APPENDIX E. SUBDIVISION REGULATIONS: CONSTRUCTION STANDARDS

A. Definitions

Words in these Regulations shall be defined as provided in the Subdivision Ordinance.

B. Pre-construction Requirements

Prior to construction of any kind within the subdivision area, approval of the final plat shall have been obtained from the Planning Commission, and appropriate permits obtained from the Local Engineer and Local Building Inspector. Permits and approvals must also be obtained from any other involved local or state officials as required herein. Construction for purposes of these Regulations shall include: removal of trees or brush, grading, road construction, installation of improvements, or other work leading to physical ground changes. Such construction before approval may constitute reasons for denial of the subdivision.

C. Improvements

The following improvements shall be installed by the owner or developer of the land which is being subdivided, except as provided in Chapter o of the Ordinance.

1. Roadway grading and surfacing.
2. Curbs and gutters.
3. Sidewalks.
4. Water system:
   a. Mains
   b. Service laterals
   c. Meters and meter boxes
   d. Fire hydrants.
5. Sanitary Sewers. Septic tanks will be approved only as provided in the Subdivision Ordinance.
6. Storm drains and appurtenant structures.
7. Street monuments.
8. Shade trees.
9. Street lighting.

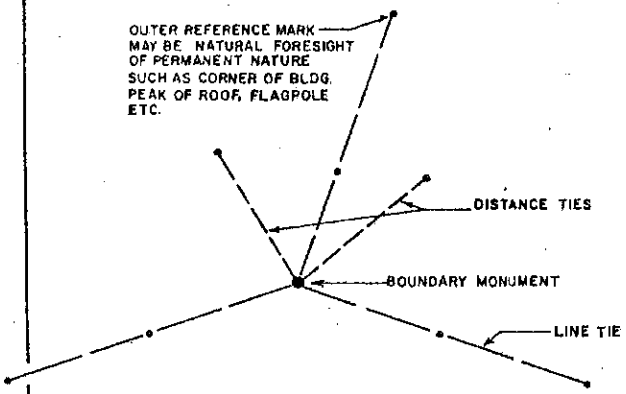
All the above improvements shall be installed to the boundaries of the subdivision and shall be designed to provide for future extension to contiguous areas.

D. Construction Plans and Profiles

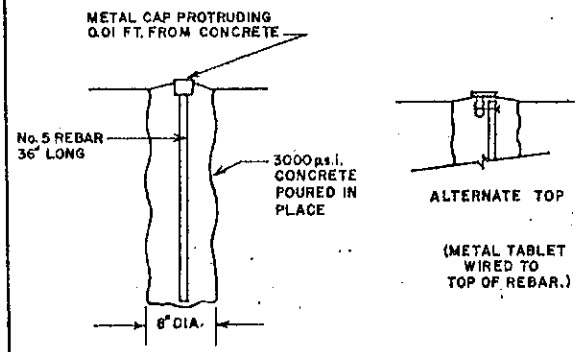
With the Final Plat and prior to commencement of construction, the subdivider shall furnish to the Planning Commission a complete set of construction plans and profiles of all streets and other construction requirements of the Subdivision Ordinance and these Regulations existing and proposed within the subdivision, prepared by a licensed professional engineer.

The Planning Commission shall refer said plans to the Local Engineer for review, who shall within a reasonable time(not to exceed

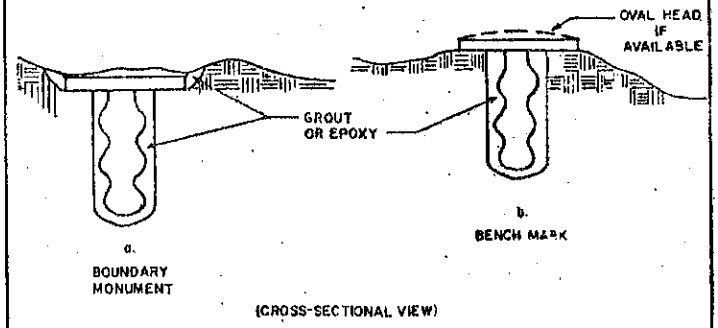
BOUNDARY MONUMENT REFERENCE MARKS



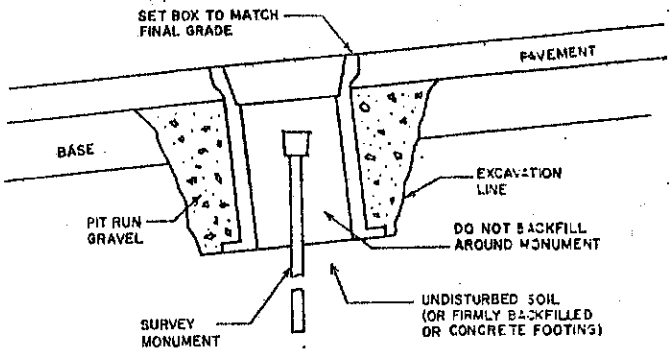
BENCH MARK CONSTRUCTION



METAL TABLET IN SOLID ROCK



MONUMENT BOX INSTALLATION



thirty days from receipt of plans) notify the Planning Commission of approval or disapproval and in the case of disapproval, the reasons therefore. This information shall be promptly transmitted to the subdivider. No construction shall be started until the plans comply with the following, and shall have been approved by the Local Engineer.

E. Construction Plans and Profiles - Drawings

Plans and profiles and all construction drawings shall be submitted in triplicate on 24 inch x 36 inch (trim line) drawings. These shall have 1-1/2 inch border on left and 1/2 inch border on the three (3) remaining sides. The minimum information on drawings submitted for approval shall include:

1. Title Block with:

   a. Name of Subdivision, and date
   b. Name of County
   c. Type of work
   d. Name of Engineer preparing drawings
   e. Space for approval of the Local Engineer.

2. North arrow, and scales. Horizontal scale preferred is 1 inch equals 50 feet; Minimum scale is 1 inch equals 100 feet. Vertical scale preferred is 1 inch equals 5 feet; minimum is 1 inch equals 10 feet.

3. Location of permanent bench marks and their true elevations according to USGS Datum. All profiles shall be drawn using true elevations. All drawings shall be complete, clear, legible, and shall conform to the standards of the profession.

4. Profiles. These shall indicate finished and existing grades for each side of the street and shall extend a minimum of two hundred (200) feet beyond the limits of the proposed project.

5. Plans and Profiles shall also include details of curb and gutter; sidewalks; street cross-sections; location and elevations of manholes, catch basins, storm sewers and their appurtenant works; elevations and location of fire hydrants, water mains, type of pipe, valves and their appurtenant works; location, size, and elevations of sewer mains with their grades and type of pipe (rubber gasket mandatory); manholes; cleanouts; and other appurtenant works. The drawings shall include the details for a nonculinary (irrigation) water system, if any indicating size, location, and kind of pipe, valves and turnouts.

On curb returns, at least one additional control point for elevation besides those at the P.C. and P.T. shall be indicated on

on the plans and staked in the field to insure drainage at the intersections. Complete curve data must be shown for all horizontal and vertical curves. Minimum length of vertical curve is two hundred (200) feet, unless otherwise approved.

Elevations for the top of curbs and road centerlines shall be shown on the plans for all 50-foot stations, all BVC's and EVC's. Street monuments shall be installed by the subdivider's engineer or land surveyor at points designated on the final map. They must be placed prior to release of the improvement bond.

6. After approval, one set of drawings shall be returned to the subdivider and shall be available at the work site.

7. As Built Drawings. Upon completion of each improvement a reproducible copy (sepia) and two (2) prints of "As Built Drawings" shall be prepared and submitted by the subdivider's engineer, to accurately define for permanent record the surface improvements and underground utilities as they were actually constructed

F. Construction Specifications. These are minimum specifications for general construction only. All special construction and/or conditions shall require consultation with the Local Engineer.

G. Road Construction

The State of Utah Standard Specifications for Road and Bridge Construction, 1970 Edition, is hereby adopted by reference for use in administering these regulations. Reference to this Edition shall be deemed to mean the appropriate section of the above-stated specifications. All roads shall be constructed in compliance with the typical sections attached hereto and shall comply with the following:

1. Preparation of Road Subgrade - Shoulder and Base
   a. Removal of Debris
      (1) all tree stumps, masonry and other obstructions shall be removed to a depth as follows:

      For paved areas: Two (2) feet below subgrade.
      For Parking areas: Six (6) inches below finished grade.

      (2) solid rock, shale, or other similar materials shall be removed to depth as follows:

      For paved areas: below subgrade.
      For Parking areas: six (6) inches below finished grade, except when it is impractical to remove outcroppings.

b. Subgrade.
The subgrade shall be considered as that portion of the roadway upon which the sub-base and curb and gutter is to be placed (this subgrade to extend eighteen [18] inches beyond the curb and gutter on each side) in full sections only. After all earth work is substantially completed and brought to lines, and cross sections, as approved by the Local Engineer, the subgrade shall be brought to a firm, unyielding surface by rolling with pneumatic-type roller or other approved means of compaction, and sprinkled as required. Compaction tests shall be performed as required by the Local Engineer. All soft and unsuitable material which will not compact readily when rolled shall be removed. All holes and depressions made by the removal of material as stated above shall be filled with suitable material approved by the Local Engineer, and the whole surface compacted uniformly.

The subgrade shall comply with State Standard Specification Section 209. Material shall be compacted to 95 per cent of Mod AASHO density.

Subgrades which differ from those provided for above require special consideration and consultation with the Local Engineer. No base or surfacing material shall be deposited on the subgrade until the subgrade has been inspected and approved.

c. Shoulders.
After the earth work has been substantially completed and after all drains have been laid, the shoulders shall be constructed of approved material to the elevation, width and shape as shown on the attached section drawing. Before any subgrade is approved the adjacent shoulders shall be constructed to their full width and at least to the level of the finished subgrade. At all times the construction shall be so carried on that subgrade, shoulders, and adjacent ditches shall be effectively and completely drained. When the surface course is completed, the shoulders shall be shaped and finished true to the lines, elevations, and cross-sections as shown on the roadway section drawing.

d. Crushed Gravel or Rock Base Courses.
Base for bituminous mat pavement, after the necessary materials have been excavated and the subgrade prepared by being shaped, and brought

to line and grade and compacted of such materials as will support the base and pavement without failure, construction of the roadway shall proceed as follows:

(1) The base for Bituminous Mat Pavement shall be constructed in two (2) horizontal courses of two (2) three-inch (3") thicknesses. The material shall be spread in uniform layers upon the completed subgrade or upon the completed layer, by means of mechanical equipment approved by the Local Engineer.

After a layer of the material has been spread as above, it shall be moistened to the extent necessary to provide maximum compaction and shall then be mixed by blading it toward the center and back toward the edges of the area to be paved, and after being satisfactorily mixed, shall be spread in a uniform layer with the grader, after which it shall be compacted to not less than ninety-five (95) per cent density.

(2) All material shall be secured from approved sources. The gravel or crushed rock shall be uniform in quality and well-graded from coarse to fine.

(3) Before placing the crushed gravel sub-base, the contractor or supplier furnishing this material shall submit sieve analysis of stockpiled materials showing that it meets the following requirements:

Per Cent by weight of gravel or crushed rock

U. S. Standard Sieve Number	Per Cent passing for base course
2 inch	100
1 inch	60-100
No. 4	30-60
No. 200	3-10

(4) Construction on gravel and clay subgrade with a CBR-7 shall require six (6) inches of compacted gravel complying with State Standard Specifications.

(5) Construction on a sandy-clay subgrade with a CBR-7 shall require four (4) inches of compacted selected materials complying with State Standard Specifications Section 204, granular backfill and six (6) inches compacted gravel complying with Section 301, 1 inch or 3/4 inch gradation.

(6) Surface Course.
A minimum of compacted thickness of two and one-half (2 1/2) inches composed of crushed stone or gravel and bituminous material premixed and spread in place upon the approved base compacted in accordance with the plans and specifications and in conformity with the lines, grades, and typical cross-sections.

e. Materials to be Secured from Approved Sources:

(1) Liquid asphalt for the prime coat shall be Grade MC 70/250, meeting the requirements of the Specifications M-81 of AASHO.

(2) Bituminous material to be used in the plant mix surface courses shall be AC-10 or AC-15, State Standard Specification as directed by Local Engineer, and shall meet the method of tests of the USDH and shall be free from water, and not foam when heated to 350 degrees Fahrenheit. No mineral matter other than that naturally contained in the asphalt shall be present.

(3) Aggregates shall be uniform quality, crushed to a size as necessary and shall be composed of round, tough, durable pebbles or fragments of rock with or without sand or other inert finely-divided mineral aggregate. All the materials shall be free from clay balls, vegetable matter and other deleterious substances, and an excess of flat or elongated pieces. Excess of fine material shall be washed, before crushing.

(4) The aggregate shall be well-guarded between the limits shown and shall meet the grading requirements by weight listed below when tested by means of laboratory sieves:

Sieve	Per Cent
Passing a 1-inch sieve	100
Passing a 1/2-in. sieve	70 to 100
Passing a No. 4 sieve	41 to 68
Passing a No. 16 sieve	21 to 41
Passing a No. 10 sieve	10 to 27
Passing a No. 200 sieve	4 to 13
Asphalt by Weight	4.5 to 7.0

(5) Seal Coat. Aggregate shall comply with State Standard Specification Section 4-6 Type "A" Use RC-3000 at 0.20 gal. per sq. yard or CRS-2 at 0.20 to 0.40 gal. per sq. yard as directed by Local Engineer.

f. Construction Methods

(1) The surface of the crushed rock or gravel base course shall be bladed to a depth sufficient to eliminate all irregularities of the surface and to permit reshaping. It shall then be bladed to a typical section as called for on the plans and to a smooth-riding profile, sprinkled if directed, and rolled until thoroughly compacted. It shall be kept free from ruts or any irregularities and to a smooth surface up to the time of applying the prime coat. The base shall be placed accurately to centerline stakes set by the subdivider's engineer.

(2) After the existing surface has been prepared as specified above an application of bituminous material type MC 70/250 shall be applied by means of a pressure distributor at the rate of 1/4 to 1/2 gallon per square yard, and allowed to cure before any surfacing mixture is placed thereon, or before traffic is allowed to use the portion of the road where the bituminous mix has been applied. This coat shall be applied to the exposed lip of the gutter as well as to full depth of required pavement.

(3) The bituminous mixture shall be delivered on the job at a temperature of not less than 250 degrees Fahrenheit, shall be spread by means of an approved mechanical self-powered paver capable of spreading the mixture true to line and grade on the crown as shown on standard sections.

(4) As soon as the material has been spread to the proper cross-section and grade the surface shall be rolled longitudinally with a powered roller weighing not less than ten (10) tons. Rolling shall begin at edges and progress toward center, overlapping one-half the width of the roller. Rolling shall continue until surface is thoroughly compacted. Should waving develop under the roller, work shall be suspended until the surface has stiffened enough to permit rolling to proceed. Finished surface shall be smooth, true to line and grade and cross-sections, free from ruts and bumps, or other irregularities.

H. Road Grades

Road grades shall be as required in the Subdivision Ordinance, Section 8-9.

J. Curb, Gutter and Driveways

1. Concrete. Construction shall comply with State Standard Specification Section 615 and Section 5-1 18. Concrete Shall be "Class A" (6 bag-3000psi) using Type II cement.

2. Bituminous. Construction shall comply with State Standard Specifications Section 616. Gutter and driveways shall be constructed in conjunction with the street. Subgrade, base course, and surface course shall be constructed with the same depths of materials as for the adjacent streets.
Use shall be limited to gradients where the storm water velocity of the design will be less than five (5) feet per second.

3. Driveway approaches shall conform to approved grades at the property line and standard cross-sections.

4. Curb and Gutters.
   a. Required curb and gutter shall be concrete, standard high back, unless an exception is recommended by the Local Engineer and approved by the Governing Body.

   b. Asphalt gutter shall be a minimum of six (6) feet in width, six (6) inches deep and constructed of materials complying with the specifications for road, subgrade, base and surface.

   c. Asphalt ditches shall be limited to gradients where velocity of water will be less than five (5) feet per second.

K. Sidewalks.
Construction shall comply with State Standard Specification Section 614 and shall be a minimum of four (4) inches thick and four (4) feet wide. Concrete shall be Class "A" (6 bag, Type II - 3000 psi.)

L. Concrete Specifications, General.
Concrete shall be composed of an approved portioned cement, water, fine and coarse aggregates to be mixed in the proportions herein specified. The concrete shall be deposited in the places and of the form and dimensions as shown on the plans, or as may be directed. All concrete shall be air-entrained, unless otherwise specified.

1. Materials.

   a. Aggregates: Coarse aggregates shall consist of crushed stone or gravel. It shall be clean, hard,

tough, durable pieces free from injurious amounts of soft, friable, thin, elongated or laminated pieces, soluble salts, organic or other deleterious matter. Fine aggregates shall consist of either a natural sand or a stone sand composed of sound particles of approved stone. All sand shall be free of clay or other adherent coatings and injurious amounts of deleterious matter.

b. Cement: Standard Portland cement and high early strength Portland Cement shall meet the requirements of current ASTM Specifications: Designation C-150-57 Type II.

2. Gradation:

Aggregate shall be well-graded between the limits specified and the size or sizes designated shall conform to the requirements listed in Table I for the specified class of concrete, when tested with sieves having square openings.

3. Control:

The cement content, consistency, air content (in the case of AE mixes) and the approximate weights of fine and coarse aggregate (saturated surface dry basis) for each class of concrete shall be shown in Table II.

a. The weights of fine and coarse aggregate given in the table are based on the use of aggregates having specific gravities in a saturated surface dry condition of 2.65 plus or minus 0.05. For aggregates having specific gravities outside the ranges indicated in the table, the weights shall be corrected by multiplying the weights shown in the table by the ratio of the specific gravity of the aggregate to be used, and 2.65.

b. The relative weights of fine and coarse aggregate per sack of cement given in the above table are based on the use of a natural sand having a fineness modulus within the range of 2.70 and 2.90 and methods of placing which do not involve high frequency vibration. When sharp, angular, manufactured sand or extremely coarsely-graded sands are used, the relative amount of fine aggregate shall be decreased. The least amount of sand which will insure concrete of the required workability, for the placing conditions involved, shall be used. Any change in weight of fine aggregate made for the purpose of adjusting workability shall always be compensated for by changing the weight of coarse aggregate in the opposite direction by a corresponding amount.

c. When air-entrained concrete is specified, the Local Engineer will determine by means of trial batches, using mixing equipment on the project, the amount of admixture required to produce an air content within the range specified. In case an air-entraining cement is permitted, the Local Engineer will determine whether the cement, when used in concrete in the required proportions, will entrain air in the concrete within the limits specified. If the air content thus determined falls outside the specified range and it is impossible to obtain the required air content by slight adjustments in the fine-coarse aggregate ratio and/or by changes in mixing procedures, the Contractor shall, if air content is too low, use an air entraining cement in an amount sufficient to bring the air content within the required range. If the air content is too high the Contractor, subject to the approval of the Local Engineer, may use a non-air-entraining cement in an amount sufficient to bring the air content within the required range.

d. The amount of water to be used in mixing concrete shall be the least possible amount and yet sufficient to provide a workable mix for the particular part of the structure in which the concrete is to be placed, but in no case shall the range in slump exceed that specified in Table II. The quantity of water used shall not be sufficient to cause collection of a surplus in the forms.

4. Consistency.

The consistency of the concrete shall be measured by the slump tests in accordance with the methods described in the ASTM Method designation C-143. Slump shall not exceed four (4) inch maximum. The consistency shall be constantly checked during the progress of the work. The concrete shall not contain less than three (3) nor more than six (6) per cent entrained air, as determined by means of either ASTM T-152 or such other tests as the Local Engineer elects.

5. Machine Mixing.

a. Concrete shall be thoroughly mixed in a batch mixer of approved type and capacity and one so designed as to positively insure uniform distribution of the materials throughout the mass. Pouring shall be continuous between construction joints.

b. All concrete shall mix for minimum period of 1-1/2 minutes after all materials including water are in the mixer. All mixers must have approved timing device.

TABLE I

Grading of Coarse Aggregate
(Percentage Passing by Weight)

	Sieve sizes - Inches								
	3	2 1/2	2	1 1/2	1	3/4	1/2	#4	#8
CLASS A or A(AE)				100	95-100		25-60	0-10	0-5
CLASS B or B(AE)			95-100		35-70		10-30	0-5	
CLASS C or C(AE)	100	95-100		35-70		10-30		0-5	

TABLE II

Approximate Weights (Saturated Surface-Dry of Fine and Coarse Aggregate per Sack (94 lbs) of Cement

Class of Concrete	Cement Content	Coarse Aggregate Size	Vibrated	Non-Vibrated	Air Content (Range)	Rounded Coarse Aggregate		Angular Coarse Aggregate		Minimum Compressive Strength 28 Days
	Sacks per Cubic Yard		Inches	Inches	Percent	Fine Lbs.	Coarse Lbs.	Fine Lbs.	Coarse Lbs.	Lbs Per Sq. Inch
A	6.0	1" - No. 4	2-4	3-5		220	310	235	275	3000
A(AE)	6.0	1" - No. 4	2-4	3-5	4-7	200	310	215	275	3000
B	4.5	2" - No. 4	1-2	2-3		265	485	290	440	2200
B(AE)	4.5	2" - No. 4	1-2	2-3	3-6	245	485	270	440	2200
C	3.5	2 1/2" - No. 4	1-2	2-3		345	640	380	590	2000
C(AE)	3.5	2 1/2" - No. 4	1-2	2-3	3-6	315	640	350	590	2000

c. During the mixing period, the drum shall operate at the speed specified by the manufacturer and as shown on the machine's name plate. The entire contents of the drum shall be discharged from the machine before materials for the succeeding batch are placed therein, and the mixer preferably should have a mechanical means for preventing addition of aggregates after mixing has begun.

d. The mixer shall be equipped with adequate water storage and a device for accurately measuring the amount of water used in each batch. Do not operate above rated capacity.

e. The first batch of concrete materials placed in the mixer shall contain an additional quantity of sand, cement and water sufficient to coat the inside surface of the drum without diminishing the mortar content of the mix. Upon cessation of mixing for any considerable length of time, the mixer shall be thoroughly cleaned.

6. Ready-mixed Concrete.

For the purposes of these specifications, ready-mixed concrete is Portland Cement concrete manufactured for delivery to the location for deposit in a plastic state. The manufacture and delivery thereof to conform to ASTM general requirements and specifications must be guaranteed.

7. Construction Methods.

Forms for concrete shall be of wood or metal, straight, free from warps or kinks, and of sufficient strength to resist the fluid pressure of concrete as it is placed. Forms shall be kept true to line and grade until the concrete has set.

8. Placing and Finishing Concrete.

Just prior to placing the concrete, the sub-grade shall be moistened. The concrete, mixed to proper consistency, shall be placed in the forms and thoroughly tamped or vibrated in place so that honeycombing will be eliminated and sufficient mortar brought to the surface. After this, the surface should be brought to a smooth, even finish by means of a wooden float. All surfaces adjacent to the forms shall be vibrated so that after the forms are stripped the surface of the faces will be smooth, even, and free of honeycomb. All edges shall then be tool rounded.

9. Expansion and Contraction Joints for Concrete. These are to be placed as described below:

a. For Structures: As shown on plans for curb and gutter, half-inch (1/2") expansion joints shall be placed at intervals not to exceed sixty (60) feet. At intervals not greater than ten (10) feet or less than five (5) feet

the concrete shall be scored to a depth of one-half (1/2) inch.

b. For Sidewalks. One-half (1/2) inch transverse expansion joints shall be placed at intervals not exceeding eighty (80) feet. Sidewalks shall be scored to a depth of one-half (1/2) inch every four (4) to six (6) feet.

10. Curing Concrete.

When completed, the concrete shall be cured by an approved method, three (3) days and longer if necessary, and shall be protected from the elements in a satisfactory manner.

11. Backfilling.

Backfill shall be of suitable selected material and shall be placed and compacted until firm and solid. Backfilling shall follow immediately after the concrete forms have been removed. Backfill around curb and gutter shall extend eighteen (18) inches beyond the outside of the concrete gutter in fill sections only.

12. Seasonal Limitations.

No concrete shall be poured on a frozen or thawing sub-grade or during unfavorable weather conditions, or when the temperature is 30 degrees and falling.

M. Pipework.

1. Culinary Water System.

a. Cast Iron Pipe and fittings shall be of the appropriate class with rubber gasket joints (Pacific States Tyton Joint or approved equal) in sizes from three(3) to twelve (12) inches, centrifugally cast in metal molds with cast iron pressure fittings suitable for water delivery, complying with AWWA Specification C 106 and C 111, latest revision; bronze wedges shall be supplied with current capacity of four hundred (400) amps for each joint as listed below:

Pipe Diameter	No. of Wedges
4 inch (cross connections)	2
6 inch	2
8 inch	3
10 inch	3
12 inch	4

b. Asbestos-Cement pipe as noted on the plans and in the specifications shall be manufactured in accord with Federal Specifications SS-P-35 1a and/or AWWA Specification C 400, their latest amendments, and shall be installed in strict accord with the Manufacturer's recommendations, two (2) copies of which shall be supplied each to the Contractor and the Engineer, prior to commencement of installation. Asbestos-Cement pipe shall be as manufactured by Keasbey and Mattison, Johns-Manville, or approved equal. Class of pipe to be furnished shall be listed in the bidding schedules or on the plans.

c. Service Lines, Meter Yokes, and Boxes

(1) Corporation stops shall be Mueller No. 15000 or approved equal. Service line shall be a minimum of 3/4-inch diameter copper water tube manufactured in conformity with ASTM Specification B88, latest revision, Type "K".

(2) Meter Yokes shall be Mueller No. 14062 with plain stops and a height of fifteen (15) inches, or approved equal.

(3) Meter boxes shall be either vitrified clay, or concrete, eighteen (18) inch inside diameter and thirty (30) inches deep. Slots shall be formed at the bottom of the box to house the service pipe.

(4) Meter box covers shall be cast iron Mueller No. H-10810, or approved equal.

d. Fire Hydrants- shall be of the appropriate class with five (5) inch, V.O. and a six (6) inch auxiliary valve and box. Fire hydrants shall have two (2) 2 1/2 inch nozzles, with 7 1/2 threads per inch, and one (1) 4 1/2 inch nozzle with four (4) threads per inch. Hydrants length shall be for a 4 1/2-foot trench depth and shall comply with AWWA Specification C 502. National Standard Fire Threads shall be required.

e. Gate valves shall be iron-body, full bronze mounted, parallel seal, double gate, non-rising stem gate valves designed to operate under the designed water pressure, conforming to AWWA Specification C 500, latest revision. All valves are to be provided with extnesion-type valve boxes.

2. Sanitary Sewers and Sewage Disposal

a. The sanitary sewer or sewage disposal system shall be designed in compliance with the regulations of the Utah State Division of Environmental Health and the Sewer District's Engineer.

b. Sewer Pipe

(1) Non-reinforced concrete sewer pipe shall conform to the requirements of ASTM Specification C 14. Cement shall be type IIA low alkali conforming to ASTM Specification C-150, latest designation. The pipe shall be "Standard Strength" or "Extra Strength" as shown on plans.

(2) Reinforced rubber gasket concrete sewer pipe, under these specifications shall conform to the requirements as ASTM Specification C76 for Culvert, Storm Drain, or Sewer Pipe. Pipe furnished under these specifications shall conform to the requirement of either Class II, III, IV, or V. The class to be furnished shall be listed in the bidding schedule or on the plans. Cement used in the pipe shall conform to Type IIA, low-alkali cement conforming to the Federal Specifications SS-C 192a, or ASTM Specification C-150. The minimum length of all pipe of twelve (12) inch diameter or larger shall be four (4) feet. Maximum length shall be thirteen (13) feet.

(3) Reinforced Rubber Gasket Pressure Pipe, under these specifications shall include all diameters twelve (12) inches and larger and shall conform

to requirements of reinforced concrete pressure pipe ASTM Specification C361, or AWWA Specification C302, except that the maximum amount of cement per cubic yard shall be six (6) bags. Cement used in this pipe shall conform to Type I or Type II, conforming to Federal Specifications SS-C-192a or ASTM Specification C-150. The twelve (12) inches in diameter and larger shall be seven and one-half (7 1/2) feet.

(4) Pipe joints for concrete sewer pipe. The joints shall be of the bell and spigot type, details of which shall be furnished with the plans. The joint shall be so designed as to provide for self-centering and, when assembled, to compress the gasket to form a water-tight seal. The gasket shall be confined in a groove on the spigot, so that movement of the pipe or hydrostatic pressure cannot displace the gasket. In order to assure water tightness, the clearances between the inner surface of the bell and the outer surface of the spigot, as well as the dimensional tolerances of this annular space, shall be such that the gasket residual diametric deformation is neither less than twenty (20) per cent or more than forty-five (45) per cent when the outer surface of the spigot contacts the inner surface of the bell.

The parallel centering surfaces of the bell shall not be tapered more than two (2) degrees. The gasket shall not be stretched more than twenty (20) per cent of its original length when it is positioned on the spigot. The joint shall be so designed as to permit the pipe to be laid on long radius curves by unsymmetrical closure of the joints, and shall provide assurance of water tightness when pulled from normal closure as much as 1/2 inch for 33-inch and smaller, 3/4 inch for 36-inch through 66-inch, and 1 inch for 69-inch through 102-inch and 1 1/4 inch for 108-inch and larger.

(5) Rubber Ring Gaskets for concrete and cement asbestos pipe shall be extruded or molded and cured in such manner that any cross-section will be dense, homogeneous, and free from porosity, blisters, pitting, and other imperfections. The rubber gasket shall be natural rubber or a co-polymer of butadiene or styrene, or a blend of these.

The physical properties of the rubber compound shall be determined by tests performed in

accordance with appropriate sections of Federal Specification ZZ-R-601A. The gaskets shall be the product of a manufacturer having a successful experience record in manufacturing rubber gaskets for pipe joints. All rubber shall be stored in as cool a place as practicable , preferably at 70 degrees Fahrenheit or less, and in no case shall the rubber for joints be exposed to direct sun rays. Gaskets shall be adequate to fill the space provided when the pipe is laid in a straight line and of a shape that when the joint is as-asembled the gasket will be compresses to form a water-tight seal. The rubber gaskets shall be the sole element of the joint depended upon to provided water-tightness.

(6) Vitrified Clay Sewer Pipe must conform to ASTM Specifications C-13 and C-200. Joint material must conform with ASTM C-425.

c. Manholes.

(1) Manholes shall be pre-cast unless otherwise approved.

(2) Barrel and cones of pre-cast concrete manholes shall have a minimum wall thickness of five (5) inches of 3000 psi. (minimum) concrete and have reinforcing equal to comparable diameter reinforced concrete pipe Class II as specified in ASTM Designation C-76-57T. Holes for pipe cut into manholes shall be cut and grouted back in an approved manner. Off-set cones shall be used.

(3) Manhole Joints

These shall be caulked with an approved material to exclude all ground water. Manholes shall be absolutely water tight both in the floor and for the full height of the walls. The lowest barrel section of pre-cast concrete manholes shall be poured in place with the concrete base. Each succeeding barrel section shall be set upon a full bed of grout or approved mastic. The invent will be constructed by laying a full section of sewer pipe straight through the manhole and cutting out the top half after the concrete base is constructed and set.

(4) Manhole Rings and Covers.

These shall be of best quality grey cast iron with a minimum tensile stress of 18,000 psi. Rings and

covers shall weigh a minimum of two hundred fifty (250) pounds, and shall be as shown on the drawings or as approved. Any cover which tends to rock or tip will be rejected.

(5) Manhole steps.

All manholes shall be equipped with manhole steps, eighteen (18) inches on centers, formed as shown on the drawings.

(6) Depth of Manholes.

Manholes shall be installed accurately to grade as shown on the drawings. The depth of the manhole shall be construed to mean the measurement from the top of the manhole lid to the lowest pipe invert elevation.

d. Culverts, Storm Sewers and Appurtenances.

(1) All pipe required for storm sewer or drainage shall be reinforced concrete culvert or corrugated metal pipe.

(2) Reinforced concrete culvert pipe shall comply with State Standard Specification Section 514.

(3) Corrugated steel pipe shall comply with State Standard Specifications Section 514-715.

(4) Corrugated steel pipe arches shall comply with State Standard Specifications Sections 514-715.

(5) Drainage structures shall be constructed of Class A concrete with grating, etc., as approved.

e. Excavation, Installation and Back Fill

(1) Culinary Water System

(a) Excavation shall comply with Section 6 of AWWA Specification C-600. Pipe shall have bell holes, shall be laid six (6) inches clear of all large rock, shall have continuous bearing on solid undisturbed ground. Excavation below grade shall require three-inch (3") compacted layers up to grade. Unstable or unsuitable material shall be removed to the depth directed by the Local Engineer and replaced with suitable material in three-inch (3') compacted layers up to grade. Adequate barricades,

construction signs, torches, red laterns, and guards shall be placed and maintained during the construction to protect persons from injury.

(b) The installation of cast iron water mains shall comply with AWWA Specification C-600. Installation of A-C pipe shall be in strict conformity with the manufacturer's specifications and recommendations.

(c) The water main shall be laid and maintained to the required lines and grades with fittings, valves and hydrants at the required locations; spigots centered in bells; and all valves and hydrant stems plumb.

(d) Pipe shall be buried four (4) feet below finished grade.

(e) The outside of the spigot and inside of the bell shall be wire-brushed and wiped clean and dry and free from oil and grease before pipe is laid.

(f) Foreign material shall be prevented from entering the pipe while being installed and while in the trench. Open ends shall be closed by a water-tight plug.

(g) Trenches shall be completely dewatered so that all joints can be made under dry condition

(h) Linings and coatings or pipe injured shall be replaced or repaired in a manner acceptable to the Local Engineer.

(I) Pipe shall be laid with bell ends upgrade.

(j) No pipe shall be laid in water or when in the opinion of the Local Engineer the trench conditions are unsuitable.

(k) Concrete reaction or thrust blocks shall be installed on all pressure lines six (6) inches and larger in diameter, at tees, plugs, caps, bends of 22-1/2 degrees and more, valves, fire hydrants, and elsewhere as directed by the Local Engineer.

(l) Valves, fittings, plugs, and caps shall be set and jointed to pipe in the manner heretofore specified for cleaning, laying and jointing pipe. Every valve shall have a valve box with box cover flush with finished pavement.

(m) Fire Hydrants shall have six-inch (6") diameter auxiliary valves with valve box, connected to the main with a six-inch (6") cast iron pipe. All hydrants shall stand plumb and shall have their nozzles parallel or at right angles to the curb. The sidewalk flange shall be at sidewalk or curb elevation. A drainage pit two feet (2') in diameter and three feet (3') deep shall be excavated below each hydrant and compacted with coarse gravel or crushed stone mixed with coarse sand, under and around the elbow of the hydrant and to a level of six inches (6") above the waste opening. The bowl of each hydrant shall be well-braced against unexcavated earth at the end of the trench with stone slabs or concrete backing, or it shall be tied to the pipe with suitable metal tie rods or clamps.

(n) No valve or other control on the existing system shall be operated for any purpose by the Contractor (Subdivider). The owner will operate all valves, hydrants, blow-offs, and curb stops.

(o) All pipe lines shall be tested to determine their water-tightness. The entire line or valved section shall be subjected to a hydrostatic pressure fifty (50) per cent above maximum operating pressure for a period of two (2) hours. All air shall be expelled from pipe. No pipe installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formula:

Bell & Spigot $L = \frac{NDP\ 1/2}{1850}$; Mechanical Joint $L = \frac{NDP\ 1/2}{3700}$

L=Allowable leakage in gallons per hour
N=Number of joints in line being tested
D=Nominal diameter of pipe in inches
P=Average test pressure in P.S.I.

Pipe shall be adequately anchored by partial backfilling prior to test.

(p) Disinfection of the water main shall be in compliance with AWWA Specification C-601. Pipe shall be flushed thoroughly prior to chlorination. Chlorine residual shall be ten (10) ppm after twenty-four (24) hours standing in pipe. The preparation of a one

(1) per cent chlorine solution requires the following proportions:

Product	Amount of Compound	Quantity of Water in Gallons
High Test Calcium Type Chlorete (65-70 percent Cl)	11.6	7.50
Liquid Laundry Bleach	1 gallon	4.25

The chlorination solution requirements for one hundred (100) foot lengths of various sizes of pipe are:

Pipe Diameter	Amount Solution in gallons Required to give 25 ppm Cl
4 inch	1/6
6 inch	3/8
8 inch	2/3
10 inch	1
12 inch	1 1/2

The rate of chlorine mixture flow shall be in proportion to the rate of water entering the pipe. Chlorine shall be retained a minimum of twenty-four (24) hours. Following chlorination, all treated water shall be thoroughly flushed from the pipe line.

(q) Backfilling shall be in compliance with Section 14 of AWWA Specification C-600. All backfill material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones or other material which in the opinion of the Local Engineer is unsuitable. However, from one foot (1') above the top of the pipe to the subgrade of the pavement, material containing stones up to eight (8) inches in their greatest dimension may be used. All trenches shall be backfilled by hand, simulataneously on both sides of the pipe from the bottom of the trench to one foot (1') above the top of the pipe with sand, gravel or other approved material placed in three-inch (3") layers and compacted by tamping. The balance of the backfill shall consist of:

(a-1) Sand, gravel or approved excavated material which shall be puddled with hose and lone pipe nozzle after trench is backfilled, or,

(b-1) Approved excavated material which shall be placed in three-inch (3") layers and compacted by tamping.

Backfilling shall not be done in freezing weather. Where any pavement, shrubbery, trees, fences, poles or other property and surface structures have been damaged, removed, or disturbed by the Contractor (subdivider) whether deliberately or through failure to carry out the requirements of the State law, Local Ordinances, or the specific direction of the Local Engineer, or through failure to employ usual and reasonable safeguards, such property and surface structures shall be replaced or repaired to a condition equal to that which existed before the work began, at the expense of the Contractor (subdivider). After the trenches have been backfilled, compacted as outlined and dried out sufficiently, the surface shall be leveled and rolled until unyielding with a roller weighing not less than twelve (12) tons or with the rear wheels of a five (5) ton truck loaded to capacity. The density of the compacted material (dry) within the trenches shall be not less than ninety (90) per cent as determined by using modified AASHO T-180 test procedures.

The Contractor (subdivider) shall be responsible for all trench settlement and will be required to repair and/or replace road surfaces if necessary.

(2) Sanitary Sewer System

(a) Excavation for pipe lines, manholes, flush tanks, and appurtenant structures shall be made to the depth shown on the approved plans, accurately shaped to line and grade to insure adequate bearing for structures and uniform bearing for the pipe. Bell holes shall be required. No rock larger than six (6) inches shall remain within two (2) inches of the pipe exterior.

(b) As each pipe unit is laid, a sufficient amount of selected backfill materials shall be placed carefully and tamped thoroughly about the lower portion of the pipe to hold it firmly in position. If the adjustment of position of a length of pipe is required after it has been laid, it shall be removed and rejointed as for a new pipe. When laying is not in progress, ends of pipe lines shall be closed.

The Contractor (subdivider) shall erect and maintain a grade line above the surface of the natural ground, for a distance of 200 hundred feet in advance of the pipe laying, to insure accurate laying of the pipe. The bell and spigot of the pipe shall be clean and dry. Service laterals with a minimum diameter of four (4) inches shall be provided to each lot. Depth at lot shall be sufficient to provide for basement drainage. Service laterals shall be tested for water tightness.

(c) Pipe lines are to be tested for alignment and water tightness and approved by the Local Engineer before acceptance. Each line shall be checked with a light and shall show a good light circle. If an internal hydrostatic test is used with a two foot (2') static head, there shall be no leakage in excess of one hundred (100) gallons per inch internal diameter per mile in twenty-four (24) hours. If external test is used with a two foot (2') static head, the infiltration shall not exceed three hundred (300) gallons per inch internal diameter per mile per twenty-four (24) hours.

(d) Backfilling shall be accomplished using the same procedures outlined for the culinary water system, except:

(a-1) Hand placed, compacted backfill shall be placed in six (6) to eight inch (8") layers up to the depth of ten inches (10") above the top of the pipe.

(b-1) From ten inches (10") above the top of the pipe to the road subgrade, materials may be placed and compacted in eight inch (8") layers.

(c-1) Compaction around structures shall follow a similar procedure. The Contractor (subdivider) shall be responsible for a settlement and will be required to repair and/or replace road surface if necessary.

(3) Storm Sewer and Drainage System. Procedures outlined for Sanitary Sewer System shall be followed.

N. Installation of Facilities

1. Any pipe, cable, structure, or facility to be constructed on, in or through any roads which have been conditionally or finally accepted by the Local Government will be permitted only after the subdivider or utility company has obtained a written permit from the Local Government. All pipes or cables must be augered, pushed, tunneled, or jetted under the roadway.

2. Open cutting any road which has been surfaced with bituminous concrete, or soil-cement paving is prohibited except with written permission of the Governing Body.

3. Backfill, repair, and replacement of all excavations on the local right-of-way will be done under direct supervision of the Local Engineer.

   a. Open cuts, through paved roadways when permitted, will be accomplished thus:

      (1) Cutting and Removing. The pavement shall be cut vertically along the lines forming the trench in such a manner as not to damage adjoining pavement. The portion to be removed shall be broken up so as not to damage the pavement outside trench limits. All waste material resulting from the above operations shall be immediately removed from the work site and disposed of.

      (2) Backfill Procedure at Pipe Zone. Selected and approved backfill material shall be deposited and compacted in the trench simultaneously on both sides of the pipe in eight-inch (8") layers for the full width of the trench and to an elevation of at least six inches (6") above the top of the barrel of pipes eight inches (8") or less in diameter and not less than ten inches (10") above the top of the barrel of pipes with diameters of ten inches (10") or larger.

      (3) Backfill Procedure Above Pipe Zone. Succeeding layers of backfill in pipe trenches may contain coarser materials placed and compacted in horizontal layers not over eight (8) inches thick and the full width of the trench.

      (4) Backfill Materials. Backfill shall consist of selected sands and gravel approved by the Local Engineer.

Where consolidation of cohesionless free-draining materials (sands, gravels) is performed by hand or mechanical tamper, the material shall be deposited in horizontal layers across the length or width of the embankment, not more than six inches (6") thick after tamping.

Where saturation and immersion-type vibration methods are used, the thickness of the layer being consolidated shall not exceed the penetration length of the vibrating head. Consolidation of embankments may be performed by treads of a crawler-type tractor or tamping roller. Internal vibrators, power tampers, or other equipment approved by the Local Engineer may be used for consolidating backfills where hand methods are specified.

During a consolidation operation, the material shall be wetted thoroughly throughout the entire layer. If the material is not saturated or wetted for proper compaction, the operation shall not proceed until such time as proper wetting is secured. Where saturation and internal vibration methods are used, saturation may be accomplished by water jets, puddling, flooding, or by any other method that will provide suitable saturation when vibration is begun.

Immersion-type vibrators shall be of adequate power to consolidate the mass to the required density. If water jets are used, the vibrator shall be removed from the mass immediately after the jet is removed. The relative density (dry) of the consolidated material shall be not less than seventy (70) per cent as determined as follows:

$$\text{Rel Den (\%)} = \frac{\text{Max. Den. (in-place den.-min.den) x 100}}{\text{in-place den. (max. Den - min. den.)}}$$

b. Temporary Pavement. Where pavement is to be restored or rebuilt over a trench section, the upper one foot (1') of the trench excavation shall be backfilled with pit run gravel or other approved gravelly material and maintained in a reasonably smooth condition until the permanent pavement is built.

c. Crushed Gravel Surface. Crushed gravel surface, as required for a base course, shall be manufactured in the manner prescribed in the State Standard Specifications, paragraph 401 Gravel Surface Course.

d. Plain Concrete Pavement. Plain concrete pavement, sidewalk and curb and gutter removed in the line of work shall be replaced with "Class B" concrete. The new slab shall be as thick as the original slab, but not less than six inches (6") in the case of street pavement, and not less than four inches (4") in the case of sidewalks. Curb and gutter shall be replaced to match the original design. Slabs shall be wood-float finished or to match the existing pavement. Expansion joints shall be installed at the same locations as in existing pavement.

e. Concrete Base-Asphalt Wearing Surface. All asphalt roadways shall be replaced with concrete-bases constructed of "Class B" concrete six inches (6") thick. Concrete bases shall be replaced in the same manner as plain concrete pavement, except that the surface shall be finished two inches (2") lower than the finished asphalt's surface.

Asphalt wearing surface shall meet the requirements of "Plant Mixed Bituminous Paving."

f. Plant Mixed Bituminous Paving. This paving shown on plants or removed in the line of work shall be manufactured and placed in the manner prescribed in the State Standard Specifications. Bituminous materials shall be Prime Coat Type MC 70/250, Plant Mixed Surfacing material Type AC-10 or AC-15 as directed by Local Engineer, and seal coat type A, RC 3000 at 0.20 gal. per sq. yd. or CRA-2 at 0.20 to 0.40 gal. per sq. yd. as directed by Local Engineer. "Crushed Gravel Surface" atleast six inches (6") thick shall be provided as a base for plant mixed bituminous surface restored over trench areas.

g. Damaging Fifty (50) per cent of Street Surface. When fifty per cent or more of existing street surface is damaged and/or removed during the course of work thereon, the Contractor responsible for such damage or removal will be required to remove the remainder of hard-surfacing and replace with all new materials in accordance with State Standard Specifications. The Local Engineer will determine when fifty (50) per cent or more of the road surface has been damaged. Failure to comply will result in non-release of bonds, liens or escrows or other legal action where necessary.

h. Winter Patching Hard-Surfaced Streets. When hard-surfaced streets are cut into during winter conditions, a temporary concrete surface will be provided immediately upon backfilling trench. Unfavorable conditions for placing asphalt paving will be determined by the Local Engineer. The temporary paving shall be constructed as follows:

(1) Layer of building paper over the sub-base.
(2) A two-inch (2") thickness minimum of Class C concrete with two (.2) per cent calcium chloride.
(3) A twenty-four (24) hour cure at fifty (50) degrees Fahrenheit. When weather conditions are favorable for placing asphalt surfaces, the Contractor will remove temporary surface and replace asphalt and concrete base in accord with these specifications.

O. Inspection

1. All construction work shall be inspected and approved by the Local Engineer and the Improvement District Engineer or authorized representatives. Requests for inspection shall be made at least three (3) days prior to date of inspection. All approvals shall be in writing.

   a. All pipework and other facilities to be buried shall be inspected and approved before being covered.
   b. Approvals required for roadway subgrades, base courses, surfaces: Each item must be approved before proceeding with the next construction phase.
   c. Bases and forms for all sidewalks, curbs, gutters, and structures shall be inspected and approved before the concrete placement.

2. Continuous inspection required for the following:

   a. Road surfacing.
   b. Pouring concrete curb, gutter, sidewalks, structures.
   c. Laying water, sewer, drainage pipe, and installing their appurtenant facilities.

3. Periodic Inspection is required for the following:

   a. Street excavation, grading, compacting of subgrade and base courses.
   b. Excavation(s).

4. The Contractor shall prosecute work only in the presence of a properly-authorized inspector. Any work done in the absence of said inspector is subject to rejection. The Contractor shall furnish to the inspector at all times reasonable facilities for obtaining such information as he may desire regarding progress and method of doing the work, as well as the character of the materials being used.

5. No work which may be defective in its construction or deficient in any of the requirements of these specifications, will be considered as accepted as a consequence of the failure of any officers of the Local Government or inspector connected with the work, to point out said defects

or deficiencies during construction. The contractor shall correct any imperfect work when and wherever discovered, before the final acceptance of the work by the Local Government.

6. At the request of the Local Engineer, the subdivider will perform such tests in the presence of the Local Engineer as necessary to prove compliance with these specifications. The tests will be performed by and certified to by a qualified licensed professional engineer.

P. Care of Improvements During Construction.

1. Extreme care should be exercised on the part of the developer or subdivider, the contractor, and all other associated agencies for the protection and maintenance of all existing or newly-placed improvements or facilities within roadway sections during the development of the subdivision or area concerned.

2. All damages to any existing or newly-placed improvements of facilities incurred during the period of development will be the sole responsibility of the developer and/or subdivider and must be replaced to the satisfaction of the Local Engineer before final acceptance.

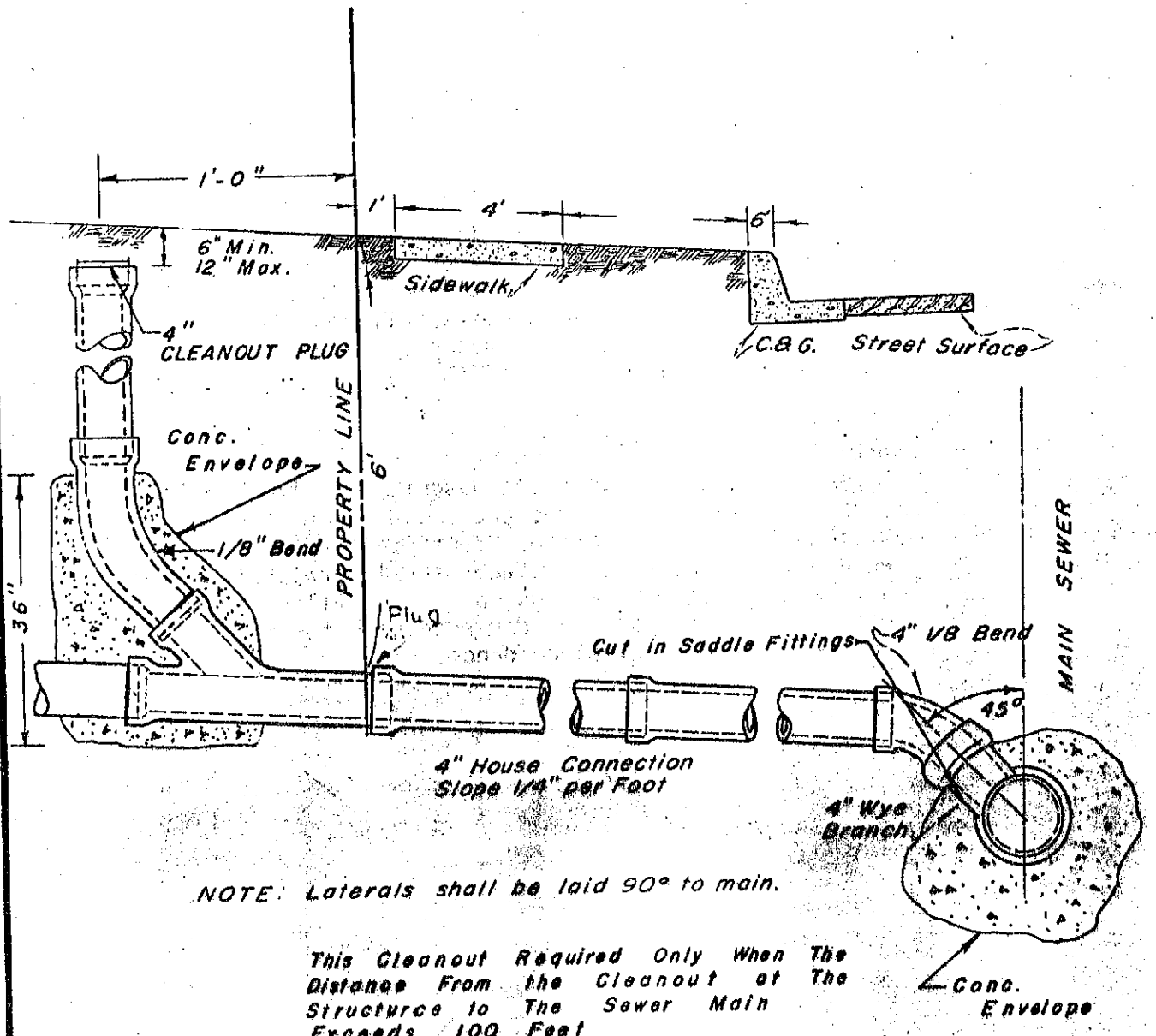
Q. Summary.

1. These standards and specifications provide only basic information. If the item under question or a construction procedure is not thoroughly outlined in these documents, the Contractor and/or Subdivider shall contact the Local Engineer in writing for his interpretation of the specification(s) for the specific item in question.

2. Any part of the work which is not mentioned in these specifications, but is shown on the drawings, or any part not shown on the drawings but described in the specifications shall be furnished and installed by the Contractor as if fully described in the specifications and shown on the drawings. The Local Engineer shall furnish from time to time such detail drawings, plans, profiles, and other information as he may consider necessary for the contractor's (Subdivider's) guidance.

MINIMUM PUBLIC WORKS STANDARDS

STANDARD LATERAL TO NEW MAIN LINE SEWER



NOTE: Laterals shall be laid 90° to main.

This Cleanout Required Only When The Distance From the Cleanout at The Structure to The Sewer Main Exceeds 100 Feet

TYPICAL ROAD CROSS SECTIONS

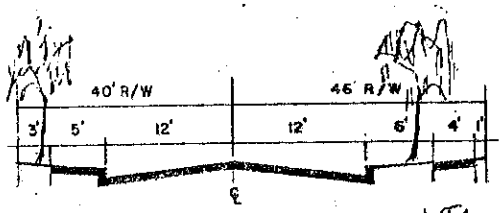
TYPICAL HALF STREET CROSS SECTIONS

Showing Integral Curb, Gutter, Sidewalk

Showing Separated Curb and Sidewalk

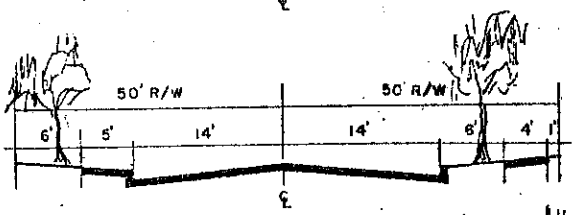
PRIVATE STREET - RECOMMENDED

MODIFICATIONS TO BE APPROVED BY PLANNING COMMISSION



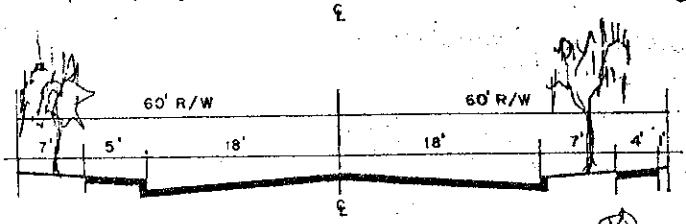
MINOR STREET - AND FRONTAGE ROAD

NO PARKING - TWO LANES MOVING
PARKING ONE SIDE - TWO LANES MOVING
PARKING TWO SIDES - ONE LANE MOVING



MINOR STREET MAY BE REQUIRED BY PLANNING COMMISSION

PARKING TWO SIDES - TWO LANES MOVING



COLLECTOR STREET

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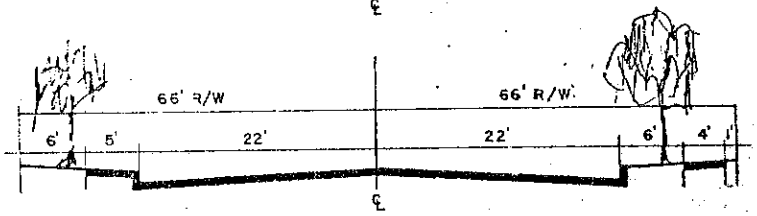
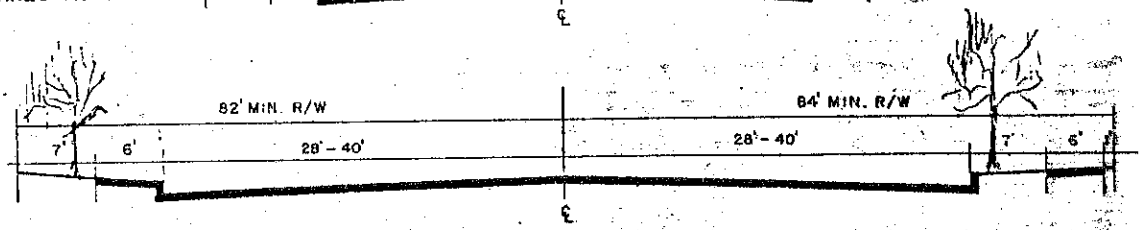
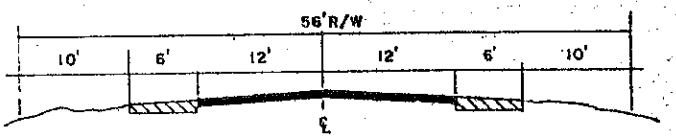


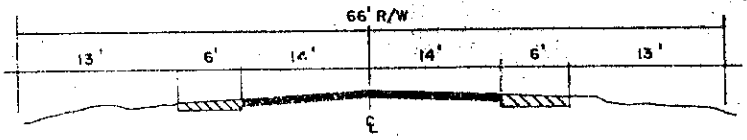
MAJOR STREET



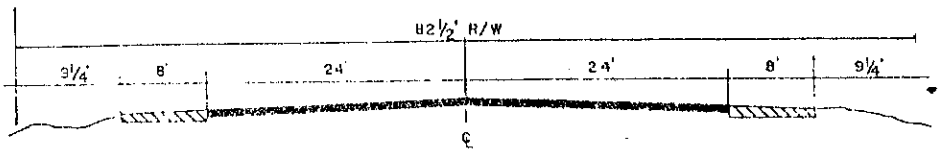
RURAL ACCESS

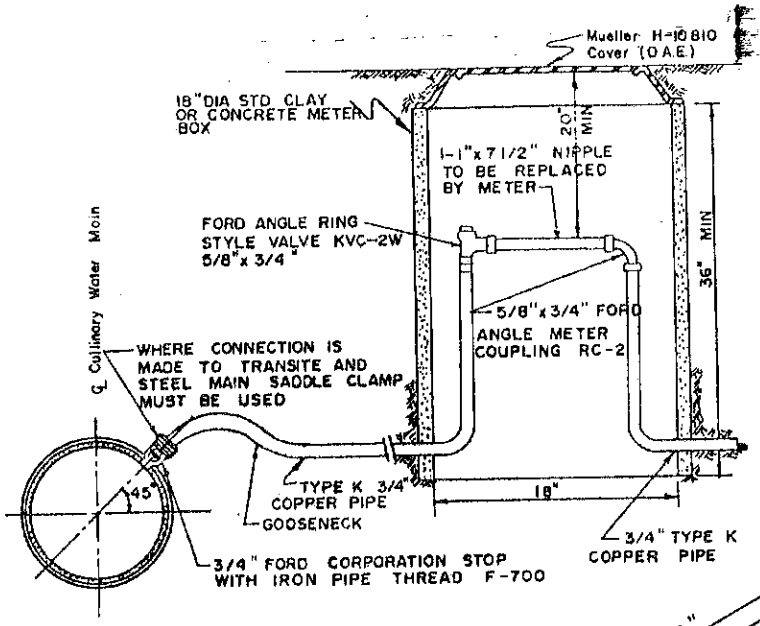


MINOR COLLECTOR



MAJOR COLLECTOR

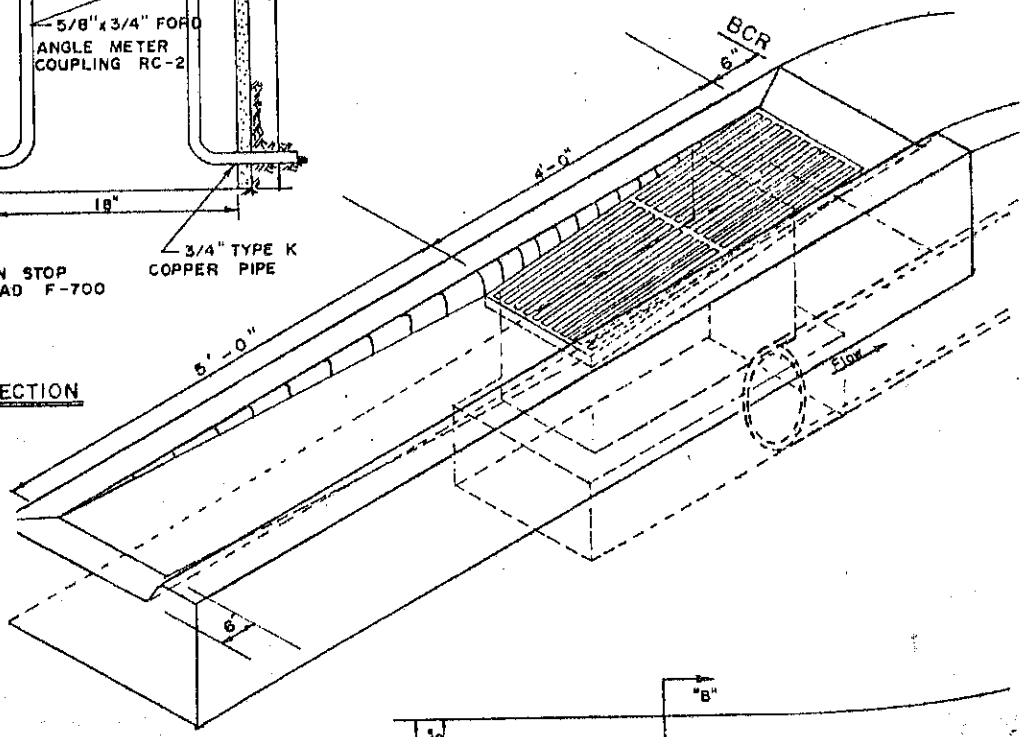


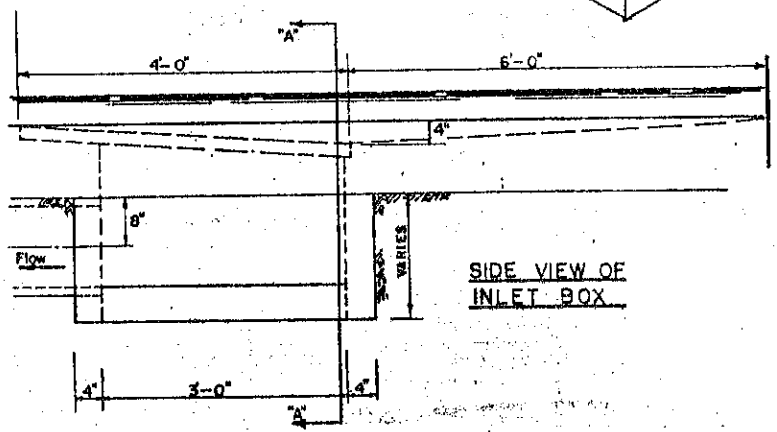


TYPICAL WATER SERVICE CONNECTION

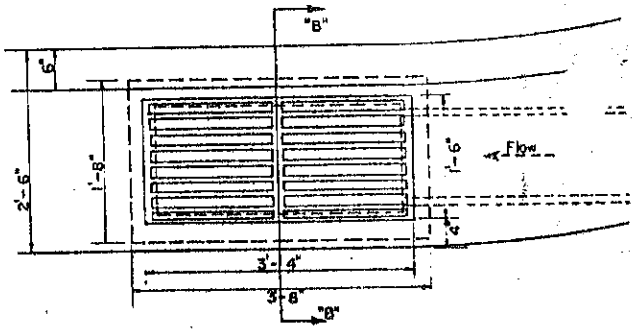
CROSS DRAIN INLET BOX

SHEET NO. 1 of 3

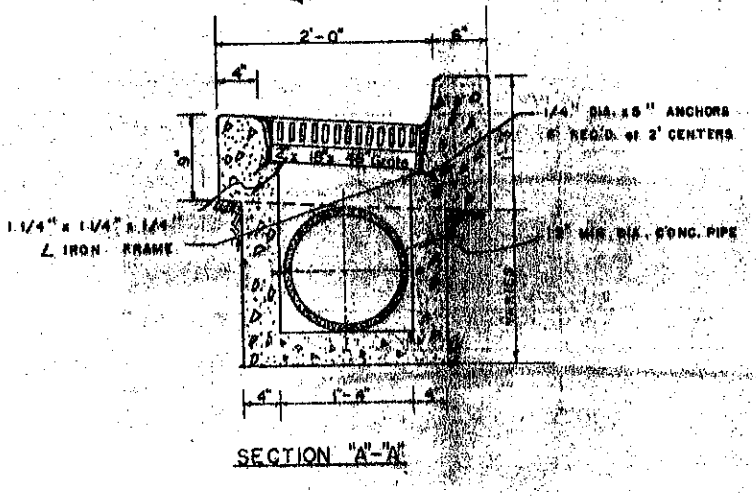




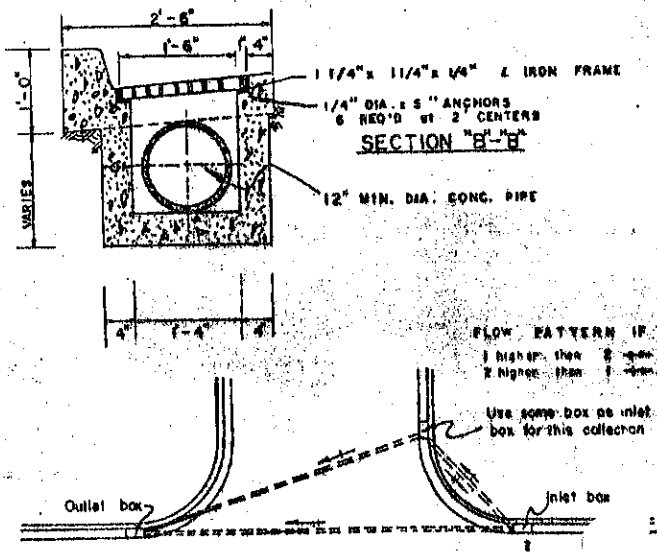
SIDE VIEW OF INLET BOX



PLAN OF OUTLET BOX



SECTION "A"-"A"



SECTION "B"-"B"

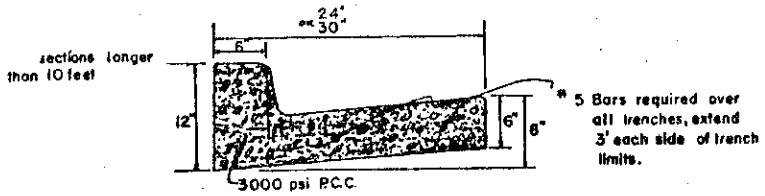
TYPICAL MAIN THOROUGHFARE
CROSS DRAIN DETAILS CON'T

SHEET NO. 2 of 3

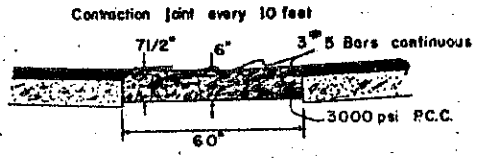
TYPICAL MAIN THOROUGHFARE
CROSS DRAIN DETAILS CON'T

SHEET NO. 3 of 3

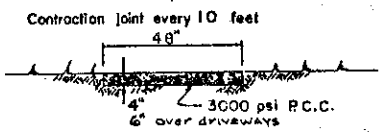
TYPICAL CROSS SECTIONS



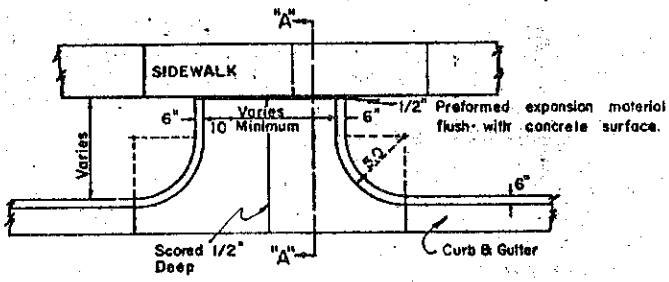
TYPICAL CURB & GUTTER SECTION



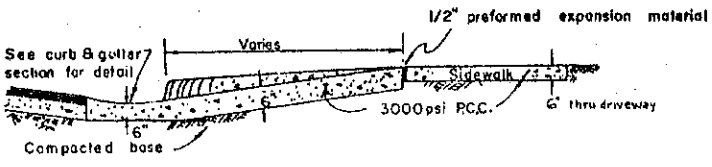
TYPICAL CROSS DRAIN SECTION



TYPICAL SIDEWALK SECTION



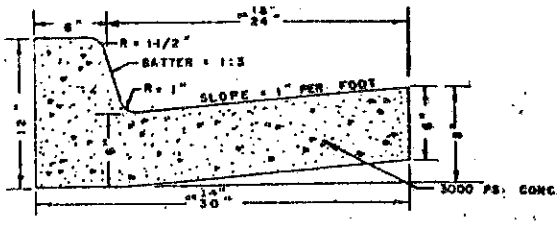
TYPICAL DRIVEWAY APPROACH



SECTION "A"-"A"

TYPICAL DRIVEWAY DETAILS

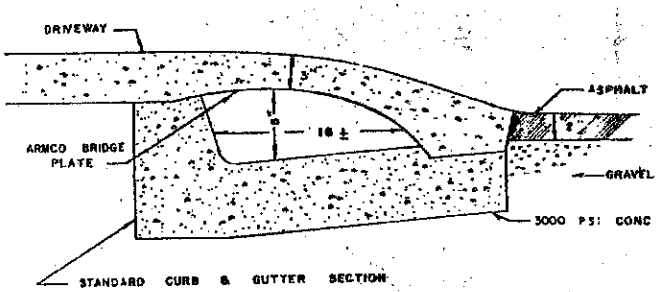
TYPICAL CURB & GUTTER SECTION

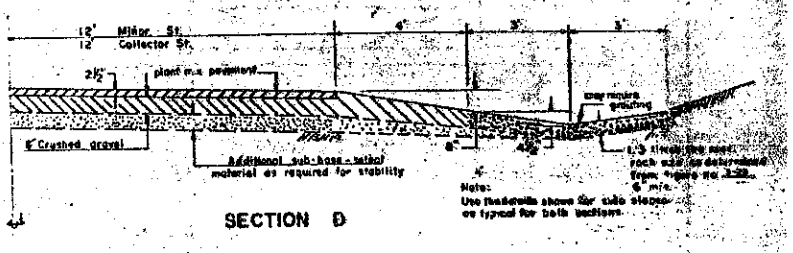


NOTE 2 No. 6 BARS OVER TRENCHES TO EXTEND 3' EACH SIDE OF TRENCH. 10' SECTIONS EXPANSIONS NOT TO EXCEED 90 FEET

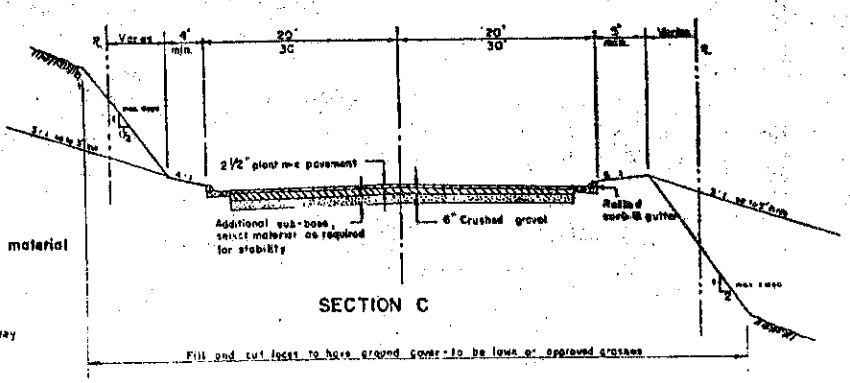
OVERHEAD DRIVEWAY

TO BE USED BY SPECIAL PERMISSION ONLY





SECTION D



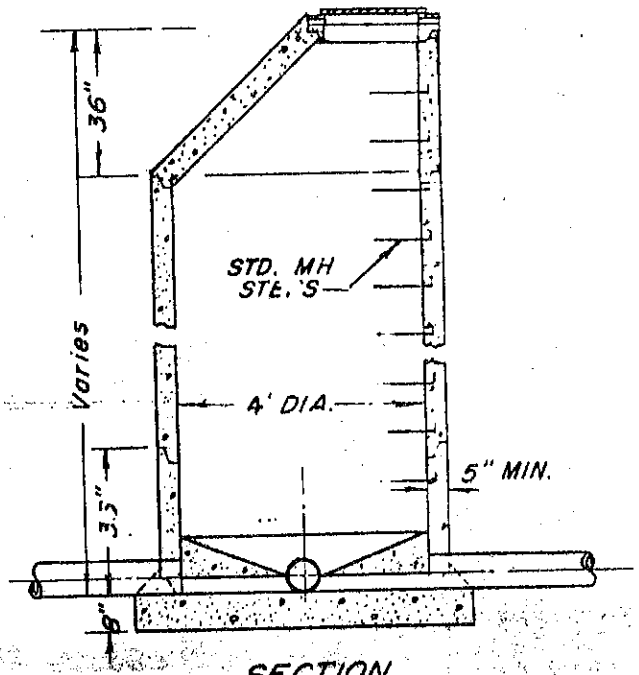
SECTION C

TYPICAL ROAD SECTION & DRAINAGE FOR SUMMER & RECREATIONAL DEVELOPMENTS

MINIMUM PUBLIC WORKS STANDARDS

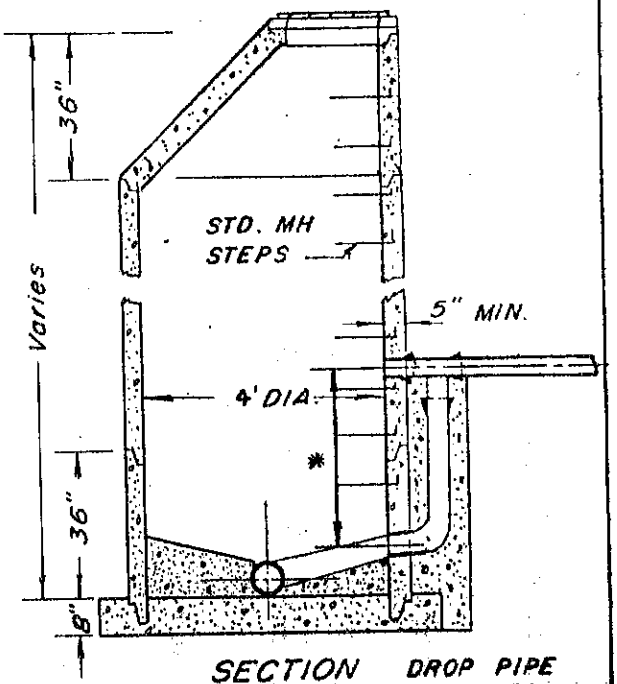
TYPICAL SEWER MANHOLES

TYPICAL JUNCTION MANHOLE PRECAST CONC.



SECTION

TYPICAL DROP MANHOLE PRECAST CONC.

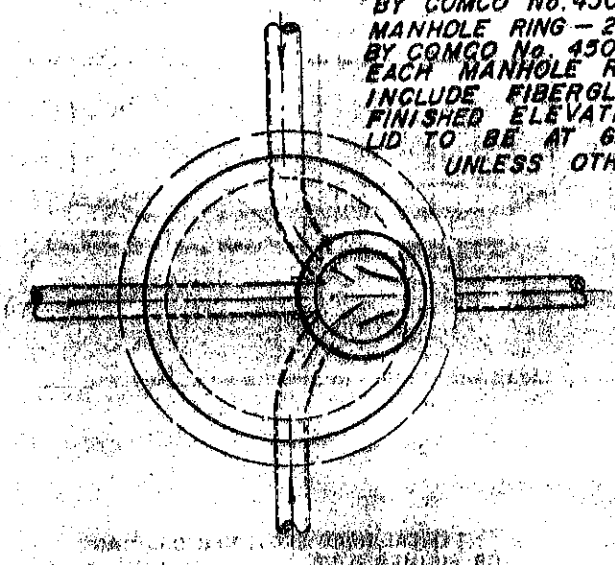


SECTION

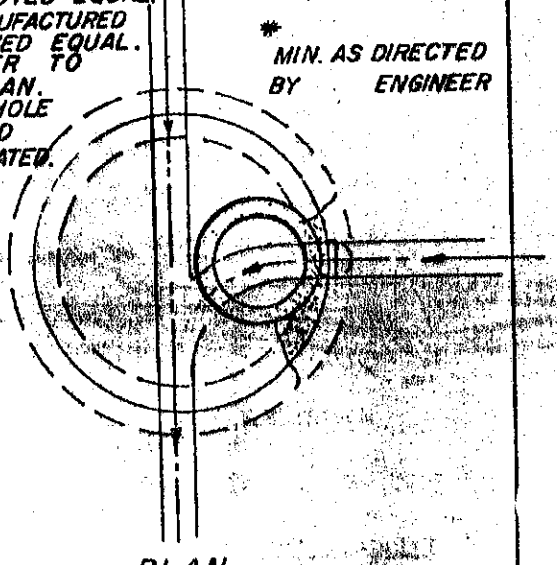
DROP PIPE INSTALLED IN CONC.

NOTE:
MANHOLE COVER — 167 # AS MANUFACTURED BY COMCO No. 450A OR APPROVED EQUAL.
MANHOLE RING — 235 # AS MANUFACTURED BY COMCO No. 450A OR APPROVED EQUAL.
EACH MANHOLE RING & COVER TO INCLUDE FIBERGLASS DIRT PAN.
FINISHED ELEVATION OF MANHOLE LID TO BE AT GRADE OF ROAD UNLESS OTHERWISE INDICATED.

* MIN. AS DIRECTED BY ENGINEER

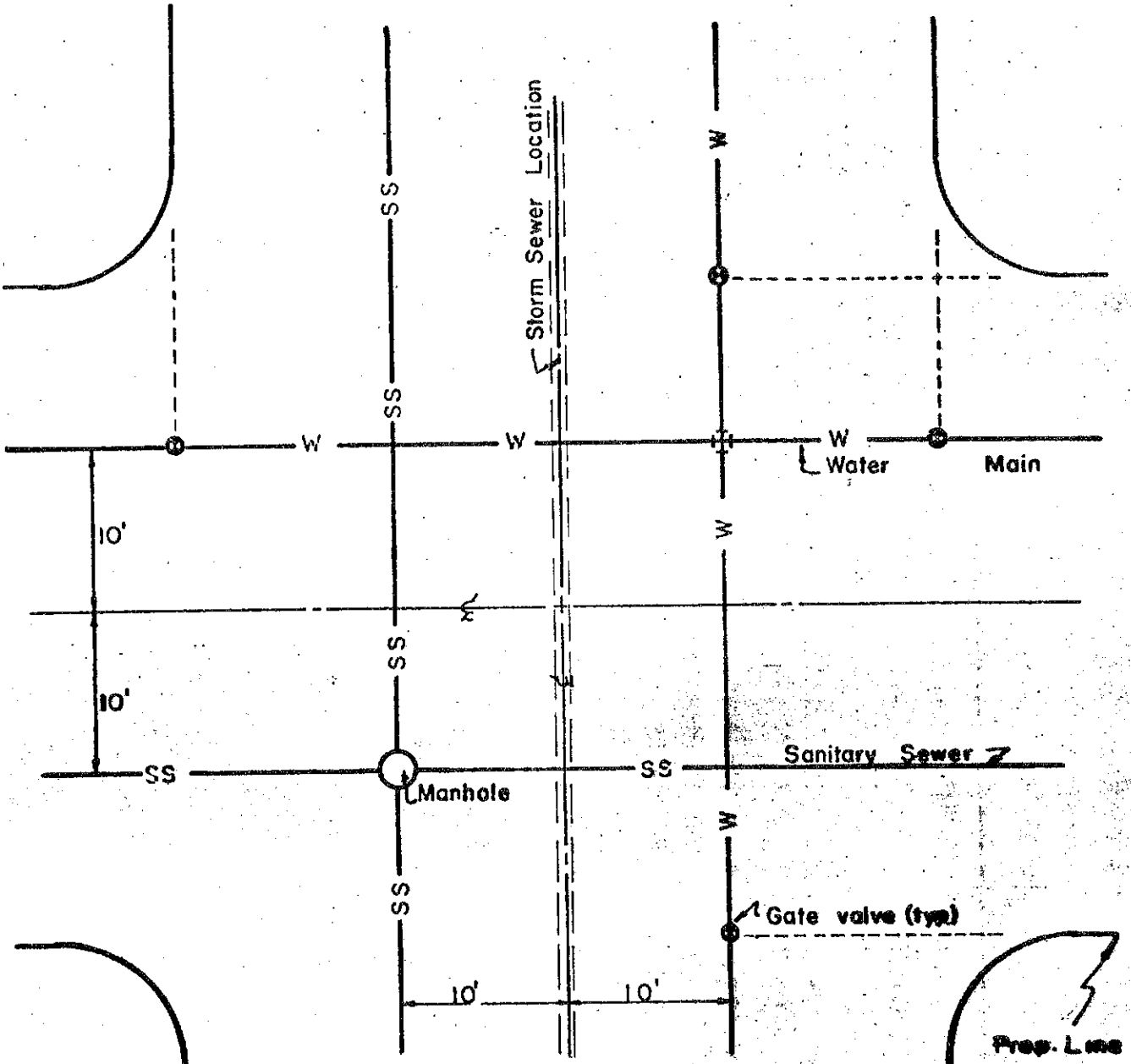


PLAN

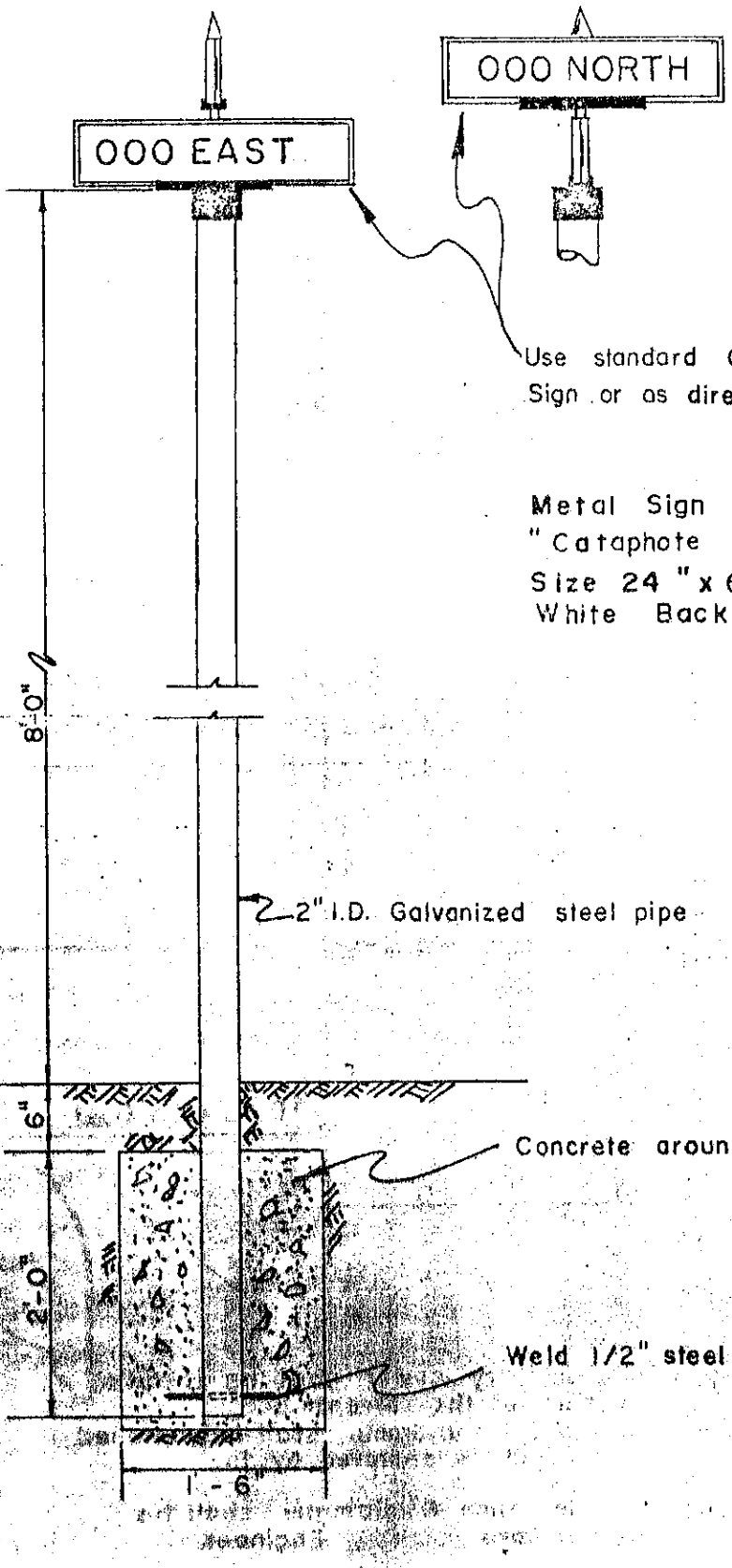


PLAN

TYPICAL INTERSECTION LOCATION DETAILS FOR UNDERGROUND UTILITIES



Notes:

1. Wherever possible, sanitary sewer shall be installed on the down hill side of the street.
2. Water valves and 5" V.O. fire hydrants shall be installed in numbers and located as approved by the engineer.
3. No water line smaller than 6" diameter shall be installed without approval of Engineer.

TYPICAL STREET SIGN