soil, it will be permissible to cut trench walls on a slope above an elevation 6 inches above top of pipe being laid in the trench.

If the trench is within 24 inches from the lip of gutter, replace AC from lip of gutter to trench limit. All trenches must be slurry sealed or fog sealed up to a minimum 10 foot width.

5.11 UNAUTHORIZED TRENCH WIDTHS. Where, for any reason, width of lower portion of trench exceeds maximum permissible as stated in the foregoing subsection, special pipe embedment or concrete arch as required by loading conditions and as determined by Engineer shall be furnished and installed by and at the expense of Contractor.

5.12 REMOVAL OF UNSUITABLE PIPE FOUNDATION MATERIAL. In locations where bottom of trench at subgrade is found to be or has become soft, mucky or otherwise unstable, or contains debris, refuse, junk or other material which in the judgement of the Engineer should be removed, Contractor shall excavate or otherwise remove such unsuitable material to the depth and width ordered by Engineer. Replacement material shall be selected backfill material compacted as directed by Engineer, or granular bedding material. Contractor shall replace all unsuitable material at no cost to City.

5.13 SUBGRADE STABILIZATION. Where trench subgrade has become soft and mucky and, in the opinion of the Engineer, a satisfactory stabilized subgrade can be obtained by tamping coarse graded crushed stone or gravel into the subgrade, such material shall be incorporated to the extent necessary to provide a satisfactory stabilized subgrade. All subgrade stabilization work shall be done by and at the expense of Contractor.

5.14 EXCAVATION FOR CONCRETE BLOCKING. Excavation for concrete blocking to be placed at bends and branches in pressure pipe lines shall be as required to obtain bearing area and sections as shown on the plans or Standard Plans for various fittings. All loose excavated material shall be removed before depositing concrete. Load bearing surface of concrete shall be cast against undisturbed earth.

5.15 PIPE SUBGRADE PREPARATION. Pipe subgrade shall be accurately graded so bottom of pipe is in contact with ground throughout the full length of pipe barrel. Any fill under pipe shall be select material and compacted to a relative density of 90%. Laying pipe on mounds of earth or on blocks will not be permitted.

5.16 BELL HOLES. Bell holes of sufficient size shall be excavated for each bell so no load on pipe is carried by bell and the joint can be properly made and inspected.

5.17 TRENCH BACKFILL. Trench backfill shall be placed and compacted after pipe has been inspected and approved by the engineer but prior to leakage test on pipe. Backfill shall be done in such a manner that pipe is supported and surrounded by a dense, uniform, well compacted backfill which will prevent settlement and not impose additional loads or stresses on the pipe.

Backfill material used for pipe embedment shall consist of imported backfill as required by the Plans and Specifications for the work and shall be placed evenly on both sides of pipe and tamped in unconsolidated lifts not exceeding 6 inches to a depth of 6 inches above top of pipe. Material shall be compacted by

mechanical tampers to a relative density of 90%, ASTM D-1557.

Backfill above embedment material shall consist of imported backfill material as required by the Plans and Specifications for the work. Backfill above embedment material shall be consolidated by mechanical compactors, vibrating compactors, or any combination as approved by Engineer. Compaction shall be not less than 90% of relative density in cross-country or non-traveled easements, 95% in all other areas.

5.18 CONTROLLED DENSITY FILL. Controlled density fill (CDF) will be accepted in lieu of the standard backfill specifications. Applications of CDF include, but are not limited to: backfills, structural fills, insulating fills, road base, slab base, trench bedding, void and abandoned tank, pipes and culvert fills. It shall be mandatory in trenches eight (8) inches wide or less where the prevention of subsequent settlement after placement of backfill is required. CDF shall conform to the following requirements:

A. **Strength** - Non-structural CDF that can be excavated by hand shall produce unconfined compressive 28 day strengths from 50 psi to a maximum of 150 psi.

B. **Materials** - Cement shall meet the standards as set forth in ASTM C-150, Type II Cement. Fly ash shall meet the standards as set forth in ASTM C-618, for Class F pozzolans. The fly ash shall not inhibit the entrainment of air. Air entraining agent shall meet the standards as set forth in ASTM C-260. Aggregates need not meet the standards as set forth in ASTM C-33. Any aggregate, producing the required performance characteristics will be accepted for consideration with the following restrictions: The amount of material passing a #200 sieve shall not exceed 12% and no plastic fines shall be present. CDF shall contain no aggregate larger than 3/8 inch nor shall the 3/8 inch aggregate comprise more than 30% of the total aggregate content.

C. **Mix Proportions** - CDF shall be a mixture of cement, Class F pozzolan, aggregate, air entraining agent and water. CDF shall be batched by a ready mixed concrete plant and delivered to the job site by means of transit mixing trucks. The actual mix proportions shall be determined by the producer of the controlled density fill to meet job site conditions, minimum and maximum strengths, and unit weight. Entrained air content shall be a minimum of 4.0%. The actual entrained air content shall be established for each job with the materials and aggregates to be used to meet the placing and unit weight requirements. Entrained air content may be as high as 20% for fluidity requirements.

D. **Mix Design** - Mix design shall be submitted for the Engineer's approval.

E. **Execution** - CDF shall be discharged from the mixer by any reasonable means into the area to be filled. CDF shall be brought uniformly to the elevation as shown on the plans. Trench sections to be filled with CDF shall be contained at either end by bulkheads of earth fill. Permanent pavement may be placed directly upon the CDF as soon as it has sufficiently self-consolidated so that the surface will withstand the process of paving without displacement or disruption. If the placement of the CDF is not completed early enough to allow for permanent paving to be completed the same day, the contractor shall provide skid resistant steel plates to cover all excavations permitted to remain open in the roadway during non-working hours. Steel plates shall be placed in a safe and proper manner that does not impede the passage of pedestrians, bicycles, and the disabled

community. Steel plates to span the trench and prevent traffic contact with the CDF until permanent paving can be placed. Compaction is not necessary when placing CDF.

5.19 TRENCH REPAVING. The base shall be an 8 inch thick, Class 2, aggregate base conforming to Section 3.02 Aggregate Base of these Technical Provisions. Type B asphalt concrete surfacing, conforming to Section 3.03 Asphalt Concrete of these Technical Provisions, shall be placed immediately after applying tack coat to the base, and the site restored to its original condition.

The base shall be compacted with a trench roller of adequate weight. No truck wheel rolling will be permitted. Relative compaction of materials shall be tested in accordance with ASTM D1557, D2922 and D3017 and all cost shall be borne by the contractor.

Joints between old and new pavements, or between successive days work, shall be carefully made in such a manner as to insure a thorough and continuous bond between old and new surfaces. Hot smoothers, or tampers, shall be carefully employed in such a manner as to heat up the existing or previously placed pavement sufficiently (without burning it) to insure a proper bond. Before placing mixture against them, all joints shall be painted with uniform coating of hot asphalt binder.

On certain streets having a higher type pavement, the requirement for base thickness and finished surfacing thicknesses may be different from above and will be established by the City prior to the beginning of the work.

If the trench is within 24 inches from the lip of gutter, replace AC from lip of gutter to trench limit. All trenches must be slurry sealed or fog sealed up to a minimum 10-foot width.

SECTION 6
STORM DRAINAGE SYSTEM

6.01 GENERAL. The Contractor shall furnish and install drainage piping and construct drainage structures in accordance with related sections of these Technical Provisions, applicable City of Millbrae Standard Drawings and in accordance with applicable sections of the State Standard Specifications, and the requirements of this section. Storm water shall, under no circumstances, be introduced into the sanitary sewage system, but shall be confined to surface and subsurface drainage facilities provided.

6.02 DESIGN CRITERIA. The following is intended to summarize the City of Millbrae's policy on storm drainage to guide the applicant and the civil engineer when preparing a drainage analysis as a required "Condition of Approval" for any proposed development.

A. Drainage Policy.

1. Post-development peak flow (runoff) and velocity must be less than or equal to pre-development peak flow and velocity in areas where there are no existing downstream storm drain systems. No additional runoff, caused by development, can cross property lines. In areas where there are existing storm drain systems, those systems must be of adequate size to accept the increased runoff, or, mitigation procedures must be taken. Mitigation procedures may include on-site storm drain detention or off-site storm drain improvements.

2. If permanent structures are to be built over existing drainage courses or drainage facilities:

   a. Adequate drainage facilities must be provided to protect the proposed development and existing downstream development.

   b. A means of adequate access must be provided for maintenance.

   c. An alternate system for drainage must be provided in the event the primary system becomes plugged or otherwise inoperable.

3. The use of dry wells to dispose of surface runoff is not allowed.

4. Drainage systems that are designed to rely on pumps are not allowed.

To comply with the City's policy, the applicant's civil engineer must submit a drainage report, hydrologic study, hydraulic calculations, and drainage improvement plans.

B. Drainage Report. A drainage report (written narrative) must be submitted to the City for review and include the following:

1. Delineation of drainage basin and subbasins.

2. Description of proposed drainage system.

3. Discussion of rationale used to design system.

4. Discussion of methods and/or calculations.

5. Description of how excess drainage will be detained.

6. Description of how discharge will be controlled to comply with the City's policy.

C. **Hydrologic Analysis.** The hydrologic calculations must be based on an appropriate design storm for the specific site conditions and project. For projects located within a floodplain or bounding an existing drainage course located on or adjacent to the property, the design shall be based upon a design storm no less than a 100 year recurrence interval. For most other projects, a design storm with a 10 year recurrence interval may be used.

The hydrologic analysis must include the following:

1. Analysis/calculations must be signed and stamped by a registered civil engineer. Without this requirement being met, no further review of the drainage analysis will be performed.

2. All drainage basins and/or subbasins clearly shown on a map plan.

3. A clear description of the method used to determine peak flows.

4. If the rational method (Q = C I A F) is used:

    a. Provide a clear statement of the basis for the runoff coefficient (C), rainfall intensity (I), time of concentration (t), intensity factor (F) of **1.1**, and duration, etc.

    b. A clear description showing the areas used in the formula.

5. If another method is used, provide a statement of method, a clear description of the basis for all assumptions and the source of all information used in the particular method.

6. Calculations for pre-development peak flow and velocity.

7. Calculations for post-development peak flow and velocity.

8. Calculations for detention basin design and a determination of the required volume of storage to comply with the City's Policy.

9. If a computer program is used in the analysis, provide the program and output, each described in the written narrative.

10. The following table shall be used for Time of Concentration and Intensity (inches per hour)

Time of Concentration (Hrs:Mins)	Intensity (Inches per Hour) 10-Year	Intensity (Inches per Hour) 100-Year
0:10	2.45	3.60
0:15	2:05	3.00
0:20	1.73	2.55
0:25	1.50	2.22
0:30	1.33	1.95
0:35	1.20	1.75
0:40	1.10	1.61
0:45	1.02	1.49
0:50	0.95	1.37
0:55	0.90	1.28
1:00	0.86	1.21
1:15	0.75	1.07
1:30	0.67	0.95
1:45	0.61	0.87
2:00	0.56	0.80
2:30	0.49	0.70
3:00	0.44	0.63
3:30	0.40	0.57
4:00	0.37	0.53
4:30	0.34	0.49
5:00	0.32	0.45
6:00	0.29	0.41
7:00	0.26	0.38
8:00	0.24	0.35
9:00	0.23	0.33
10:00	0.21	0.30
12.00	0.19	0.27
24:00	0.13	0.18

11. The following table shall be used for runoff coefficients:

Type of Development	Runoff Coefficient
Parks and Cemeteries	0.30
Residential – Acres	0.40
Residential – Regular	0.50
Commercial	0.75
Paved Areas	0.85

D. **Hydraulic Analysis.** Analysis/calculations must be signed and stamped by a registered civil engineer. Without this requirement being met, no further review or the drainage

analysis will be performed.

The hydraulic analysis must include calculations that clearly demonstrate:

1. That the post-development discharge will be controlled, and peak flow and velocity will not exceed pre-development values.

2. That all storm drainage facilities have sufficient capacity to carry the anticipated peak flows. These facilities include, but are not necessarily limited to pipes, culverts, swales, ditches, valley gutters, etc.

E. **Plans.** The plans must incorporate the following items:

1. Plans must be signed and stamped by a registered civil engineer. Without this requirement being met, no further review or the drainage analysis will be performed.

2. All proposed storm drainage facilities clearly shown.

3. Existing and proposed contours and/or spot elevations clearly indicated.

4. All flow patterns clearly shown.

5. Profiles of all storm drain lines including all crossings of other utilities. A minimum one (1) foot clearances between utility lines is required.

6. Construction details must be shown, including but not necessarily limited to:

   a. Specific locations of all storm drainage facilities specified (i.e. stations, dimensions from property lines, etc.)

   b. Dimensions of all storm drainage facilities.

   c. Pipe/Swale slopes, pipe sizes, etc.

   d. Invert elevations.

   e. Construction materials must be specified (i.e. PVC, RCP, etc.)

6.03 PIPE AND INSTALLATION.

A. **Reinforced Concrete Pipe.** Reinforced concrete pipe culverts shall be furnished in accordance with Section 65 of the State Standard Specifications as modified herein. Non-reinforced pipe may not be substituted for reinforced concrete pipe. The minimum allowable size for publicly maintained RCP shall be 15 inches in diameter.

B. **Plastic Pipe.** Plastic pipe shall be furnished, installed, and paid for in accordance with

Section 64 of the State Standard Specifications. Plastic pipe shall be PVC C900 Class 150. The minimum allowable size for publicly maintained plastic pipe shall be 15 inches in diameter.

6.04 CATCH BASINS AND STORM WATER INLETS. Manholes, catch basins, junction structures and transition structures shall be constructed at the location and of the type shown on the plans and in accordance with applicable City of Millbrae Standard Plans. They shall be concrete structures, fitted with frames covers and grates of specified weight as shown on the Standard Plans for the specified type of structure.

Concrete structures shall be constructed with Class "A" concrete in conformance with the applicable portions of Section 4 of these Technical Provisions and applicable Standard Plans. Concrete structures shall not be plastered.

6.05 SUBSURFACE DRAINS. Subsurface drains shall conform to Section 68 of the State Standard Specifications.

Excavation for subdrains will not be separately measured and paid for but shall be included in the price paid per linear foot of subdrain.

SECTION 7
WATER SYSTEM

7.01 GENERAL. The water distribution system includes all water mains, valves, hydrants, service connections, meters, tanks, pump stations and other appurtenances that supply water to City of Millbrae customers. New construction and/or relocation of the above facilities must comply with the specifications below and all applicable state and federal codes. All plans or drawings must be submitted to the Millbrae Engineering Division, 621 Magnolia Ave., Millbrae, CA 94030 for review and approval. An Encroachment Permit must be obtained from the Engineering Division before any work may begin.

7.02 DESIGN CRITERIA.

A. Design Parameters

1. Demand on the water system shall be as follows:

Development Type	Average Demand
Single Family Residence	300 gallon per day
Multi-Family Residence	240 gallons per day per unit
Commercial and Industrial	2,000 gallons per day per acre

2. Maximum day demand is defined as **2.2** times the average demand, and maximum hourly demand is defined as **3.8** times the average demand.

3. Fire flow and hydrant spacing shall be as follows:

Development Type	Fire Flow	Hydrant Spacing
Low/Medium Density Residential	1,250 gallons per minute	350 feet max.
High Density Residential	2,000 gallons per minute	350 feet max.
Commercial	2,500 gallons per minute	300 feet max.

B. Layout

1. Mains shall be designed to permit circulation of water as part of the distribution system grid to assure water quality. Hydrants or blow off valves shall be utilized on any dead end main installations.

2. Any installations of water mains east of or in El Camino Real, or other locations as required by the Engineering Division, shall incorporate additional corrosion control measures. Ductile iron pipe shall be fusion epoxy coated on the exterior and interior with 13 mil, minimum, 20 mil, maximum, fusion epoxy coating and encased in 8 mil polyethylene pipe wrapping.

3. Ductile iron pipe installed west of El Camino Real shall be installed with polyethylene pipe wrapping.

4. All water mains shall maintain a minimum vertical clearance of 1 foot above and 10

feet horizontal clearance from sanitary sewers. When the above clearances are not possible, the sewer main shall be encased with a steel casing 15 feet on both sides of the crossing. Clearance for other utilities shall be a minimum of 2 feet, unless approved otherwise by the City Engineer.

B. Mains

1. Minimum inside diameter of water mains shall be 8 inches.

2. Minimum cover in areas subject to vehicular traffic shall be 36 inches.

3. Minimum cover of non-traffic areas shall be 24 inches.

4. Connections shall be mechanical joint or flanged and bolted fittings. In-line pipe joints shall be U.S. Pipe Tyton push-on joints or approved equal.

C. Pipe Materials

1. Ductile iron pipe shall meet ANSI / AWWA C151/A21.51-96.

2. Poly Vinyl Chloride (PVC) pipe shall meet AWWA C900, rated for 200 psi, for 4 inch through 12-inch diameter pipe, or AWWA C905, rated for 235 psi, for pipe greater than 12 inches in diameter. All joints shall be factory manufactured with bell and spigot ends and rubber gaskets. Solvent cement welded joints will not be permitted.

3. Pipe casings shall be 3-inch thick steel, with a smooth bore. End caps shall be CALPICO Model W or C, or approved equal. Casing insulators shall be CALPICO Model P or PX, or approved equal.

4. Bell restraint harness for C905 PVC pipe shall be used. Restraint for PVC pipe (AWWA C905) at the bell shall consist of the following: The restraint shall be manufactured of ductile iron conforming to ASTM A586. A ring shall be utilized on the PVC bell. A restraint ring, incorporating a plurality of individually actuating gripping surfaces, shall be used to grip the pipe and a sufficient number of bolts shall be used to connect the bell ring and the gripping ring. The combination shall have a minimum working pressure rating equivalent to the pipe. The restraint shall be the Series 2800 as manufactured by EBAA Iron, Inc. or approved equal.

5. Restraint devices for bell and spigot joints of PVC pipe shall consist of two split retainer rings. One clamping ring shall be installed on the spigot pipe, and with the necessary restraining rods and nuts, connected to a second clamping ring located on the pipe barrel behind the gasketed bell. Restraint devices shall incorporate a series of machined serrations that provide positive restraint, exact fit and full support of the pipe wall.

   The restraint device shall provide the necessary bolts and nuts to complete the PVC

pipe bell assembly. Devices shall meet or exceed the recognized testing for restrained joints on PVC pressure pipe and offer factory certification and independent test results. Restraint devices for securing PVC pipe bell assemblies shall be SIGMA Series PVP or approved equal.

6. Restraint devices for joining plain end PVC pipe to either mechanical joint or push-on joint with ear lug watermain fittings shall consist of a split retainer ring that incorporates a series of machined serrations that provide positive restraint, exact fit and full support of the pipe wall. The restraint device shall provide the necessary bolts and nuts to complete the watermain fitting assembly. Devices shall meet or exceed the recognized testing for restrained joints on PVC pressure pipe and offer factory certification and independent test results. Restraint devices for securing PVC pipe to mechanical joint/push-on joint watermain fittings shall be SIGMA Series PVM or approved equal.

D. Appurtenances

1. **Valves:** 3-inch through 12-inch valves shall be ductile iron body, non-rising stem, resilient wedge gate valves as manufactured by Clow, U.S. Pipe or equal and meet the requirements of AWWA C509. The wedge shall be fully encapsulated with elastomeric material. Coating inside and out shall be fusion epoxy meeting AWWA C550 standards. All bolts, nuts and washers shall be ASTM 316 stainless steel. The operating nuts shall be bronze.

   Valves larger than 12 inches shall be ductile iron body, resilient seated butterfly valves as manufactured by Clow, US. Pipe, or equal and meet the requirements of AWWA C504. Coating inside and out shall be fusion epoxy, meeting AWWA C550 standards. All bolts, nuts and washers shall be ASTM 316 stainless steel. The operating nuts shall be bronze.

2. **Fittings:** Ductile iron fittings shall meet ANSI/AWWA C110/A21.10-87. Connections shall be mechanical joints or flanged and bolted fittings. Bolts, nuts and washers shall be ASTM 316 stainless steel. Coating inside and out shall be fusion epoxy, meeting AWWA C550. Push on fittings are not allowed.

3. **Thrust blocks:** Thrust blocks shall be installed per Millbrae Standard Plan W-3. Alternative restraint systems shall be submitted to the City Engineer for approval prior to beginning construction.

4. **Water Service Connection:** Water service connections shall be installed per Millbrae Standard Plan W-1 and in accordance with AWWA C800. Taps shall be made while the main is in service, unless otherwise approved by the City Engineer.

   a. A bronze, double strap service saddle sized to fit the outer diameter of the water main shall be used. 1-inch through 2-inch corporation stops shall be brass thread by compression fitting as manufactured by Ford, Mueller, or equal.

b. 1-inch through 2-inch service lines shall be type K or L soft copper pipe. Red brass threaded piping and fittings are also allowed.

c. Service line fittings shall be bronze flared or compression couplings as manufactured by Mueller, Ford, or equal. Threaded fittings such as curb stops and meter spuds shall be brass.

5. **Water Meters:** All water meters shall be the standard touch read meter make/model used by the City. Contact Public Works Superintendent to obtain make/model information. Meters shall have a bronze case and be equipped with 100 cubic foot registers.

6. **Meter Boxes:** Boxes shall be Christy B-9 through B-48 or equal, sized to the meter(s) to be installed

a. Lids shall be Christy with reading lid to accommodate the touch read pad.

b. Boxes and lids subject to traffic loading shall be H-20 rated and have skid resistant surfaces.

7. **Fire Hydrants:** Fire Hydrants shall be installed per Millbrae Standard Plan W-2. Hydrants shall be Long Beach Model 651, Rich Model 76, CLOW 76 hydrant, or equal and shall be equipped with two 2-1/2 inch and one 4-inch nozzles.

a. An auxiliary shutoff gate valve shall be installed nearby on the supply line leading to the hydrant. This valve shall be installed no less than 5 feet and no greater than 10 feet from the hydrant unless otherwise approved by the City Engineer.

b. The hydrant shall be mounted on a break off spool attached with hollow bolts.

c. The bury shall be installed with concrete thrust blocking per Standard Drawing W-3.

d. All pipe joints between the bury and the main shall be restrained. All nuts, bolts and washers shall be ASTM 316 stainless steel.

e. Maximum hydrant spacing is 350 feet in residential areas and 300 feet in commercial areas.

8. **Fire Service Connections:** Fire service connections shall be made with the main in service.

a. The Engineer shall be present for the air test of the tapping assembly before tapping of the main commences and during the tapping operation.

b. The coupon from the main shall be retrieved and given to the Engineer.

c. All pipe connections between the main and the check valve assembly shall be flanged or restrained. ASTM 316 stainless steel hardware shall be used.

d. All above ground piping shall be ductile iron up to the check valve.

e. An approved double detector check valve assembly shall be installed above grade. A metal enclosure shall be provided for the device and fitted with a lock.

9. **Backflow Prevention/Cross Connections:** All proposed service connections where the use of the water may pose a hazard to the public water supply shall be reviewed by the Engineer and/or San Mateo County Department of Health Services (D.H.S.) inspector. All pipe used to configure the backflow service shall be epoxy coated DI pipe. All joints shall be flanged. All fittings shall be epoxy coated. Backflow preventor shall be protected by a see-thru cage and 6-inch concrete pad, with insulation on all pipe protruding from pad.

a. Watts #909, Hersey FRP II or equal reduced pressure principle backflow devices or equal shall be used. Devices shall be equipped with full port ball or resilient wedge gate shut-off valves.

b. The device shall be tested and certified to be in good working order by a technician certified by the D.H.S. A copy of the test report shall be furnished to the Engineer. Thereafter, backflow prevention must be tested and certified and tagged by the County annually.

c. Fire sprinkler systems shall be categorized as class 1, 2, 3, 4, and 5 (refer to Manual of Cross-Connection Control, University of Southern California). Fire sprinkler systems meeting class 1, 2, and 3 requirements shall have a double detector check valve installed after the meter by the owner of contractor. Class 4 and 5 systems shall require approval before installation by the City Engineer. Double detector check valves shall be Wilkens 950, Watts 709, or equal. Resilient wedge operating valves shall be on the prevention devices, and shall have 316 stainless steel nuts and bolts. Double detector check valves shall be installed in such a manner that they shall be readily accessible for repair and inspection. All devices shall be Underwriters Laboratory (UL) approved. Inspection service by the City is required before fire service line is put in service.

d. Irrigation systems shall have reduced pressure principle backflow prevention devices installed after the water meter. Irrigation or other connections shall not be connected **before** the backflow device. Possible criminal charges incurring against the perpetrator from the City of Millbrae could result from these illegal connections. The reduced pressure principle

prevention device shall be a Watts 909 or equal. All devices shall be UL approved. Inspection service by the City is required before irrigation line is put in service. All material used to build the service from the meter to the customers outlet shall be DI pipe and epoxy coated fittings.

7.03 INSTALLATION.

A. Trenches: All trench work shall conform to AWWA C600.

1. The contractor shall submit to the Engineer for approval its plan for traffic control, Stormwater Pollution Prevention Plan (SWPPP), dust control, pedestrian safety, driveway access, on-site storage of equipment, pipe and materials and any other considerations deemed necessary by the City before a Notice to Proceed or an Encroachment Permit is issued.

2. The paved area to be excavated shall be sawcut to provide a clean edge. Sawcut residue shall be vacuumed concurrently with the sawcut operation.

3. The contractor shall call Underground Service Alert (U.S.A.) at least two working days before beginning any excavation.

4. Wherever utilities have been marked in the proposed excavation, the contractor shall hand dig to locate the utility. No heavy equipment shall be used for this work.

5. The trench configuration in paved areas shall be a "tee" type. The top 6 inches shall be at least 60 inches wider than the trench per Standard Plan R-9.

6. No more than 100 feet of open trench shall be permitted at a time. Steel road plates shall be used as needed; edges of plates shall be ramped with "cutback" AC.

7. Asphalt along the original trench line damaged during construction shall be neatly trimmed as approved by the Engineer and at the Contractor's expense prior to finish trench paving.

B. Ductile Iron Pipe Wrapping: At the time of installation, all non epoxy coated ductile iron pipe shall be encased in 8 mil, minimum thickness, polyethylene tubes. At the time of installation, all ductile iron pipe shall be either epoxy coated or encased in 8 mil minimum thickness polyethylene tubes. Epoxy coated pipes shall be poly wrapped. .

At all penetrations of the wrapping (service lines, valves, etc.), the wrapping shall be neatly trimmed and securely taped around the penetration. Care shall be taken to ensure no punctures occur to the wrapping during pipe laying and backfill operation.

At joints in the polyethylene tube, successive lengths of tubing shall be overlapped a minimum of one foot (1'). The completed length of tubing shall be continuously taped to the circumference of the pipe. The next length of tubing shall be overlapped a minimum of one foot (1') and similarly continuously taped around the circumference of the pipe to the

previous layer of polywrap. Pipe barrels and polywrap to which tape is to be applied shall be clean and dry at the time of application of tape. Tape used in adhering polywrap to pipe and to preceding layers of polywrap shall be two inches (2") wide by 10 mils thick and shall be Scotchwrap No. 50, Polyken No. 900-12, or equal.

C. **Electrical Continuity:** At the completion of all work, City maintenance personnel will check the completed waterline for electrical continuity throughout its entire length. Continuity requirements may be met by one of the following methods as approved by the City Engineer:

1. For Ductile Iron Pipe: electrically-continuous joints (e.g. flanged and bolted), bonding straps across joints, installation of tracer tape or installation of 8 gauge solid copper electrical wire, type TW, with solid blue jacket. If electrically-continuous joints or bonding straps are used, the contractor shall bond an 8 gauge solid copper electrical wire as specified above to the pipe and extend this wire into the valve riser as specified below.

2. For Poly Vinyl Chloride Pipe: tracer tape or 8 gauge solid copper electrical wire, type TW, with solid blue jacket. A continuous length of tape or wire shall be used from valve riser to valve riser with no splices allowed.

3. At all in-line valves, tracer tape or wire shall be installed to within four inches (4") of design finished grade within the valve riser to facilitate future use of location equipment.

D. **Pipe Casing:** Where water line facilities cross rights-of-way of other agencies, or at other locations required by the City of Millbrae, said facilities shall be installed within a bored and jacked, 3-inch thick, smooth steel casing meeting ASTM A36, 10 feet on each side from centerline of waterline.

Model "W" or Model "C" end seals manufactured by CALPICO, Inc., or equal, shall be used to seal the annular space between the casing and the carrier pipe at each end of the casing.

Model "M" or Model "P" casing insulators as manufactured by CALPICO, Inc., or equal, shall be installed on the carrier pipe prior to its insertion into the casing. The insulators shall isolate the carrier pipe from the casing and shall be installed at spacings recommended by the manufacturer and approved by the Engineering Division.

E. **Air Release Valve:** Air release valves shall be installed at the high points of the waterline.

F. **Concrete Thrust Blocks:** Concrete thrust blocks shall be Class B concrete and installed per Standard Plan W-3.

7.04 TESTING AND STERILIZATION.

A. **General:** Prior to making final connection to the existing water system, installed lines shall

be flushed, sterilized and tested. All necessary material and equipment and all work required in connection with the flushing, sterilization and testing of the installed pipe system as specified herein shall be provided. Hydrostatic and leakage tests shall be made only after the trenches have been backfilled and backfill compacted sufficiently to hold the pipe firmly in position. All labor, materials and equipment necessary for filling, flushing, sterilization, and testing shall also be provided by the contractor. A City water meter shall be obtained for use in obtaining water for filling, flushing, sterilization and testing.

The Hydrostatic and Leakage Tests shall be in accordance with AWWA C600, Section 5., and as specified herein.

Any flaws disclosed by any of the tests required herein shall be corrected and the pipeline retested at the Contractor's expense to the satisfaction of the City of Millbrae.

B. **Hydrostatic Test:** All new water mains shall be subjected to a hydrostatic test of 150 psi at the lowest point of the section being tested. The pipes shall be flushed before testing to remove any foreign material. Each section being tested shall be slowly filled with water in a manner to expel all air from the pipe by such means as are necessary. Water shall be required to stand in the pipe for twenty-four (24) hours before test pressure is applied. The required pressure, as measured at the lowest elevation, shall be applied for not less than one (1) hour. Any leaks discovered in performing the pressure test shall be corrected and the test shall be repeated until satisfactory to the City of Millbrae. Any defective pipe, fittings, valves, or joints shall be repaired or replaced at no additional expense to the City. Allowable pressure variation for this test shall be 5 psi from nominal test pressure.

C. **Leakage Tests:** After the hydrostatic pressure test has been satisfactorily completed, each section of the line shall be subject to a leakage test, which is defined as the quantity of water to be supplied into the line necessary to maintain the specified test pressure after the pipe has been filled with water and the air expelled. The duration of each leakage test shall be not less than two (2) hours, and during the test, the pipe shall be continuously subject to a hydrostatic pressure of 140 psi as measured at the highest elevation of the section being tested. The specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the City of Millbrae. The test pressure shall be maintained for the specified time during which all exposed pipe, couplings, fittings, valves and hydrants shall be examined carefully. No pipe installation will be accepted if the leakage for the section of line that is tested is more than 2.45 gallons/hour per 100 couplings.

When test results indicate leakage beyond that allowed, a survey of the line shall be made and any leaks shall be repaired. Leakage test shall be repeated at no additional expense to the City until conformance to this specification is demonstrated to the satisfaction of the City of Millbrae. Leakage test may be combined with the hydrostatic test.

D. **Sterilization:** Prior to connecting and placing new water lines into service in the City system, all lines shall be sterilized in accordance with the requirements of AWWA Standard C651-92. Sterilization of new water facilities may be accomplished by either applying chlorine to the entire water content of the line, including services, fire hydrants and stubs, in sufficient quantity to produce a residual of at least ten (10) parts per million

(ppm) after twenty-four (24) hours retention; or of applying the chlorine to a portion of the water at a higher concentration which is passed through the line as a "slug", at a velocity which will result in a contact period of at least one (1) hour; all as stipulated in the above mentioned AWWA Standard.

1. If the "tablet" form of chlorination by mounting High Test Hypochlorite onto the pipe walls as they are installed is elected, the Contractor shall determine the minimum number of tablets per pipe. If the pipeline fails to meet any of the specified criteria, the line shall be re-chlorinated.

2. After chlorination has been completed to the satisfaction of the City of Millbrae, the lines shall be thoroughly flushed until the chlorine content in all parts of the system has been proven by test to be less than one (1) ppm.

3. Flushing water shall be disposed of in accordance with applicable regulations and in such a manner to prevent flooding or damage to adjacent properties or facilities. Disposal of chlorinated water by discharge directly to storm drains, natural water courses and creeks shall not be permitted.

4. After flushing of chlorine from the lines, the services of a Commercial Water Laboratory, approved by the State of California Department of Public Health, shall be engaged to gather an approved number of representative water samples, the location and number of which shall be determined by the City of Millbrae.

5. No section of the water system shall be accepted when any sample of water reveals the presence of any coliform bacteria. Should the laboratory report show that any sample taken contains any coliform bacteria, the pipe line shall be considered as having failed this test. The line shall be rechlorinated and the water retested as specified above. This process shall be repeated until satisfactory test results are reported.

6. The laboratory shall submit copies of its Report of Bacteriological Examination to the City of Millbrae within 2 days of completion of laboratory testing.

E. **Disposal of Flushing and Sterilization Water:** Water obtained from the City of Millbrae water distribution system and used for flushing, sterilization and bacteriological testing of new mains shall not be introduced back into the distribution system. Such waters shall be disposed of in accordance with applicable federal, state and local regulations.

The Contractor is advised that discharge of such waters with a chlorine residual greater than 0.1 parts per million (ppm) directly to storm drain facilities, natural water courses or creeks will not be permitted.

The Contractor shall submit a proposed procedure for handling and disposing of flushing, sterilization and testing waters to the Engineering Division for review and approval prior to scheduling such operation.

SECTION 8
SEWER COLLECTION SYSTEM

8.01 GENERAL. These specifications shall be applicable to the construction, repair, and relocation of sanitary sewer facilities in the City of Millbrae including without limit mains, laterals, services and all related appurtenances. New construction and/or relocation of the above facilities must comply with the specifications below and all applicable state and federal codes. All plans or drawings must be submitted to the Millbrae Engineering Division, 621 Magnolia Avenue, Millbrae, CA. 94030 for review and approval. An Encroachment Permit must be obtained from the Engineering division before any work may begin.

Existing castings that will not be reused in the work shall be delivered to City's Corporation Yard, 400 East Millbrae Avenue, Millbrae, CA, Telephone (650) 259-2333 .

Sanitary sewers to be abandoned and in potential conflict with new sewer lines or other utilities shall be removed. Open ends of remaining pipe shall be securely plugged with brick and mortar. The Contractor may elect to remove such mains in their entirety. In such case, the Contractor shall be responsible for disposal of all materials, backfill and compaction of trenches, repaving, and related items of work. Existing sanitary sewer mains to be abandoned in place shall be pumped dry and filled with sand or slurry and ends plugged with concrete.

8.02 DESIGN CRITERIA. Permittee's attention is directed to the City of Millbrae Standard Documents for Public Works Construction for detailed design criteria.

Diameter of sewer mains shall be as required by the City Engineer (6-inch diameter, minimum). Single family residence laterals shall be 4 inches in diameter; multi-family residence laterals shall be 6 inches in diameter. Slope of laterals shall be minimum of 1/4 inch per foot, or constructed on a slope to provide a minimum velocity of 2 feet per second (fps).

Minimum cover from finished surface to top of pipe shall be 36 inches in areas subject to vehicular traffic and 24 inches in non-traffic areas. Ten (10) foot horizontal clearance shall be maintained between parallel water and sewer lines. One (1) foot vertical clearance shall be maintained between crossing water and sewer lines with the water line being above the sewer line. Where above clearances cannot be maintained, the sewer line shall be constructed with a steel casing that reaches 15 feet on either side of the center line of the water main. The steel casing shall be large enough to allow future size upgrades up 2 times the original pipe size installed.

8.03 MATERIALS AND INSTALLATION. All materials to be furnished and installed and required to complete the work shall be new and as herein specified. Any deviations from the specifications must be approved, in writing, by the City Engineer prior to such materials being installed or otherwise used in the work.

A. Pipes and Joints: Sanitary sewer pipe shall be of the following type with specific type determination made in consideration of site conditions and other relevant factors as approved by the City Engineer. Depending on existing site conditions, Vitrified Clay Pipe, Ductile Iron Pipe and Poly Vinyl Chloride Pipe shall be used for point repairs. High Density Polyethylene (HDPE) pipe shall be used at all times. Thermo-fused plastic slip liner or inversion bags (Insituform) may be used for repairs on a case by case basis.

1. Vitrified Clay Pipe (VCP) shall be extra strength manufactured in accordance with ASTM C700. Pipe shall be plain end and joints shall be Type "D" Joints as specified in Section 208-2 Joints for Clay Pipe, Standard Specifications for Public Works Construction of the Southern California Chapter of the American Public Works Association (APWA). The joint shall consist of three parts: a circular synthetic rubber sleeve, two stainless steel compression bands and an injection molded plastic shear ring. Bell and spigot pipe with pre-molded gasket material will not be permitted. VCP pipe may only be used for point repairs of existing mains and laterals. All new construction shall be HDPE pipe, fused joints, including the clean-out and connection to the main. PVC C900 may be used at the discretion of the City Engineer. All weld/fusion beads shall be removed inside and outside. All pipes crossing water utilities shall be encased in iron pipe 2 times the size of sewer pipe being installed. The casing shall extend a minimum of 15 feet from the center line of the water pipe on both ends of the sewer pipe.

2. Ductile Iron Pipe (DIP) shall be manufactured in accordance with AWWA C151. Joints may be rubber gasket push-on or mechanical joint conforming to AWWA C111 at the option of the Contractor unless otherwise designated on the plans or specified herein. Note: DIP is normally not approved for use except for special considerations as approved by the City Engineer.

   For installation east of or in El Camino Real, ductile iron pipe and fittings shall be exterior coated and interior lined with a thirteen (13) mil, minimum, to twenty (20) mil, maximum , thickness fusion epoxy coating. Coating and lining materials shall not build up in thickness so as to interfere with joint assembly or with installation of required fittings.

   At all locations throughout the City, all ductile iron pipe shall be wrapped with 8 mil, minimum thickness, polyethylene tubes at the time of pipe installation.

   At all penetrations of the wrapping (service laterals, etc.), the wrapping shall be neatly trimmed and securely taped around the penetration. Care shall be taken by the Contractor to ensure no punctures occur to the wrapping during pipe laying and backfill operation.

   At joints in the polywrap, successive lengths of tubing shall be overlapped a minimum of one foot (1'). The first length of tubing shall be terminated by continuous taping to the circumference of the pipe. The next length of tubing shall be overlapped a minimum of one foot (1') and similarly continuously taped around the circumference of the pipe to the previous layer of polywrap. Pipe barrels and polywrap to which tape is to be applied shall be clean and dry at the time of application of tape.

   Tape used in adhering polywrap to pipe and to preceding layers of polywrap shall be two inches (2") wide by 10 mils thick and shall be Scotchwrap No. 50, Polyken No. 900-12, or equal.

3. Poly Vinyl Chloride (PVC) pipe and fitting shall conform to the requirements of ASTM Designation D 3034-73 as they apply to Type SDR 35 PVC sewer pipe using an Elastomeric Gasket Joint in a bell and spigot assembly system. Pipes and fittings shall be Class 150 ASTM C900 for diameters less than 12 inches or Class 165 ASTM C905 for diameters greater than 14 inches. Rubber sealing gaskets shall meet the requirements of ASTM Designation D-1869. No solvent cement joints will be permitted.

   PVC pipe entering or leaving a manhole shall have a rubber sealing gasket, as supplied by the pipe manufacturer, firmly sealed perpendicular to the pipe axis around the pipe exterior. The sealing gasket shall be cast into the manhole base near the center of the manhole wall as a water stop. The sealing gasket may also consist of a manhole coupling with rubber sealing rings cast into the structure base.

4. High Density Polyethylene Pipe (HDPE) shall be manufactured from a polyethylene compound that conforms to ASTM D-1248 and shall be at least C900 Class 150. The pipe shall have a Standard Dimension Ration (SDR) appropriate for the proposed installation but in no case shall the numerical value be greater than 17. The minimum wall thickness shall conform to manufacturers specifications when measured in accordance with ASTM D-2122. Pipe shall be in minimum lengths of Twenty (20) feet except for point repairs.

   The pipe must have a long-term hydrostatic strength of 1600 psi, minimum, in accordance with ASTM D-2837.

   When the environmental stress crack resistance (ESCR) of the compound is measured in accordance with ASTM D-1693, Condition C, the compound shall withstand not less than 192 hours in 100% solution at 100 degrees F before reaching a 20% failure point (F20).

   Sections of pipe shall be joined into continuous lengths on the job site at ground level above the trench. Joining shall be accomplished by thermal butt fusion performed in accordance with pipe manufacturer's recommendations and applicable section of ASTM D-2657 or employing electrofusion couplers in accordance with ASTM F1055, Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe Tubing.

   An appropriate electrofusion coupler shall be used. Couplers shall be installed in accordance with the manufacturer's instructions and as approved by the City Engineer.

   Butt fusing shall be accomplished by aligning the sections to be joined in a fixture, trimming, softening the ends by heat, and then joining them together under controlled pressure. All fusion must be done by personnel trained by the pipe supplier or other qualified person, and using tools recommended by the pipe supplier. Joints between pipe sections shall be smooth and internal fusion bead

shall be removed and in no case shall be greater than 0.10 inch. A thermal crayon shall be used as a thermometer to assure proper fusion temperature.

A waterstop specified by the pipe manufacturer shall be installed at all manhole connections. The waterstop shall be placed in the manhole base and centered in the manhole wall. The waterstop shall be firmly fitted around the pipe exterior. Waterstop may also consist of a manhole coupling with rubber sealing rings cast into the structure base.

B. **Manholes:** Manholes shall be constructed in accordance with the details shown on Standard Plan S-2.

Joints in the precast riser sections, at the eccentric cone, and at the manhole base shall be sealed utilizing Ram-Nek Joint Compound or approved equal. After setting of precast sections, the manhole shall be allowed to settle for twenty-four (24) hours, minimum. After the settling period has elapsed, all interior joints shall be finished with a mortar coating.

Maximum manhole spacing shall be 300 feet. The minimum manhole opening shall be 30 inches. All manhole covers shall have cast into them "City of Millbrae." All manholes shall be H-20 load rated. Ladder rungs shall be removed.

For manholes providing access to a sewer trunk line greater than 18 inches (18") in diameter, the manhole access diameter, including the frame and cover, shall be thirty-six inches (36") minimum. Contractor shall submit shop drawings of manhole cones, adjustment rings, and frame and castings for review and approval by the Engineering Division before incorporating required items into the work.

C. **Clean Outs:** Clean Outs shall be constructed in accordance with the details shown on City of Millbrae Standard Plan S-1 . Notwithstanding the detail as drawn or joint materials specified on Standard Plan S-1 , pipe points for the riser, plug and wye branch shall be Type "D" Joints per Section 208-2, APWA.

Cleanouts shall be constructed in such a manner that a 39-inch rigid cleaning rod can pass through to main line. Cleanouts shall be installed on the sidewalk and located 6 inches minimum, 12 inches maximum clearance from back of walk.

Sewer Relief Plugs and a sidewalk frame and grate are required on cleanouts. Any cleanout and lateral construction or repair that require repair of the lateral to the connection to the main line shall be installed in HDPE pipe.

D. **Service Laterals:** Service Laterals and their connections to sewer mains shall be in accordance with details shown on Standard Plan S-1. All new service laterals shall be HDPE.

E. **Connections:** Lateral connections shall be wye branch (no combos). Saddles or tees will not be allowed unless diameter of main is greater than three times the diameter of the lateral.

Plastic laterals shall be connected with wye branches. Repair couplers on point repairs shall be Fernco or Caulder. HDPE pipe connections shall be fused and electrofusion joints acceptable when regular fusion is not possible. All fusion beads inside and out shall be removed.

F. **Backflow Prevention Device:** In addition to a standard cleanout, a backflow prevention device as shown on Standard Plans S-1 shall be installed on the private property side. Backflow prevention device shall comply with detail shown on Standard Plan S-10.

8.04 EXCAVATION AND BACKFILL. USA shall be notified (811) at least two (2) working days (excluding Saturdays, Sundays and legal holidays) before start of any excavations. Contractor shall pothole all trenches where suspected or marked utilities (i.e. water, gas, electrical, etc.) cross the line of proposed construction. Except where sewers are to be installed in steel casing pipes, excavation for sewers shall be made by open trenching.

Trench shall be T-type with a 6 inch concrete cap which extends 6 inches beyond each side of the edge of trench. The walls of the sewer trench shall be vertical in the region between the bottom of the trench and the top of the sewer pipe as shown on Standard Plan R-9.

The pipe shall be laid in a trench excavated to the lines and grades shown on the plans and designated by the Engineer. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. Where mud or other soft, spongy material incapable of proper support is encountered, it shall be excavated to a minimum depth of 12 inches below sewer subgrade.

The portion of the trench shall be backfilled with "coarse bedding material" and thoroughly compacted to achieve a firm, dry bed for the sewer pipe or structure. Coarse bedding material shall be clean rock conforming to the following requirements:

GRADING LIMITS (CALIF. TEST 202) SIEVE SIZES	PERCENTAGE PASSING
2 inches	100
1 ½ inches	90-100
¾ inches	5-30
⅜ inches	0-5
No. 200 sieve	0-2

Where rock is encountered, the trench shall be excavated to a minimum depth of 3 inches below sewer subgrade and backfilled to sewer subgrade with coarse bedding material. Sewer subgrade is defined as being 3 inches below the exterior bottom of the pipe.

Native material is not allowed for backfill, new import shall be used for backfill. All street trenches shall be compacted to 95% relative compaction as evidenced in a certified testing agency's report to be provided to the City. Prior to repaving trenches, trench edges shall be neatly saw cut. Trenches shall not be left

open over weekends. Trenches shall be backfilled, compacted and paved with temporary paving ("cutback"). In lieu of backfill, etc., bridging of trenches with steel trench plates may be approved by the City Engineer.

8.05 CLEANING, TESTING AND INSPECTION.

A. **Cleaning:** All new sewer mains shall be cleaned prior to testing and final inspection. At the contractor's option, cleaning may be completed using a high pressure water device or with an approved cleaning ball or device in accordance with such device manufacturer's instructions or recommendations.

Sand traps with screens shall be set in the manhole at the downstream end of the section being cleaned and shall be secured as approved by the Engineer. Flushing of cleaned materials into downstream sections of the sewer system shall not be permitted.

B. **Testing:** Low pressure air tests shall be performed on the total footage of all new sewer pipeline installations after the pipelines have been properly cleaned. Prior to testing, the Contractor shall submit a schedule of equipment and installation procedures to the Engineering Division for approval. Low pressure air tests shall be conducted in accordance with the following Test Procedure:

1. All necessary test equipment shall be in proper working order and tests shall be made in the presence of the Engineer. Test plugs shall be carefully placed at each end of the section of line to be tested. When all necessary test equipment is in place, the test section shall be pressurized to 3.5 psi gage and held above 3.00 psi for not less than five (5) minutes. Air shall be added as necessary to keep the pressure above 3.00 psi. At the end of this five (5) minute saturation period, the pressure must be 3.00 psi min. to begin the timed test period. If the pressure drops 0.50 psi in less than 15 minutes, the section of pipe shall not have passed the test.

   If the time for the pressure to drop 0.50 psi is 19 minutes or less, the line shall immediately be repressurized to 3.00 psi and the test repeated. If, during the five (5) minute saturation period, the pressure drops less than 0.50 psi after the initial pressurization and air is not added, the section undergoing the test shall have passed.

   If the test is not passed, any leaks shall be found and repaired to the satisfaction of the Engineer, and the section retested.

C. **Inspection:** After satisfactory completion of cleaning and low pressure air testing, all new sewer mains, including sewer line stubs, shall be inspected by closed circuit television equipment designed for such work. Videotapes shall be made of each section televised in color, on-screen footage marker and audio track log. The sections of pipe televised shall be clearly identified on each tape and one (1) copy of the videotape for each section of pipe shall be furnished to the City of Millbrae.

The Engineer shall be notified at least three (3) working days in advance of scheduled

television inspections. The contractor shall repair any defects noted during the TV inspection. Any repaired section of pipe shall be re-televised and videotaped in its entirety. A copy of the videotape of the re-televising meeting the above-specified requirements shall be furnished to the City of Millbrae.

SECTION 9
STREET LIGHTING AND TRAFFIC SIGNALS

9.01 STREET LIGHTS. General lighting shall be required in all new developments and approved by the City Engineer. The cost of installing, relocating, repositioning or reconfiguring streetlights as a result of new construction shall be paid by the developer. Streetlights design shall adhere to CalTrans Standard ES-6A with following modifications: Pole Manufacturer: Valmont with Acceptable models:, or approved equal; Head Manufacturer: Cobra Head or Leotek GCJ1.

9.02 PLAN DETAILS. The plans shall show and identify all existing lights in the immediate vicinity of the project, all streetlights and pull boxes to be installed, all conduit runs and the service point for the new streetlights.

On subdivision plans, the streetlights shall be shown in the plan views and on a separate sheet. In addition to the above, regardless of the fact that duplications may be involved, the following shall be required on the streetlight portion of subdivision plans:

A. Utility poles.

B. Public utility easements.

C. Intersecting property lines of adjacent properties.

D. All existing streetlights on both sides of any streets.

9.03 DESIGN STANDARDS.

A. Street lighting shall be designed by a Registered Civil or Electrical Engineer and approved by the City Engineer.

B. All intersections shall have at least one streetlight. Whenever possible, streetlights shall be placed on the far side of the intersection to silhouette objects in the intersection area.

C. All cul-de-sacs exceeding 100 feet in length, measured from the street light location at the intersection to the right-of-way line at the end of the bulb, shall have at least one street light located at the end of the bulb.

D. All street light poles shall be of galvanized steel.

E. Luminaries: The type of street light and the appropriate wattage shall be specified on the plans. The luminaries shall be high-pressure sodium vapor type with internal ballasts. 100 -watt luminaries shall be used in commercial areas and 70 -watt luminaries shall be used in all other areas.

F. Service: All street light systems shall have underground service provided.

G. Photocell: A single photocell shall be required for multiple service poles containing four or

more lights. All other light systems shall have a photocell in each luminary.

9.04 TRAFFIC SIGNALS. Traffic signal installation or modification work shall conform to the requirements of Section 87 Signals, Lighting and Electrical Systems of the Standard Specifications and Standard Plans of the State of California Department of Transportation, most recent edition. LED packs only. No gel LED's allowed.

SECTION 10
LANDSCAPE IMPROVEMENTS

10.01 IRRIGATION SYSTEMS. All irrigation systems shall comply with AB325. A licensed landscape architect shall submit water calculations to the Public Works Department for approval showing compliance with AB325. All irrigation system appurtenances shall comply with **SECTION 7, WATER SYSTEM** regarding Backflow Prevention/Cross Connections.

10.02 PLANTING MATERIALS. All planting materials and landscape improvements must be reviewed and approved by the Park Superintendent.

SECTION 11
IMPROVEMENT PLANS

11.01 GENERAL. Complete plans and specifications for all proposed improvements, including any necessary easements, rights-of-entry, and/or dedications for public rights of way shall be submitted to the Engineering Division for review and must receive the required approvals prior to the start of construction. All plans shall be prepared by or under the direction of a registered civil engineer in accordance with the provisions of Division 3, Chapter 7 of the Business and Professions Code, the "Civil Engineer's Act." Plans shall also be subject to requirements of the Millbrae Municipal Code, Title 10, Planning and Zoning.

11.02 FORMAT. Improvement plans and specifications shall be prepared in accordance with the following requirements:

A. Dimensions: Improvement plans shall be clearly and legibly drawn on sheets 24 by 36 inches in size with a 1 ½ inch clear margin on the left edge and a minimum ½ inch margin on all other edges.

B. Scale: At a minimum, horizontal scale shall be 1 inch equal to 40 feet; vertical scale shall be 1 inch equal to 4 feet; or as approved by the City Engineer prior to submittal.

C. Content:

1. Title Sheet.

   a. Plan view showing the entire street right-of-way layout at a scale of 1 inch equal to 100 feet, the proposed water and sewer mains, the storm drainage system, lot numbers and other miscellaneous improvements to be installed.
   b. Index of sheets.
   c. Vicinity map.
   d. Complete legend.
   e. Typical street sections(s).
   f. Title block located in the lower right-hand corner or the right edge of the sheet.
   g. Full description of temporary and permanent benchmarks.
   h. General and special notes relating to the construction.
   i. Signature blocks for the Design Engineer and the City Engineer.
   j. For grading plans, include additional signature blocks for Geotechnical Engineer and Community Development Director.
   k. For landscape/irrigation plans, include additional signature block for Parks and Recreation Director.
   l. State of California registration seal and signature of the design engineer shall be on the cover sheet.

2. Street Plan and Profile Sheets

   a. The plan view of each street to be improved shall be shown on separate sheets indicating existing improvements, proposed improvements and

future improvements, if known. Proposed improvements shall include sidewalk, curb and gutter, driveways, sewer mains and lateral locations, water mains and water service locations, storm drains, catch basins, manholes, valves, fire hydrants, fencing, barricades, monuments, lot lines, survey stationing and other data as required by the City Engineer. The survey stationing shall normally read from left to right with the north arrow pointing either to the top or left edge of the sheet. All stationing shall be a continuation of existing improvements where possible.

b. When conforming to existing pavement, curb and gutter, or other facilities, detailed location and elevation information shall be provided on the improvement plans. Existing edge of pavement and street centerline shall be shown at 25 foot intervals for the length of the project and at least 100 feet beyond. Cross-sections at the same 25 foot intervals shall be accurately drawn to show the conform paving, indicating that the resultant cross-slope is no flatter than two percent (2%) and no steeper than five percent (5%). The cross-sections shall be drawn at a scale sufficiently large to clearly show the proposed conform work.

c. A profile view of each street shall be shown immediately below or above its plan view. For projects including construction of underground facilities (water, sewers, storm drains, etc.), the profile shall include existing grade lines, sewer mains, storm drains, water mains, public utility mains, all utility crossings, and top of curb. Elevations shall be shown for the top of curb at grade break points, at each full station, at 25 foot intervals through vertical curves, at manhole and catch basin inverts and rims, and at water main, sewer and storm drain crossings with other utilities.

3. Site Development Plan (For On-site Development).

The site development plan shall include building pad, floor and garage elevations, individual lot drainage patterns, adjacent land drainage, driveway locations, fencing, existing contours, existing trees, wells, ditches and other landmarks important to the construction of the improvements.

4. Small projects may involve a combination of the above sheets.

5. Any development/improvement plan containing any Public Works improvements shall be submitted to the Public Works Department in AutoCAD.

11.03 GENERAL NOTES. The following general notes as a minimum shall be included on plans, as applicable:

A. All work is to be done in accordance with the standard plans and specifications of the City of Millbrae, which are hereby incorporated into these plans.

B. At least 48 hours notice to the Public Works Division is required for a pre-construction

meeting prior to the start of construction. Phone (650) 259-2339.

C. All revisions to these plans must be approved by the City Engineer prior to their construction and shall be accurately shown on record drawings prior to the acceptance of the work as complete.

D. An Encroachment Permit is required for all work within a public right-of-way/ or easement and must be obtained prior to the start of work.

E. The contractor shall notify Underground Service Alert at 811 at least 48 hours prior to the start of work to verify the location of existing underground utilities. The utilities shown on the plans are based upon record information, however the engineer assumes no responsibility for their accuracy or actual locations.

F. The contractor shall leave a 24-hour emergency telephone number with the Police, Fire and Public Works Departments, and keep them informed daily of any detours.

G. The contractor shall abide by the rules and regulations of the State of California Construction Safety Orders pertaining to excavations and trenches. A copy of the Construction Safety Orders is available in the Engineering Division for inspection.

H. Public safety and traffic control shall be provided in accordance with the "WATCH" Manual and as directed by the City Engineer.

I. The contractor shall give at least 24 hours notice to the City Maintenance Superintendent prior to connecting to existing water facilities. At all times, the operation of existing valves shall be done under the direction of maintenance division personnel.

J. All underground utilities shall be completed prior to the placement of base rock unless otherwise approved by the City Engineer.

K. Existing curb and gutter, sidewalk, survey monuments, and other public improvements within the project limits that are damaged or displaced shall be replaced at the contractors expense, even if damage or displacement was not caused by actual work performed by the contractor.

L. When the lowest finished floor level of a house is 12 inches or less above the top elevation of the nearest upstream sanitary sewer structure, there shall be a backwater overflow device or check valve installed on the sewer lateral next to the clean out.

M. If paving and storm drain improvements are not completed by October 15, temporary silt and erosion control facilities shall be installed to control and contain silt deposits and to provide for the safe discharge of storm waters into existing storm drainage facilities. Design of the silt and erosion control facilities must be approved prior to their construction.

N. All traffic signs and street name signs shall be high reflective grade and conform to CalTrans specifications and City Standard Plan R-14.

O. Approval of these plans by the City Engineer does not relieve the permittee or his engineer from the responsibility for the design of the improvements and any deficiencies resulting from the design thereof.

P. All City Standard Drawings referenced on the plans shall be the current version available from the Public Works Department.

Q. A licensed land surveyor shall be retained to establish all lines, levels, grades and locations of all improvements and to verify the proper installation of all improvements. A State of California registered civil engineer shall be retained to update contract plans and to submit record drawings indicating all final improvements, with approved revisions, installed.

R. Cut sheets shall be submitted to the City for approval at least one (1) week prior to the start of construction of an improvement requiring them.

S. The contractor shall perform the necessary tests in accordance with City standards on newly installed storm drains, sewer, and water systems only after trenches are backfilled and street base is in place, compacted and ready for asphalt paving.

T. The contractor shall adjust to final grade all manholes, valve and monument covers within the work area unless noted otherwise.

U. The contractor shall place a "S" (for sewer) and a "W" (for water) in the wet concrete curb top at all new lateral locations.

V. The contractor shall be responsible for contacting appropriate utilities and requesting verification of service points, field verification of location, size, depth, etc. for all their facilities and to coordinate work schedules.

11.04 SUBMISSION AND CITY APPROVAL.

A. Improvement plans shall be submitted in triplicate to the Engineering Division for checking to insure compliance with these standards, City of Millbrae ordinances, and good engineering practice. Submittal shall include specifications, supporting calculations, easement and right-of-way descriptions, rights-of-entry, and/or other materials as requested by the City Engineer.

B. Plans shall not be considered as approved until required individuals have signed the plans in the approval block on the plans. No changes shall be permitted to an approved set of plans unless such changes are first approved by the City Engineer as described above. Excepted from approval are any features of the plans that are contrary to, in conflict with, or do not conform to any California State Law, City of Millbrae Ordinance or Resolution, or generally accepted good engineering practice in keeping with the standards of the profession, even though such errors, omissions or conflicts may have been overlooked in the Engineering Division review of plans.

C. After formal approval of the improvement plans by the City Engineer, electronic copies of the plans shall be furnished to the Engineering Division. If additional copies of the improvement plans are requested by the City Engineer, they shall be furnished to the City. Prior to acceptance of the improvements by the City, the consulting engineer shall furnish to the City a full set of the record "as built" drawings of the improvements to include all revisions.

SECTION 12
REUSE AND RECYCLING

12.01 GENERAL. The City of Millbrae conducts recycling programs in compliance with State law AB939, which require all California cities to reduce the amount of garbage placed in landfills by 50% by the end of the year 2000 and to maintain this level thereafter. Therefore the applicant and contractor(s) shall maximize the reuse and recycling of construction and demolition waste materials to the greatest extent possible.

The City of Millbrae has prepared literature, including the "Construction Site Recycling & Reuse Guide," and offers technical assistance to aid in the reuse and recycling of materials from construction and demolition projects, including information on recycling service companies. For more information, please contact the City's Recycling Coordinator at (650) 259-2444.

Specifically, the following measures shall be implemented:

1. Applicant and contractor(s), including subcontractors shall specifically investigate opportunities to salvage materials for reuse prior to the start of demolition or remodeling activities using the City's Guide and will provide sufficient lead time in the demolition or remodeling schedule for the salvage activities to take place.

2. All written bids for construction and/or demolition services for the project (including subcontractors) shall indicate the City's goal to maximize the reuse and recycling of construction and demolition waste materials from the project.

3. Applicant shall prepare and submit for approval a Solid Waste Management Plan that details the anticipated reuse, recycling, and disposal of materials from the project. The Plan shall be in accordance with guidelines and forms provided by the City and shall be submitted to and approved by the City's Recycling Coordinator prior to the approval of a building permit. At minimum, the Plan shall estimate the total waste to be generated by the project and shall describe the methods and facilities to be used for reuse, recycling, and disposal of these materials. In addition to describing the recycling of construction and demolition waste, the solid waste management plan must either include salvaging of materials for reuse, with sufficient lead time provided for this activity prior to any full or partial demolition, or a clear explanation of why salvaging is not feasible for this project.

4. Applicant shall achieve and document a recycling rate of at least 50% of all waste generated for the project by weight, with at least 25% achieved through reuse and recycling of materials other than source separated dirt, concrete and asphalt.

5. Applicant shall submit monthly Recycling and Reuse Reports and one final Report on disposal and reuse and recycling activities in a format and schedule provided by the City. The reports shall detail recycling rates and activities and summarize all tonnages disposed, reused, and recycled, and shall include receipt documentation from disposal, reuse and recycling facilities. If a facility is used that sorts mixed Construction &Demolition loads for recycling, the receipt must identify the load as construction and demolition debris and that the load will be sorted for recycling, and include the total weight of the load. These reports shall be submitted to and

reviewed and approved by the City's Recycling Coordinator prior to final project approval. If there are questions about a facility's mixed waste recycling activities, contact the City's Recycling Coordinator.

Notes:

Solid waste and recycling services in the City of Millbrae are under an exclusive franchise contract to South San Francisco Scavenger Company. There are only two exceptions to this exclusive franchise contract:

1. Only South San Francisco Scavenger Company can be paid for reuse and recycling collection services; however, if reuse and recycling collection services are offered for free or if customers are paid for recyclables then any company may be used for the collection of reusable and recyclable materials; and

2. Contractors and subcontractors are allowed to self-haul their own garbage and recyclables ("self-haul" means hauling done by a company in their own truck and with their own employees, and which is incidental to their primary business function (e.g., roofer, plumber, etc.)).

South San Francisco Scavenger Company can recycle mixed construction and demolition loads from their debris boxes. If a total of 50% cannot be achieved from debris box sorting at South San Francisco Scavenger Company's facility, other reuse and recycling activities must take place in addition to meet the 50% recycling requirement.

12.02 DESIGN. Building materials and components containing recycled material shall be incorporated and used in the design of the project to the maximum extent possible.

All plans and drawings for new commercial construction, new construction of apartment buildings with five units or more, or renovation of commercial and apartment complexes that involve at least 30% of the total square footage of the building are subject to the City's space allocation requirements. These requirements are that all plans and drawings include sufficient and accessible space and signage for storage and collection of recyclables and shall include notations indicating use of the space (e.g. containers, baler). For additional information regarding appropriate sizing of space for recycling use, contact the City's Recycling Coordinator at (650) 259-2444.