CITY OF PRATTVILLE

PUBLIC WORKS MANUAL

REV2022

ARTICLE I

GENERAL REGULATIONS AND DEFINITIONS

Section 1. GENERAL REGULATIONS

Section 1.1 From and after the date of adoption, the regulations contained herein shall be known as the Prattville Public Works Manual. Said regulations shall govern all public works or works offered for Public Maintenance occurring within the corporate limits of the City of Prattville as now or hereinafter established. Where applicable, these regulations shall also govern work on private land and in the police jurisdiction.

Section 1.2 The requirements of this ordinance are supplementary to the requirements and provisions of the City of Prattville Zoning Ordinance and shall not be interpreted as repealing any portion of those documents. In the case of overlapping or conflicting requirements, the stricter requirement shall prevail.

Section 1.3 Any owner of land within the limits of said jurisdiction as stated above wishing to develop or improve his property in such a way as to require any construction improvements regulated herein, shall submit plans and specifications as required to the City Engineer for review and approval. No such improvements shall be accepted for public maintenance unless constructed to the standards contained herein and approved and recommended by the City Engineer.

Section 1.4 The following standard note shall be required on all preliminary plat cover sheets. "All technical specification as shown and noted on these plans shall be constructed in accordance with the requirements of the most current edition of the City of Prattville's Public Works Manual. Where conflicts arise, City of Prattville standards will govern."

Section 1.5 Where conflicts arise in construction requirements between the City of Prattville's Subdivision Regulations and the City of Prattville's Public Works Manual, the Public Works Manual will govern.

Section 2. PENALTIES

Section 2.1 Failure to comply with these regulations will result in the denial of acceptance for maintenance by the City of Prattville until such improvements comply with the requirements contained herein. In addition, no utilities shall be connected, no building permit, certificate of occupancy, or equivalent shall be issued until such time as the improvements or plans as appropriated have been approved by the City's Engineer.

Section 2.2 Should buildings, structures, grading or other work covered by these regulations be undertaken without full compliance with said regulations, the Mayor, in addition to other remedies, may institute injunction mandamus or other appropriate actions or proceedings.

Section 3. DEFINITIONS

Section 3.1 City's Engineer shall mean that person, firm or corporation hired, appointed, assigned to act, or otherwise employed by the City of Prattville to provide engineering services for a project or projects.

Section 3.2 Commission shall mean the City of Prattville Planning Commission.

Section 3.3 Council shall mean the Prattville City Council.

Section 3.4 All other words and phrases shall have their normal meaning in the written language or as a technical planning, engineering or legal term as is appropriate to the context.

Section 4. BONDS

Section 4.1 Bonds or irrevocable letters of credit, in a form approved by the City Attorney and in an amount and time limit approved by the City's Engineer may be accepted by the City Engineer in lieu of any or all actual improvements required by this ordinance.

Section 4.2 Upon default by any developer, contractor, or other person posting any bond or irrevocable letter of credit under the provisions above, the City Engineer shall cash said bond or letter of credit and complete the project or have it completed.

Section 4.3 In the event that the bond or letter of credit is insufficient to complete the project in accordance with accepted plans, the City may, at its discretion, enter any additional cost as a lien against the subject property.

ARTICLE II

STREETS AND HIGHWAYS

DESIGN CRITERIA

Section 1 **CITY OF PRATTVILLE STANDARD PAVEMENT SECTION**

Section 1.1

1 1/2" A.H.D. Section 416-A, Mix 1 Wearing Surface
A.H.D. Section 405 Tack Coat
2 1/2" A.H.D. Section 327-A, Mix 1 Black Base
A.H.D. Section 401-A Prime Coat
4" A.H.D. Section 823 Soil Aggregate Base
(Placed at 100% ASTM D-698)

Section 1.2 Prior to placement of the solid aggregate base, the final six (6) inches of subgrade should be compacted to 98% ASTM D-698 as per A.H.D. Section 230 modified roadbed.

Section 1.3 Prior to placement of the black base, the entire roadway section should be proof-rolled with a ten (10) ton (total load) single axle truck under the observation of City Engineering Department personnel or the City's designated representative in an attempt to detect isolated soft/yielding areas.

Section 1.4 Material specifications shall be taken from the Alabama Highway Department's (A.H.D.) Standard Specifications for Highway Construction - 1992 edition.

NOTE 1: Traffic loading generally corresponding to a traffic class 2 as defined by the Alabama Asphalt Pavement Association's Asphalt Pavement Design Guide: A truck is defined as a 2 axle, 6-tire vehicle having a gross vehicle weight of 20,000 pounds or greater. Light panel trucks and pick-up trucks are not included. Collector/distributor streets may require additional asphalt base thickness on a site-specific basis as developed by each design engineer and approved by the City Engineer.

NOTE 2: The California Bearing Ratio (CBR) Test is a test performed on the subgrade to determine the required thickness (AASHTO T-193 Test Method).

NOTE 3: The City Engineer may elect, on a site-specific basis, to perform subgrade sampling/testing to verify CBR values. Where CBR subgrade values are proven by the City's selected testing agency to be 10 or greater, 1" of AH.D. Section 327-A, Mix 1 Black Base shall be deleted from the "Standard" for those specific streets. Where CBR subgrade values are proven to be less than 6, 1" of AH.D. Section 327-A, Mix 1 Black Base shall be added to the "Standard" for those specific streets.

NOTE 4: All paving sections may be revised on a site-specific basis at the discretion of the City Engineer.

Section 2 MAJOR STREET PLAN

Section 2.1 All proposed streets, roads and developments must conform to or be compatible with the City of Prattville Thoroughfare Plan, which is a part of the Prattville Comprehensive Plan. This plan should be consulted prior to any development. Construction shall not commence on any new public street or street proposed for public use until the same has been reviewed by the Commission as provided in Section 11-52-11 of the Code of Alabama, 1975. Copies of the Prattville Comprehensive Plan may be obtained at the office of the City Engineer.

Section 3 UTILITY EASEMENTS

Section 3.1 The location of utility easements on all subdivisions shall be shown on the plan drawings. Each utility (gas, water, power cable, telephone, etc.) must be located in the plan view with distances referenced from the street centerline.

Section 4 INTERSECTION GEOMETRICS

Section 4.1 No more than two (2) streets shall cross the same point. In so far as practical, acute angles at street intersections shall be avoided. Intersections of less than eighty-five (85) degrees (measured at the centerline of streets) shall not be permitted.

Section 4.2 Radii at street intersections shall not be less than twenty-five (25) feet, and where the angle of the street intersection is less than ninety (90) degrees, a greater radius may be required.

Section 4.3 Public streets which enter from opposite sides shall be directly opposite to each other or they shall be separated by at least one hundred twenty-five (125) feet between their centerlines, measured along the centerline of the intersected street. The use of "T" intersections is encouraged within residential subdivisions provided this separation can be attained.

Section 5 ENTRANCES, EXITS, DRIVES, NEW STREETS AND ROADS

Section 5.1 All connections of entrances, exits, drives, new streets and roads shall have the approval of the City Engineer or a designee prior to their construction. The City Engineer shall have the power to barricade and close any such entrance, exit, drive, new street or road constructed without approval.

Section 5.2 Approval of any turnout site plan shall not constitute approval of any entrance or exit. Such approval shall be granted in accordance with procedures elsewhere in this Article.

Section 5.3 New public streets or roads or extensions of existing public streets or roads, not a part of a required subdivision plan shall be approved or disapproved by the Commission following review by the City's Engineer, Police Chief, and Fire Chief.

Section 5.4 Entrances, exits, drives, new non-public streets or roads, or the extension of existing non-public streets or roads, which are not the result of developments requiring site plans or subdivisions requiring subdivision approval, shall be submitted to the City.

Engineer in a manner prescribed by him or her. The City Engineer shall approve or disapprove each such submittal within 30 calendar days. The City Engineer or his designee may approve drives, entrances and exits without consultation beyond the City Engineer's office. New non-public streets and roads, extensions thereto and all entrances, exits, and drives for multi-family structures or apartments, mobile home parks, commercial or industrial structure complexes shall not be approved without consultation with the City's Engineer, the Police Chief and Fire Chief.

Section 5.5 All entrance and exit driveways shall be located to afford maximum safety to traffic, provide for safe and convenient ingress and egress to and from the site, and to minimize conflict with the flow of traffic.

Section 5.6 Any exit driveway or driveway lane, other than to serve single house or mobile home, shall be so designed in profile and grading and shall be located to provide the following minimum sight distance measured in each direction. Sight distance measurements shall be from a driver's eye height of 3.5 feet above the pavement to an approaching object height of 4.25 feet above the pavement on that portion of the exit driveway that is 15 feet from the edge of the pavement of the road into which the driveway enters.

85TH PERCENTILE SPEED	REQUIRED SIGHT DISTANCE EACH DIRECTION
25 MPH	250 FT.
30 MPH	300 FT
35 MPH	350 FT
40 MPH	400 FT
45 MPH	450 FT
50 MPH	500 FT

Section 5.7 At sites occupying a corner of two (2) intersecting roads, no driveway entrance or exit shall be located within fifty (50) feet of the point of tangency of the existing or proposed curb radius of that site.

Section 5.8 Driveways used for two-way operation shall intersect the road at an angle as near to ninety (90) degrees as site conditions will permit and in no case will be less than sixty (60) degrees.

Section 5.9 Driveways used by vehicles in one direction of travel (right turn only) shall not form an angle smaller than forty-five (45) degrees with a road.

Section 5.1O The dimensions of driveways shall be designed to adequately accommodate the volume and character of vehicles anticipated to be attracted daily onto the land development for which a site plan is prepared. The required maximum and minimum dimensions for driveways are indicated below. Driveways serving large volumes of daily traffic or traffic of over fifteen (15) percent truck traffic shall be required to utilize high to maximum dimensions.

	ONE-WAY OPERATTION * DRIVEWAY WIDTH	TWO-WAY OPERATION * DRIVEWAY WIDTH	CURB RADIUS
1 FAMILY	10-12 FT.	10-12 FT.	5 FT.
3-10 FAMILY	20 FT.	20-25 FT.	15 FT.
10 FAMILY +	20-25 FT.	20-35 FT.	15 FT.
COMM. & IND.	20-30 FT.	25-35 FT.	20 FT.

- The driveway grade shall not exceed twelve (12) percent within the right-of-way area percent within any ten (10) feet of distance.

Note: The width ranges shown are for two lane drives. Multi-lane driveway dimensions should be increased by 11-14 feet per additional lane beyond two lanes.

Section 5.11 New commercial driveways on arterial streets or boulevards shall not be spaced closer than 125 feet from centerline to centerline except on streets bearing traffic lanes separated by medians.

Section 5.12 Sight lines to be maintained: Proper sight lines shall be maintained at all intersections of streets. Measured along the centerline, from a point of intersection, there shall be a clear sight triangle of seventy-five (75) feet for local and collector streets and one hundred fifty (150) feet for arterial streets. This shall be indicated on all plans. No building or obstruction shall be permitted in this area.

Section 5.13 Rounding at street corners: Property lines at street intersections shall be rounded with a radius of twenty (20) feet, or of greater radius where the engineer may deem it necessary. Comparable cutoffs or chords may be permitted in place of rounded corners.

Section 5.14 Unusable reserve strips: Reserve strips controlling access to streets shall not be allowed except where such control is placed with the City under conditions approved by the Planning Commission.

Section 6 STREET STANDARDS

Section 6.1 New public streets shall meet the following standards. Public right-of-ways may be used for the installation of public utilities with the permission of the City Engineer.

Section 6.2 Minimum street right-of-way widths: Street right-of-way widths shall be as shown in the community plan or, where not shown, they shall not be less than as follows:

STREET TYPE	RIGHT-OF-WAY	
*ARTERIAL BOULEVARD	120	FEET**
*ARTERIAL STREET	100	FEET
*COLLECTOR STREET	65	FEET
MINOR STREET	50	FEET
MARGINAL ACCESS STREET	50	FEET
CUL-DE-SACS & LOOPS	50	FEET
ALLEYS	24	FEET

- Major street
- The maximum amount of right-of-way deemed reasonable to be required by dedication shall be 120 feet in normal situations. However, topography may dictate greater widths when crossing difficult terrain. It is also deemed reasonable that an additional 20 feet setback be required along proposed arterial highways and streets, in addition to the setback required in the Zoning Ordinance.

Note: A six lane median divided roadway should have a reserved right of way of 150 feet and a seven-lane roadway should have a reserved right of way width of 130 feet.

Section 6.3 Minimum Roadway Widths

STREET	LANES	PAVEMENT WIDTH FROM CURB FACES
ARTERIAL BOULEVARD	5**	50 FEET
ARTERIAL STREET	4	51 FEET
COLLECTOR STREET	3**	42 FEET
MINOR STREET	2	29 FEET
MARGINAL ACCESS STS.	2	29 FEET
CUL-DE-SACS & LOOPS	2	29 FEET
ALLEYWAYS	--	20 FEET

* or 4 plus a median
** or 2 plus a median

Note: Minimum dimensions should be increased by 11-14 feet for additional lane.

Section 6.4 Additional width on existing streets: Owners of development that adjoin existing streets shall dedicate additional right-of-way to meet the minimum street requirements specified above.

a. The entire right-of-way shall be provided where any part of the development is on both sides of the existing street.

b. When the development is located on only one (1) side of the existing street, one-half (1/2) of the required right-of-way, measured from the center line of the road way shall be dedicated.

Section 6.5 Street Grades: Street grades shall not exceed the following unless otherwise recommended and approved by the City Engineer.

STREET TYPE	PERCENT GRADE
ARTERIAL BOULEVARD	03.0%*
ARTERIAL STREET	05.0%*
COLLECTOR STREET	7.0%*
MINOR STREET	12.0%*
MARGINAL ACCESS STS.	12.0%*
CUL-DE-SACS & LOOPS	12.0%*
ALLEY	12.0%*

- Vertical curves shall be such as to prevent abrupt change and shall be as approved by the City Engineer.

Section 6.6 Gutter Grades: The minimum grade of any gutter shall not be less than five tenths of one (0.5) percent unless otherwise approved by the City Engineer. Cross drains are not permitted on streets of collector level or above unless recommended by the City Engineer.

Section 6.7 Horizontal Curves: Where a deflection angle of more than ten (10) degrees in the alignment of a street occurs, a curve of reasonably long radius shall be introduced. On streets sixty-five (65) feet or more in width, the centerline radius of curvature shall be not less than three hundred (300) feet: and on other streets, not less than one hundred (100) feet.

Section 6.8 Vertical curves: Every change in grade shall be connected by a vertical curve constructed so as to afford a minimum sight distance of two hundred (200) feet, said sight distance being measured from the driver' eye, which is assumed to be three and one-half (3-1/2) feet above the pavement surface to an object six (6) inches high on the pavement. Profiles of all streets showing natural and finished grades drawn to a scale of not less than one (1) inch equals one hundred (100) feet horizontal, and one (1) inch equals twenty (20) feet vertical, may be required by the City's Engineer. Delta, Tangent and Radius shall be noted on the vertical profiles. On major streets greater sight distance may be required by the City Engineer. Combinations of vertical and horizontal curvature shall be reviewed on an individual basis to assure compliance with standard traffic engineering requirements.

Section 6.9 Cul-de-sacs (dead end streets).

a. Turn-a-rounds required: Minor terminal streets or courts designed to have one end permanently closed shall be no more than one thousand feet long unless greater length is necessitated by topography. All such streets shall be provided at the closed end with a tum-a-round having an outside roadway diameter of at least eighty (80) feet and a street right-of-way of at least one hundred (100) feet.

b. Temporary turn-a-rounds: Where, in the opinion of the Planning Commission, it is desirable to provide for street access to adjoining property, proposed streets shall be extended by dedication to the boundary of the subdivision. Such streets shall have a right-of-way of at least fifty (50) feet and be provided with a temporary turn-a-round having a roadway diameter of at least eighty (80) feet (not required if stub out is only one (1) lot in depth).

Section 6.10 Alley:

a. Where required: Alleys shall be provided in commercial and industrial developments unless waived by the City Engineer.

b. Where optional: Provisions for alleys along the rear of residential lots are optional except where, in the opinion of the Planning Commission, such alleys are advisable.

c. Alignment: At all intersections, changes in alignment shall be avoided, but where necessary, corners shall be cut off sufficiently to permit safe vehicle movement.

d. Dead ends: Dead end alleys shall be avoided where possible, but if unavoidable, shall be provided with an adequate turn-a-round as required by the City Engineer.

Section 6.11 Alternative Street Standards: Developments not located within the corporate limits of the City of Prattville, in which public streets shall be accepted and maintained by a county government, may be developed to such standards and using such surfaces as the county shall direct, provided that:

a. Right-of-way widths and curb and gutter requirements shall not be less than those required by these regulations for comparable City road types.

b. All public roads shall be paved.

Section 7 STREET DRAINAGE

Section 7.1 All gutters, drains, culverts, sewers and inlets shall be kept clean and open at all times for surface drainage. No damming or ponding of water in gutters or other waterways will be permitted, except to a very limited extent where the Engineer shall consider the same necessary. Flow of water across or over pavements, except through approved pipe or properly constructed troughs, shall not be allowed. Inlets shall be located at the upgrade side of all public road intersections.

Section 7.2 The ultimate pipe drainage system should begin where the quantity of water in the street gutter approximately equals the capacity of a curb opening inlet. Thereafter, inlets shall be placed at a maximum of four hundred (400) feet or where projected flaw exceeds gutter capacity.

Section 7.3 The City of Prattville requires the use of an "S" type inlet.

See Illustration No. 1, Appendix

Section 7.4 Pipes 24 inches in diameter and smaller shall be laid on straight lines and grades.

Section 7.5 For pipes 27 inches in diameter and larger, horizontal and vertical curves may be used provided the joint openings do not exceed one-third ($^1/_3$) the depth of the groove.

Section 7.6 The grade of the main pipe shall be carried through the invert of structures unless greater drop is required by hydraulic conditions. A minimum drop of 0.1 feet shall be provided through the invert of any structure.

Section 8 SIDEWALKS

Section 8.1 Sidewalks required: Sidewalks shall be required on both sides of arterial and collector streets. Sidewalks are required on one side of all other streets except alleys, cul-de-sacs upon which twenty or fewer lots front, and loop streets upon which forty or fewer lots front. The City Council will not accept maintenance for any street upon which a sidewalk has not been built, if such is required by this ordinance, and the Council may direct the City Engineer to close off entrance to said street

until the required sidewalk is constructed. Sidewalks shall not be less than sixty (60) inches in width on arterial and collector streets and forty-eight (48) inches on other streets.

Section 8.2 Location: Sidewalks shall normally be placed on the public right-of-way one (1) foot in from the property line. Under special conditions of terrain or other factors, the Planning Commission may approve alternate designs.

Section 8.3 Sidewalks shall be constructed with 3,000 psi concrete mix and shall be scored at five (5) foot intervals with expansion joints at a maximum of thirty (30) foot intervals.

Section 9 BLOCKS

Section 9.1 General requirements: The lengths, width and shapes of blocks shall be determined with due regard to:

a. Provisions of adequate building sites suitable to the special needs of the type of use intended.

b. Zoning ordinance and health department requirements as to lot size and dimensions.

c. Need for convenient access, circulation, control and safety of street traffic.

d. Limitations and opportunities of topography.

Section 9.2 Length: Shall be as the Planning Commission considers necessary to secure efficient use of land or desirable street patterns.

Section 9.3 Width: Blocks shall be wide enough to allow two (2) rows of lots, except where reverse frontage on a major street is provided or where prevented by topography or size of the property, in which case the Planning Commission may approve a single row of lots of suitable depth.

Section 10 NAMES

Section 10.1 Street names: No street names shall be used which will duplicate by spelling or sound or otherwise be confused with the names of existing streets, except where a proposed street is an extension of an existing street, in which case the proposed street shall bear the name of the existing street.

Section 10.2 Naming of streets shall be consistent with the directional line of the street as follows:

Through street lying east and west	Avenues
Through streets lying north and south	Streets
Through streets lying other than what can be determined north and south or east and west	Roads
Cul-de-sacs running east and west	Courts
Cul-de-sacs running north and south	Places
Cul-de-sacs winding	Lanes
Multi-directional (continuous)	Drives
Semi-Circles and winding loops	Circles

Section 10.3 The Autauga County 911 Agency shall be notified of all new street names or changes to names prior to their approval by the Planning Commission and acceptance by the Council.

Section 10.4 Development names: Development names shall not be duplicated or be confusing with existing names. Such names are subject to the approval of the Planning Commission.

ARTICLE III
STREETS AND HIGHWAYS
CONSTRUCTION CRITERIA

Section 1 **GENERAL**

Section 1.1 The specifications for construction of roads within the City of Prattville include the latest edition of the Alabama Highway Department Standard Specifications for Highway Construction. The following is a general discussion of these standards as well as additional standards determined by the City. If any conflict exists, the stricter standard will apply.

Section 2 **SITE WORK AND GRADING**

Section 2.1 All streets, roads and service drives shall be graded so that the entire right-of-way can be constructed to the required cross section. Before grading is started, the entire right-of-way shall be first cleared of all stumps, roots, brush and other objectionable materials, along with all trees and other topographic features. not intended for preservation.

Section 2.2 The stumps, boulders, and other obstructions shall be removed to a minimum of four (4) feet below existing grade when encountered and scarified to a depth of twelve (12) inches below the subgrade.

Section 2.3 Stump holes and trenches must be carefully backfilled and tamped. Heavy sod and all soft, yielding or otherwise unsuitable materials must be removed and replaced with acceptable fill material.

Section 2.4 All suitable materials from roadway cuts may be used in the construction of fills, approaches, or at other places as needed. The fill shall be spread in layers and compacted. Compacted layers shall not be more than six (6) inches. Fills must be rolled in accordance with State Highway Department standards. The top twelve (12) inches of soil in both cut and fill sections shall have a dry weight density of at least equal to ninety-five (95) percent of that obtained by AASHTO Standard Method T-99.

Section 2.5 Grading must progress so as to insure good drainage and prevent formation of depressions where water may collect. When the natural soil cannot be made stable enough to support construction traffic, subgrade modification shall be performed as directed by the City Engineer.

Section 2.6 All underground utilities crossing paved streets shall be installed prior to final grading. Electrical and telephone cables crossing public streets shall be placed in adequately sized conduits.

Section 3 **BASE COURSE**

Section 3.1 The base normally shall consist of two layers, the first layer shall be at least six (6) inches crusher run stone material compacted to 100% density. The second layer, if required, shall be bituminous concrete consisting of a hot mix, hot laid bituminous base constructed on the prepared underlying primed base.

Section 3.2 The blended mineral aggregate shall be graded and combined to meet the general composition limits by weights for the dry mix. Fine aggregate shall be local sand and gravel, crushed limestone or crushed slag.

Section 3.3 Course aggregate shall be local or commercial gravel, crushed gravel, crushed slag, crushed stone, or a combination of these.

Section 3.4 The blend of course and fine aggregate shall meet the following gradation, combined so as to produce a mix that will develop not less than 1,000 pounds Marshall Stability at 75 blows, or as shown on the approved plans or specified in the proposal.

TOTAL PASSING	PERCENT
$1\frac{1}{2}$ INCH SCREEN	100
$\frac{3}{4}$ INCH SCREEN	70-100
$\frac{3}{8}$ INCH SCREEN	45-90
NO. 4 MESH SIEVE	25-70
NO. 8 MESH SIEVE	20-57
NO. 50 MESH SIEVE	7-24
NO. 100 MESH SIEVE	2-14
NO. 200 MESH SIEVE	0-8
BITUMEN (A-C 8)	3.5-6.5

Section 3.5 Local source material (pit run) shall have a P.I. of 6.0 or less.

Section 3.6 The proportion of bitumen to total aggregate by weight will be fixed in the job mix formula. The grade of asphalt shall be (AC-20) 85-100 penetration as directed by the City Engineer.

Section 3.7 Sampling and testing by an independent testing firm may be required at the discretion of the City Engineer.

Section 3.8 All bituminous mixture placement equipment shall be approved by the City Engineer.

Section 3.9 No bituminous mixture shall be placed unless the temperature is at least 40 degrees Fahrenheit (including wind-chill factor) and rising in the shade or during any severe weather conditions or seasons unless approved by the City Engineer.

Section 3.10 The depth of the base courses shall be determined utilizing sound Engineering practices based on the following:

a. Soil Support -The inherent ability of the native subgrade soil to support loads transmitted through the pavement.

b. Traffic Intensity - The weight and relative frequency of anticipated wheel loads.

Section 3.11 For satisfactory run-off, $\frac{3}{8}$ inch rise per foot of pavement width is the minimum required crown.

Section 4 **PRIME COAT**

Section 4.1 Prime shall not be applied until the base has been approved by the Engineer. Before applying the prime, the surface shall be swept and prepared.

Section 4.2 Loose material, dust, dirt, caked clay, and any foreign material that might prevent proper bond with the existing surface shall be removed for the full width of the treatment by means of revolving brooms, mechanical sweepers and blowers. Dust and other loose material not removed by mechanical means shall be removed with hand brooms. All sweeping shall be removed before any bituminous material is supplied.

Section 4.3 The base shall be sprinkled with water if the City Engineer so directs.

Section 4.4 Prime shall be applied at the rate of 0.25 gallons per square yard consisting of grade MC, RC, or RT, as approved by the City Engineer. Prime coats shall be applied at the following temperatures:

Cut-back Asphalt	70 degrees – 180 degrees
Emulsified Asphalt	60 degrees – 140 degrees

Section 4.5 Cleaning equipment, pressure distributor and bitumen heating equipment for application of prime coats and tack coats shall be approved by the City Engineer.

Section 5 **MATERIALS / MIXTURE**

Section 5.1 Unless the type of bitumen is specified on the plans or in the proposal, the Contractor may select for use either asphalt cement, grade AC-20 or AC-30, or tar of a grade approved by the City Engineer. The proportion of bitumen to total sample by weight shall be 3.5 percent to 7.0 percent.

Section 5.2 All mixes shall be tested to determine if an anti-stripping agent is needed. All mixes shall have a tensile strength ratio of at least 0.70 when tested in accordance with AASHTO T-283 as modified by AHD Procedure 361. However, if visual stripping occurs in the design or field production, an anti-stripping agent may be required if deemed necessary by the City Engineer.

Section 5.3 Silicone may be used in asphalt cement, not to exceed 2 oz. per 5000 gallons. Other additives shall not be added to the bitumen unless expressly authorized in writing by the City Engineer.

Section 5.4 The use of any unauthorized additive will be cause for rejection of the mixture.

Section 5.5 The bituminous plant mix shall be composed of *a* mixture of aggregate, filler if required, and bituminous material. Various aggregate fractions shall be combined in such proportions that the resulting mixture meets the gradation requirements within the composition of State of Alabama Highway Department Supplemental Specification No. 2-89(2) "Mix No. 1".

Section 6 JOB-MIX FORMULA

Section 6.1 No work shall be started until the Contractor has submitted and received approval of his intended material sources and his job-mix formula. A copy of the approved job mix shall be available at the plant any time material is being delivered to the owner.

Section 6.2 The Contractor shall submit to the City's Engineer for approval a job-mix formula to be supplied from a specific plant.

Section 6.3 The job-mix formula shall allow for a minimum of a five percent difference in percent passing on each sieve larger than the #100 on which there is material retained, and this difference shall be maintained during production.

Section 7 EQUIPMENT

Section 7.1 In general, choice of equipment will be left to the Contractor and it shall be his responsibility to provide equipment in the proper size and amounts to produce, deliver to the roadbed, spread, and compact the plant mixed material in sufficient quantities for the continuous movement of the spreaders under normal operation conditions.

Section 7.2 The contractor shall secure approval of all equipment prior to beginning work and any equipment found unsatisfactory shall be promptly replaced or supplemented.

Section 8 SCALES

Section 8.1 A digital recorder shall be installed as part of the platform truck scales. The recorder shall produce a printed digital record on a ticket of the gross and tare weights of the delivery trucks along with a time and date print for each ticket. Provisions shall be made so that scales may not be manually manipulated during the printing process, and so interlocked as to allow printing only when the scale has come to rest. The scales and recorder shall be of sufficient capacity and size to accurately weigh the heaviest loaded truck or tractor trailers that are used for delivery of the bituminous concrete from the plant.

Section 9 HAULING EQUIPMENT

Section 9.1 Trucks used for hauling bituminous mixtures shall have tight, clean, smooth metal beds which have been thinly coated with a minimum amount of paraffin oil, lime solution or other approved material to prevent the mixture from adhering to the bed. The use of gasoline, kerosene or other volatile material is prohibited. The truck shall be equipped with a cover of canvas or other suitable material of such **size as** to protect the mixture from adverse conditions. Each shall have a hole in the side of the body, approximately 5/16" in diameter and suitably placed to allow for temperature measurement of the bituminous mix when the air temperature is below 60 degrees Fahrenheit or hauling time exceeds 30 minutes, or threatening weather exists. No mixture shall leave the plant unless it is covered entirely and the cover securely fastened.

Section 10 BITUMINOUS PAVERS OR SPREADERS

Section 10.1 All bituminous pavers or spreaders used for mainline paving, including shoulders and interchange ramps, shall be equipped with a full width vibratory, or other compactive type screed. The augers used to move the material across the width of the screed shall extend within one foot of the edge of the screed. It will be permissible to use a hydraulically extendable strike-off for paving turnouts and short sections of pavement including variable width sections and crossovers.

Section 10.2 When laying mixtures, the paver shall be capable of being operated at forward speeds consistent with satisfactory laying of the mixture, providing a finished surface of the required evenness and texture without tearing, gorging or shoving of the mixture.

Section 11 COMPACTION EQUIPMENT

Section 11.1 Compaction equipment shall be self-propelled and capable of compacting the mixture throughout the depth of the layer while it is still in a workable condition without damage to the material.

Section 11.2 The compaction shall be accomplished with the use of a steel wheel breakdown roller, followed by a multi-wheel pneumatic tired roller.

Section 12 WEATHER

Section 12.1 The mixture shall be laid only upon an approved underlying course which is dry and only when weather conditions are suitable. The City's Engineer may, however, permit work of this character to continue when overtaken by sudden rains, up to the amount which may be in transit from the plant at the time, provided the surface just ahead of the placing is swept clear of water and the mixture is within the temperature limits specified. The layer placed under such conditions shall be at the Contractor's risk and shall be removed and replaced by him without extra compensation should it prove unsatisfactory.

Section 12.2 Bituminous plant mix layers of 200 pounds per square yard or less shall not be placed when the surface or air temperature, taking into account the wind-chill factor, is below 40 degrees Fahrenheit before the spreading operation is started. Rolling and finishing operations shall be completed during the daylight hours.

Section 13 PERFORMANCE

Section 13.1 The underlying surface must be approved before placing of a plant mix application will be allowed. The underlying surface, whether an old surface or a new surface, shall be thoroughly cleaned of all foreign or loose material and maintained in such condition in advance of the surfacing work.

Section 13.2 When leveling of an existing pavement or base is provided by the plans, the surface shall be brought to proper grade and cross section with 327 asphalt base as per AHD spec.

Section 13.3 If the leveling is not placed in a uniform layer, it shall be compacted to the satisfaction of the City Engineer.

Section 13.4 Leveling shall include superelevating when so directed.

Section 13.5 When widening is required, the widening shall be placed at the locations designated by the City's Engineer. The requirements for the placing of the widening shall be the same, as far as practical, as for the placing of the normal roadway.

Section 13.6 The bituminous material shall be heated in a manner that insures the even heating of the entire mass under efficient and positive control at all times. Any bituminous material, which in the opinion of the City's Engineer, has been damaged shall be rejected.

Section 13.7 All aggregates shall be dried so that the moisture content at the time of mixing is less than 0.5 percent by weight in accordance with AHD Test 130. The temperature of the aggregate at the dryer shall not exceed 350 degrees Fahrenheit.

Section 13.8 The aggregate, immediately after being heated, shall be screened into three or more sizes and conveyed into separate bins, ready for matching and mixing with bituminous material. However, for mixes using aggregates of one-half inch maximum size, the number of bins may be reduced to two.

Section 13.9 For bituminous pavement wearing layers, spreading operations shall be so correlated with plant and hauling equipment that the spreading operation, once begun, shall proceed at a speed as uniform and continuous as practical. The continual forward movement of the spreader requires the use of hauling vehicles capable of supplying the spreader with bituminous material while the spreader is in motion. Repetitive interruptions or stopping of the spreader shall be cause for the City's Engineer to stop the work until a definite action plan is developed for correction of the interruptions. Any interruption will require a thorough check of the area immediately under the spreader and any variances shall be corrected immediately or the material removed and replaced, as directed, without additional compensation.

Section 13.10 Material placed in the spreader shall be immediately spread and screened to such uniform depth that the average weight of the mixture required per square yard is secured. Alignment of the outside edges of the pavement shall be controlled by present control lines, and shall be finished in conformity with these controls.

Section 13.11 For areas inaccessible to mechanical spreading equipment, and when patching potholes and minor pavement failures, hand spreading of the bituminous mixture may be permitted. The mixture shall be distributed immediately in place by means of suitable tools and spread in a uniformly loose layer.

Section 13.12 As soon as the mixture has been spread and has set sufficiently to prevent undue cracking or shoving, rolling shall begin. A delay in the initial rolling will not be tolerated and initial or breakdown rolling should in general be performed by rolling longitudinally, beginning at the sides and proceeding toward the center of the surface. If the Contractor has not obtained the required density for a bituminous layer before the temperature of that layer has dropped below 180 degrees Fahrenheit, he shall cease his paving operation until he has made the necessary adjustment in his operation to ensure that the density will be obtained prior to the temperature of the layer dropping below 180 degrees Fahrenheit.

Section 13.13 If any displacement occurs during rolling, it shall be corrected at once. To prevent adhesion of surface moisture to the rollers, the wheels shall be kept adequately moistened with water and a non-foaming detergent, but an excess of water will not be permitted.

Section 13.14 In places inaccessible to a roller, compaction shall be obtained with hand or mechanical tampers of adequate weight to produce required density.

Section 13.15 Placing of bituminous paving layers shall be as continuous as possible. All joints shall be made in a careful manner in such a way as to provide a smooth, well bonded and sealed joint.

Section 13.16 Density tests will be made at the City Engineer's discretion, promptly during and upon completion of compaction so that density deficiencies may be corrected while the mixture is still workable. Areas of deficient density not corrected shall be removed and replaced without any additional compensation.

Section 14 **GENERAL**

Section 14.1 The finished surface of all base, binder and wearing surface layers shall not vary more than ¼ inch from the required section measured at right angles to the pavement centerline. The finished surface shall not vary more than $^3/_8$ inch in any 25-foot section from a taunt string applied parallel to the surface and roadbed centerline at the following location: one foot inside the edges of pavement, at the centerline, and at other points as designated. The variance from the designated grade shall not increase or decrease more than ½ inch in 100 feet.

Section 14.2 Surface, binder and leveling pavement edges not confined by curbing or other structures shall be lightly tamped generally with a lute immediately behind the placement of operation, to form an approximate 1:1 slope as a preventative measure against cracking and bulging during the rolling process. This procedure shall also be required on the initial edge of a longitudinal cold joint. These edges shall be neatly shaped to line behind the breakdown roller and shall be trimmed as necessary after final rolling to an accurately lined string of wire providing a maximum tolerance of 2 inches outside the theoretical edge of pavement, with a maximum variation from a true line of ½ inch in 1O feet and a slope not flatter than 1:1. Edges that are distorted by rolling shall be corrected promptly.

Section 14.3 Deficiencies in surface smoothness shall be remedied to the extent practicable by rolling while the material is still workable. Otherwise the layer shall be removed and replaced as necessary to obtain required smoothness. "Skin patching" of a surface layer to correct low areas or healing and scraping to correct high areas will not be permitted. Overlays of not less than 80 pounds per square yards may be authorized by the City Engineer for surface smoothness deficiencies, provided all material in the overlay is without additional cost to the City.

Section 14.4 All areas containing excessive or deficient amounts of bitumen, all areas showing segregation of material, and all areas unbonded after rolling shall be removed and replaced without additional compensation.

Section 14.5 Sections of newly finished work shall be protected from all traffic until they become properly hardened. Maintenance shall include immediate repairs of any defects that may occur on the work. Such repairs shall be repeated as often as necessary to maintain the work in a continuously satisfactory condition. The Contractor will be responsible for the protection of the work and protection of any traffic using the work. No extra compensation will be paid for maintenance and protection.

Section 14.6 The accepted quantity of bituminous plant mix used as directed will be measured in tons of 2000 pounds.

Section 14.7 The weight measurement shall include all components of the mixture. No deductions will be made for any of the components, including the bituminous.

Section 14.8 Deductions in measurement will be made for all material wasted or lost due to negligence of the Contractor or applied beyond the limits of the work.

Section 14.9 Compensation for plant mixture, measured as provided above, will be made on a tonnage basis. The contract unit price per ton shall be full compensation for construction of the bituminous plant mix layer complete, in place on the road bed as indicated or directed, including all materials, procurement, handling, hauling and processing cost, and includes all equipment. tools, labor and incidentals required to complete the work.

Section 14.10 Unless otherwise covered by a separate pay item, no additional payments will be made for excavation for widening, compacting the subgrade, backfilling, spreading or disposing of excess excavated material, removal and disposal of old pavement, and removal and re-setting of road-way signs, mailboxes and other miscellaneous items.

Section 14.11 MIX DESIGNATION

SIEVE	**AGGREGATE COMPOSITION**
MIX 1	**PERCENT PASSING BY WEIGHT (SQUARE MESH TYPE)**
1 INCH SIEVE	100%
3/4 INCH SIEVE	95 - 100%
1/2 INCH SIEVE	80 - 100%
3/8 INCH SIEVE	54 - 74%
NO. 4 SIEVE	38 - 56%
NO. 8 SIEVE	25 - 44%
NO. 16 SIEVE	25 - 44%
NO. 30 SIEVE	16 - 36%
NO. 50 SIEVE	10 - 26%
NO. 100 SIEVE	5 - 12%
NO. 200 SIEVE	3 - 8%

Section 14.12 A tack coat shall be applied to the old surface or binder course, including all contact surfaces such as curbs, manholes, and adjacent pavement edges wherever encountered, and to the extent directed by the City Engineer.

Section 14.13 Tack coat material shall be heated or otherwise prepared to insure uniform distribution as directed by the City Engineer in the amount specified and shall be distributed as directed by the City Engineer in an amount of 0.1 gallons per square yard on a clean, dry prepared surface. Tack coat material shall be applied only far enough in advance to permit construction to progress uniformly and continuously after the curing period. Tack coat material shall not be applied so far in advance that the viscous quality will be reduced by traffic prior to construction. Tack coat that has lost its viscous quality before being covered shall be renewed and any which has been damaged shall be replaced.

Section 15 CONSTRUCTION OF OVERLAYS

Section 15.1 Vertical faces of pavement, curbs, gutters, drainage, gratings, manholes, and other contact surfaces should be sprayed or painted with a uniform coating of asphalt, preferably emulsified asphalt. This work shall be done in such a way as not to stain exposed curb or gutter surfaces. Asphalt coatings on vertical surfaces shall be protected from dust and dirt. This should be done immediately prior to pavement construction.

Section 15.2 When the pavement has been prepared, placing the overlap to the predetermined thickness, whether for surface improvement or structural improvement, should proceed without delay.

Section 15.3 Construction procedures for asphalt overlays are the same as for asphalt pavement construction described earlier.

ARTICLE IV

REQUIREMENTS FOR TESTING

Section 1 The following steps shall be followed in general for the testing and acceptance of all streets to be maintained by the City of Prattville whether publicly or privately constructed.

Section 1.1 Step 1. On submission of a preliminary plan, site plan, or upon Council approval to go to bid on a City street project, the City Engineer will order tests of proposed streets to develop paving recommendations (borings, soil analysis, CBR, proctor density). These recommendations will become a part of the plans submitted, or of the bid documents, as is appropriate.

Section 1.2 Step 2. Upon commencement of construction, the Contractor shall notify the City Engineer. The City's testing laboratory, if requested by the City Engineer, shall make visual observations of clearing and grubbing operations.

Section 1.3 Step 3. Upon completion of clearing and grubbing, the Contractor shall notify the City Engineer prior to beginning earthwork operations. The testing lab will arrive on-site to assure that the subgrade is being processed (i.e., scarified and mixed to a homogeneous color/texture) before compacting. In general, this testing will consist of visual tests and densities of a maximum of one test every 3500 sq. ft. Upon completion of subgrade and all utilities within the street right-of-way, trenches shall be backfilled by compaction or flooding. Compaction tests shall be taken every 100 linear feet by trench and one-foot thickness of fill. Flooding shall be performed under the direction of the testing laboratory.

Section 1.4 Step 4. Upon acceptance of the subgrade and trenches, the testing lab shall examine the base material prior to placing on the street. This will consist of soil analyses and proctor densities.

Section 1.5 Step 5. The base material shall be processed, placed into thickness and compacted as directed in the pavement requirements report. Again, this shall be done with a maximum of one test every 3500 sq. ft. under normal circumstances. The base and sub-base should be maintained in the condition in which they are accepted. Should either become saturated, disturbed or not maintained properly, they shall be rechecked prior to construction proceeding and any area showing deficiencies shall be corrected and retested.

Section 1.6 Step 6. The asphalt mix design shall be submitted and approved prior to paving operations.

Section 1.7 Step 7. The asphalt mix shall be inspected during productions (quantitative extraction, gradation, Marshall stability).

Section 1.8 Step 8. The streets shall be cored after paving for thickness and compaction. In general, coring should be performed every 200 feet.

ARTICLE V

CURB AND GUTTER SPECIFICATIONS

Section 1 **SAFETY REQUIREMENTS**

Section 1.1 Every street should be designed and constructed in the safest possible manner. Every precaution shall be taken both during the construction and operation phases of each street to ensure the safety of the public. The safe operation of a roadway depends to an increasingly important degree on the proper use of traffic control devices. These devices include:

a. Pavement markings
b. Traffic signs
c. Traffic signals
d. Temporary signs utilized during construction, etc.

Section 1.2 Since the motorized public depends upon traffic devices as a guide in their driving, it is important that these devices be used uniformly, whether they are used on new highway, detours or temporary routes. Traffic devices shall be completely installed or constructed before any roadway is open to traffic.

Section 1.3 Devices which are no longer applicable, or those that may create confusion, shall be removed as soon as possible. Other devices required by road conditions or restrictions shall be removed when those conditions cease to exist or the restrictions are withdrawn.

Section 1.4 The application of all types of traffic devices, whether of a permanent or temporary nature, shall be governed by the requirements and principles set forth in the Alabama Manual of Uniform Traffic Control Devices.

Section 2 **PAVEMENT MARKINGS**

Section 2.1 Pavement, curb and object markings may utilize a variety of materials. The basic requirements of the materials are that they provide the specified colors both day and night hours and that they maintain the required visibility throughout their lifetime.

Section 2.2 For night visibility of pavement markings, glass "beads" shall be embedded in the pavement marking material to produce a retrodirective reflecting surface.

Section 2.3 All pavement markings, except parking space markings, shall be reflectorized.

Section 2.4 Plastic markings should be used where heavy traffic rapidly destroys painted markings.

Section 2.5 Permanent built-in pavement markings in white or colored concrete or inlaid bricks or blocks shall not be used.

Section 2.6 Large "mushroom" buttons or bars of cast iron or concrete several inches high, with or without reflectors, lights, symbols or messages, shall not be used. They may be used to designate pedestrian islands or to assist in channelizing traffic. In these applications they function as curbs or islands and they should be restricted to each application.

Section 2.7 Pavement markings shall be white, yellow or red in color. Through consistent use of markings, the colors should transmit to vehicle operators a consistent meaning. Yellow shall be used to delineate the separation of traffic flows in opposite directions, to mark left edge lines on divided highways, one-way roads and ramps or to mark objects that traffic must pass on the right.

Section 2.8 White markings shall be used to delineate the separation of traffic flows in the same direction or to mark objects that can be passed on the left or on both sides.

Section 2.9 Red delineators may be used to indicate that the vehicle operator is traveling in the wrong direction.

Section 2.10 White shall be used for:

a. Lane lines
b. Right pavement edge lines
c. Paved shoulder markings (unless otherwise specified)
d. Pavement width transitions (except transitions between traffic in opposing directions)
e. Channelizing lines
f. Approaches to obstructions (if obstruction is between lanes where travel is in the same direction)
g. Turn markings
h. Stop lines
i. Crosswalk lines
j. Approaches to railroad crossing (except centerlines and no-passing zone lines)
k. Parking space limits
l. Word and symbol markings
m. Lane use control markings

Section 2.11 Yellow shall be used for:

a. Center lines that separate traffic flows in opposite direction
b. Left pavement edge lines on multi-lane divided highways and interchange ramps
c. No-passing zone lines on two lane and three lane two-way roadways.
d. Pavement width transitions (only between opposing lanes of traffic and the no- passing zone line)
e. Approaches to obstructions (only between opposing lanes of traffic)
f. Approaches to railroad crossings (only the no-passing zone line or centerline portion)
g. Curb markings to indicate parking prohibitions covered by signs and/or ordinances
h. Curb markings to outline islands in the line of traffic

Section 2.12 Red is used for:

a. Delineation of roadways that shall not be entered or used by the viewer of those markings.

Section 2.13 All markings, whether placed on the pavement, on curbs or on an object, must be maintained in their original condition as nearly as possible. This makes necessary a continuing program of striping, curb marking and re-marking lines, works and symbols to revitalize the markings. It is essential, in the interest of uniformity, that these markings be maintained in the best possible conditions so they provide the specified color and patterns for both day and night operations.

Section 2.14 Pavement markings should be re-marked on a regular basis dependent upon the degree of wear to which they are subjected.

Section 2.15 The frequency of re-striping and re-marking is dependent upon the amount of traffic passing over the marking and on the durability of the materials used.

Section 2.16 Stop lines shall be used where it is desirable to indicate the point at which vehicle operators are required to stop in compliance with a stop sign, traffic control signal or other legal requirements.

Section 2.17 Stop lines shall be placed five (5) feet in advance of, and parallel to, the near crosswalk line. In the absence of a marked crosswalk, the stop line shall be placed at the required or desired stopping point. In no case shall it be placed more than thirty (30) feet or less than five (5) feet from the nearest edge of the intersecting roadway.

Section 3 TRAFFIC SIGNS

Section 3.1 Traffic signs shall be used only where necessary and where justified by facts and field studies. Each sign shall conform to the standards set forth in the Alabama Manual on Uniform Traffic Control Devices. Each standard sign shall be displayed only for the specific purpose described in the manual. A conservative use of regulatory and warning signs is strongly recommended. Non-standard signs shall be replaced with standard signs as soon as possible.

Section 3.2 Traffic signs should ordinarily be located on the right side of the road where the vehicle operator is in the habit of looking for them. Under some circumstances, signs may advantageously be placed on channelizing islands and, for sharp curves to the right, signs may be placed on the left shoulder of the road directly in front of approaching vehicles. A supplementary sign located on the left of the road is often helpful on a three or four lane road, or on a one-way roadway, where traffic in the right lane interferes with the vehicle operator's view to the right. In these cases, the supplementary signs should be definitely more conspicuous than the signs normally placed.

Section 3.3 Signs should be located to optimize night visibility and in conformance with safety factors related to fixed obstacles near the roadway. Signs should be located not to obscure other signs or to be hidden from view by roadside objects. Signs requiring different decisions by vehicle operators shall be spaced sufficiently far apart for the required decisions to be made safely. The spacing shall be determined in units of time as determined by the expected vehicle approach speed.

Section 3.4 Stop signs shall not be erected at intersections controlled by traffic control signals.

Section 3.5 Normally, signs should be individually erected on separate posts or mountings, except where one sign supplements another, or where route or directional signs must be grouped. Signs erected at the side of the road where rural conditions exist shall be mounted at a height of at least five (5) feet above the level of the near roadway edge of pavement measured to the bottom of the sign. In business and residential areas, and in cases where there are other obstructions to the view, the height shall be at least seven (7) feet.

Section 3.6 Signs should have the maximum practical lateral clearance from the edge of the traveled way for the safety of vehicles who may leave the roadway and strike the sign supports.

Section 3.7 Normally signs should not be closer than six (6) feet from the edge of the shoulder, or if none, twelve (12) feet from the edge of the traveled way, except where physical conditions prevent such placement.

Where a raised curb, a guard rail or a paved shoulder is present, a sign shall be placed with its nearest edge at least two (2) feet from the face of the curb, guard rail or paved shoulder.

Section 3.8 Sign posts and their foundations and sign mountings shall be constructed to hold signs in a proper and permanent position, to resist swaying in the wind and to resist displacement by vandalism.

Section 3.9 All traffic signs shall be kept clean, legible, and in proper position at all times. Damaged signs shall be replaced immediately.

Section 3.10 To ensure adequate maintenance, all signs should be inspected at least twice a year and any that are defective shall be cleaned, replaced or repaired. The sign inspection program shall include at least one night inspection.

Section 3.11 Special care shall be taken to see that weeds, shrubbery, and construction materials are not allowed to obscure the face of any sign.

Section 4 STREET NAME SIGNS

Section 4.1 Street name signs of the type normally existing within the City shall be installed by the developer and should be installed at a comer not containing a stop sign (unless intersection is controlled by a 4-way stop).

Section 5 TRAFFIC SIGNALS

Section 5.1 To ensure that drivers are provided with a clear, unmistakable indication of a right-of-way assignment, the use of more than one signal head on each approach shall be mandatory. The use of more than one signal face for each approach will provide a signal indication in the event of bulb burnout and obstruction of the vehicles operator's view of a particular signal head by some obstacle such as overhanging tree limbs or large trucks.

Section 5.2 Proper maintenance of traffic signals is important in securing safe and efficient traffic flow. Before installing any traffic control signals, the responsibility for the maintenance of signal shall be clearly established.

Section 5.3 To maintain the desirable operation of existing traffic control signals, engineering studies and inspections shall be regularly conducted to ensure that the desired operation is realized. The engineering studies should determine whether the installation continues to be justified, meets manual standards and the signal time in use meets the current traffic requirements. In addition, the inspection should note the general condition of traffic signals.

Section 6 TEMPORARY SAFETY REQUIREMENTS

Section 6.1 All temporary traffic control devices shall be governed by the following basic principles described in the Alabama Manual of Uniform Traffic Control Devices (AMUTCD):

a. Traffic safety in work areas should be an integral part and high priority element of every project from planning through design and construction. Similarly, maintenance work should be planned and conducted with the safety of vehicle operators, pedestrians and workers kept in mind at all times.
b. Traffic movement should be inhibited as little as practicable.
c. Traffic movement should be guided in a clear and positive manner while approaching and traversing work areas.
d. To insure acceptable levels of operation, routine inspection of traffic control elements should be performed.
e. The maintenance of roadside safety requires constant attention during the life of a construction work area due to the potential increase of hazards.

Section 6.2 The closing of portions of any street shall be coordinated so as to interfere with traffic as little as possible. Suitable barricades and signs to direct traffic shall be provided and appropriately placed and maintained as long as necessary. Such barricades and signs shall be promptly removed when no longer needed. Plans for the complete or partial closing of any street or for any work which requires the presence of any personnel or equipment in the public right-of-way shall be approved by the Prattville Police Department. The City Fire Department and Police Department shall be notified in advance of the closing and of the re-opening of any street.

Section 6.3 Specific criteria described in the manual (AMUTCD) shall be strictly adhered to.

Section 7 ON-STREET PARKING

Section 7.1 Parking is prohibited for a minimum distance of thirty (30) feet from any signalized intersection and twenty (20) feet from any other intersection and must also comply with sight triangle restrictions noted earlier.

Section 7.2 In no case will on-street parking be permitted on streets in which the speed limit is greater than thirty (30) miles per hour.

Section 7.3 The City of Prattville encourages the use of well-designed off-street parking in lieu of on-street parking. No new development shall be accepted, given approval, granted a certificate of occupancy, etc. unless it contains the minimum number of parking spaces required by the Prattville Zoning Ordinance.

Section 8 STREET LIGHTING

Section 8.1 Street lighting should be installed at every intersection. In medium and high-density areas, mid-block street lighting also is highly desirable. Unless approved by the City Engineer, City lights shall be placed no more often than every other pole.

Section 8.2 Street lighting design and standards should be in accordance with the latest recommendations of Alabama Power Company and the City Engineer.

Section 9 HANDICAP REQUIREMENTS

Section 9.1 The City of Prattville encourages the placement of handicap parking spaces at each off-street parking lot and at selected on-street parking locations throughout the City. The City will install and maintain handicap parking places at public buildings. Any handicap parking space shall meet the requirements below.

Section 9.2 Each parking space reserved for the handicapped shall be so painted.

See Illustration No. 2, Appendix

In addition, a sign shall be installed meeting the requirements set out in the "Alabama Manual on Uniform Traffic Control Devices".

Section 10 WALKS

Section 10.1 At least one accessible walk having no steps or abrupt changes in level, and complying with all criteria specified within this section, shall be provided from a parking space for disabled people. An accessible walk shall also be provided from a public sidewalk and a public transportation stop, if provided, into each accessible primary building entrance.

Section 10.2 Accessible walks shall also be provided between buildings on a common site.

Section 10.3 Accessible walks shall have a minimum clear width of forty-eight (48) inches.

Section 10.4 The slope of an accessible walk shall not exceed 1 in 20 or 5 percent gradient, otherwise the walk is considered to be a ramp.

Section 10.5 The cross slope of an accessible walk shall not exceed 1:48.

Section 10.6 Accessible walks less than sixty (60) inches in width shall have level zones, suitable for wheelchair passage or rest, spaced at no more than two hundred (200) feet apart, and measuring a minimum of 60" x 60".

Section 10.7 Wherever accessible walks cross other walks, driveways, or parking lots, they shall blend to a common level, by use of grading, curb cuts or ramps. Level changes greater than ¼ inches and less than ½ inches shall be beveled with a slope no greater than 1:2.

Section 10.8 Level changes exceeding ½ inches shall be treated as a ramp.

Section 10.9 Whenever possible, gratings should not be located within or along walks.

Section 10.10 When gratings must be located in accessible walks, the clear openings shall not exceed ½ inches in one direction. If grating openings are elongated, the long dimension shall be perpendicular to the predominant direction of travel.

Section 10.11 Doors swinging onto or away from walks shall have level areas.

Section 10.12 Walk surfaces shall be stable, firm and of sufficient texture to resist slippage.

Section 11 CURB RAMPS

Section 11.1 A curb ramp shall be provided whenever a walkway intersects a curb.

Section 11.2 Curb ramps at street intersections shall be located within and to one side of marked crossings, unless adequate and safe maneuvering space (48 inches minimum clear space), permits positioning of curb ramps at diagonal comer locations.

Section 11.3 Curb ramps shall be located or protected to prevent their obstruction by parked vehicles or street furnishings.

Section 11.4 The maximum slope of curb ramps shall be 1:12, except for existing sidewalks, where a maximum slope of 1:8 may be used if it is impractical to install a more gradual slope.

Section 11.5 A flush, smooth transition shall be provided at the juncture of a curb ramp with grade or street level.

Section 11.6 The minimum width of a curb ramp shall be 36 inches, exclusive of flared sides.

Section 11.7 If a curb ramp is positioned where pedestrian traffic is likely to walk across the ramp, then it shall have flared sides with a maximum slope of 1:8.

Section 11.8 Where pedestrians are prevented from walking across the ramp, flared sides may be omitted.

Section 11.9 Built-up curb ramps are the least preferred method of curb ramping, and should only be used when no other alternative is available. Built-up curb ramps shall be located so they do not project into vehicular traffic lanes.

Section 11.10 Built-up curb ramps shall have flared sides.

Section 11.11 Surface of curb ramps shall be the same as for walking surfaces.

Article VI

SANITARY SEWER SYSTEM

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Article VI
SANITARY SEWER SYSTEM

1. PURPOSE

These Sanitary Sewer System Design and Construction Standards, referenced throughout as "Standards", provides an understanding of the requirements of the City of Prattville's Public Works Department and establishes a minimum level of design quality and construction performance for commercial and residential sanitary sewer infrastructure projects.

These Standards provide uniform design and construction requirements for new sanitary sewer infrastructure and are intended to complement the City of Prattville's existing ordinances and policies and to identify a single set of criteria to be used in the design and construction process. These Standards do not cover all provisions set forth in the City's Utilities Ordinance such as pretreatment requirements, industrial waste discharges, enforcement, fees, etc.

The sanitary sewer components included herein are sanitary sewer service lines, connections, gravity sewers, force mains, pump stations and low-pressure sewer systems. The application of sound engineering, surveying and construction principles and judgement, combined with these Standards, are necessary for successful project completion. The Owner and the Owners' representatives (which includes engineers, architects, attorneys, general contractors, plumbers, etc.) are solely responsible for design and construction and for compliance with all City regulations and all applicable state and federal laws.

2. DEFINITIONS / ABBREVIATIONS

Where the following words, terms, or abbreviations (or pronouns in place of them) are used in this Section, the intent and meaning shall be interpreted as follows:

1. Approval – Approval of Plans – A review by the City of Prattville, stating that the plans are in substantial compliance with the City's specifications.
2. And/Or - An option of the City of Prattville or representative.
3. ASCE – American Society of Civil Engineers.
4. ASTM – American Society for Testing and Materials.
5. AWWA – American Water Works Association.
6. City of Prattville Attorney – The law firm and/or attorney hired and/or retained by the City. Contractor – The individual, partnership, firm, corporation, or any acceptable combination thereof licensed in the State of Alabama and contracting for the prescribed work.
7. Developer – The party or parties paying for the installation of the utility and other infrastructure.

8. Developer's Engineer – The professional engineer (licensed in the state of Alabama) employed by the Developer who is responsible for the submission of engineering plans and project development.
9. Drop Manhole – A precast, concrete, structure used where one sewer joins another several feet below. The lower sewer enters the manhole at the bottom in the usual manner. The upper sewer, however, turns down sharply just outside the manhole and enters it at the bottom. To permit cleaning of the upper sewer from the manhole, the upper sewer also extends to the manhole at constant slope past the sharp drop through which the sewage flows.
10. Duly Authorized Employee- Any person the Director of Public Works has given written authorization to act in the beneficial interest of the City of Prattville.
11. Easement – A right to use or control the property of another for designated purposes.
12. Inspector – The City of Prattville's authorized representative assigned to make detailed inspection of contract performance.
13. Job Site – The location of the project where sewer mains and infrastructure are to be or being built.
14. Lateral – A sewer that discharges into a branch or sewer main from a property.
15. Manhole – A concrete (precast or poured in place) structure providing access to a sewer. The lower portion is cylindrical, with an inside diameter of at least 4 ft. The upper portion generally tapers to an opening of approximately 2 ft. The opening is capped with a heavy cast-iron cover seated on a cast iron frame.
16. Owner – The person who has legal or equitable title to any premises.
17. Paving – The surface of a street, or treatment thereof.
18. Right of Way (ROW) – A general term denoting lands, property or interest therein, usually in a strip, acquired for or devoted to transportation purposes.
19. Sewer main – A pipe receiving sewer laterals from more than one building on a public right-of-way or easement.
20. Standard Drawings – Drawings approved for repetitive use, showing details to be used where appropriate.
21. Street – Every way or place of whatever nature, whether within or without the corporate limits of the City of Prattville, open to the use of the public, including streets, alleys, highways, park, or other road, and all public places.

3. GENERAL INFORMATION

3.1 INTERPRETATION

The Director of Public Works shall be responsible for the interpretation and application of these Standards and Utilities Ordinance. In the event that a project does not meet the Department's requirements, the Director of Public Works shall submit the reasons for disapproval of the sanitary sewer plans in writing to the Director of the Planning and Development Department. An Owner/Applicant may file an appeal in accordance with the City's Land Development Ordinance.

3.2 WAIVERS

The City may, at their discretion, make a project-specific waiver to these Standards when any one of the conditions described below applies:

1. The standard is not applicable to the particular situation.
2. Topography, ROW, or other geographical conditions impose undue hardship to the Owner or extraordinary environmental damage; and an equivalent alternative that can achieve the same design objective is available and does not compromise public safety.
3. A waiver is required to address a specific design or construction problem that will result in an undue hardship to the Owner with little or no material benefit to the public, if not granted.
4. A new technology is available that results in a benefit to the project, accomplishes the same design objective, reduces environmental intrusion, and does not compromise public safety.

The Owner shall make a written request to the Director of Public Works and it shall clearly define the waiver request, compare it to the existing City standard, state the reason for the waiver and describe how it meets the conditions for consideration. In addition, reference any relevant industry standards or specifications that support the waiver request. The City will review the request and supporting documents and take one of the following actions: 1) Approve as requested; 2) Approve with noted conditions; 3) Deny the request. The City's response will be in writing. A conditional approval or denial of the request will be accompanied with a brief explanation. Any approved waiver is project-specific and does not constitute a precedent for the modification of a standard.

3.3 CONTACT INFORMATION

The Wastewater Division of the Public Works Department is responsible for the public sanitary sewer system. The Director of Public Works oversees the operations of the Division. The contact information is:

Physical Address: Public Works Yard, 530 Doster Road, Prattville, AL 36067; 334-595-0888
Mailing Address: 101 West Main Street, Prattville, AL 36067
Attn: Director of Public Works

3.4 UPDATES

Updates to these Standards will be made periodically as deemed necessary. These updates will be posted to the City's web site, and a date the changes will go into effect.

It is expected that updates will be provided on an annual basis. Any individual who believes that a change is necessary should submit the suggestion in writing to the Director of Public Works for consideration. Periodically, as revisions are made, the changes will be posted to the City's website. It is the responsibility of the users of these Standards to make certain that they are using the current version.

4. GENERAL LOCATION CRITERIA

Sewers shall be located using sound engineering judgment to determine the most cost- effective and environmentally sensitive alignment which best serves the needs of the entire tributary area. Additionally, it is imperative that all alternatives worthy of consideration receive maximum and equal consideration with regard to environmental impact. The cost for acquisition of easements can be significant; therefore, sewers should be located within existing easements and rights-of-way whenever feasible and practical.

1. When selecting the sewer alignment, consideration shall be given, but shall not be limited to, the following general location criteria:
2. Elevation requirements necessary to provide appropriate service with due consideration of sanitary facilities in basements.
3. Environmentally sensitive areas and constraints such as creeks, wetlands, trees, protected habitats, etc.
4. Existing utilities, railroads, highways, and overhead facilities.
5. Location of other existing and proposed sewerage facilities.
6. Property values, easement needs and potential damages to the affected properties.
7. Existing and proposed high water elevations, including high water for appropriate design periods.
8. Anticipated extension of existing streets and the potential for the development of contiguous areas.
9. Continuity with adjacent design segments.

4.1 HORIZONTAL ALIGNMENT CRITERIA

Whenever possible all sanitary sewer mains shall be located within the pavement. The sewer main shall have straight alignment between sewer manholes and be typically located halfway between the center line of the roadway and the curb.

Sanitary sewer laterals must extend six feet (6') beyond limits of all utility easements on both sides of the street (reference standard drawings).

4.2 VERTICAL ALIGNMENT CRITERIA

In establishing the elevation of the proposed sanitary sewer, the elevations of existing or proposed interceptor sewers, or the elevations of inflow pipes to existing pump stations or wastewater treatment plants and all other utilities, shall be considered.

4.3 SUBMITTAL REQUIREMENTS

The design engineer shall submit a complete set of design plans along with a Sanitary Sewer Design Report for review to the Planning Department. The submitted plans must be a complete set, comprehensive in all details of the design. The requirement to submit a complete set of design plans does not prevent an engineer from submitting a Preliminary Sanitary Sewer Design Report and meeting with the Public Works Department for recommendation and comments. The Preliminary Sanitary Sewer Design Report and the Sanitary Sewer Design Report can be found in the appendix of this manual.

5. DESIGN FLOW

5.1 COLLECTOR SEWERS

Collector sewers are primarily installed to receive wastewater directly from property service connections. A major change in land use within a tributary area can have a significant impact on the collector system's ability to transport the necessary flow. Collector sewers should, therefore, be designed to transport the saturation population (final build out) flow which might be expected during their service life (flowing full).

5.2 INTERCEPTOR SEWERS

An interceptor sewer is a principal sewer to which collector sewers are tributary. All interceptor sewers should be designed for saturation population unless otherwise approved by Director of Public Works. For a major industrial water user or undeveloped industrial land in the tributary area, the Director of Public Works will require the engineer to supply an estimated average daily flow.

6. HYDRAULIC DESIGN CRITERIA

All design shall be in accordance with the Ten State Standards for Wastewater, latest edition. Any deviations shall be immediately pointed out at the time of submittal. Failure to do so shall be reason for rejection. Manning's Equation shall be used to determine proper pipe size and slope to transport the design flow. Design shall be for full flow at saturation conditions (include a peaking factor of 3) with the following characteristics:

Roughness coefficient	n = 0.013 (Sanitary Sewers Only- Ten State Standards)* Minimum
velocity	v = 2 feet/second
Minimum pipe size	D = 8 inches
Minimum acceptable grades	(See Table 6.4)

6.1 HYDRAULIC GRADE LINE

The hydraulic grade line should not rise above the crown of the sewer pipe. When critical, the hydraulic grade line shall be computed to show its elevation at manholes, transition structures, and junction points of flow in pipes, and shall provide for the losses and the differences in elevation. If velocity entering a manhole is above critical, the hydraulic grade line must be computed to ensure that no service connections are surcharged.

6.2 ELEVATION CHANGE AT MANHOLES

The pipe exiting the manhole must be adjusted in elevation to ensure the energy gradient remains level across the manhole. The minimum elevation change between the pipe invert entering the manhole and the pipe invert exiting shall be 1/10 foot or as approved by the Director of Public Works.

6.3 VELOCITY

All gravity sanitary sewers shall be designed to carry the design flow (including the peaking factor). Any slope greater than 8 percent shall require special provisions as necessary to protect against scour (erosion) and displacement (impact). When severe topographic or other unusual conditions require a design slope greater than 8 percent, the hydraulic design and pipe material must be specifically approved in writing by the Director of Public Works.

6.4 MINIMUM SANITARY SEWER GRADES

The minimum acceptable grades for various sewer main sizes are indicated below:

MAIN SIZE	MINIMUM ACCEPTABLE GRADE	
8”	0.40%	4’ PER 1000’
10”	0.28%	2.8’ PER 1000’
12”	0.22%	2.2’ PER 1000’
15”	0.15%	1.5’ PER 1000’
16”	0.14%	1.4’ PER 1000’
18”	0.12%	1.2’ PER 1000’
21”	0.10%	1’ PER 1000’
OTHER	AS Specified by the Director of Public Works	

6.5 SEWER SIZE CHANGES

1. Sewer size changes shall only take place within a manhole or junction box structure. To ensure that the energy gradient is maintained, the following general criteria shall be used:

Pipes 24" in Diameter or Smaller

1. When increasing the sewer size by 6 inches or less, crown elevations shallmatch at the centerline of the manhole.
2. When increasing the sewer size by more than 6 inches, the spring lines of the smaller and larger sewer shall match at the centerline of the manhole. However, for the hydraulic design calculations, the Design Engineer shall match crown elevations at the centerline of the manhole by raising the elevation of the smaller sewer.

Pipes 27" in Diameter or Larger

1. Sewer pipe larger than 27” in diameter shall be handled on a case-by-case basis.

7. DESIGN CRITERIA

7.1 SEWER PIPE

7.1.1 SIZE

The minimum allowable inside diameter for sewer pipe, other than property service connections, shall be 8 inches. All property service connections shall have a minimum inside diameter of 6 inches until the edge of Right-of-Way; however, commercial or industrial connections shall be individually considered.

7.1.2 TRANSITIONS

Where ductile iron, plastic solid wall, plastic profile wall connects to another pipe material (i.e. clay concrete, brick, etc.) a concrete collar and an appropriate fitting for joining the two materials shall be used.

7.1.3 DEPTH REQUIREMENTS

If the grade at any time (during or after) construction is greater than 12 feet from the top of the sanitary sewer main, then ductile iron pipe will be required. If the grade at any time (during or after) construction is less than 3 feet from the top of the sanitary sewer pipe, then ductile iron pipe will also be required. City of Prattville approved solid wall PVC plastic pipe can be used in areas where the cover above the pipe is in the range of 3 to 12 feet.

7.1.4 SEWER GRADIENT ELEVATIONS

All sewer gradient elevations shall be referenced to the North American Vertical Datum 88 (NAVD 88). When connecting into or extending existing sewer facilities that were constructed using another datum, an elevation equation shall be shown on the plans. Datum shall be verified by a licensed Land Surveyor.

7.1.5 FLOODING AND PONDING AREAS

The top of sanitary manhole elevations shall be a minimum of 2 feet above existing, proposed, or projected 100-year high water elevations. However, when this minimum elevation causes the manhole to be above the natural ground creating obstructive mounds, the top of the manhole elevation shall be lowered to the natural ground elevation and a watertight manhole lid and frame shall be specified.

7.1.6 WATER MAIN CLEARANCE CRITERIA

The minimum horizontal clearance between the sewer and water mains shall be 10 feet. The vertical clearance shall be at least 18 inches. If at all possible, the sewer shall be located below the water main. Should it become necessary for the sewer to cross the water main special precautions shall be made. Any lateral within 3 vertical feet of the water main must be bedded in 57 stone.

7.1.7 DISTURBED SOIL

Ductile iron pipe shall be required in all fill areas.

7.1.8 LOT LINES / LIMITED ACCESS AREAS

All sewer mains located along lot lines or between areas of limited access shall be ductile iron pipe from property line to property line. When it becomes necessary to run a sanitary sewer down lot lines between adjacent streets, none or as few as possible offsets in the sanitary sewer line will be allowed.

7.1.9 ENCASEMENTS

Ductile iron pipe will be required in encasements unless specifically authorized by the Director of Public Works on approved plans. Sanitary sewer mains that run through storm sewer, storm boxes, other utility mains, boxes manholes or conduits must be ductile iron and are required to be encased.

7.2 MANHOLES

7.2.1 MANHOLE LOCATIONS

Manholes shall be required at the following:

1. Changes in sewer grades or alignment.
2. Sewer junctions.
3. Where required not to exceed the maximum manhole spacing.
4. Changes in sewer diameters.

Termination points. The exact location of the terminal manhole in each sewer line shall be based on many factors including manhole spacing, driveway locations, the position of improvements on the lots being served, and the location of present temporary sanitary facilities, such as septic tanks, etc. A definitive single policy cannot be established to cover all circumstances, although the sewer line would normally terminate a minimum of 25 feet past the lot line of the last property served. This is to allow enough room for the last lot to have a wye and lateral run into the sanitary sewer main without encroaching upon the adjacent property.

7.2.2 MAXIMUM MANHOLE SPACING

The following maximum manhole spacing distances shall be employed in the design of all new sanitary sewer collection system construction. When certain conditions warrant, such as the elimination of a manhole, the manhole spacing can be exceeded with the approval of the Director of Public Works.

SIZE OF SEWER MAIN	SPACING (DISTANCE IN FEET)
8” - 16”	400’
18” – 30”	500’

7.2.3 MANHOLE DIAMETER

The minimum diameter of a manhole shall be as indicated in the table below. Regardless of the recommendations offered, all manholes shall be checked to ensure that sufficient wall is supplied between pipe openings to meet all pre-cast manhole criteria.

SIZE OF SEWER MAIN	MINIMUM MANHOLE DIAMETER
8” - 18”	4’ (OR 48”)
20” – 42”	5’ (OR 60”)
GREATER THAN 48”	As Specified by the Director of Public Works

7.2.4 MANHOLE CLASSIFICATION

All manholes shall be classified as Class I, Class II, or Class III depending on the level of corrosion protection required.

Class I – Manholes shall be of standard manhole construction with no specified admixtures or protective coatings (lining system or grouting). Class I manholes may be used on any sewer main up to 12" in diameter where the Director of Public Works has determined no significant corrosion hazard is present.

Class II – Class II manholes shall be constructed with specified concrete admixtures at the time of casting to provide the manhole a measure of waterproofing. In addition to the concrete admixture, the invert and benches of the manhole shall have a 0.5" to 1" layer of corrosion resistant troweled on material applied. Class II manholes typically shall be required on all sewer mains between 12" and 18" in diameter. In addition to the requirements as described above, the Director of Public Works may extend the use of the concrete admixtures and troweled on invert material to include the first two segments (or 500 ft. of sewer main) of any branch sewer emanating from the 12" – 18" sewer mains.

Class III –In addition to the requirements of Class II manholes as described above, Class III manholes shall incorporate a specified protective liner system at the time of casting in order to provide a physical layer of corrosion resistant material over the exposed concrete. Class III manholes shall be required on all outfall lines (18" and greater in diameter) and on any manhole 20 feet or deeper.

7.2.5 WATERTIGHTNESS

Watertight manholes are to be used on all manholes in the City of Prattville.

7.2.6 DROP MANHOLES

An outside drop connection shall be provided for a sewer entering a manhole at an elevation of 24 inches or more above the manhole invert. Where the difference in elevation between the incoming sewer and the manhole invert is less than 24 inches, the slope of the invert shall be such that it provides a smooth slope to the outgoing invert. See City standard detail.

7.2.7 MANHOLE COLLARS

Manholes will be adjusted to the final grade by pre-cast extensions /grade rings. Manhole extensions will not exceed more than 30 inches of chimney as measured from the top of the manhole rim to the point where the manhole starts to increase in size.

7.2.8 RAISED MANHOLE FRAME AND COVER

A ball-hinge manhole frame and lid shall be required when a manhole stands two or more feet above the surrounding grade.

7.3 LATERALS

Each platted lot shall have its own individual sanitary sewer lateral (building sewer). Each duplex, apartment, or condominium that has the potential to be sold as an individual dwelling on its own lot shall have a separate sanitary sewer lateral. If a single-family dwelling is built upon several lots, only one sanitary sewer lateral will be required. It is intended that each single-family owned unit shall have its own separate sanitary lateral.

7.3.1 TAPS ON EXISTING SEWER MAIN

Pipe shall be thoroughly cleaned to remove any dirt or foreign material and leave smooth sealing surface for gasket of sewer saddle tee. Opening made in sewer main (connection pipe) shall be clean, smooth, circular (not segmented), in symmetry with branch of sewer saddle tee, with no projections to allow grease or rags to build-up. The preferred method for cutting an opening is with the use of a diamond grit hole-saw, complete with pilot and segmented teeth. Install sewer saddle tee with branch rotated to 10 o'clock or 2 o'clock position or as directed by the Director of Public Works or duly authorized employee. See City standard detail.

7.3.2 LATERAL MINIMUM SIZE AND GRADE

Sanitary sewer laterals shall be a minimum of 6 inches in diameter to the edge of Right-of-Way and run perpendicular to the sanitary sewer line. Laterals located in cul-de-sacs are not required to run perpendicular to the sewer main. Laterals shall have a minimum slope of 1/8-inch per foot (1%) for property service connections. However, in all cases, the invert elevation of the property service connection at the easement or property line shall be equal to or higher than the crown of the sewer.

7.3.3 LATERAL STACKS

In order to minimize lateral pipe "Punch Through", wye or tee fittings shall be installed at an angle no greater than 60 degrees from the horizontal centerline. Lateral Stacks (installing wyes or tees at 90 degrees from the horizontal centerline) are prohibited. Laterals deeper than 12 feet shall be installed in accordance with City standard detail.

7.3.4 LATERAL LOCATION

The sanitary sewer lateral (building sewer) shall extend perpendicular from the sewer main (connection pipe) to a point a minimum of 6 feet beyond the street right-of-way, property line or utility easement. In areas where the main is in a dedicated easement, the lateral shall extend 6 feet beyond the edge of the easement on to private property. The end of the sanitary sewer lateral shall be placed no shallower than 3 feet and no deeper than 8 feet deep with respect to final grade. When a sewer main runs along a lot line, laterals shall be stubbed outside building limits to prevent any possible conflict with the building slab. All lateral connections shall be no closer than 3 feet to another lateral and 5 feet from a manhole. In addition to providing accurate as-built data indicating location of laterals, all laterals shall be marked in the field at the terminus point with a color-coded electronic marker and with an "S" on the concrete gutter or curb.

7.4 LIFT STATION

Lift Stations shall be kept to an absolute minimum and gravity sewer shall be used wherever possible. A lift station must service an area which will produce at least 250,000 GPD. The City's Director of Public Works shall determine if a lift station is necessary. Additional information may be requested in order to make this determination. When it has been determined a lift station is warranted it will be subject to the Lift Station Resource Fund (LSRF) and shall comply with the requirements outlined in City ordinance 66. The amount to be allocated to the LSRF shall be 40% of the total cost to construct the lift station.

7.4.1 PUMP REQUIREMENTS

A minimum of two (2) pumps shall be required using a lead / lag scenario for pump operation. One (1) pump shall be for redundant operation. All pumps shall be Flygt. Alternatives will not be considered. All lift stations shall be wet well style with submersible pumps.

7.4.2 WET WELLS

Shall be precast concrete with corrosion barrier system (Spectrashield, or approved equal). Sufficient buoyancy provisions shall be provided. Lockable, aluminum hatches shall be provided for each pump. The invert shall be grouted with a one to one slope to minimize grit and debris accumulation. The wet well shall be adequately vented. A minimum of one (1) stainless steel portable davit crane of adequate size shall be provided at each lift station. The wet well top shall be cast with recessed ports (confirm location prior to casting) for use of the portable davit crane.

7.4.3 VALVE VAULTS

Shall be precast concrete and sized as required for check valves and plug valves. Lockable aluminum hatches shall be provided for valve maintenance. Combination air / vacuum release valves shall be provided along with tap and gauge. Vault shall be drained back to wet well with grout invert to provide positive drain. Check valves and plug valves shall be provided for each individual pump.

7.4.4 POTABLE WATER WASH DOWN

Potable water shall be provided at all lift station sites.

7.4.5 BACKUP POWER

Shall be provided at all lift stations. It must be sized to 125 percent of the kilowatt requirement at peak demand.

7.5 FORCE MAIN

7.5.1 VELOCITY AND DIAMETER

Force mains shall be sized for a minimum velocity of 2 feet per second at design flow. Velocity shall not exceed 10 feet per second.

7.5.2 COMBINATION AIR AND VACUUM RELIEF VALVE

Combination valves shall be provided at all high points of force main profile. Force main profile design shall keep high points to a minimum with a minimum slope of 0.25% at all times. Combination valve shall be within a precast concrete manhole in accordance with City standard details.

7.5.3 UTILITY LOCATE WIRE

All force mains shall include utility locate wire with tracer access stations located at a maximum of 400 linear feet intervals in accordance with City standard details.

7.6 GREASE INTERCEPTORS

Grease Interceptors shall be required at all food service facilities which shall include but not limited to any restaurant, eatery, food cater, cafeteria, grocery store, manufacturing facility, or institute which cut, cooks, bakes, prepares, serves, or makes available for consumption any food products. Any facility, in the judgment of the Director of Public Works, in which some component(s) in its wastewater (i.e. grease, grit, etc.) may interfere with the operation and maintenance of the sewer collection system will require a grease interceptor.

All grease interceptors shall be located in an area easily accessed. If the top is located in a drive or parking area, it must contain traffic rated rings and covers. All lids must also be in compliance with the Sadie Grace Andrews Acts. Manhole rings and covers shall not be covered or obstructed by landscaping, pavement or other obstructions. All grease interceptors must be maintained in accordance with City of Prattville ordinance Chapter 66.

7.7 OIL AND GRIT SEPARATOR

Oil and grit separators will be required at all commercial car washes, equipment wash bays, automotive service or repair stations, mechanical equipment service or repairs stations, and similar garages and facilities that would discharge polluted wastewater as deemed necessary by the Director of Public Works. The oil and grit separators shall meet all applicable local plumbing codes and be of a sufficient size to handle the specified loading for the intended use. The oil and grit separators shall be cleaned and inspected shall meet all discharge requirements as specified in the City's Sewer Ordinance chapter 66. Oil and grit separators shall be a minimum of 1,000 gallons unless otherwise approved.

7.8 POOL DRAINS

Swimming pools that are constructed for public use, private community or organization use, or with a volume greater than 30,000 gallons will be required to connect the drain line to the sanitary sewer system to avoid chemical release into local streams or water bodies. Swimming pool drain connections made to sanitary sewer shall be no larger than 2 inches in diameter and shall in no case exceed 50 GPM of flow, either by gravity or pumped discharge, to avoid surcharging the collection system. Swimming pools connected to the sanitary system shall not be filled through the use of an irrigation meter. Typical single-family residential swimming pools with volumes smaller than 30,000 gallons will not be required to connect the drain line to the sanitary sewer system.

7.9 DUMPSTER PAD AND COVER

A building consisting of three walls and a roof shall be required over any dumpster that drains to the sanitary sewer. All food service facilities dumpster pads are required to be tied into the sanitary sewer upstream of the grease interceptor. The dumpster pad must be elevated to prevent surrounding surface water runoff from entering the sewer collection system.

7.10 EPOXY COATING

All ductile iron pipe, and other sewer system components on interceptor/outfall lines (sewer mains with diameters of 18" and greater) shall be protected from corrosion by the use of factory applied epoxy coatings. The Director of Public Works further reserves the right to require protective coatings on any manhole, ductile iron pipe, or component of any collector line (less than 18" in diameter) as is deemed necessary to protect the wastewater system.

7.11 FLOTATION

All sewers and sewer structures to be constructed where high groundwater conditions exist or where flooding of the trench is anticipated shall be designed to prevent flotation or excessive pipe flexing.

7.12 CONCRETE ENCASEMENT

Concrete encasement shall extend a minimum length of 2 feet beyond the point where a 4-foot depth of cover is reached or to a point 5 feet beyond the tops of banks when crossing a ditch or stream. Concrete encasements may be used when it is necessary to prevent floatation, when crossing streams, ditches, or existing storm drains, where soil conditions may indicate the possibility of heavy erosion, where crossing over or under utilities with less than 2-feet of clearance, or in areas where the sewer has less than the required minimum cover.

7.13 ENCASEMENT REQUIREMENTS

7.13.1 GENERAL

Encasement is required when crossing all State highways, railroad, and some County and City roadways which have excessive traffic flow or other critical situations (such as protecting building foundations). Encasement and mains shall cross the roadway and/or railroads as near as possible perpendicular to the roadbed. In all cases the agency requiring the encasement shall have the final approval of the engineering design. Ductile iron pipe will be required in encasements unless specifically authorized by the Director of Public Works on the approved plans.

7.13.2 ENCASEMENT PIPE

Pipe to be installed under pavement where open trenching is not permitted shall be installed through steel casing, which has been jacked and/or bored. Casing shall extend out past both sides of pavement a minimum of 3 feet or past toe of slope whichever is greater.

7.13.3 ENCASEMENT SPACERS

Ductile iron pipe sewer mains shall be pushed or pulled through the encasement piping on spacers placed no more than 10 feet apart. A minimum of two spacers/runners per joint of pipe shall be required. The spacer shall have a clearance range of 1 to 1.5 inches between the spacer and the inside of the encasement piping. Spacers shall be required in the first foot of each end of the encasement.

7.13.4 ENCASEMENT ENDS

All casing ends shall be sealed with neoprene end seal designed for the size pipe/casing. End seal shall be a seamless, pullover type with any associated hardware or accessories constructed of either Grade 304 or 316 stainless steel. No rigid end seals will be allowed.

7.14 RAILROAD CROSSINGS

7.14.1 CRITERIA

In addition to the individual railroad's design requirements the following criteria shall be strictly adhered to when the planning for sewer construction affects railroad rights-of-way and facilities (railroad may specify more stringent requirements):

1. Sewers shall cross tracks at an angle as close to 90 degrees as practical, but preferably never less than 45 degrees. Sewers shall not be placed under railroad bridges where there is a likelihood of restricting the required waterway area of the bridge or where there is a possibility of endangering the foundations.
2. Sewer lines crossing under railroad tracks and rights-of-way shall be bored and jacked casings unless the railroad company grants written permission for open-cut construction.
3. Sewer lines laid longitudinally along railroad rights-of-way shall be located as far as practical from any tracks or other important structures. If located within 25 feet of the centerline of any track, or should there be danger of damage from leakage to any bridge, building or other important structure, the sewer shall be encased.
4. When placed along railroad rights-of-way, the top of the pipe shall have a minimum cover of 4 feet.

7.14.2 RAILROAD CONFLICT DRAWINGS

Railroad conflict drawings shall conform to the following criteria:

1. Drawings shall be prepared to scale showing the relationship between the proposed sewer and the railroad, angle of crossing, location of utilities, original survey station of the railroad (when available), right-of-way lines, topography and general layout. The profile established from a field survey shall show the sewer in relation to the actual ground and tracks. The limits of boring or tunneling by station, sewer line soundings and borings and all other pertinent information shall be shown on the drawing.
2. Railroad conflict drawings shall be submitted along with a complete questionnaire which shall be furnished by the railroad company.

7.15 HIGHWAY CROSSINGS

Sewer pipe installations under State, County, or City maintained roadways which are designated by their governing agencies shall meet the following requirements (more stringent criteria may be required on a project specific basis):

1. Sewers shall cross roadways at an angle as close to 90 degrees as practical, but preferably never less than 45 degrees. Sewers shall not be placed under roadway bridges where there is a likelihood of restricting the required area of the bridge or where there is a possibility of endangering the foundations.
2. Borings under roadways shall have a minimum depth of 4 feet from the surface elevation to the top of the boring. The top of the tunnel lining shall not be above the invert of existing or proposed ditches.
3. Borings under roadways shall extend a minimum of 10 feet outside the existing pavement, as measured at right angles to the roadway, or to the toe of the slope when the roadway is on fill and the toe of slope exceeds 10 feet outside the existing paving.
4. Sewer lines laid in a longitudinal direction on highway rights-of-way shall be located a sufficient distance from the edge of the pavement to allow adequate working room and to provide maximum safety to the motorist when the roadway is to remain open to traffic. Those

sewer lines within the roadway rights-of-way, but not located under paved areas, shall have no less than 5 feet of cover.

7.16 INTERRUPTION OF EXISTING SEWER SERVICE

Existing sewer customers shall not be placed out of service in order to connect or lay new sewer piping. The Contractor shall coordinate with the Public Works Department all service interruptions prior to construction. The Contractor shall be responsible for providing temporary service through by-pass pumping if necessary to all customers affected by the construction.

7.17 TRENCH PREPARATION

7.17.1 EXCAVATION

All excavation shall be done in accordance with OSHA Code of Regulation Part 1926 (latest revision). A trench shall be opened so that the pipe can be installed to the alignment and depth required. It shall be excavated only so far in advance of pipe laying as necessary.

The trench shall be excavated to the depth required so as to provide a uniform and continuous bearing support for the pipe on undisturbed ground. Bell holes shall be provided at each joint to permit jointing to be made and inspected properly.

During excavation, if ashes, cinders, muck or other organic material considered unstable is uncovered at the bottom of the trench at subgrade, it shall be removed and backfilled with approved material for a depth not less than 12 inches. This material shall be tamped in layers of 6 inches to provide a uniform and continuous bearing characteristic of that area's soil condition. Where the bottom of the trench at subgrade consists of unstable material to such a degree that it cannot be removed and replaced with an approved material to support the pipe properly, a suitable foundation shall be constructed. Excavated material shall be piled in such a manner that it will not endanger work, obstruct natural watercourse, sidewalks or driveways.

Fire hydrants, valve boxes, or other utility controls shall be left unobstructed and accessible at all times. Street gutters shall be kept clear or other satisfactory provisions made for street drainage. All surface materials, which are suitable for reuse in restoring the surface, shall be kept separate from the excavated materials.

7.17.2 SHEETING AND BRACING

Open cut trenches shall be sheeted and braced as required by OSHA Code of Regulations Part 1926 (latest revision) and as may be necessary to protect life, property or the work. Trench bracing may be removed after the backfilling has been completed or has been brought up to such an elevation as to permit its safe removal. The use of a trenching box may be used in place of sheeting and bracing as long as said box is in compliance with above referenced OSHA Code.

7.17.3 DEWATERING

Water shall not be allowed in the trench at any time. An adequate supply of well points, headers and pumps, all in first class operating condition, shall be used to remove the ground water. The use of gravel and pumps shall also be an acceptable means of removing the water. At no time shall any pumps emit an unacceptable noise level as determined by the Director of Public Works or his representative or contractor will be required to shut down pumping operations.

The trench shall be excavated no more than the available pumping facilities are capable of handling.

The discharge from pumps shall be routed to settling basins or other acceptable erosion and sedimentation control devices prior to discharging to natural or existing drainage channels or storm sewers. Any and all permits required for dewatering are the responsibility of the Contractor and shall be obtained prior to commencement of construction.

7.18 PIPE LINE CONSTRUCTION

7.18.1 PIPE LAYING

All sewer mains, laterals, and appurtenances shall be installed as specified in these technical provisions, manufacturers' recommendations, and in accordance with the approved Plans and appropriate standard detail sheets as provided herein.

The bottom of the trench shall not be excavated below the specified grade. If undercutting occurs, the bottom of the trench shall be brought up to the original grade with approved material, thoroughly compacted as directed by the Director of Public Works or designated representative.

Before placing pipe into the trench, the outside of the spigot and the inside of the bell shall be wiped clean and dry, free from oil and grease. Every precaution shall be taken to prevent foreign material from entering the pipe. During laying operating, no debris, tools, clothing or other material shall be placed in the pipe.

All slip joints shall be made up in strict accordance with the manufacturer's specifications. The bell shall be carefully cleaned before the gasket is inserted.

After placing a length of pipe in the trench, the spigot end shall be centered in the bell, the pipe forced home, and brought to correct alignment.

7.18.2 BEDDING AND BACKFILLING

All pipe must be bedded in accordance with City standard details.

All backfilling material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks, stones or other material which is considered unsuitable. The Contractor shall not backfill any connection or appurtenances that requires inspection prior to inspection. Failure to provide the opportunity for inspection shall be grounds for unearthing, or the removal and replacement of all disputed items. All such inspections shall be scheduled two (2) working days in advance.

All trenches cut in roadways to make repairs to existing lines must be bought back to grade with compacted No. 57 stone, with the last 5" being asphalt.

7.18.3 SAFEGUARDING NEWLY INSTALLED SEWER MAIN

To prevent unwanted contaminates from entering newly installed sewer mains, the Contractor shall at the end of each day, secure the main through the use of a temporary, non-pressure, water tight, friction gasket plug. The Contractor shall maintain the use of these plugs until such time as sewer (manholes and main) have been installed, manholes stacked out, and the system is secured from the threat of the potential contaminants.

7.19 REPAIR CLAMPS

The number of repair clamps allowed on any one segment of newly installed main shall be limited to two (2). If a segment of newly installed sewer main requires more than two (2) repair clamps the main shall be removed and relayed. No more than one repair clamps will be allowed for any one joint of pipe.

7.20 SEWER ABANDONMENT

7.20.1 SEWER MAIN

Sewer mains scheduled to be abandoned shall be completely removed from the trench and the void filled with suitable compacted backfill material. If approved by the Director of Public Works, sewer main can be abandoned in place by capping the pipe ends and filling pipe void with flowable grout.

7.20.2 SEWER MANHOLES

Sewer manholes scheduled to be abandoned shall be prepared by punching through the invert of the manhole where water can freely drain into and out of the manhole structure. The manhole shall be filled with sand to within three feet of grade. The walls of the manhole will be removed or broken down to three feet below grade and the remaining void filled with sand to 6" of the surface grade. Surface restoration to grade shall be performed to match surrounding areas.

8. MATERIAL REQUIREMENTS

8.1 INSPECTION OF MATERIALS

All materials delivered to the job site are subject to inspection by the Director of Public Works or his representative. Any materials found during inspection or during the progress of the work to be defective or not meeting specifications shall be rejected and removed from the job site without delay.

Materials and/or work not inspected by the Director of Public Works or his representative prior to installation shall be uncovered by the Contractor at his expense in order to verify compliance. Copies of the Packing List shall be furnished on demand. All materials used for sanitary sewer construction shall be new. No used material shall be allowed.

8.2 PIPE

8.2.1 DUCTILE IRON PIPE

Ductile iron gravity sewer pipe shall be class 350 for 4"-12" and Class 250 for diameter 12" and greater. Ductile Iron pipe must conform to AWWA and ANSI Specifications C-150, C-151 and A21.50, A21.51. Interior lining shall be concrete lined, or ceramic epoxy, Protecto401, or approved equal. Gaskets shall be SBR (synthetic rubber). Exterior coating shall be black asphaltic coating when buried and Tnemec coating system (or approved equal) when exposed. Restrained joint pipe required in all casings, at all aerial crossings and at all creek crossings.

8.2.2 PLASTIC SOLID WALL PIPE (8" – 15")

PVC pipe shall be slip joint conforming to ASTM D1784, SDR26 with standard lay lengths of 13 feet. PVC pipe shall be marked in accordance with ASTM D3034 including pipe size, manufacturer's name, cell classification, SDR, use (sewer) and ASTM Standard. The pipe shall be colored green for in-ground identification as sewer pipe.

8.2.3 HIGH-DENSITY POLYETHYLENE (HDPE) PIPE – FORCE MAINS

All force main pipe shall be DR17 (minimum) DIPS HDPE conforming to ANSI/AWWA C901 and C906.

8.3 LATERALS

Laterals shall match main materials (ductile iron or solid wall PVC) and be 6 inch conforming to the requirements of ASTM A746 or ASTM D3034. Solid wall lateral pipe may be SDR 26.

8.3.1 LATERAL SERVICE CONNECTIONS

All lateral service connections shall provide a water tight connection in accordance with ASTM D3212.

8.3.2 NEW SEWER MAINS

Lateral service connections on newly laid sewer main (not previously mandrel tested) shall be made with a prefabricated wye fitting of same material as the main.

8.3.3 TAPS ON EXISTING SEWER MAIN

Lateral service connections on existing sewer main shall be made with an all stainless steel sewer saddle tee and hardware Inlet branch of tee shall be connected to sewer lateral by a flexible coupling with stainless steel bands and stainless steel shear ring.

8.4 FITTINGS

8.4.1 IRON FITTINGS

Fittings shall be cast iron or ductile iron and shall be designated and manufactured in accordance with ANSI A21.1 latest version. Fittings shall be cement mortar-lined and seal coated in accordance with ANSI/AWWA C104/A21.4

8.4.2 PLASTIC FITTINGS

All fittings for PVC composite pipe shall conform to ASTM D2680-90.

8.5 COUPLINGS AND CONNECTORS

Couplings and connectors may be used to join similar and dissimilar materials as well as pipes of the same diameter or of different diameters.

8.6 NON-PRESSURE PLUG

Temporary plugs used to secure sewer mains from contaminants during construction shall be non-pressure, friction gasket, and water tight plugs. In lieu of a temporary plastic plug as stated above, the Contractor may use a permanent water tight plug designed for a pressure application. Pressurized/inflatable plugs will not be allowed for this purpose.

8.7 ELECTRONIC UTILITY MARKER WIRE

All pressurized HPE sewer pipe installations shall require electronic utility marker wire to be installed with the pipe. The wire shall be CCS with 30 mil MDPE jacket. All wire is to be taped to the pipe every 8-10 feet in the 3 o'clock position. All splices must be made using watertight connectors. Concrete tracer access stations must be located at a maximum of 400 linear feet intervals.

8.8 EPOXY COATINGS

8.8.1 CONCRETE AND MASONRY

Epoxy coatings on concrete and masonry (manholes, concrete pipes, etc.) shall be a polyamide coal tar epoxy. A seal coat of epoxy shall be applied to the inside and outside of the structure per the manufacture's recommendations.

8.8.2 DUCTILE IRON

Epoxy coatings on ductile iron pipe and fittings shall have a ceramic epoxy lining on the interior and a bituminous coating on the exterior except for 6" back from the spigot end. The bituminous coating shall not be applied to the first 6" of the exterior of the spigot ends. The material used for the lining shall be a two component amine cured epoxy. The epoxy shall be applied to a thickness per the manufacture's recommendations.

8.9 MANHOLES

8.9.1 PRECAST MANHOLES

All sanitary sewer manholes shall be precast concrete structures conforming to ASTM C478, latest edition, with minimum floor thickness of 6", minimum wall thickness of 5", shall utilize ASTM C990 butyl rubber joint sealant with a 12" wide butyl wrap at all joints and shall have individual FRP steps for access at 16" intervals. Top shall be concentric cone (or flat with approval from the Director of Public Works) and shall be H-20 load rated. Wall thickness and diameter must match that of the manhole. Grade rings shall be reinforced concrete rings, 6" to 9" total thickness to match diameter of manhole

8.9.2 CAST IN PLACE MANHOLES

Cast in place manholes shall be reviewed on a case by case basis. Wherever possible a precast manhole shall be used.

8.9.3 MANHOLE RIM AND CASTING

Manhole frame and cover shall have a minimum of 26" diameter cover. Frame and cover shall be Grade 60-40-18 ductile iron and shall include a removable HDPE watertight bowl internal to cover.

8.9.4 MANHOLE STEPS

Manhole steps shall be copolymer polypropylene plastic with ½" diameter grade 60 reinforcements and shall conform to ASTM C478. All steps shall be built into the walls of the precast sections in straight alignment so as to form a continuous ladder with a maximum distance of 16 inches between steps.

8.9.5 CORROSION-RESISTANT INVERT AND BENCH GROUT

Corrosion-Resistant Benches and Inverts in Class II and Class III manholes shall be coated with a .5" – 1" layer of acid-resistant cementitious materials manufactured from 100% pure calcium aluminate cement and enhanced with high density chemically stable aggregates. Materials may contain inert poly fiber reinforcement and chemical admixtures.

8.9.6 CONCRETE ADMIXTURE

Concrete used in Class II and Class III manholes shall include admixtures added to the concrete during the mixing process to provide increased waterproofing and durability. Amounts of admixture shall be in accordance with the manufacturer's recommendations for the specific product. Admixtures shall include a dye or tracer to allow field verification of presence of the admixture.

8.9.7 MANHOLE PROTECTIVE LINER

Manhole liner systems used in Class III manholes shall be manufactured from sheets of thermoplastic materials that are resistant to the chemical environment normally found in wastewater transmission systems. The liner shall be a non-load bearing component integrally cast and adequately anchored inside pre-cast manhole sections. Joints shall be fused together to form a continuous sheet of lining material. Pre-approved lining systems include: Spectrashield.

8.9.8 MANHOLE JOINT

Joints between manhole sections shall be made with a preformed butyl sealant. Butyl sealants shall meet the hydrostatic performance requirements of ASTM C990. Use ConSeal CS-102 or approved equal. Only lifting eyes shall be grouted (interior and exterior). Manhole joints shall remain un-grouted to allow butyl sealant to compress and form a bond with manhole segments.

8.9.9 STACKING OUT BRICK

Brick shall be hard burned common brick meeting ASTM C32 Grade NA. Brick shall be standard brick size.

8.9.10 HYDRAULIC CEMENT

Use a rapid setting, non-shrink, hydraulic cement especially formulated for underwater use. The cement shall be non-staining, containing no organic materials.

8.9.11 PIPE-TO-MANHOLE CONNECTOR ASSEMBLY

Flexible connector assemblies shall be made of a rubber compound especially formulated to resist weather, ozone, oils, acids, alkalis, and animal/vegetable fats with a stainless internal band and external clamp. The assembly shall be inserted into the precast manhole at the factory and shall meet the requirements of ASTM C923.

8.10 GREASE TRAPS

Precast grease traps shall be reinforced concrete conforming to the requirements of ASTM C1613-06 (Standard Specification for Precast Concrete Grease Interceptor Tanks). The Tanks shall be H-20 load rated and the concrete when tested in compression shall be not less than 4000 psi.

8.11 STEEL ENCASEMENTS

Where sanitary sewer borings are required, the encasement pipe shall conform the requirements of AWWA C-200 and A139, Grade B steel piping (for sizes 24” and smaller). The encasement shall be set straight and true to grade as indicated on the construction plans. Each end shall be sealed with a neoprene end seal as specified and encasement shall be of such a size as to assure a final correct grade on the sanitary sewer main. Straight seamed or seamless encasement piping is required; no spiral encasement pipe shall be allowed. Where it is necessary to adjust the sanitary sewer pipe within the encasement, appropriate chairs (supports) for grade adjustment will be required. Borings under railroads or State highways shall meet their respective permit requirements.

Casing size and thickness shall be as indicated below:

DIAMETER OF SEWER MAIN (INCHES)	MINIMUM CASING DIAMETER (INCHES)	MINIMUM CASING THICKNESS (INCHES)	ASTM / AWWA STANDARD
4"	12.5"	.25"	ASTM A53
6"	14"	.25"	ASTM A53
8”	16”	.25”	ASTM A53
10”	18"	.25”	ASTM A53
12"- 14”	24"	.25”	ASTM A53
16”-20”	30”	.3125”	AWWA C200
24”	36”	.3125”	AWWA C200
Larger than 24"	As approved by Director of Public Works	As approved by Director of Public Works	As approved by Director of Public Works

8.11.1 ENCASEMENT SPACERS

Spacers for 4” –12” piping shall be stainless steel with 8” wide bands as shown in accordance with City standard details. Spacers for piping larger than 12” shall be reviewed on a case by case basis.

8.12 BACKFILL

8.12.1 GRAVEL

Coarse aggregate (gravel) shall be white or very light -colored gravel, limestone, marble, or granite, subject to the approval of the Director of public Works or his representative. Gravel shall be crushed angular stone conforming to No. 57 and No. 67stone as provided for in Section 801 *“Coarse Aggregate”* of ALDOT’s standard specifications.

8.12.2 CRUSHER RUN

Crusher run shall consist of 100 percent crushed aggregates conforming to the requirements of Section 825.02 Type A *“Crushed Aggregate Base Materials”* of ALDOT’s standard specifications.

8.12.3 SAND

Sand shall be local “washed” material consisting of grains of hard, predominantly quartz or other hard rock, including friable, loosely bound deposits of sandstone conglomerate. The sand shall be free from lumps of clay, loam, organic matter, or other foreign material. Sand shall meet the requirements of Section 826 .02 (b) *“Local Sand and Sand Gravel for Miscellaneous Construction Use”* of ALDOT’s standard specifications.

8.12.4 PIT RUN / CLAY GRAVEL

Pit run (clay gravel) shall be local material consisting of grains of hard, predominantly quartz or other hard rock, including friable, loosely bound deposits of sandstone conglomerate. The coarse aggregate and sand shall be free from lumps of clay, loam, organic matter, or other foreign material. Pit run shall meet the requirements of Section 826 .02 (c) *"Local Sand and Sand Gravel for Miscellaneous Construction Use"* of ALDOT's standard specifications.

9. SEWER TESTING AND INSPECTION

9.1 GENERAL

Testing shall be accomplished through the combination of visual inspections, deflection tests, low-pressure air tests, and leakage tests methods. Acceptance tests shall only be performed after all work adjacent to and over the pipeline has been completed. Backfilling, placement of fill, grading, initial/base layer of paving, concrete work, and any other superimposed loads shall be completed and in place prior to any testing. All testing shall be performed in the presence of the Director of Public Works representative, after the installation of all other utilities (including power poles). Tests performed in the absence of the Director of Public Works representative shall be considered invalid and shall be repeated at the Contractor's expense.

9.2 VISUAL INSPECTION

The Director of Public Works representative shall visually inspect all gravity sewer pipe (plastic composite and ductile iron) installed to verify alignment and ensure the pipe is free from obstructions and debris. The inspector shall use a pole camera system or the sun light and mirrors to "flash" the sewer pipe one section at a time. When the full diameter of the pipe is visible between adjacent manholes, the segment of piping is deemed properly aligned and free of sags and debris. If the segment of pipe fails the visual inspections the pipe shall be cleaned and/or replaced and re-tested.

9.3 DEFLECTION TEST

A deflection test shall be required for all plastic sewer piping installed (ductile iron piping will be tested at the discretion of the Director of Public Works Inspector). A GO-NO-GO Mandrel shall be pulled through the pipe a minimum of 60 days after the final placement of backfill and superimposed loads. The deflection of the sewer pipe shall not exceed 5.0 percent of average inside diameter when tested with a mandrel specifically designed for the type and size of pipe installed. Pipe segments failing the Mandrel test shall be removed and replaced.

MATERIAL TYPE	NORMAL INSIDE DIAMETER (INCHES)	AVERAGE INSIDE DIAMETER (INCHES)	95% OF INSIDE DIAMETER INCHES
Solid Wall PVC	8	7.754	7.37
(PS115 SDR 26)	10	9.692	9.21
	12	11.538	10.96
	15	14.124	13.42
	18	17.261	16.40
	21	20.349	19.33
	24	22.891	21.75
Ductile Iron*			

(Note: Mandrel shall have a factory stamped identification mark indicating its size (in inches) or shall be verified in the field by the use of a stamped following ring)

*Average inside diameter varies. See Director of Public Works for mandrel sizing.

9.3.1 MANDREL EQUIPMENT

Because the inside diameter of composite plastic piping varies from that of solid wall PVC, equipment systems used to perform Mandrel tests shall be specifically designed for the pipe material being tested. Mandrels that do not specifically state the size and type of piping for which it is applicable shall not be allowed.

9.4 LOW-PRESSURE AIR TEST

On all sanitary sewer lines (plastic composite and ductile iron), including private sewer lines, the Contractor shall conduct a line acceptance test using low-pressure air testing. For ductile iron pipelines test in accordance with the applicable requirements of ASTM C924. For PVC pipelines test in accordance with ASTM F1417-98 and UBPPA UNI-B-6.

The Contractor shall furnish all labor, equipment, and any appurtenant items necessary to satisfactorily perform the vacuum test. All testing equipment shall be approved for vacuum testing manholes.

9.4.1 AIR PROCEDURE TEST (DRY CONDITIONS)

The following procedure shall be used during the low–pressure air testing of sewer mains located above the ground water table:

- Isolate section of sewer by inflatable stoppers or other suitable test plugs. Plug or cap the ends of all branches, laterals, tees, wyes, and stubs to be included in the test. Securely brace all plugs or caps to prevent blow-out. One of the plugs or caps should have an inlet tap, or other provision for connecting a hose to a portable air source.

  (Note: Special attention should be placed on the exposed spigot end of composite plastic pipe. If not properly sealed, air can leak through the porous material in the pipe's annulus.)

- Connect the air hose to the inlet tap. Add air slowly to the test section until the pressure inside the pipe reaches 4.0 psig.
- Allow the pressure to stabilize such that a pressure between 4.0 psig and 3.5 psig is maintained for at least two minutes. The pressure will normally drop slightly until equilibrium is obtained; however, a minimum of 3.5 psig is required.
- Disconnect the air supply and decrease the pressure to 3.5 psig. before starting the test.
- Use the Time-Pressure Drop Method to determine if the segment of pipe is "Acceptable". Determine the minimum acceptable time for a 1 psig drop in pressure from 3.5 psig to 2.5 psig. Compare the minimum acceptable time to that actually observed in the field to determine if the rate of air loss is within acceptable limits. Minimum holding times are listed in the following table depending on length and size of mains.

Minimum specified time required for a 1.0 psig pressure drop for size and length of pipe.

Pipe Diameter (inches)	Specification Time for Length Shown (Minutes : Seconds)							
	100ft	150ft	200ft	250ft	300ft	350ft	400ft	450ft
8	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	14:10	17:48	22:15	26:42	31:09	35:35	40:04
18	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33

9.4.2 AIR TEST PROCEDURE (WET CONDITIONS)

All test pressures are measured as gage pressure, which is any pressure greater than atmospheric. Since water produces a pressure of 0.43 psig for every foot of depth over the main, air test pressures must be increased to offset the depth of ground water over the sewer line.

In areas where groundwater is known to exist, the contractor shall install a one-half inch diameter capped PVC pipe nipple, approximately 10" long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to performing the line acceptance test, the ground water elevation shall be determined by removing the pipe cap, blowing air through the pipe nipple

into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The hose shall be held vertically and a measurement of the height in feet of water over the invert of the pipe shall be taken after the water has stopped rising in the plastic tube.

Multiply the height in feet above the pipe invert to the ground water table by 0.43 psig/ft and add it to the required 3.5 psig minimum test pressure. For example, if the height of water is 11.5 ft, then the added pressure will be 0.43 psig/ft x 11.5 ft or 4.9 psig. This increases the test pressure from 3.5 psig to 8.4 psig and the 2.5 psig to 7.4 psig, respectively. The allowable drop of 1 psig for the time allowed as outlined in Table 1 still remains the same.

If however, the ground water level is 2 ft or more above the top of the pipe at the upstream end, or if the air pressure required for the test calculates out to be greater than the 9 psig gage, the air test method should not be used. In these cases, a visual inspection for leakage would produce a more conservative test. Before the air test method is used, the ground water level should be lowered by pumping or dewatering.

9.5 VACUUM TESTING OF MANHOLES

All sanitary sewer manholes constructed by the Contractor shall be vacuum tested for leakage in the presence of a Director of Public Works Representative. Vacuum testing shall be performed in accordance with ASTM C1244. The vacuum test requirement will not apply to any existing manhole, or any existing manhole that has been converted to a drop manhole by the Contractor.

The Contractor shall furnish all labor, equipment, and any appurtenant items necessary to satisfactorily perform the vacuum test. All testing equipment shall be approved for vacuum testing manholes.

9.5.1. VACUUM TESTING PROCEDURE

All lifting holes shall be plugged with an approved non-shrink grout inside and out. Manhole joints shall be grouted from the outside only. All pipes entering the manhole shall be plugged. The Contractor shall securely brace the plugs in order to keep them from being drawn into the manhole. The test head shall be placed at the inside of the top of the cone section of the manhole and the seal inflated in accordance with the manufacturer's recommendations.

A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time for the vacuum to drop to 9 inches of mercury shall not be less than that shown in the table below:

DEPTH (FEET)	MANHOLE DIAMETER (INCHES)		
	48	60	72
0-8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97
26	64	85	105
28	69	91	113
30	74	98	121

(Times shown are minimum elapsed times, in seconds, for a drop-in vacuum of 1 inch of mercury.)

9.5.2 AIR/VACUUM TEST EQUIPMENT

Equipment systems used to perform low-pressure air tests shall be specifically designed for this purpose. Systems approved by the Director of Public Works shall be Cherne Air-Loc Equipment, Lansas Products, or approved equal. Isolation of pipe segments shall be accomplished through the use of plugs (mechanical or pneumatic type). Pressurization of the sewer main shall be accomplished through the use of an air compressor that has an oil free air source, singular control panel, main shut-off valve, pressure–regulating valve, 9 psig pressure relief valve, input pressure gauge, and a continuous monitoring pressure gage. The continuous monitoring pressure gage shall have a pressure range from 0 psig to at least 10 psig with minimum divisions of .10 psig. The gage face shall be a minimum of 4 inches in diameter and have an accuracy of $\pm$.04 psig.

9.6 HYDROSTATIC LEAK TESTING

This hydrostatic leak test procedure consists of filling, an initial expansion phase, a test phase, and depressurizing for all sewer force mains.

9.6.1 FILLING

Fill the restrained test section completely with test liquid. The test section is usually filled from the lowest point of the pipeline and at a slow fill rate to minimize air entrainment. A fill rate of 10-feet per minute axial velocity or less is suggested in PPI TN-46. After filling, allow time for the system to reach thermal equilibrium and allow for any dissolved air to exit the system air vents.

WARNING – Ensure that there is no air trapped in the test section. Failure with entrapped air can result in explosive release and result in death or serious bodily injury. Use equipment vents at high points to remove air.

9.6.2 INITIAL EXPANSION PHASE

Gradually pressurize the test section to test pressure, and add make-up water as necessary to maintain maximum test pressure for four (4) hours. During the initial expansion phase, polyethylene pipe will expand slightly due to elasticity and Poisson effects. Additional test liquid will be required to maintain pressure. The amount of additional test liquid will vary because expansion in the PE pipe is not linear. It is not necessary to monitor the amount of water added during the initial expansion phase. If test pressure cannot be attained, or if it takes an unreasonably long time to reach test pressure, there may be faults such as excessive leakage, entrapped air, or open valving, or the pressurizing equipment may be inadequate for the size of the test section. If such faults exist, discontinue pressurizing and correct them before continuing.

9.6.3 TEST PHASE

Immediately following the initial expansion phase, pressure should be stabilized at 200 PSI and stop adding water. Monitor the pressure for two 2 hours. If no visual leakage is observed and test pressure remains steady for one (2) hours, no leakage is indicated.

9.6.4 DEPRESSURIZATION

Depressurize the test section by reducing pressure or releasing water at a controlled rate. Sudden depressurization can cause water hammer.

10. CLOSE OUT PROCEDURES

10.1 ALL UTILITIES INSTALLED

After all utilities are installed the sewer system can be tested. The sanitary sewer system must pass all testing and inspections required by section 9. Only after all testing has been approved by the Director of Public Works representative can the Plat be signed and recorded or a Certificate of Occupancy issued.

10.2 PRIOR TO ALL UTILITIES INSTALLED

If a developer chooses to record a plat prior to all utilities being installed, the following procedures shall apply. The sanitary sewer system must pass all testing and inspections required by section 9. The developer must supply the City of Prattville with a security in the form of a bond or cashier's check equal to 25% of the total construction cost of the sanitary sewer system. Only after all testing has been approved by the Director of Public Works representative and the security received by the City of Prattville can the plat be signed and recorded. Once all utilities have been installed, another low-pressure air test will be required on all sanitary sewer lines in the recorded plat, or where deemed necessary by the Director of Public Works. Only after the low-pressure air testing has been approved by the Director of Public Works representative, can the security be returned.

11. INDUSTRIAL USER SURCHARGE RATES

The rate at which the excess pollutants as identified in Section 66-359(2) shall be charged shall be determined on a periodic basis by the Director of Public Works. The fee schedule is as follows:

- BOD (lb./month): $0.44
- COD (lb./month): $0.28
- TKN (lb./month): $0.65
- FOG (lb./month): $0.95
- TP (lb./month): $2.00
- TSS (lb./month): $0.25
- TDS (lb./month): $0.20

Form 1 – Preliminary Sanitary Sewer Design Report

City of Prattville Review

Reviewed By: _____ Date: _____

Approval Status: ☐ Approved ☐ Approved Contingent ☐ Denied ☐ Incomplete

Comments: _____

_____

General Information

Project Name: _____

Site Location / Address: _____

_____

Tax Parcel ID(s):

___ ___ ___ __ ____ ____.____ ___ ___ ___ __ ____ ____.____

___ ___ ___ __ ____ ____.____ ___ ___ ___ __ ____ ____.____

___ ___ ___ __ ____ ____.____ ___ ___ ___ __ ____ ____.____

___ ___ ___ __ ____ ____.____ ___ ___ ___ __ ____ ____.____

___ ___ ___ __ ____ ____.____ ___ ___ ___ __ ____ ____.____

Development Type: ☐ Residential ☐ Commercial ☐ Industrial

Owner's Information

Name: _____ Phone: _____

Address: _____ Fax: _____

City: _____ State: _____ Zip Code: _____

E-mail: _____

Engineer's Information

Name: _____ Phone: _____

Address: _____ Fax: _____

City: _____ State: _____ Zip Code: _____

E-mail: _____

Development Information

Drainage Basin: ☐ Noland Creek ☐ Autauga Creek ☐ Pine Creek ☐ Fay Branch

Total Development Area: _____ acres Estimated Equivalent Population: _____

Estimated Average Flow: _____ gal/day Estimated Peak Flow: _____ gal/day

Lift Station Proposed? ☐ Yes ☐ No

Comments: _____

_____

_____

_____

Form 2 – Sanitary Sewer Design Report

City of Prattville Review

Reviewed By: _____ Date: _____

Required Attachments: ☐ USGS Topo Map (1" = 2,000') ☐ Narrative with calculations ☐ Design Drawings ☐ Specifications

Approval Status: ☐ Approved ☐ Approved Contingent ☐ Denied ☐ Incomplete

Comments: _____

General Information

Project Name: _____

Site Location / Address: _____

_____

Tax Parcel ID(s):

___ ___ ___ __ ____ ____.____ | ___ ___ ___ __ ____ ____.____

___ ___ ___ __ ____ ____.____ | ___ ___ ___ __ ____ ____.____

___ ___ ___ __ ____ ____.____ | ___ ___ ___ __ ____ ____.____

___ ___ ___ __ ____ ____.____ | ___ ___ ___ __ ____ ____.____

___ ___ ___ __ ____ ____.____ | ___ ___ ___ __ ____ ____.____

Development Type: ☐ Residential ☐ Commercial ☐ Industrial

Owner's Information

Name: _____ Phone: _____

Address: _____ Fax: _____

City: _____ State: _____ Zip Code: _____

E-mail: _____

Engineer's Information

Name: _____ Phone: _____

Address: _____ Fax: _____

City: _____ State: _____ Zip Code: _____

E-mail: _____

Development Information

Drainage Basin: ☐ Noland Creek ☐ Autauga Creek ☐ Pine Creek ☐ Fay Branch

Required Attachments: ☐ USGS Topo Map (1" = 2,000') ☐ Narrative with calculations ☐ Design Drawings ☐ Specifications

Comments: _____

_____

_____

_____

Form 2 – Sanitary Sewer Design Report

Design Information

Total Development Area: _____ acres Estimated Equivalent Population: _____

Estimated Average Flow: _____ gal/day Estimated Peak Flow: _____ gal/day

☐ Residential Total number of residential Lots? _____

☐ Commercial

Building Type	Square Footage	Estimated Use
_____	_____ ft^2	_____
_____	_____ ft^2	_____
_____	_____ ft^2	_____
_____	_____ ft^2	_____
_____	_____ ft^2	_____

Proposed Gravity Sewer System: Total linear feet of gravity sewer: _____ft

Pipe Size	Min. Slope	Max. Slope	Pipe Size	Min Slope	Max. Slope
_____In	_____%	_____%	_____in	_____%	_____%
_____In	_____%	_____%	_____in	_____%	_____%
_____In	_____%	_____%	_____in	_____%	_____%
_____In	_____%	_____%	_____in	_____%	_____%
_____In	_____%	_____%	_____in	_____%	_____%

Total Number of Manholes: Existing Project Discharge: City Manhole ID No.: _____

Class I Manholes: _____ea

Class II Manholes: _____ea

Class III Manholes: _____ea

	Diameter	Slope	Inv. Elevation
Inlet Pipe:	_____in	_____%	_____
Outlet Pipe:	_____in	_____%	_____

Maximum Manhole Spacing: _____ft

Lift Station Proposed? ☐ Yes ☐ No If Yes, provide Form 3 – Sanitary Sewer Lift Station Design Report

Professional Engineer Certification

By affixing my professional seal and signature on this form, I hereby certify that I have read and am familiar with both the City of Prattville's Public Works Manual and the Ten State Standards, that this sanitary sewer design meets or exceeds all requirements set forth in these referenced documents and that this form will be resubmitted should any changes occur to the project scope that impact the sanitary sewer design in any way.

Company: _____ Seal:

Name: _____

Address: _____

_____

E-mail: _____

Phone: _____

Signature: _____ Date: _____

Form 3 – Sanitary Sewer Lift Station Design Report

City of Prattville Review

Reviewed By: _____ Date: _____

Required Attachments: ☐ Preliminary Engineering Report ☐ Design Drawings ☐ Specifications

Approval Status: ☐ Approved ☐ Approved Contingent ☐ Denied ☐ Incomplete

Comments: _____

General Information

Project Name: _____

Site Location / Address: _____

_____

Tax Parcel ID(s):

___ ___ ___ __ _____ _____.____ | ___ ___ ___ __ _____ _____.____

___ ___ ___ __ _____ _____.____ | ___ ___ ___ __ _____ _____.____

___ ___ ___ __ _____ _____.____ | ___ ___ ___ __ _____ _____.____

___ ___ ___ __ _____ _____.____ | ___ ___ ___ __ _____ _____.____

___ ___ ___ __ _____ _____.____ | ___ ___ ___ __ _____ _____.____

Development Type: ☐ Residential ☐ Commercial ☐ Industrial

Owner's Information

Name: _____ Phone: _____

Address: _____ Fax: _____

City: _____ State: _____ Zip Code: _____

E-mail: _____

Engineer's Information

Name: _____ Phone: _____

Address: _____ Fax: _____

City: _____ State: _____ Zip Code: _____

E-mail: _____

Development Information

Drainage Basin: ☐ Noland Creek ☐ Autauga Creek ☐ Pine Creek ☐ Fay Branch

Required Attachments: ☐ Preliminary Engineering Report ☐ Design Drawings ☐ Specifications

Justification of Lift Station: Discussion of why gravity sewer is not an option / why a lift station is required?_____

_____

_____

_____

_____

_____

Initial and Ultimate Contributions: Discussion of long-term planning for project area as well as entire drainage basin?_____

_____

_____

_____

_____

_____

Design Calculations

☐ Residential Design Flow (Q) = Number of Lots * average capita / Lot* 110 gpd / capita

No. Lots		Avg Capita / Lot				Design Flow (Q)
_____	*	_____	*	110 gpd/capita	=	_____ gpd

☐ Commercial Design Flow (Q) = Source Unit * Unit Flow (gpd)

Source	Unit		Unit Flow (gpd)		Design Flow (Q)
_____	_____	*	_____ gpd	=	_____ gpd
_____	_____	*	_____ gpd	=	_____ gpd
_____	_____	*	_____ gpd	=	_____ gpd
_____	_____	*	_____ gpd	=	_____ gpd
_____	_____	*	_____ gpd	=	_____ gpd
			Total Q	=	_____ gpd

Peak Flows (Q_p) = Total Design Flow (Q)* City provided peaking factor

Q_p = _____ gpd * City provided peaking factor

Q_p = _____ gpd

Wet Well Calculations:

Minimum wet well volume required: _____ ☐ ft^3 or ☐ gal

Actual wet well volume provided: _____ ☐ ft^3 or ☐ gal

Wet Well Diameter: _____ ft Depth: _____ ft

Volume Cycle Time: _____ min (assume maximum 4 starts / hour)

Cycle time curve chart/graph included: ☐ Yes ☐ No

Forcemain: Size: _____ in Velocity: _____ ft/s

System Head Calculations: Static Head: _____ ft Friction Loses: _____ ft

System Total Dynamic Head: _____ ft

System Head Graph / Chart Attached: ☐ Yes ☐ No

Pump VFD: ☐ Yes ☐ No Specific Pump Literature Attached: ☐ Yes ☐ No

Site Information

Utilities: ☐ Yes ☐ No Power: _____ voltage _____ phase

☐ Yes ☐ No Gas

☐ Yes ☐ No Water

☐ Yes ☐ No Cable

☐ Yes ☐ No Telephone

Flood Map: ☐ Yes ☐ No Provide FIRM map of Lift Station Site

Final Summary

Final Recommendations: Summary of the proposed Lift Station Design._____

Professional Engineer Certification

By affixing my professional seal and signature on this form, I hereby certify that I have read and am familiar with both the City of Prattville's Public Works Manual and the Ten State Standards, that this sanitary sewer design meets or exceeds all requirements set forth in these referenced documents and that this form will be resubmitted should any changes occur to the project scope that impact the sanitary sewer design in any way.

Company: _____ Seal:

Name: _____

Address: _____

_____

E-mail: _____

Phone: _____

Signature: _____ Date: _____

BEDDING/BACKFILL REQUIREMENTS & MAT'L DESIGNATIONS (SEE MATERIAL DESIGNATION / DESCRIPTOINS TABLE)										
PRESSURE MAINS			GRAVITY LINES & LATERALS				PAVED AREAS			
DI	CONC	PVC	DI	CONC	PVC	DI	CONC	PVC		
5	5	5	5	5	5	6**	6**	6**		
4	4	4	4	4	4	1	1	2		
3	3	2	1	3	2	1	1	2		
3	3	2	1	1	2	1	1	2		
1	1	2	1	1	2	1	1	2		
RIP-RAP OR CRUSHED STONE CLASS 1B (USCS IN ASTM D2487)										

* SEE NOTE 2
** SEE NOTE 4

MATERIAL DESIGNATION/DESCRIPTOINS TABLE	
DESIGNATION/ MATERIALS	DESCRIPTION
1.	CRUSHED STONE, ASTM-448 NO. 57 GRADATION
2.	CRUSHED STONE, ASTM-448 NO. 67 GRADATION. SAND SHALL BE USED AS SUBSTITUTE IN RESIDENTIAL LAWNS, YARDS, AND LANDSCAPED AREAS.
3.	SELECT EXCAVATED MATL REASONABLY DRY (WITHIN LIMITS REQ'D FOR COMPACTION) NO STONES > 1" DIA.
4.	EXCAVATED MATL REASONABLY DRY (WITHIN LIMITS REQ'D FOR COMPACTION) NO STONES > 12" DIA.
5.	SELECT TOPSOIL MATL TO SUPPORT VEGETATION, NO STONES OR ROCK ALLOWED
6.	CRUSHED STONE, MOIST "PUG-MIX" PER ALDOT SECTION 825

NOTES:

1. SLOPE, BENCHING, SHORING, ETC. AS DETERMINED AND DESIGNED BY THE CONTRACTOR. CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE OSHA REGULATIONS FOR "OPEN TRENCH EXCAVATIONS".
2. BEDDING REQ'D FOR ALL GRAVITY LINES, ALL PVC LINES AND ALL CONCRETE LINES. BEDDING REQUIRED IN ALL AREAS OF ROCK EXCAVATION OR UNSUITABLE SOILS. BELL HOLES REQ'D FOR PIPES > 4" DIA FOR DUCTILE IRON PRESSURE MAINS. SELECT EARTH MAY BE USED FOR BEDDING IN AREAS OF ROCK EXCAVATION.
3. ALL MATERIALS SHALL BE COMPACTED TO MINIMUM 95% STANDARD PROCTOR DENSITY AT 2%+/- OPTIMUM MOISTURE CONTENT. MATERIALS UNDER PAVING, CONCRETE, STRUCTURES, ETC. SHALL BE COMPACTED TO MIN 98%-100% STANDARD PROCTOR. MECHANICAL COMPACTION SHALL BE BY VIBRATORY SHEEPSFOOT OR OTHER EQUIP SPECIFICALLY DESIGNED FOR THE COMPACTION OF EARTH. COMPACTION EQUIP SHALL BE ON-SITE PRIOR TO BEGINNING OF WORK. MECHANICAL COMPACTION SHALL BE COMPLETED IN LOOSE LIFTS AS SHOWN ON THE DETAIL.
4. TEMPORARY COMPACTED PUG-MIX BACKFILL REQ'D UNTIL PAVEMENT PLACEMENT IS COMPLETE. THE CONTRACTOR SHALL CONTINUOUSLY MAINTAIN THIS PUGMIX TO KEEP IT FLUSH WITH THE ADJACENT PAVING, ETC. UNTIL THE FINAL PAVING IS PLACED. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ASPHALT OR CONCRETE PATCHES WHEN NEEDED FOR PUBLIC SAFETY AND/OR CONVENIENCE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SELECTING AND UTILIZE APPROPRIATE MEANS AND METHODS OF CONSTRUCTION TO ENSURE THAT THE ENTIRE AREAS UNDER THE HAUNCHES OF THE PIPE ARE FILLED WITH THE REQUIRED MATERIALS AND COMPACTED APPROPRIATELY.
6. ADDITIONAL AND/OR SPECIAL REQUIREMENTS MAY BE REQ'D BY THE PLANS, SPECIFICATIONS AND/OR CONTRACT DOCUMENTS.
7. TO THE EXTENT POSSIBLE, AS DETERMINED BY THE CONTRACTOR, TRENCH WALL SHORING METHODS SHALL BE USED IN PAVED AREAS TO MINIMIZE PAVING REPAIR REQUIREMENTS.

CITY OF PRATTVILLE

PUBLIC WORKS DEPARTMENT

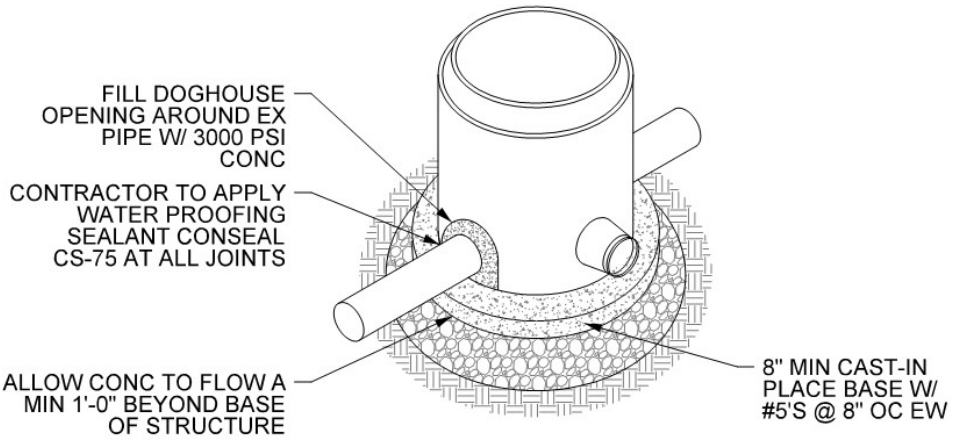
530 DOSTER ROAD
Prattville, Alabama 36067

PUBLIC WORKS MANUAL

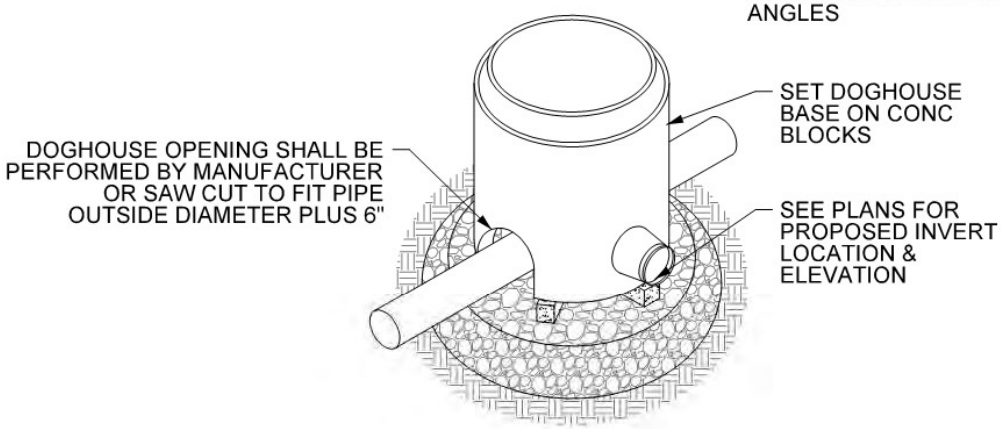
BEDDING AND BACKFILL FOR TRENCHES

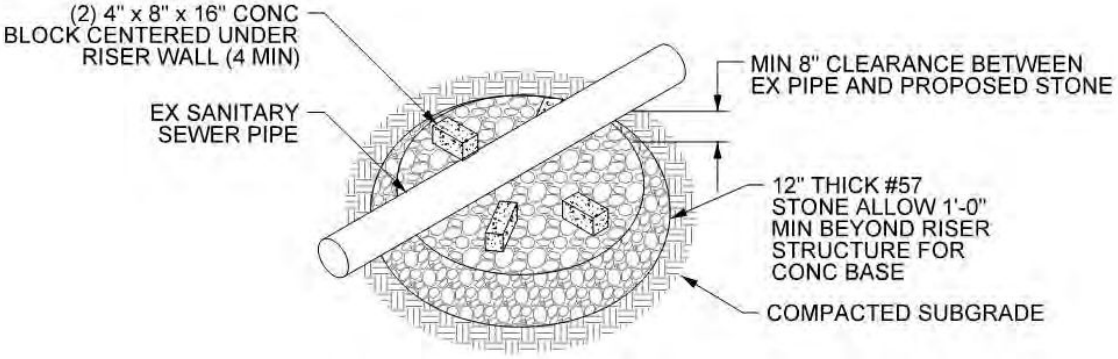
SCALE: N.T.S.

DETAIL # : 1

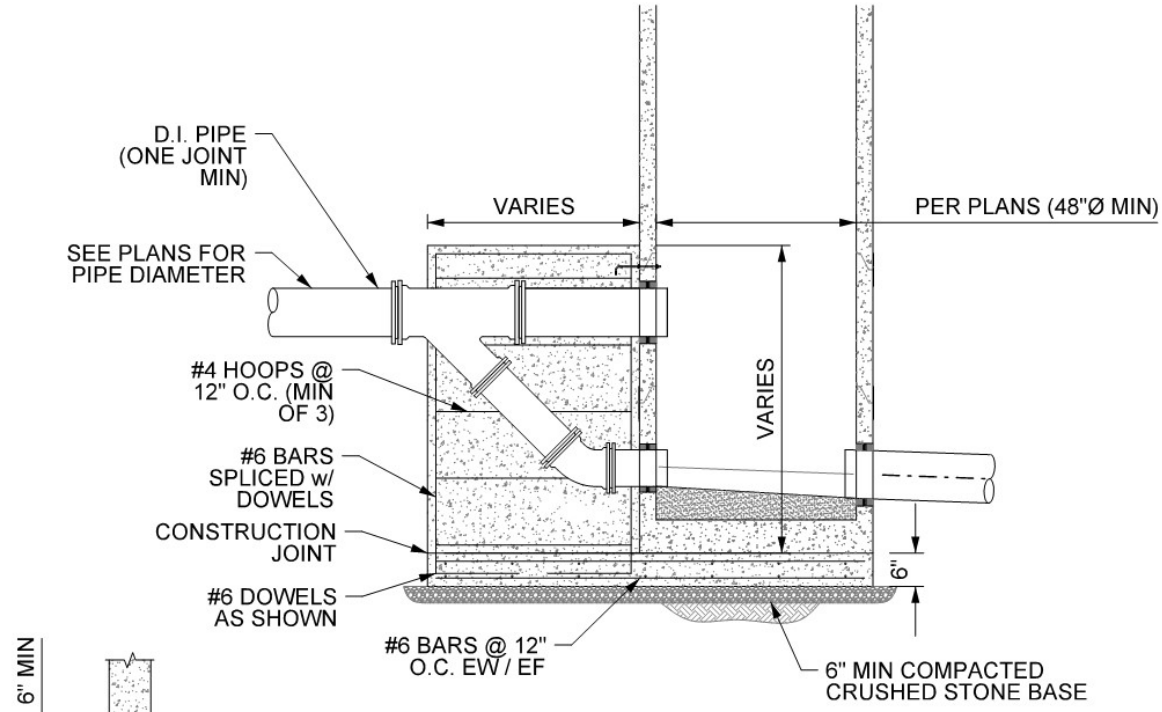


NOTE:
CUT & REMOVE EX. PIPE INSIDE MH AND FORM INVERT PER ELEVATIONS AND ANGLES

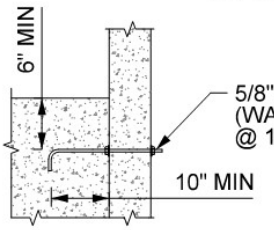




CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL	SCALE: N.T.S.
	DOGHOUSE MANHOLE	DETAIL # : 2

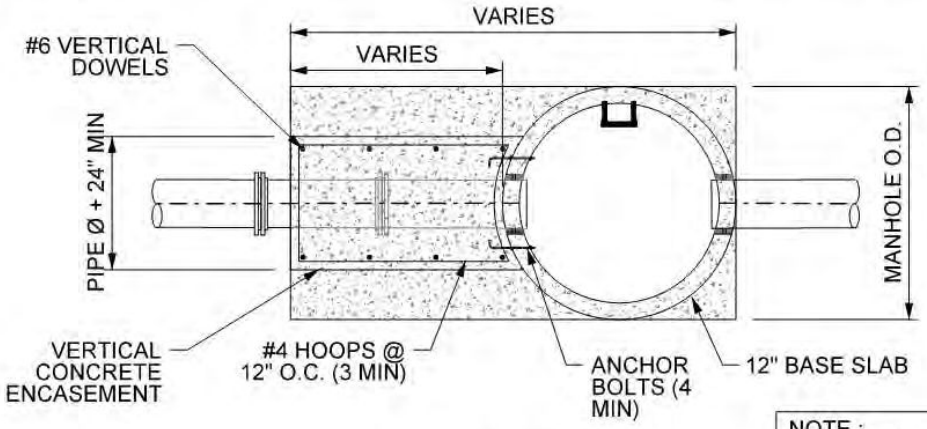


DROP MANHOLE SECTION



ANCHOR BOLT DETAIL

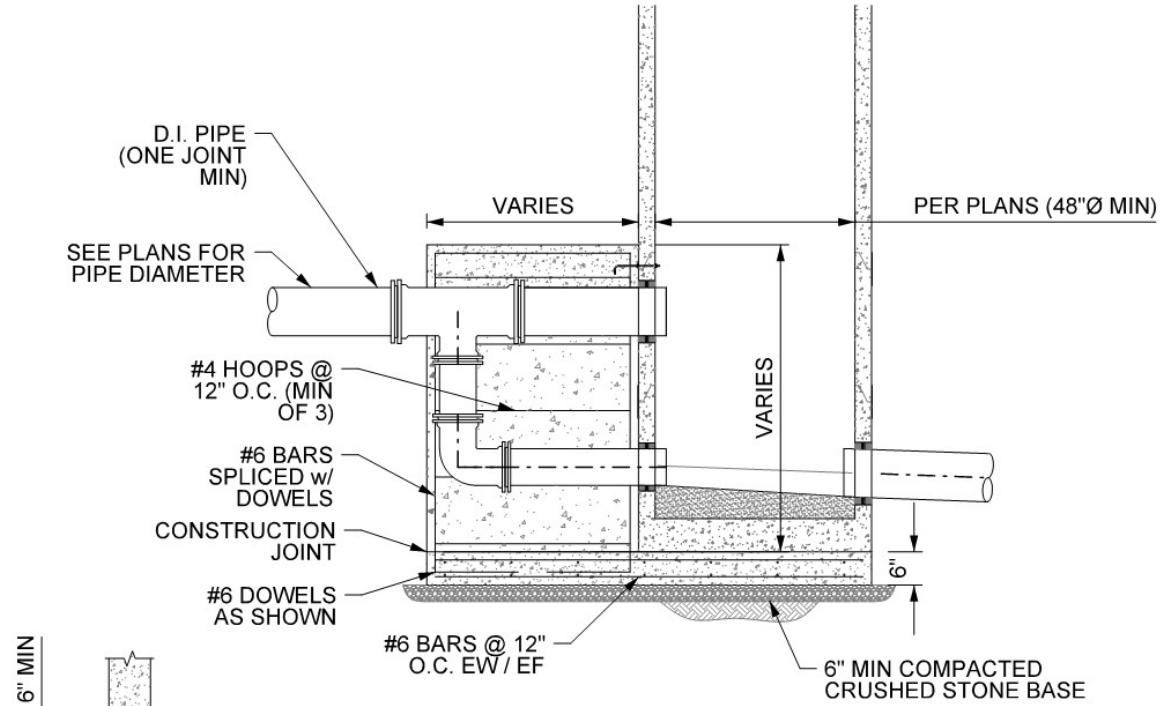
NOTE :
ALL PIPE AND FITTINGS SHALL BE D.I.



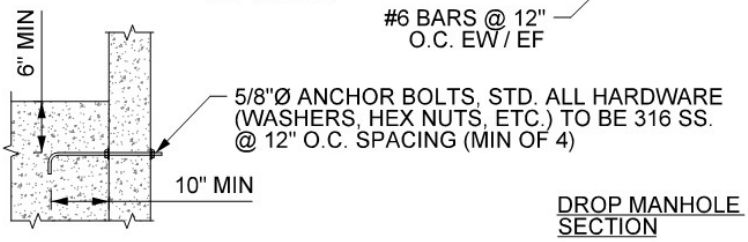
DROP MANHOLE PLAN

NOTE :
TYPICAL MANHOLE FOR PIPE DIAMETERS 12" OR GREATER WITH GREATER THAN 24" FALL ACROSS INVERT.

CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL DROP MANHOLE (FOR PIPE DIAMETERS 12" OR GREATER)	SCALE: N.T.S. DETAIL # : 3

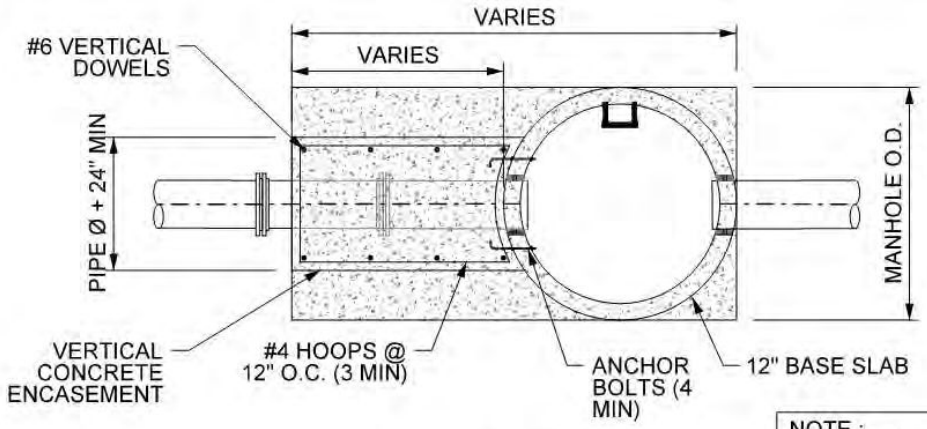


DROP MANHOLE SECTION



ANCHOR BOLT DETAIL

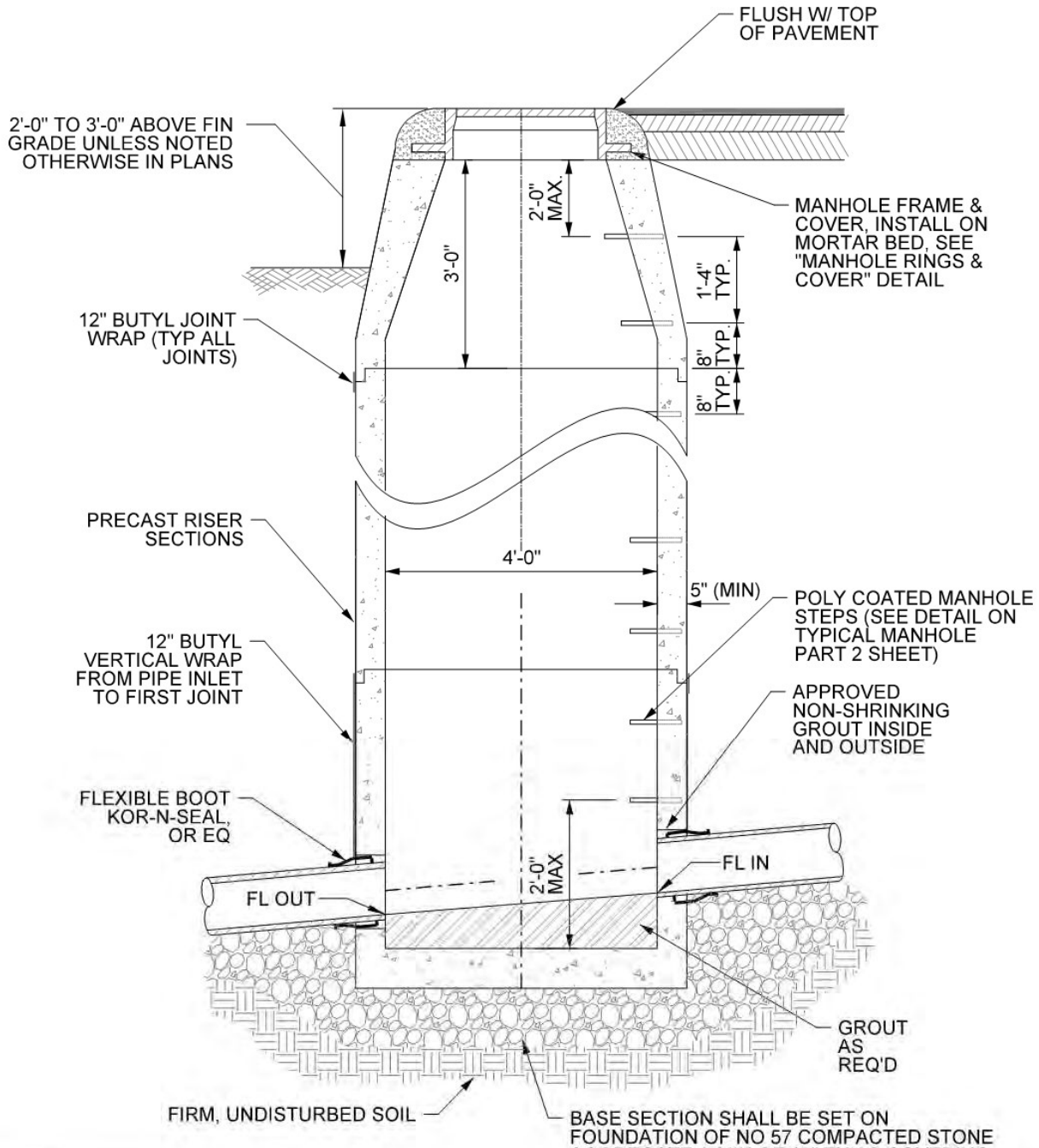
NOTE :
ALL PIPE AND FITTINGS SHALL BE D.I.



DROP MANHOLE PLAN

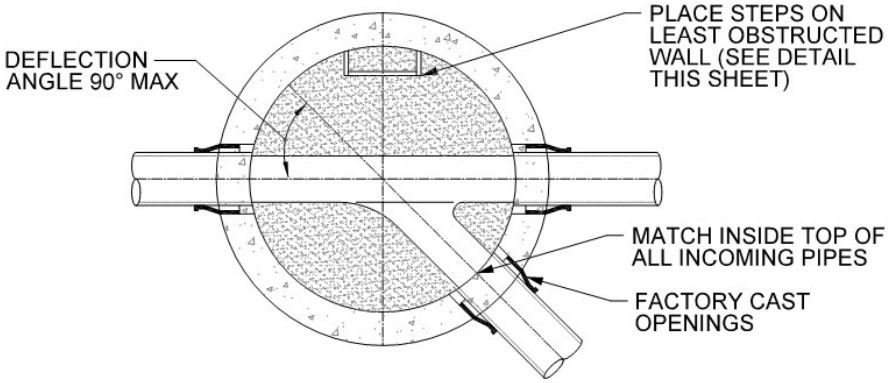
NOTE :
TYPICAL MANHOLE FOR PIPE DIAMETERS 12" OR LESS WITH GREATER THAN 24" FALL ACROSS INVERT.

CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL DROP MANHOLE (FOR PIPE DIAMETERS 12" OR LESS)	SCALE: N.T.S. DETAIL # : 4



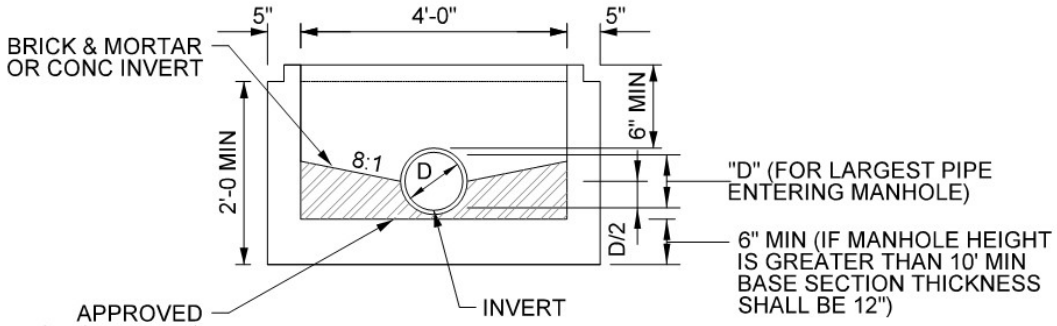
NOTE :
TYPICAL MANHOLE WITH LESS THAN 24" FALL ACROSS INVERT.

CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL TYPICAL MANHOLE PART 1	SCALE: N.T.S. DETAIL # : 5

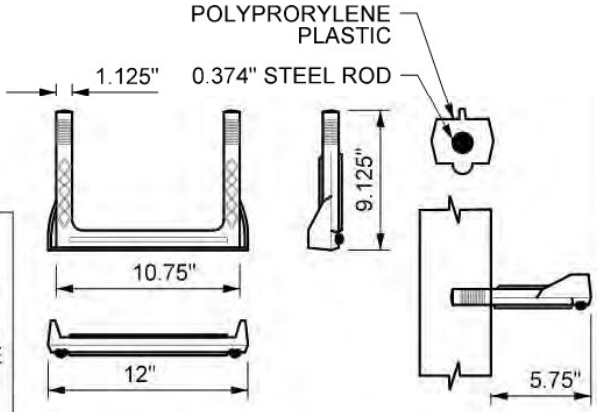


MANHOLE BASE PLAN

TYLOX-SUPER SEAL (OR EQ) SIZE CHART	
48" OD	3/8"
60" OD	3/8"
72" OD	3/8"
84" OD	3/4"
96" OD	3/4"



BASE SELECTION

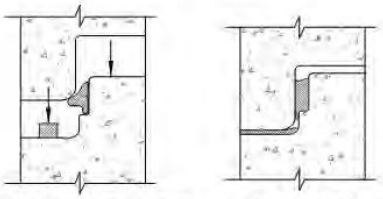


MANHOLE STEPS NOTE:

1.MANHOLE STEPS SHALL BE MANUFACTURED FROM ALUMINUM (ALLOY 6063-T6) OR POLYPROPYLENE PLASTIC REINFORCED WITH A 1/2 " GRADE 60 STEEL ROD. STEPS SHALL BE EMBEDDED IN THE RISER, BASE AND TOP SECTIONS A MINIMUM OF 3" AT THE TIME OF CONSTRUCTION. MANHOLE STEPS SHALL BE A MINIMUM OF 10 3/4" WIDE AND EXTEND FROM THE MANHOLE WALL A MINIMUM OF 5 3/4".

NOTES:

1. ALL MANHOLES WITH PIPE ENTERING WITH DIAMETER OF 24" D.I.P OR LESS SHALL BE SUPPLIED WITH KOR-N-SEAL FLEXIBLE BOOTS OR APPROVED EQUAL. LINES > 24" SHALL HAVE A-LOK (OR EQ) FLEX BOOTS CAST INTO MH WALLS, GROUT CONN (2" MIN CL OPNG) ONLY WHEN CALLED FOR IN PLANS.
2. PRECAST SECTIONS SHALL BE REINFORCED PER ASTM C-478
3. UNLESS OTHERWISE INDICATED ON PLANS OR PROFILES, ALL MANHOLES SHALL BE 48" DIAMETER.



OPEN MANHOLE JOINT SEALED MANHOLE JOINT

JOINT DETAIL TYP ALL SIZES

CITY OF PRATTVILLE

PUBLIC WORKS DEPARTMENT

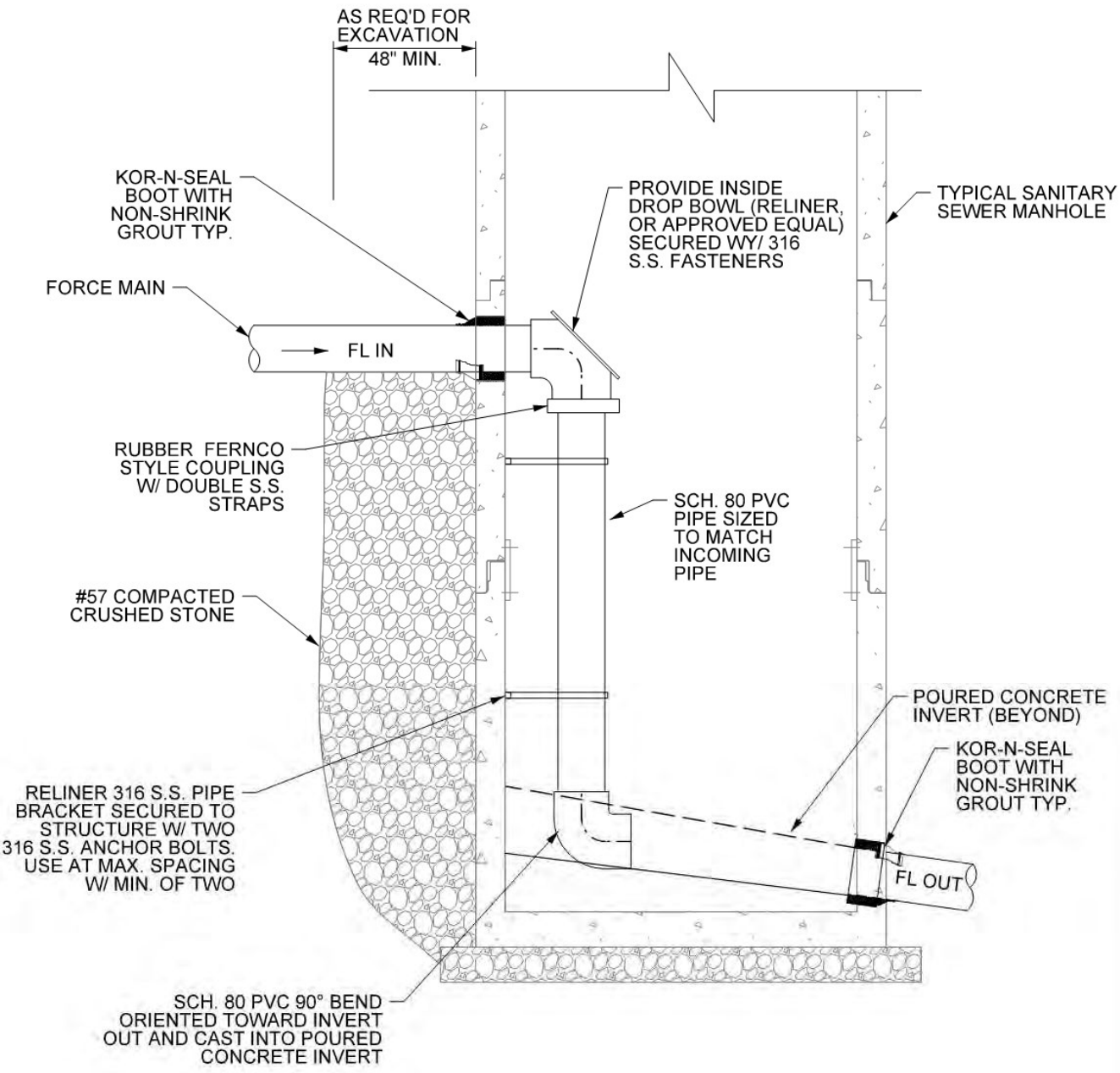
530 DOSTER ROAD
Prattville, Alabama 36067

PUBLIC WORKS MANUAL

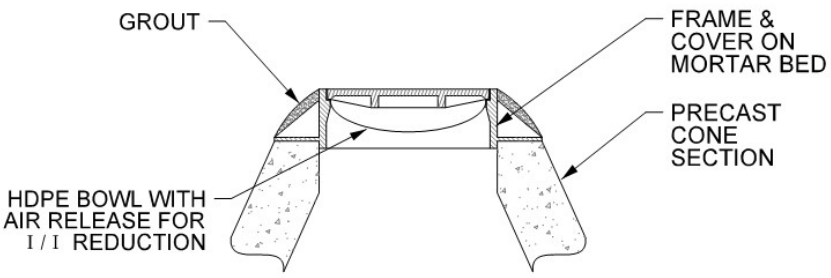
TYPICAL MANHOLE PART 2

SCALE: N.T.S.

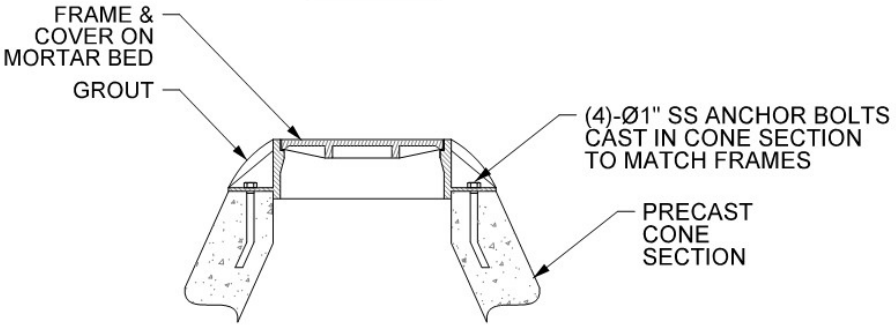
DETAIL # : 6



CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL FORCE MAIN DISCHARGE DETAIL	SCALE: N.T.S. DETAIL # : 7



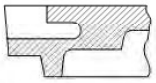
STANDARD



WATERTIGHT

NOTES:

1. CONTACTING/SEALING SURFACES OF FRAME AND COVER SHALL BE MACHINED.
2. MINIMUM WEIGHTS:
   FRAME - 180 LB
   COVER - 120 LB
3. UNLESS INDICATED ON PLANS, ALL COVERS SHALL BE NON-VENTED.
4. COVER PATTERN SHALL MATCH THE STANDARD OF THE OWNER.
5. ALL COVERS SHALL BE STANDARD UNLESS SPECIFICALLY CALLED OUT AS WATERTIGHT ON PLANS.

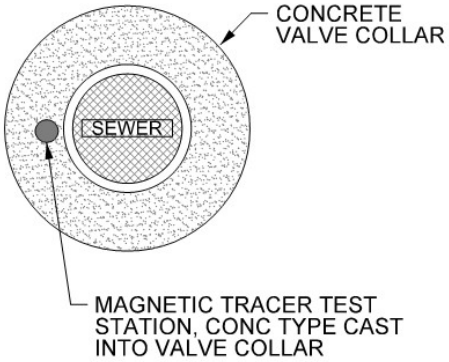


TYPE TWO NON-PENETRATING PICKHOLES

PICKHOLE DETAIL

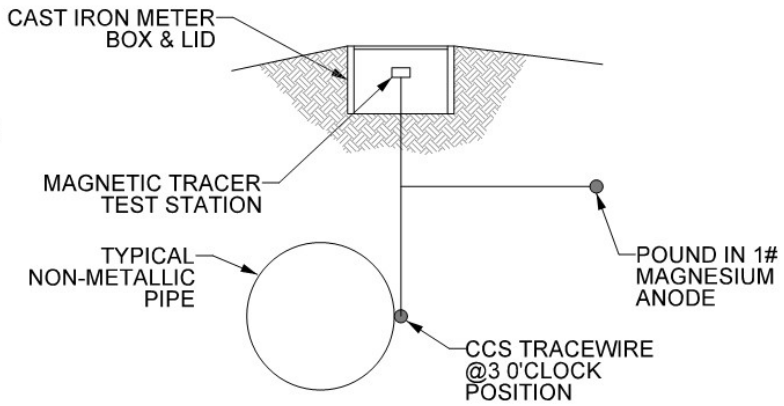
WATERTIGHT DETAIL

CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL TYPICAL MANHOLE RING AND COVER	SCALE: N.T.S. DETAIL # : 8



CONCRETE VALVE COLLAR PLAN

SCALE : N.T.S.

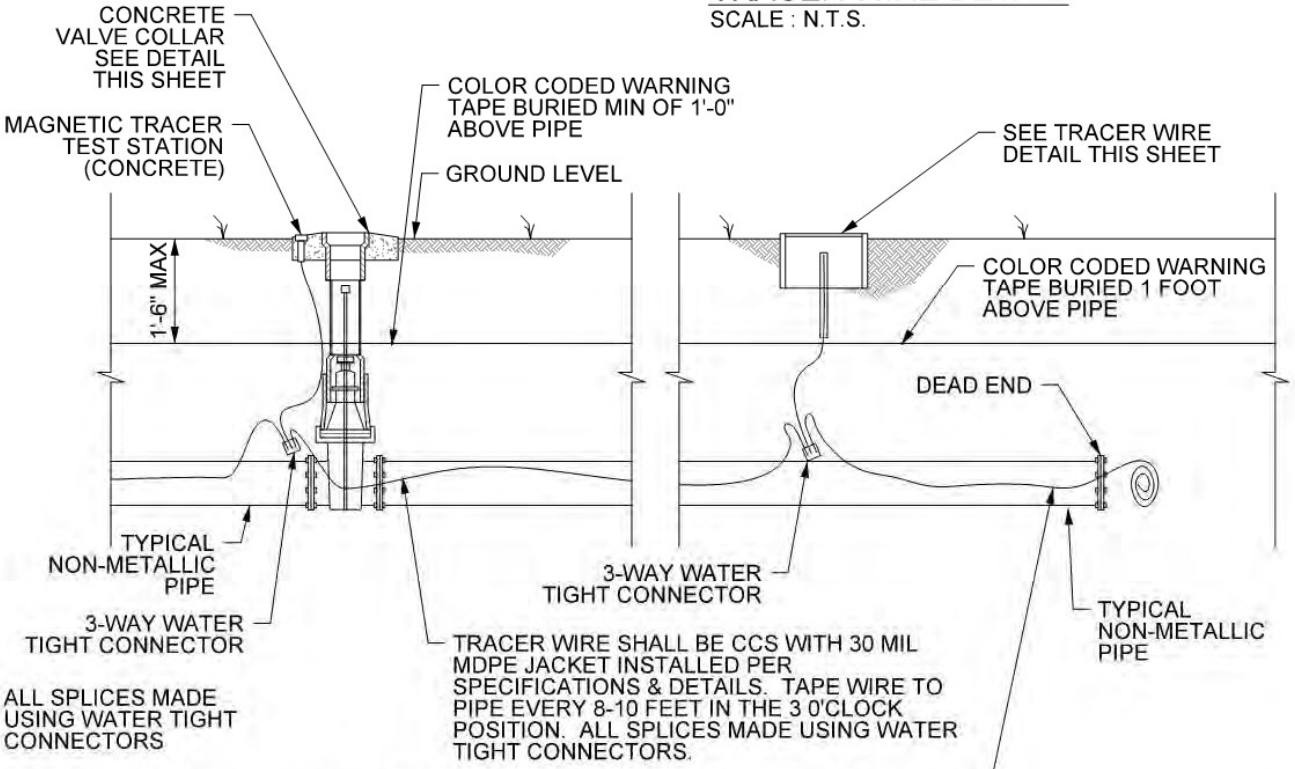


NOTES: BOX TYPE BASED ON LOCATION
1. TRAVELWAY = CAST IRON TRAFFIC RATED
2. GRASSED YARDS = WATER METER BOX

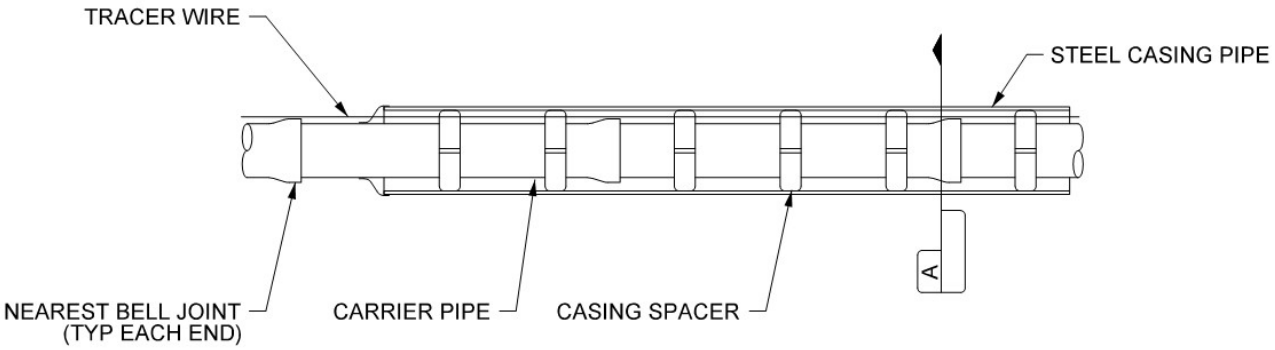
SEE CITY SPEC'S FOR MORE INFO

TRACER WIRE DETAIL

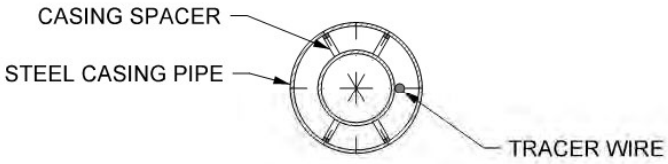
SCALE : N.T.S.



CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL NON-METALLIC PIPE LOCATING SYSTEM	SCALE: N.T.S. DETAIL # : 9



TRACER WIRE IN ENCASEMENT PIPING

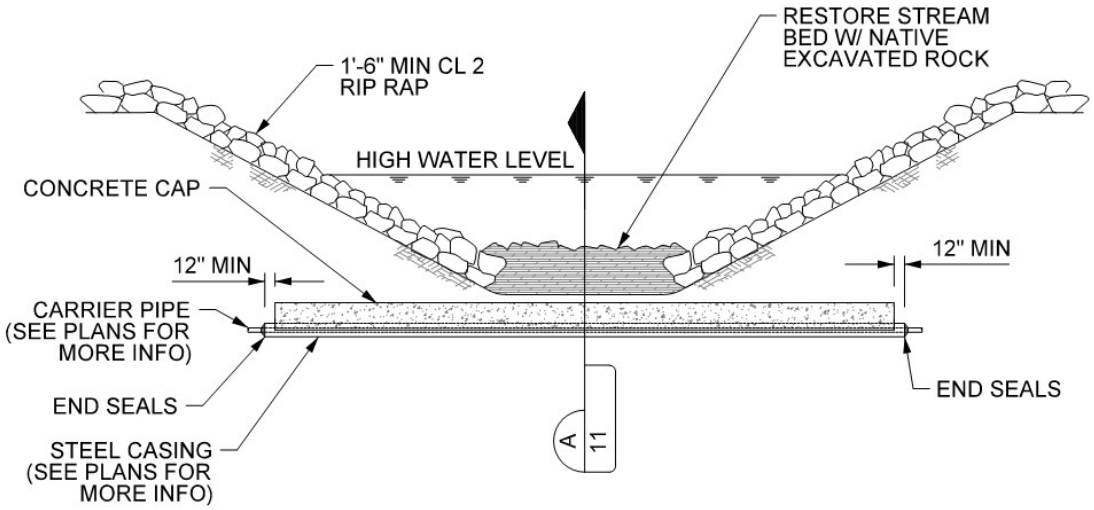


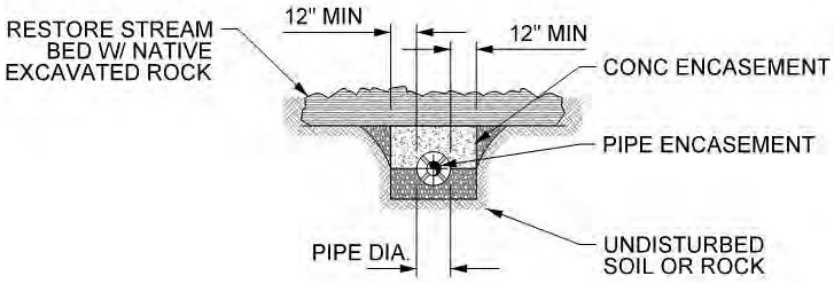
SECTION A-A

NOTES:

1. TRACER WIRE & ACCESSORIES SHALL BE AS MANUFACTURED BY COPPERHEAD INDUSTRIES, OR EQ.
2. MAGNETIC TRACER TEST STATION REQ'D AT EACH END
3. BORING NOTES:
   CCS EXTREME HIGH STRENGTH TRACERWIRE TAPED TO PIPE BETWEEN CASING SPACERS CONTINUOUS W/OUT SPLICE IN BORE OR CASING.
4. TRACER WIRE SHALL BE #12 AWG SOLID CCS WITH 30 MIL MDPE JACKET PER SPECIFICATIONS. ALL SPLICES MADE USING WATER TIGHT CONNECTORS.

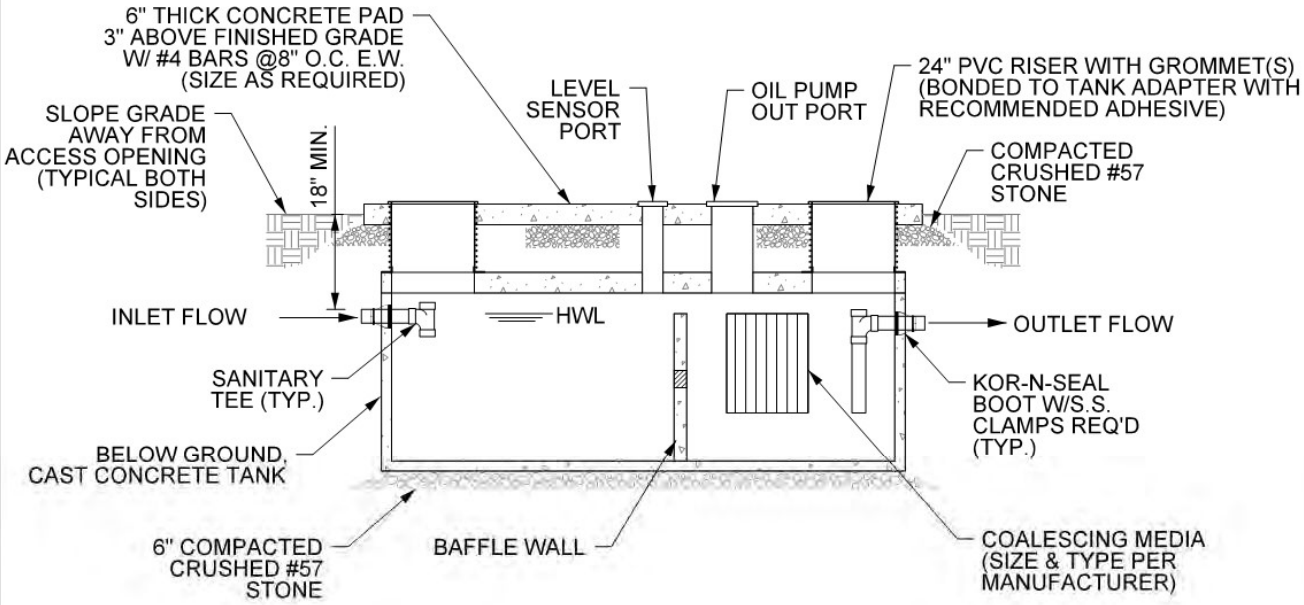
CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL TRACER WIRE IN ENCASEMENT PIPING	SCALE: N.T.S. DETAIL # : 10





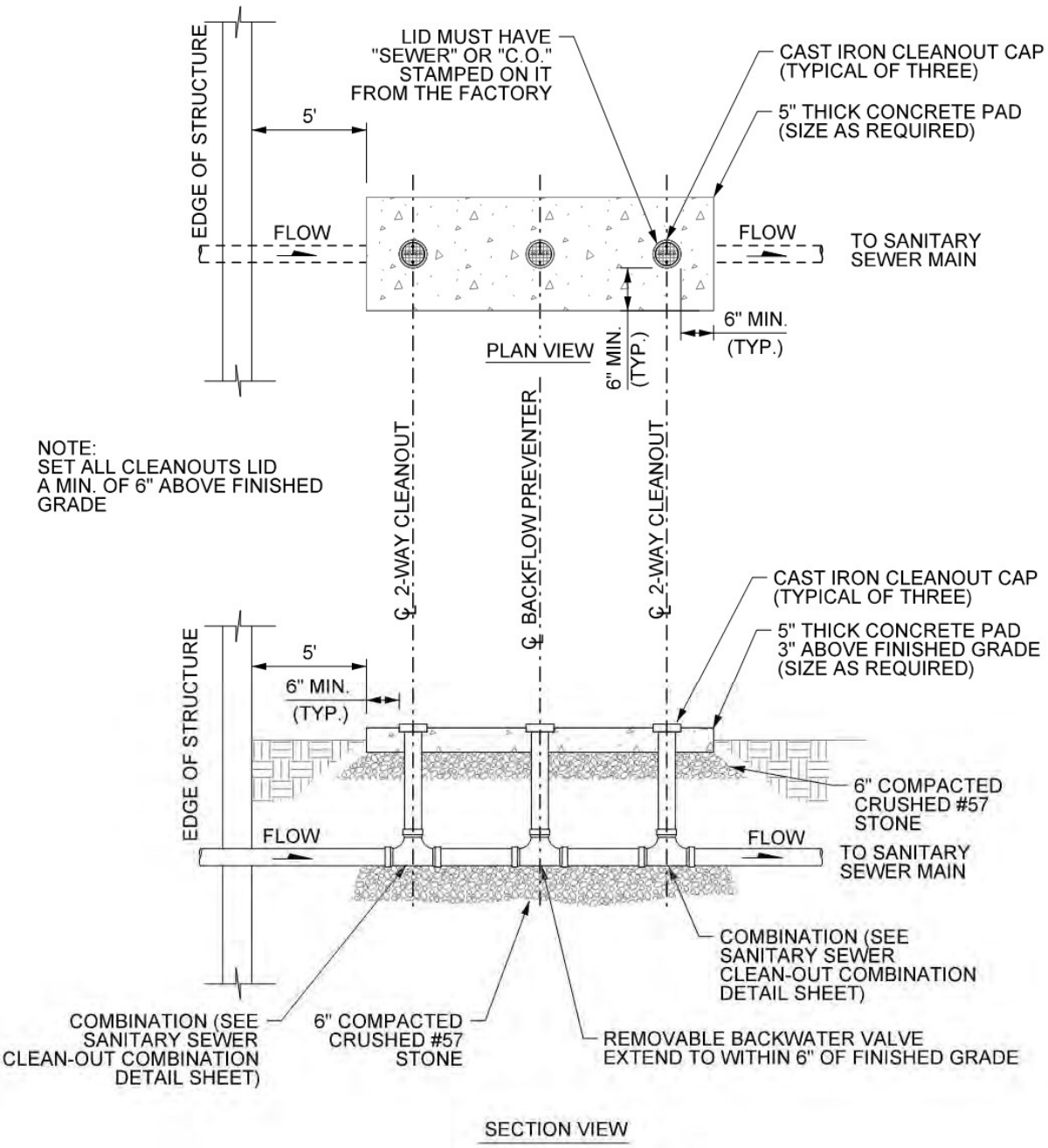
A
11
SECTION

CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL TYPICAL CREEK OR DITCH CROSSING	SCALE: N.T.S. DETAIL # : 11

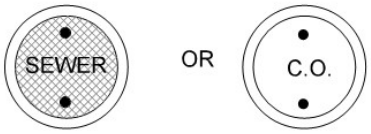


NOTES:
1. PROVIDE VENTS, IF REQUIRED.
2. ALL ACCESS LIDS SHALL BE LOCKABLE & SHALL CONFIRM TO SADIE'S LAW.
3. IF SYSTEM IS LOCATED IN TRAVEL WAY, ALL COMPONENTS SHALL BE TRAFFIC RATED.
4. ALL COMPONENTS OF THE OIL WATER SEPARATOR SYSTEM SHALL BE SIZED BY THE MANUFACTURER. PROJECT SPECIFIC DESIGN CALCULATIONS FROM THE MANUFACTURER SHALL BE PROVIDED FOR REVIEW.

CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL OIL WATER SEPARATOR DETAIL	SCALE: N.T.S. DETAIL # : 12

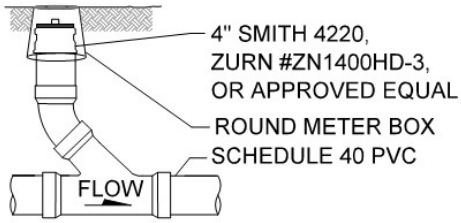


CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL	SCALE: N.T.S.
	SANITARY SEWER BACKFLOW PREVENTER DETAIL	DETAIL # : 13

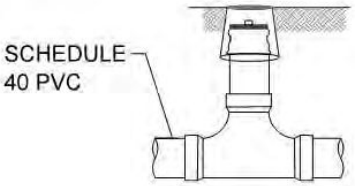


LID MUST HAVE
"SEWER" OR "C.O."
STAMPED ON IT
FROM THE FACTORY

COVER DETAIL



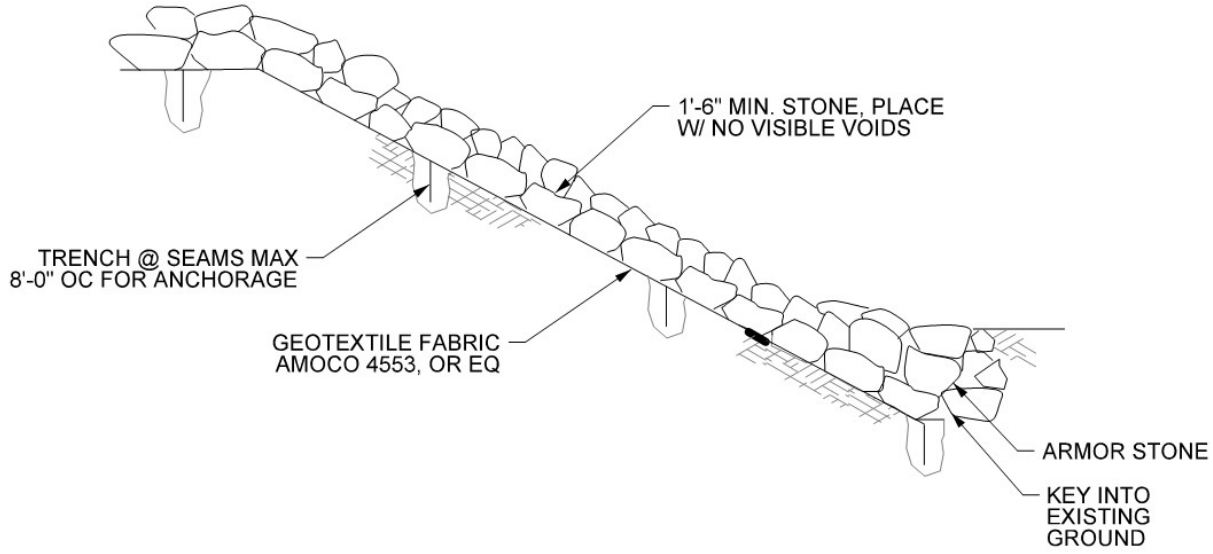
COMBINATION WYE and 1/8 BEND



NOTE:
SET ALL CLEANOUTS LID
A MIN. OF 6" ABOVE FINISHED
GRADE

COMBINATION 2 WAY CLEANOUT

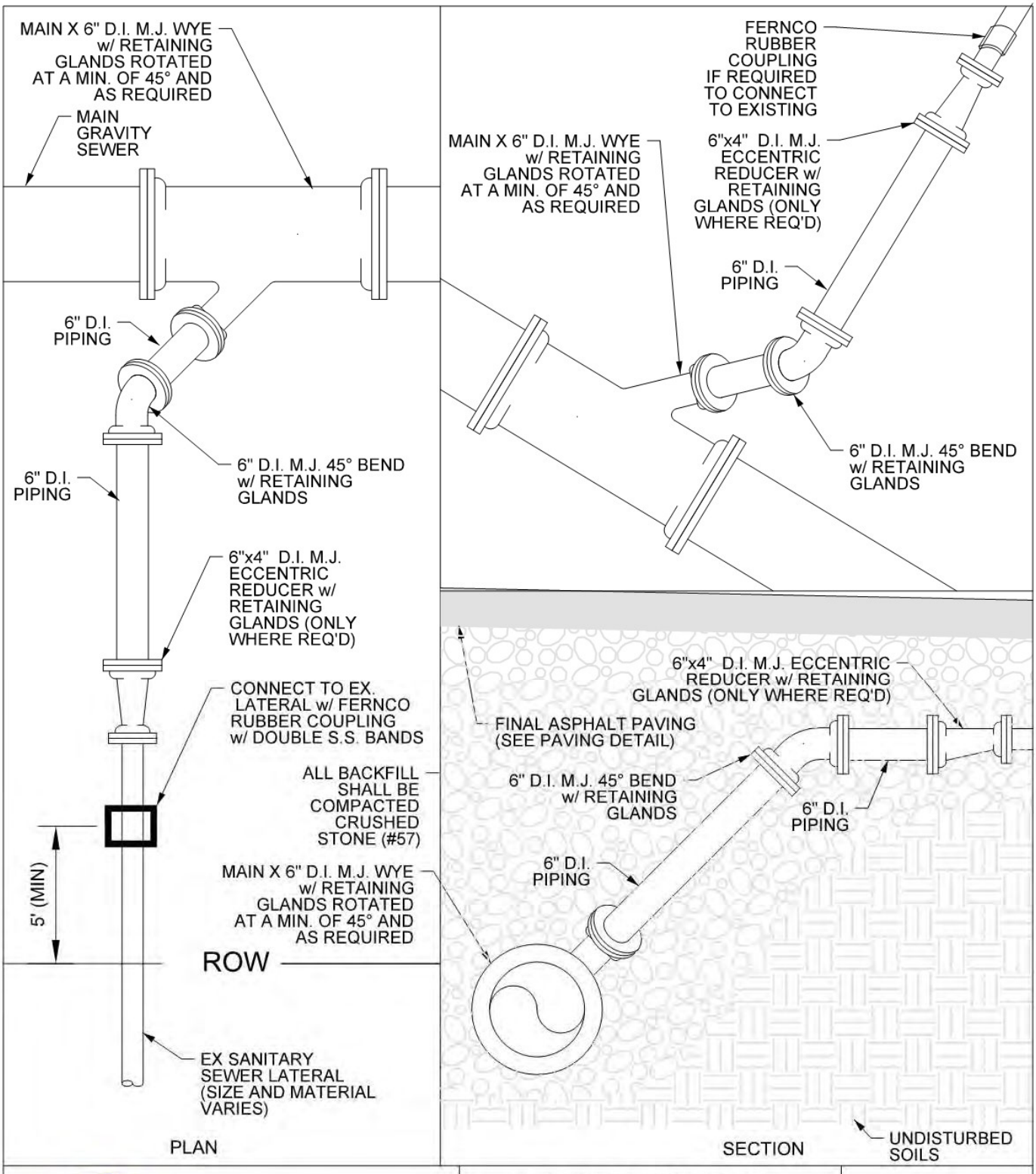
CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL	SCALE: N.T.S.
	SANITARY SEWER CLEAN-OUT COMBINATION DETAIL	DETAIL # : 14



NOTES:

1. STONE FOR CHANNEL PROTECTION RIP RAP SHALL BE SELECTED LIMESTONE ROCK CONSISTING OF WELL GRADED STONE WEIGHING FROM 10 POUNDS TO 200 POUNDS EACH WITH AT LEAST 50% WEIGHING OVER 80 POUNDS. BOTH WIDTH AND THICKNESS SHOULD BE 1/3 THE LENGTH FOR EACH STONE. NOT MORE THAN 10% BY TOTAL WEIGHT SHALL WEIGH LESS THAN 10 POUNDS. AND NOT MORE THAN 10% BY TOTAL WEIGHT SHALL WEIGH MORE THAN 200 POUNDS.
2. ALDOT BID ITEMS & QUANTITIES FOR RIP-RAP MAY BE USED FOR WATER LINE PROTECTION AT CREEK CROSSINGS.

CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL	SCALE: N.T.S.
	TYPICAL RIP - RAP SECTION	DETAIL # : 15



CITY OF PRATTVILLE

PUBLIC WORKS DEPARTMENT

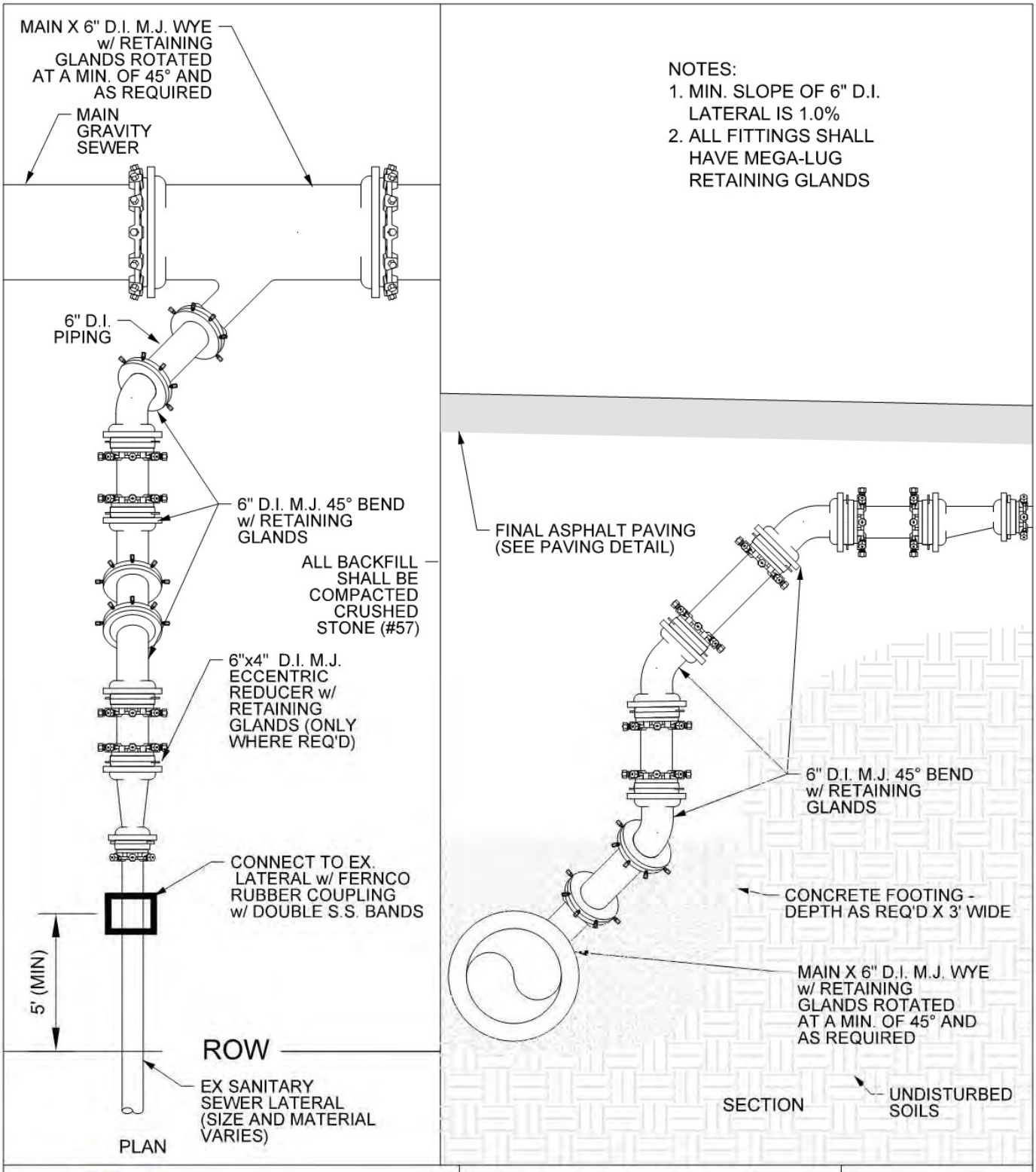
530 DOSTER ROAD
Prattville, Alabama 36067

PUBLIC WORKS MANUAL

TYPICAL SANITARY SEWER LATERAL D.I. CONNECTION DETAIL

SCALE: N.T.S.

DETAIL # : 16



CITY OF PRATTVILLE

PUBLIC WORKS DEPARTMENT

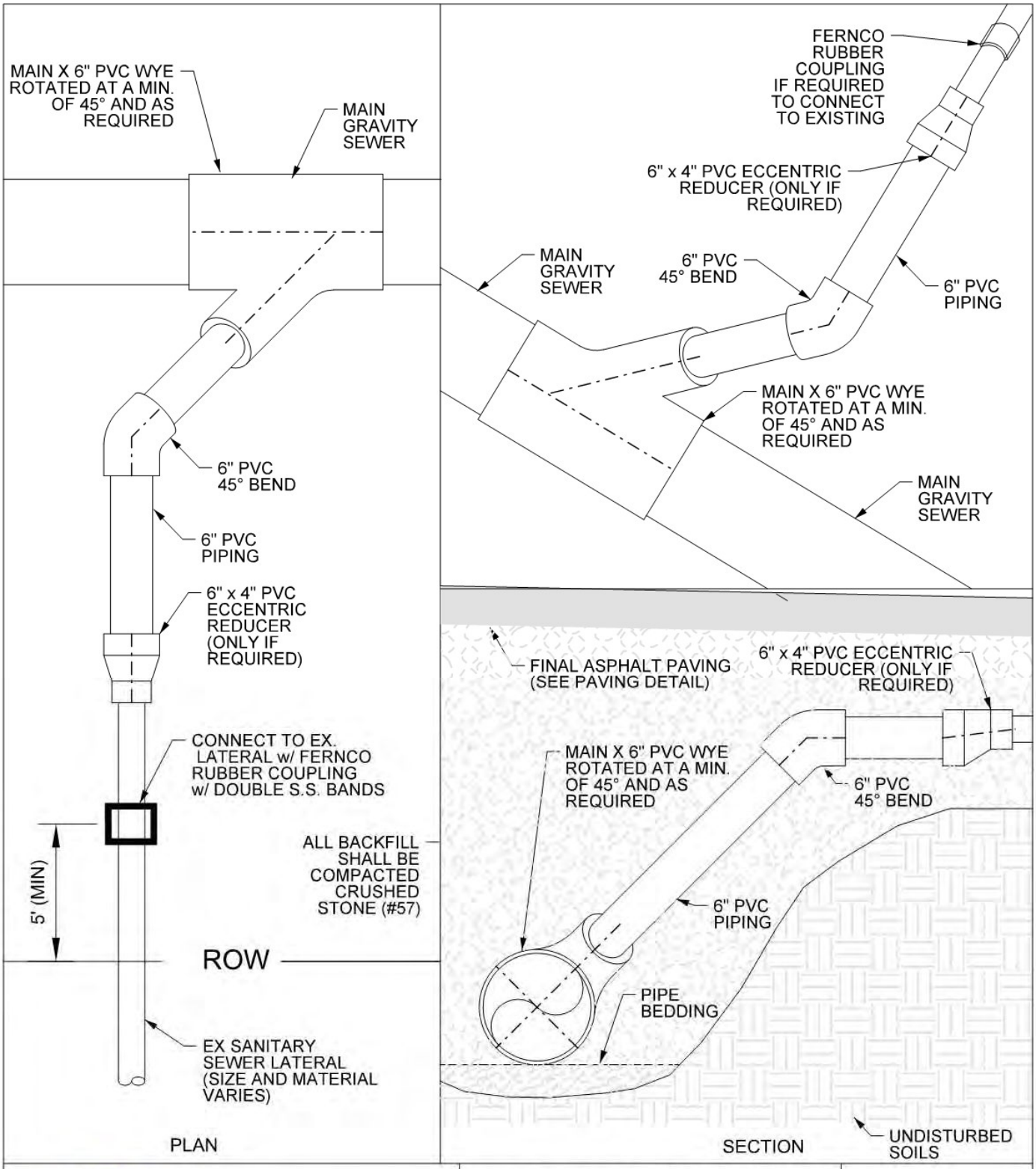
530 DOSTER ROAD
Prattville, Alabama 36067

PUBLIC WORKS MANUAL

TYPICAL SANITARY SEWER DEEP LATERAL D.I. CONNECTION DETAIL

SCALE: N.T.S.

DETAIL # : 17



CITY OF PRATTVILLE

PUBLIC WORKS DEPARTMENT

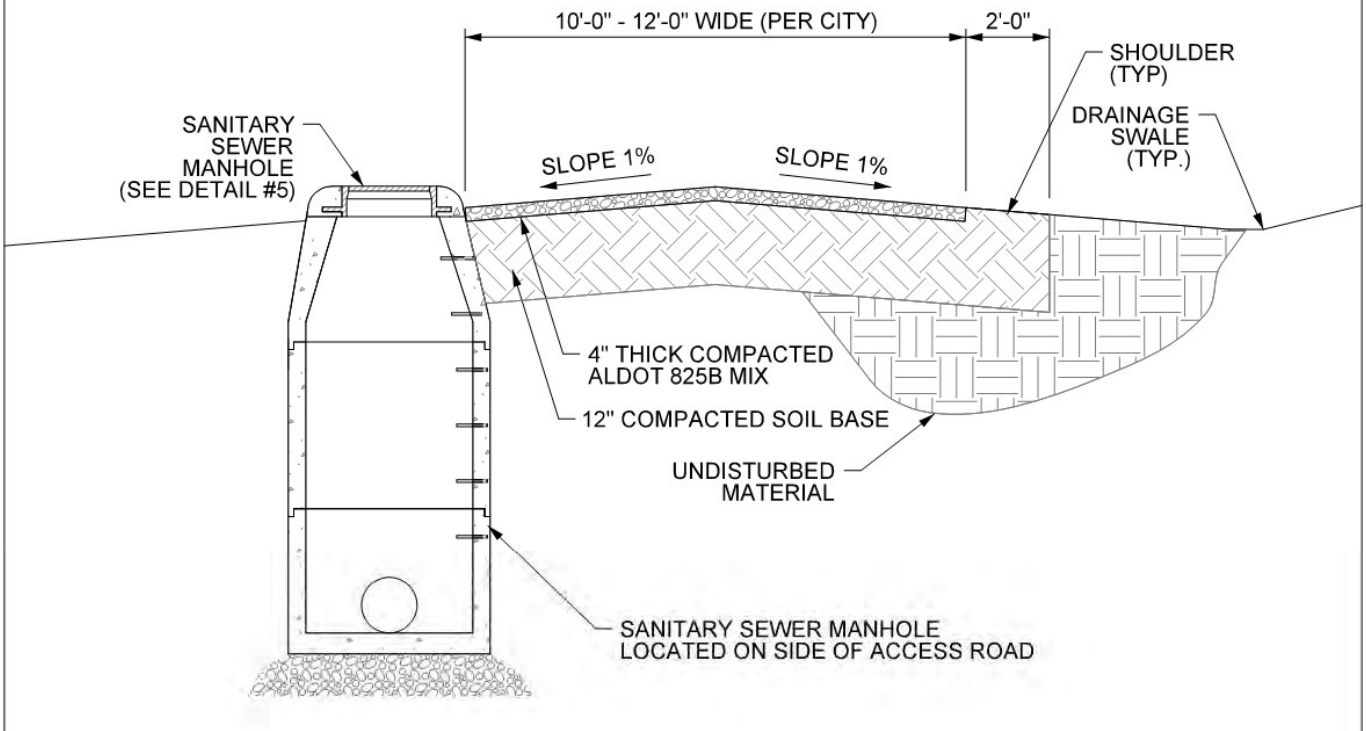
530 DOSTER ROAD
Prattville, Alabama 36067

PUBLIC WORKS MANUAL

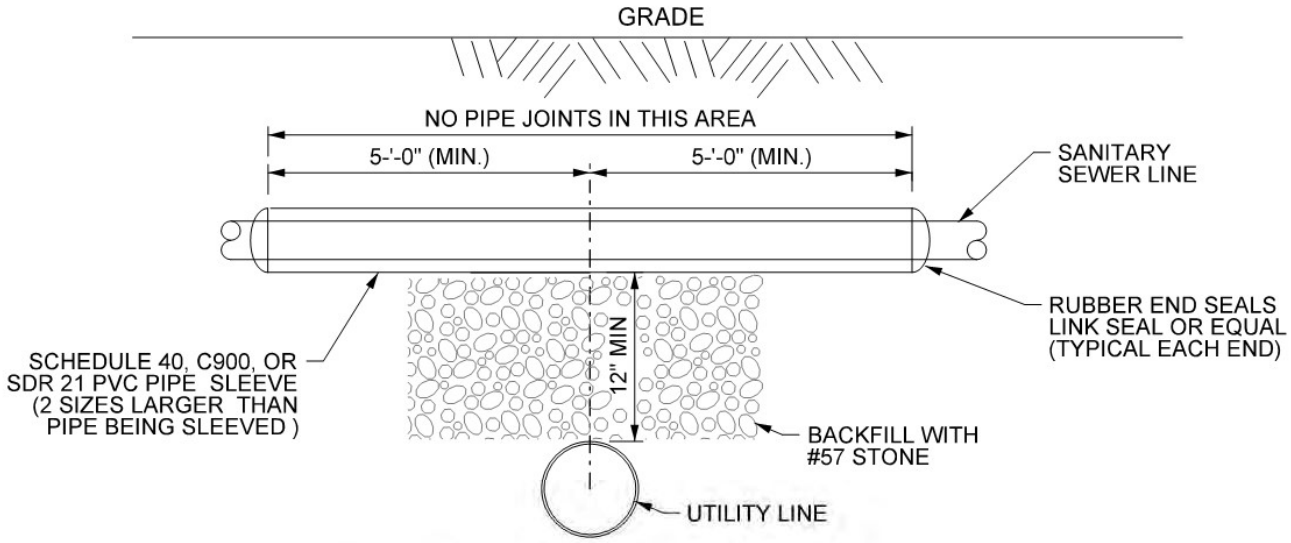
TYPICAL SANITARY SEWER LATERAL PVC CONNECTION DETAIL

SCALE: N.T.S.

DETAIL # : 18



CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL	SCALE ¼" = 1'-0"
	SANITARY SEWER ALL WEATHER ACCESS ROAD DETAIL	DETAIL # : 19



TYPICAL SEWER OVER UTILITY LINE CROSSING

NOTE : CASING PIPE UNDER ROADS SHALL BE SCHEDULE 10, COATED STEEL PIPE

CITY OF PRATTVILLE PUBLIC WORKS DEPARTMENT 530 DOSTER ROAD Prattville, Alabama 36067	PUBLIC WORKS MANUAL SANITARY SEWER TYPICAL UTILITY LINE CROSSING DETAIL	SCALE : N.T.S. DETAIL # : 20

ARTICLE VII

STORM DRAINAGE SYSTEM

Section 1 EASEMENTS

Section 1.1 Location: Easements shall be located on rear, front, or side lot lines, as required and to the width specified by their prospective users. Drainage easements shall be as required by the City Engineer.

Section 1.2 Maier Drainages: Where a subdivision is traversed by a water course, drainage way**,** channel or stream or if such a proposed drainage way is shown on an adopted drainage plan, there shall be provided a storm water drainage easement or right-of-way conforming substantially with the lines of such existing or planned drainage way. The width of such drainage easement shall be sufficient to contain the ultimate channel and maintenance way for the tributary area upstream.

Section 1.3 Alignment: Lots and easements shall be arranged in such a manner as to eliminate unnecessary easement jogs or offsets and to facilitate the use of easements for power distribution, telephone service, drainage, water, and sewer services.

Section 1.4 All storm drainage systems shall be installed so that all storm water is led to and confined in natural drainage channels without causing erosion. No storm drainage shall empty into a sanitary sewer.

Section 1.5 If a development lies within the police jurisdiction of the City of Prattville and a public storm water sewer system is reasonably accessible, the developer shall connect with such storm drainage systems and shall do all grading and provide all drainage structures that are necessary to properly carry water to locations which are acceptable to the City of Prattville.

Section 2 GENERAL CRITERIA

Section 2.1 Applicable Developments: The City's updated post-construction stormwater management requirements are applicable to "Qualifying New Development or Redevelopment" projects that meet one of the following criteria:

1. "Qualifying New Development and Redevelopment" means any site that results from the disturbance of one acre or more of land or the disturbance of less than one acre of land if part of a larger common plan of development or sale that is greater than one acre. Qualifying new development and redevelopment does not include land disturbances conducted by entities under the jurisdiction and supervision of the Alabama Public Service Commission (APC); or,

2. New development and redevelopment projects that result from the disturbance of less than one acre and stormwater management is required to provide adequate protection of the City's MS4. Projects meeting this requirement shall be identified at the discretion of the City.

Since the City has implemented its post-construction stormwater management program in October 2018, the primary Best Management Practices (BMPs) that have been used for post-construction stormwater management include but are not limited to detention ponds, retention ponds, underground detention, bioretention and hydrodynamic separators. This technical memorandum has been updated to address stormwater management BMPs that have been used for post-construction stormwater management. However, this does not preclude the use of other generally accepted BMPs.

2.1.1 Implementation

Effective 5 October 2018, all qualifying new development and redevelopment projects shall be designed in accordance with this technical memorandum.

2.1.2 Waiver Request

The City recognizes that certain developments may qualify for a waiver from post-construction stormwater management requirements: Developments that meet one of the following criteria may request a waiver:

1. An existing development that has been constructed or approved prior to the effective date (5 October 2018) of this technical memorandum;

2. A development that is part of a larger development that has been approved prior to the effective date (5 October 2018) of this technical memorandum and all stormwater management facilities were constructed as part of the larger development; or,

3. A Development that reduces the existing impervious area within the development.

A development that meets criteria 1 or 2 may apply for a waiver by completing an Existing Development Waiver Request Form (Figure 1A). A development that meets criteria 3 may apply for a waiver by completing a Redevelopment Impervious Area Waiver Request Form (Figure 1B). In order for a development to be considered for a waiver, the proposed development shall meet the following requirements:

1. The appropriate waiver request form shall be completed and submitted to the City for review.

2. All supporting documentation (i.e. master plan, basin maps, H&H calculations, development plan approval, etc.) shall be submitted with the waiver request form.

3. For an Existing Development project, density of the development has not increased and/or been modified.

4. For a Redevelopment project, the development does not adversely impact and/or cause flooding of properties within the development, upstream of the development, or downstream of the development. If known flooding or stormwater related concerns are located within the development, upstream of the development, or downstream of the development, the City may deny the waiver request.

2.1.3 Permit Application Review Fee

A Permit Application Review Fee of $1,500 shall be included with the permit application. The permit application review fee shall be in a check made payable to “City of Prattville”. The permit application will not be processed until the permit application review fee is received by the City.

2.1.4 Water Quality Requirements

Post-construction stormwater runoff quality is an important component of the City's SWMP. In order to meet the requirements of the City's NPDES Permit, a Water Quality Volume (WQ_v) must be accounted for on each development and BMPs must be utilized to store and/or treat the WQ_v. The required WQ_v is based upon the first 1.14 inches of rainfall that occurs on the development. The WQ_v can be estimated as described below:

WQ_v = 1.14 inches per acre of additional impervious area

For example: An existing 12.5-acre site planned for redevelopment contains 3 acres of existing impervious area. The proposed development will contain 7 total acres of impervious area in the post-development condition. The required WQ_v shall be calculated as follows:

WQ_v = 1.14 inches * 4 acres of additional impervious area
WQ_v = 1.14 inches * (1 foot / 12 inches) * 4 acres * (43,560 sq.ft. / 1 acre)
WQ_v = 16,553 cubic feet of storage required

The WQ_v that is required for each development may be provided in multiple ways to allow greater flexibility during design. There are a number of post-construction BMPs (such as detention ponds, retention ponds, underground detention, bioretention areas, proprietary stormwater quality treatment devices, etc.) that may be utilized by the Owner and Engineer to meet the water quality and stormwater management requirements.

2.1.5 Low Impact Development (LID)

As an option for meeting the updated post-construction stormwater management requirements, the City encourages Owners, Developers, and Engineers to incorporate the use of low impact development (LID) and/or green infrastructure (GI) practices into qualifying development and redevelopment projects. The latest version of the Alabama Low Impact Development Handbook is incorporated into this technical memorandum by reference.

2.1.6 Design Standards and Requirements

All stormwater management facilities and BMPs shall be designed in accordance with the following requirements:

1. The calculation methodology for hydrologic and hydraulic (H&H) analysis shall utilize the National Resource Conservation Resources (NRCS) Urban Hydrology for Small Watersheds Technical Release 55 (TR-55) or equivalent as approved by the City. For the determination of pre-construction and post-construction stormwater runoff hydrology, the 24-hour rainfall depths from National Oceanic and Atmospheric Administration (NOAA) Atlas14, Volume 9, Version 2 included in Table 1 shall be used:

Table 1 – Design Storms

Storm Event (24 hour)		Rainfall (inches)
WQ_v		1.14
2-year		4.21
5-year		5.24
10-Year		6.17
25-Year		7.55
100-Year		9.93

2. As a part of the City's requirements for post-construction stormwater runoff management, all project sites shall be responsible for ensuring, to the MEP, that post-development runoff mimics pre-development hydrology for the WQ_v, 2-year, 5-year, 10-year, and 25-year rainfall depths listed in Table 1.

3. Stormwater management facilities cannot be constructed within a floodway.

4. The Owner and/or Developer shall ensure, to the MEP, that installation of post-construction BMPs shall not adversely impact and/or cause flooding of properties within the development, located upstream, and/or located downstream of post-construction BMPs.

5. The storm drainage system (i.e. piped storm sewer, overland flow, etc.) within the development shall be designed to convey the discharge resulting from a 100-year, 24-hour storm event in a manner that will not adversely impact and/or cause flooding of structures within the development, located upstream of the development, and/or located downstream of the development.

6. The principal spillway for a stormwater management facility shall be sized to convey the 25-year, 24-hour discharge without allowing any discharge from the emergency spillway.

7. All stormwater management facilities shall be able to convey the peak discharge associated with a 100-year, 24-hour storm event.

8. Each stormwater management facility shall provide for an emergency spillway designed to convey the discharge resulting from a 100-year, 24-hour rainfall event. A freeboard of 20 percent (1 foot minimum) should be added to the embankment above the emergency spillway height to prevent overtopping.

9. Design plans for stormwater management facilities shall show existing contours, proposed contours, details of outlet structure, details of emergency spillway, layout of storm sewer system, details of storm sewer system outlet protection, property lines, drainage area boundaries, roads, rights-of-way, streets, easements, etc.

10. H&H studies for stormwater management facilities shall include model network schematic, existing drainage areas, proposed drainage areas, time of concentration, curve number, pre-development peak discharges, post-development peak discharges, outlet structure geometry,

11. emergency spillway geometry, stage-area-storage summary, discharge summary, inflow and outflow hydrographs, outlet velocities, etc.

12. Design Forms have been developed by the City to aid in the review and approval of stormwater management BMP submittals. The design forms provide a standard format for the Engineer to provide information concerning pre-development conditions, post-development conditions, and BMP information. For a development that contains multiple BMPs, the Engineer shall provide a completed Design Form for each .BMP

2.1.7 As-Built Certification

As a part of the NPDES permit, the City shall ensure the BMPs that have been designed and approved are constructed and operated in accordance with their original design. In an effort to confirm that the constructed BMPs meet the designer's intent, the City has developed various As-Built Certification Forms. It shall be the Owner's responsibility to have as-built information of each post-construction stormwater management BMP field surveyed by a Professional Land Surveyor. It shall be the Engineer's responsibility to utilize the field surveyed information to fill out the applicable As-Built Certification Form. The As-Built Certification Form shall be submitted and approved by the City prior to the issuance of a Certificate of Occupancy (CO) and/or prior to the recording of the final subdivision plat.

2.1.8 Annual Inspections

In order to ensure post-construction BMPs continue to function in accordance with their original design and installation, annual inspections are required by the City. The Owner of the development is required to have these annual inspections performed and must then submit the required Annual Inspection Form to the City. The Annual Inspection Form shall provide documentation concerning the condition of each BMP and any maintenance required and/or performed. The City shall evaluate the documentation submitted to confirm that the stormwater management facilities are continuing to function as designed. Specific requirements for annual inspections include:

1. Retain a qualified professional to perform an annual inspection.

2. The qualified professional shall inspect each Post Construction Stormwater BMP to determine if the

3. Post Construction Stormwater BMP is operating as it was originally designed.

4. Identify any maintenance that is required to restore the Post Construction Stormwater BMP back to its original condition. Maintenance activities may include but are not limited to the following:

a. Remove any accumulated sediment, debris, and/or trash;

b. Remove any invasive vegetation (i.e. trees, shrubs, kudzu, etc.);

c. Repair and re-vegetate any damaged slopes or embankments; or,

d. Repair or replace any damaged component(s) of the BMP.

5. Develop a cost estimate for all necessary maintenance required to restore the Post Construction Stormwater BMP back to its original condition.

6. Complete the applicable Annual Inspection Form and submit it to the City on or before 30 September.

2.1.10 Escrow Requirements

All HOAs or other multi member entities, shall create and contribute annually to a BMP maintenance escrow account. The annual contributions shall be recorded on the HOA Maintenance Request Form and shall be submitted to the City each year by 1 September.

2.1.11 Operation and Maintenance

It is the responsibility of the Owner to operate and maintain the stormwater management facility and/or BMPs in accordance with the original design intent and approval. If the original Owner or Developer has sold the development or transferred ownership to a Homeowner's Association (HOA) or other entity, the Operation and Maintenance Agreement (OMA) shall be transferred to the new Owner or HOA. It is the new Owner, HOA or other entity responsibility to maintain the stormwater management facility and provide any required inspection, maintenance and escrow funds.

Should maintenance be needed at a stormwater management facility as a result of the annual inspection or at the direction of the City, the Owner, HOA or other entity shall take the following actions:

1. Retain a qualified registered professional to develop a scope of work and estimated cost for the maintenance to be performed;

2. Complete and submit the HOA Maintenance Request Form to the City Department for review and approval;

3. Upon approval of the Maintenance Request Form by the City, the City shall authorize the escrow agent to release funds from the escrow account to perform the necessary maintenance work; and,

4. Upon completion of all maintenance work, the qualified registered professional shall conduct an inspection to certify that all maintenance work has been completed and the stormwater management facility is operating as it was designed. A supplemental Annual Inspection Form shall be submitted to the City.

Section 2.2 No land shall be developed in the police jurisdiction of the City of Prattville without first considering the effects of this design storm event. If, in the opinion of the City Engineer, drainage from the design storm event will adversely affect the proposed development, confined conveyance of the drainage will be required. If it is determined that this drainage should be conveyed by pipe 42 inches in diameter or less, then an underground structure will be required to transport this flow. For greater flows, properly designed open flumed ditches may be used at the option of the City's Engineer. However, an underground structure will be required on buildable lots, between road rights-of-way and the building line. Drainage parallel to an uncurbed roadway, and drainage that flows through parks or lots greater than one (1) acre may be excepted from this requirement if it can be shown that utilizing a drainage ditch will not adversely affect the development.

Section 2.3 Special consideration shall be given to innovative drainage designs that would not adversely affect the quality of development in a particular area.

Section 2.4 If it is determined that drainage ditches are required to convey the storm drainage and it is necessary that these ditches be constructed at a slope of greater than four (4) percent, then these ditches shall be suitably paved.

Section 2.5 Detention ponds and/or similar structures may be required at the option of the City's Engineer.

Section 2.6 Drainage structures shall be constructed at street intersections or where changes in vertical or horizontal alignment occur. The maximum length of storm sewer pipe between such structures shall be four hundred (400) feet unless otherwise directed by the City Engineer.

Section 3 CURB AND GUTTER REQUIREMENTS

Section 3.1 Curb and gutters shall be required for all streets except those on which no lot is less than one and one-half ($1\ ^1/_2$) acre in size, and no lot dimension fronting on a street is less than one hundred fifty (150) feet. Curb and gutter may still be required if, in the opinion of the City Engineer, they are required for proper drainage.

Section 3.2 Curb and Gutters Required: Curb and gutters shall be required along the edges of all street pavements and shall be formed to the cross-section shown on the plans. Whenever practical, the curbs shall be constructed integrally with the pavement using slipform or extrusion equipment, or placed immediately after finishing operations by hand forming or using face forms.

Section 3.3 Curbs: Curbs shall be constructed of Portland Cement Airentrained Concrete, Class B, having a standard strength of three thousand (3,000) pounds per square inch. If it is not feasible to install curb and gutter, the Engineer may require a header curb or valley curb to be installed at the pavement edge.

See Illustration No. 4 and Illustration No. 5, Appendix

Section 4 PIPE CONSTRUCTION SPECIFICATIONS

Section 4.1 All concrete and vitrified clay pipe to be installed as storm sewers, except existing pipe required to be removed and re-laid, shall be unused pipe conforming with the following specifications and latest revisions:

Concrete Sewer, Storm Drain and Culvert Pipe	ASTM Des.C-14-68
Reinforced Concrete Culvert Pipe	ASTM Des.C-76-69
Extra Strength Vitrified Clay Pipe	ASTM Des.C-200-69

Section 4.2 Trenches shall be as narrow as practicable, at the same time providing on each side of the pipe, space necessary for thoroughly tamping the bedding material under and around the pipe.

Section 4.3 The bottom of the trench on which the pipe is to be laid shall be free from projecting stones, roots or any inequalities, and shall be brought to a true grade and so shaped as to conform to the contour of the bottom of the pipe for at least one fourth ($^1/_4$) of its circumference to provide a firm, uniform bearing for the entire laying length of the pipe. Recesses shall be formed in the trench to receive the bells of the pipe, or to provide ample space for making joints for tongue and groove pipe.

Section 4.4 If, in the opinion of the City Engineer, the material at the bottom of the trench excavation is of such character as to result in unequal settlement of the pipe after backfilling, the trench shall be excavated below grade to the depth directed by the Engineer and backfilled with gravel or select material and thoroughly tamped to insure a stable foundation. Gravel shall conform to the specifications for concrete aggregate and select material shall be pit run sand-gravel or clay-gravel, approved by the City Engineer.

Section 4.5 If rock is encountered in excavating the trenches, it shall be removed to a depth of at least six (6) inches below grade and the trench brought to grade by refilling with suitable material thoroughly tamped to the contour of the bottom of the pipe as above directed.

Section 4.6 Sheeting, bracing, wales, etc. are required as may be necessary to properly support the sides of trench excavations and to prevent any movement thereof which may in any way injure the pipe, diminish the width of the excavation, or otherwise injure or delay the work or endanger adjacent pavement or other structures. Care shall be used to prevent voids outside the sheeting, but if voids occur they shall be immediately filled with suitable material which shall be rammed to the satisfaction of the City's Engineer.

Section 4.7 Upon written order of the Engineer, sheeting or bracing may be left in place to be embedded by the backfilling of the trench. The sheeting so left in place shall be cut off at the elevation directed which shall, in no case, be less than three (3) feet below the finished grade of the street, or, in the absence of any street grade, from the surface of the ground.

Section 4.8 All sheeting and bracing, not ordered left in place, shall be removed in such manner as will not endanger the constructed sewer, or other public or private structures, or utilities. All voids left or caused by the withdrawal of sheeting shall be immediately refilled and compacted by ramming tools adapted for the purpose, by puddling or otherwise, as directed.

Section 4.9 When it is necessary that sheeting be driven to a depth of two feet or more below the invert elevation of the pipe for this protection of the bottom portion of the trench, the sheeting shall be cut off at the level of the top of the pipe, leaving the lower portion in place.

Section 4.10 Pumping shall be conducted as may be necessary to permit the construction to proceed in an expeditious and workmanlike manner. The disposal of the water removed and excavations shall be constructed in such manner as not to cause any nuisance or any injury to public health or public or private property or to any portion of the work completed or in progress, or to the surface of the streets or any impediment to the use of the streets by the public.

Section 4.11 In no case is water to be allowed to run over the foundation, the invert, or through the pipe until the pipe joints have hardened to the satisfaction of the Engineer. All sewers shall be laid to lines and grades shown on plans or designated by the Engineer or City Engineer.

Section 4.12 No section of pipe shall be laid which has not been inspected by the City Engineer, or his authorized representative, after it has been placed alongside the right-of-way, or line of sewer. Lowering pipe into trenches shall be done with ropes or such other proper facilities as will prevent damage to the pipe during handling. Dropping pipe into place, or rolling, except controlled rolling on plank in the case of shallow

trenches, will not be permitted. The pipe shall be laid starting at the down-stream end with the hub or receiving end of the adjacent section with the spigot end hard against the shoulder of the bell. Each section shall be carefully bedded in place in close contact with the adjoining section with the invert true to line and grade.

Section 4.13 No jointing of pipe on the bank or out of position as to line and grade will be permitted without prior written approval of the City Engineer.

Section 4.14 Not later than 24 hours prior to joining bell and spigot pipe, the ends to be joined shall be coated with a prime in accordance with the instructions of the manufacturers of the joint material. The prime shall be placed only on clean, dry surfaces.

Section 4.15 When pipes are to be joined a gasket of closely twisted, long fiber hemp of oakum, of suitable diameter and of sufficient length to shape around the pipe and lap at the top, shall be placed on the spigot end of the pipe being laid and this pipe shall be pushed home into the bell of the adjacent pipe. The gasket shall then be thoroughly caulked to the back of the bell with a suitable caulking tool. A runner shall be placed around the pipe to close the socket opening. The joint compound shall then be placed in accordance with the manufacturer's recommendations in such a manner that the annular space will be completely filled.

Section 4.16 Joint material shall be "G.K.Compound", "Jointite", or approved equal. Handling and preparation of the joint material shall be in accordance with the manufacturer's recommendations.

Section 4.17 Tongue and groove pipe joints shall be constructed using a stiff mortar composed of one part Portland cement and not more than two parts clean, sharp sand. The mortar shall be used within thirty minutes from the time that the ingredients are mixed with water.

Section 4.18 The first pipe shall be bedded carefully to the established grade line with the groove upstream. A shallow excavation shall be made underneath the pipe at the joint and filled with mortar to provide a bed for the second pipe. The grooved end of the first pipe shall be carefully cleaned with a wet brush, and a layer of soft mortar applied to the lower half of the groove. The tongue of the second pipe shall be cleaned carefully with a wet brush, and while in a horizontal position, a layer of soft mortar shall be applied to the upper half of the tongue. The tongue end of the second pipe shall then be inserted in the groove end of the first pipe, until mortar is squeezed out on the interior and exterior surfaces. Sufficient mortar shall be used to completely fill the joint and to form a bead on the outside. The interior surface of the pipe at the joint shall then be brushed smooth. The mortar on the outside shall immediately be protected from the air and sun with a cover of wetted burlap or earth, and shall be kept protected until the mortar is satisfactorily cured.

Section 4.19 Tongue and groove pipe joints may be constructed by use of "diaper bands" in lieu of above specified method, providing method of installation is approved by the City's Engineer.

Section 4.20 All backfilling material shall be carefully selected to ensure that it is free from roots, rock or other unsuitable material and shall have a moisture content which will facilitate compaction.

Section 4.21 Special care shall be used in backfilling around the pipe and a distance of two (2) feet above its top surface. The material shall be deposited in uniform layers not to exceed four (4) inches in thickness, solidly tamped and rammed with proper tools to insure thorough compaction and at the same time avoid injury to or disturbance of the pipe.

Section 4.22 Where backfilling is done within the limits of roads, streets, alleys or other thoroughfares, the backfill, except as specified above, shall be placed in layers of not more than six (6) inches and each layer

thoroughly compacted with mechanical rammers or by hand tamping with heavy tampers, the tamping face of which shall not exceed 25 square inches. Except for that part of the trench below a line two (2) feet above the top of the pipe, backfilling done outside the limits of public thoroughfares may be placed in twelve (12) inch layers, and tamped or this portion of the backfill may be flooded.

Section 5 **CONSTRUCTION SPEIFICATIONS FOR MANHOLES, INLETS, JUNCTION BOXES, WINGWALLS, SPILLWAY CONCRETE, HEADWALLS AND SPECIAL STRUCTURES**

Section 5.1 The materials and method of construction of the concrete portion or portions of manholes, inlets, junction boxes, wingwalls, spillway concrete, headwalls, and other similar structures, shall conform to the applicable portions of this manual.

Section 5.2 If the construction of a portion or portions of manholes, inlets, junction boxes, headwalls and other similar structures requires less than the equivalent of one carload of brick, such brick shall be supplied from a source approved by the Engineer and shall be hard burned and free from imperfections.

Section 5.3 However, if the work requires the equivalent of a carload of more, such brick shall conform to the requirements of ASTM Des. C-32, Grade MA. Developer shall furnish to the Engineer certificates by the manufacturer of the brick evidencing that the brick supplied meets the requirements of these specifications.

Section 5.4 Mortar for brickwork shall consist of one (1) part Portland cement and two (2) parts clean, sharp sand with not more than twenty (20) pounds of hydrated lime added, per sack of cement.

Section 5.5 All courses shall be laid as header courses. Each brick shall have full mortar joints on the bottom and sides which shall be formed in one operation by placing sufficient mortar on the bed and shoving the brick into it. Horizontal joints shall not exceed three eighths ($^3/_8$) of an inch and the vertical joints on the inside shall not exceed one-fourth ($^1/_4$) of an inch. All brick shall be thoroughly drenched with water immediately before being laid.

Section 5.6 Brick manholes shall have a plaster coat of 1:2 mortar not less than one-half ($^1/_2$) of an inch in thickness on the outside and inside.

Section 5.7 That portion of all manholes, inlets, junction boxes and other similar structures below the center line of the largest pipe or box culvert entering or leaving the particular structure shall have a "streamlined" contact surface. This shall be accomplished by land-placing concrete in a manner as to provide a smooth contact surface, without angular breaks, from upstream conduit or conduits to downstream conduit or conduits.

Section 5.8 Bricks may be used to construct part of the "streamline" fill provided each brick is completely embedded in concrete or a stiff mortar of one part Portland cement and two parts sand, and further provided that no portion of the brick work be closer than one inch from the contact surface.

Section 5.9 All castings shall conform to the latest requirements of ASTM Des. A-48, Class 30.

Section 5.10 Gray iron castings shall be made in accordance with detail drawings furnished and shall be of tough, close-grained iron, true to pattern and free from defects.

Section 5.11 Manhole covers shall be fitted to manhole frames by chipping, grinding or other means, in such manner as to prevent rocking of the cover when an eccentric load is applied to its top. Any tendency to rattle as

determined by test before or after installation will be sufficient cause for rejection of the cover, frame or both.

Section 5.12 All surfaces of castings shall be thoroughly cleaned and given one coat of asphaltum or coal tar pitch varnish before being shipped from the foundry. The varnish shall be of good quality, tough and tenacious when cold, and have no tendency to scale off.

Section 5.13 Grates not required to be fitted into frames shall be given a thick coating of coal tar pitch or grease on the contact surfaces which are to be seated into masonry so as to prevent bonding thereto.

Section 6 REQUIRED CONTRACTOR NOTES

Section 6.1 The following notes to the Contractor shall be placed on all plans and specifications for surface drainage structures or work drawn for the City of Prattville.

NOTES TO THE CONTRACTOR

A. CONCRETE PEDESTAL SHALL BE POURED IN PLACE. ROUND FORM MAY BE CONSTRUCTED OF METAL, PLASTIC, OR OTHER APPROVED MATERIAL A 6 INCH DIAMETER PIPE SHELL FILLED WITH CONCRETE WILL NOT BE APPROVED.

B. PIPE MAY CONNECT WITH INLETS FROM ANY DIRECTION, AND AS MANY CONNECTIONS SHALL BE MADE AS NECESSARY.

C. MANHOLE FRAME AND COVER SHALL BE AN APPROVED STANDARD CAST IRON DESIGN.

D. A MINIMUM OF THREE (3) 5/8 INCH STEEL LADDER BARS OF AN APPROVED DESIGN ARE REQUIRED IN ALL INLETS WHERE HEIGHT IS GREATER THAN 4'-0".

E. TWO (2) INCH MINIMUM WEEP HOLES SHALL BE CONSTRUCTED IN INLETS AS DIRECTED BY THE ENGINEER TO FACILITATE SUBGRADE DRAINAGE.

F. INLET DIMENSIONS MUST BE INCREASED TO ACCOMMODATE LARGER PIPE.

G. WHERE DIRECTION OF FLOW IS FROM EACH END OF INLET, SIDE WING (SINGLE WING SHOWN) OPENINGS SHALL BE CONSTRUCTED AT EACH END OF INLET, FOR EACH INLET SO CONSTRUCTED.

H. CONCRETE SHALL BE CLASS A (3000 psi@ 28 DAYS).

I. TWO (2) INCH TEMPORARY DRAIN PIPE TO BE USED DURING STREET CONSTRUCTION. DRAIN PIPE TO BE SEALED AFTER PAVING COMPLETED.

Section 7 CONSTRUCTION SPECIFICATIONS FOR OPEN DITCHES

Section 7.1 Drainage ditch construction will only be permitted with the approval of and at the direction of the City Engineer.

Section 7.2 If it necessary to stockpile the excavation along the bank or banks of a ditch, it shall be placed so that the top of the slope of the stockpiled dirt will not be less than five (5) feet from the top of the ditch bank and shall have openings as required to permit surface water to drain to the ditch and prevent the ponding of water in back of the stockpiled dirt.

Section 7.3 In those cases where the slope of the ditch is to be greater than four (4) percent, or where otherwise required, the ditch shall be lined with concrete.

Section 7.4 The materials and method of construction of the concrete lining and slope paving for open ditches shall conform to the applicable portions of this manual. Exposed base width portion of concrete lined ditches shall be finished with a steel trowel.

Section 7.5 A dry mix will be permitted for the concrete ditch lining and slope paving; however, the concrete shall have sufficient water to assure proper mixing and bonding of concrete. Forming will not be required, but the concrete shall be thoroughly tamped and consolidated. The bottom of the concrete lined ditches shall be given a trowel finish and the bank slopes of concrete lined ditches and slope paving a sidewalk shall be given a brush finish. Wire mesh shall not be placed on the ground and the concrete poured on top of the mesh. Approximately two (2) inches of concrete shall be placed and the wire mesh then placed on the concrete, after which the final two (2) inches of concrete shall be placed on top of the mesh, or the wire mesh may be supported on small concrete blocks wired to the mesh to hold the mesh in proper position in the slab. Wire mesh shall lap three (3) inches on side joints and six (6) inches on end joints.

Section 7.6 Two horizontal lines of weep holes shall be constructed in all slope paving and concrete lining on ditch banks and the lines shall be located six (6) inches above the flow line of ditch and top of slope paving or bank concrete ditch lining. Weep holes shall be spaced twenty (20) feet on centers and shall be staggered between top and bottom lines.

Section 7.7 Weep holes shall be formed by driving a tapered wooden pin with a minimum diameter of two (2) inches through the concrete and approximately one (1) inch into dirt bank. The wooden pin shall be clean and oiled and shall be placed immediately after the concrete has been screened off and shall be removed after the concrete has set hard enough to permit removal of the pin without damage to the concrete around the weep hole.

Section 8 UPGRADE OF RECEIVING DITCHES OR PIPES

Section 8.1 Whenever a development will increase flow into an existing drainage structure, the developer shall be required to upgrade the receiving structure as directed by the City Engineer.

ARTICLE VIII
UTILITIES CONNECTIONS AND
UTILITY COMPANY REQUIREMENTS

Section 1 **GENERAL CRITERIA**

Section 1.1 Every pipe or conduit for water, sewage, gas drainage, communication, or any other use shall be constructed so that it is covered by at least twenty-four (24) inches.

Section 1.2 Each utility should provide the City of Prattville with an up-to-date map of their system within thirty (30) days of written request. This map should indicate the location and depth of each structure along with its relationship to other existing features such as paved areas, structures, and other utility structures.

Section 1.3 Each utility shall provide the City of Prattville with a complete set of construction plans prior to receiving a construction permit.

Section 1.4 Where feasible and appropriate, utility companies shall indicate by means of "surface markings" the locations of their undersurface structures. For instance, curb markings would be considered an excellent method of indicating where a pipe intersected pavement.

Section 2 **PERMITS**

Section 2.1 No person, except in the case of an emergency, shall make any tunnel, opening, or excavation of any kind in or under the surface at any street maintained by the City of Prattville without first securing a permit from the City for each separate undertaking. In the case of an emergency, this permit shall be applied for on the next regular business day. The permit and application therefor shall be in such form as the City Engineer shall require.

Section 3 **EXCAVATIONS**

Section 3.1 No opening or excavation in any street shall extend beyond the center line of the street before being backfilled and the surface of the street temporarily restored. Streets will not be completely closed to traffic except when approved by the City Engineer and noted on the permit.

Section 3.2 No more than 250 feet measured longitudinally shall be opened in any street at any one time.

Section 3.3 All utility facilities shall be exposed sufficiently ahead of trench excavation work to avoid damage to those facilities and to permit their relocation, if necessary.

Section 3.4 Pipe drains, pipe culverts, or other facilities encountered shall be protected.

Section 3.5 Monuments of concrete, iron, or other lasting material set for the purpose of locating or preserving the lines of any street or property subdivision, or a precise survey reference point or a permanent survey reference point or a permanent survey bench mark within the City of Prattville shall not be removed or disturbed or caused to be removed or disturbed unless permission to do so is first obtained in writing from the City Engineer.

Section 3.6 When any earth, gravel, or other excavated material is caused to roll, flow, or wash upon any street, the permittee shall cause the same to be removed from the street within eight (8) hours after the deposit.

Section 3.7 Every permittee shall place around the project such barriers, lights, warning flags and danger signs as shall be determined by the Engineer of Public Works as well as the Alabama Manual of Uniform Traffic Control Devices to be necessary for the protection of the public.

Section 3.8 Access to private driveways shall be provided except during working hours when construction operations prohibit provision of such access. Free access must be provided at all times to fire hydrants.

Section 3.9 Excavated materials shall be laid compactly along the side of the trench and kept trimmed up so as to cause as little inconvenience as possible to public travel. In order to expedite the flow of traffic or to abate a dirt or dust nuisance, bards or bins may be required. If the excavated area is muddy and causes inconvenience to pedestrians, temporary wooden plank walks shall be installed. If the street is not wide enough to hold the excavated material without using part of the adjacent sidewalk, the permittee shall keep a passageway at least one-half the sidewalk width open along such sidewalk line.

Section 3.10 Work shall be performed between the hours of 7:00 AM and 5:00 PM, during day light hours Monday through Friday.

Section 3.11 All pavement cuts, openings, and excavations shall be backfilled and surfaced by the permittee according to City of Prattville specifications.

See Illustration No. 3, Appendix

Section 4 CONSTRUCTION IN THE VICINITY OF EXISTING UTILITIES

Section 4.1 GENERAL CRITERIA

Every effort shall be made to provide any existing maps or information concerning existing utilities to anyone wishing to excavate. However, it remains the contractor's or developer's responsibility to confirm the location of these utilities prior to excavation.

Section 4.2 Every pipe or conduit for water, sewage, gas, drainage, communication or any other use which may be encountered in trenching, shall be carefully protected from injury or displacement and all damage caused to such structures shall be completely repaired.

ARTICLE IX

OFF STREET PARKING: ENTRANCES AND EXITS

Section 1 **GENERAL CRITERIA**

Section 1.1 The location of and the minimum number of off-street parking spaces shall be as described in the City of Prattville Zone Ordinance. Entrances and exitways shall be as required in the following sections.

Section 1.2 Entrances and exits for all public and private parking areas for commercial, residential, industrial or other use, connected to a public street must be approved by the City Engineer prior to use, and shall have the following characteristics:

a. Driveway turn-outs shall be in substantial accordance with the standard drawings shown below.

b. Driveways entering or exiting to public streets with curb and gutter shall match the existing curb and gutter section.

c. Driveways entering or exiting to public street having open ditch drainage at the point of the driveway, shall be provided with a pipe to allow the free flow of 25-year storm water to flow under the driveway unless the City's Engineer approves an alternate design.

d. Driveways should be located in such a way as to maximize sight distance.

e. Driveways should be located so that they will not be in blind spots of other existing driveways.

f. Driveways shall be located at least thirty feet from any intersection of minor streets and at least forty feet from any intersection involving a major street.

See Illustration No. 4, Appendix

Section 1.3 Parking lots, bays or areas shall be constructed with the following materials, or a porous pavement surface approved by the City Engineer. Surface treatment or gravel shall not be used unless the adjacent street is unpaved. This requirement shall apply to interior travel lanes or driveways. Pavement shall consist of the following:

a. Ninety-five (95) percent compacted base soil.

b. Six (6) inches of ninety-five (95) percent compacted crushed stone.

c. One and one-half (1 ½) inches of an asphalt wearing surface.

Section 1.4 The minimum slope of a parking lot shall be one (1) percent. The maximum slope shall be ten (10) percent.

Section 1.5 Parking space allocations should be oriented to specific buildings.

Section 1.6 All parking shall be so arranged that cars and trucks may be turned on the lot so that it is not necessary to back into any street.

Section 1.7 The width of all aisles providing direct access to individual parking stalls shall be in accordance with the requirements set forth below.

Section 1.8

PARKING ANGLE (DEGREES)		AISLE WIDTH ONE-WAY TRAFFIC	AISLE WIDTH TWO-WAY TRAFFIC
0	PARALLEL PARKING	12	24
30		12	24
45		14	24
60		18	24
90	PERPENDICULAR PARKING	24	24

Section 1.9 A one-way car movement (to the left or counter-clockwise) should be encouraged. A loop drive should be developed around the parking areas.

Section 1.10 Parking areas or lots providing for more than sixty (60) motor vehicle spaces shall, where possible, be subdivided into modular parking bays or lots of not greater than sixty (60) spaces each.

Section 1.11 Parking lots shall be curbed with permanent and durable curbing to confine cars to striped parking, without overhang or projection onto sidewalks, driveways, bicycle parking areas, planting areas or adjacent landscaped areas. Parking stripes shall be four (4) inches wide and shall be white.

Section 1.12 Parking spaces shall be on the same lot or tract of land as the building or use to be served unless the planning board, in connection with site plan review, shall approve collective off-street parking facilities for two (2) or more buildings or uses on adjacent or contiguous lots. The total of such collective off-street parking facilities shall be not less than the sum of facilities required for the individual uses computed separately.

Section 1.13 Sidewalks between parking areas and principal structures, along aisles and driveways and wherever pedestrian traffic shall occur, shall be provided with a minimum width of four (4) feet of passible area and be raised six (6) inches or more above the parking area except when crossing streets or driveways.

Section 1.14 Parked vehicles shall not overhang or extend over sidewalk areas, unless an additional sidewalk width of two and one-half (2 ½) feet is provided to accommodate such overhang.

Section 1.15 All parking areas shall be lighted to provide a minimum of three (3) footcandles at driveway intersections with main roads and a total average illumination of one-half (1/2) footcandles throughout the parking area.

Section 1.16 Such lighting shall be shielded in such a manner as not to create a hazard or nuisance to the adjoining properties or the traveling public.

Section 1.17 Unobstructed access to and from a street shall be provided. Paved access drives or driveways shall be provided in accordance with the criteria provided in this ordinance. Should exterior curb and gutter not exist, curb and gutter shall be constructed as required by this ordinance.

Section 1.18 In parking lots containing over (10) spaces, the following landscaping standards shall apply:

a. Five (5) percent of the total vehicular use area shall be landscaped as planter islands or peninsulas within the interior of the parking lot;

b. In addition to (a.) above, five (5) percent of the entire lot shall be landscaped with trees or suitable ground cover;

c. A landscaped barrier or other suitable barrier shall separate parking areas within a site from the main entrance and exitways leading to a public street.

Section 1.19 No public or private parking area or access roads thereto shall be constructed, altered or added to until there shall have been filed with the Department of Planning and Development, an application for a building permit, which shall include a plan, drawn to scale, showing the actual dimensions of the lot or lots to be built upon, the exact size and location on the lot or lots of the building or structure and accessory buildings already existing or to be erected, and containing such other information as shall be deemed necessary.

ARTICLE X

STANDARDS AND REQUIREMENTS

FOR ALL DEVELOPMENTS

Section 1 **GENERAL CRITERIA**

Section 1.1 The following requirements shall apply to all commercial, housing, mobile home, or other developments requiring review under the City Zoning Ordinance or the City Planning Commission's Subdivision Regulations.

Section 2 **DRAINAGE AND INUNDATION**

Section 2.1 Plan required: A drainage plan shall be made for each development by a registered engineer which shall take into account the ultimate or saturated development of the tributary area in which the proposed development is located. Adequate provision shall be made within each development to provide drainage facilities needed within the development taking into account the saturated development of the tributary area. The storm and sanitary sewer plan shall be made prior to other utility plans. Engineering considerations in developments shall give preferential treatment to storm sewer improvements over other utilities and improvements.

Section 2.2 On-site retention: Where development will materially increase downstream flows, on-site retention of water may be required.

Section 2.3 Spill agreements required: Off-premises drainage easements and improvements shall be required to handle the run-off of developments into an appropriate drainage channel as determined by the City Engineer. The developer shall provide the City of Prattville with a Hold-harmless Spill Agreement as required by the City's Engineer.

Section 2.4 Development restricted in flood areas: Low areas below the federally established one hundred (100) year flood level shall not be developed or subdivided unless and until the City Engineer may establish that the area may be developed in accordance with the City's Flood Damage Prevention Ordinance.

Section 2.5 The federally established one-hundred-year flood plain shall be shown on all plats or maps or other graphic descriptions of building development or subdivision of land submitted to any office of the City of Prattville for acceptance or approval, and the same shall be shown on any map, plat or other graphic description filed or recorded with the Judge of Probate’s office.

Section 2.6 Other information required: The City Engineer may require whatever additional engineering information is deemed necessary to make a decision on subdivision and other developments in an area of questionable drainage.

Section 2.7 Conditions of acceptance of water bodies: Lakes, ponds, and similar retention areas will not be accepted for maintenance by the City of Prattville unless said acceptance is approved by the City Engineer.

Section 2.8 Design: Storm sewers shall be designed in accordance with good, accepted engineering practices. Reinforced concrete pipe in accordance with ASTM standards shall be used in all cases. In the case of questionable practices, the opinion of the City Engineer will prevail.

Section 3 SEWER AND WATER STANDARDS

Section 3.1 Developments shall be designed to accommodate public water and sewer if it is available. Water and/or sewer will be considered available if lines of the proper size and flow, with pumping not required, are located within 1200 feet of the property and gravity flow can be established. Installation of all lines shall be the responsibility of the developer. If water and/or sewer is not available, private water supply and sewage disposal may be used subject to the approval of the appropriate County Health Department, and the Alabama Department of Environmental Management.

Section 4 OTHER UTILITIES:

Section 4.1 Development shall be designed to accommodate electrical, gas, telephone, and, if available, cable television utilities. The developers shall contact each of these utilities prior to submission of the plans to the City of Prattville in order to obtain necessary standards or other information which will allow service to any project.

Section 5 CONFLICT WITH PUBLISHED CITY PLANS

Section 5.1 Where a proposed park, playground, school, or other public use shown in the community plan is located in whole or in part in a development, the City Engineer shall require that an option to buy such land be extended to the appropriate public agency or body and that such land be reserved from development pending the action of the appropriate public agency or body. Failure of a public body or agency to exercise such option within sixty (60) days of notification shall be deemed non-acceptance.

Section 6 PRESERVATION OF NATURAL FEATURES

Section 6.1 In all developments, due regard shall be given to the preservation of all natural features such as tree cover, natural groves, water courses, scenic points, historic points, and similar community assets which will add attractiveness and value to the property.

Section 6.2 It is recognized that the preservation of existing trees and vegetation, as well as the planting of new trees and vegetation, can significantly add to the quality of the physical environment of the community. The regulations outlined herein are designed to provide for the health, safety, and welfare of the citizens of the City of Prattville.

Section 6.3 Specifically, trees can provide the following benefits to the community:

a. Provide buffers and screens against noise, air pollution, and unsightly and incompatible land uses;

b. Reduce the hazards of flooding and aid the control of erosion and storm water run-off. Trees also assist in the stabilization of soil and replenish ground water supplies;

c. Act to moderate extremes of temperature and provide shade;

d. Absorb carbon dioxide and supply oxygen in our atmosphere, which is an essential ecological function in the preservation of human and animal life;

e. Provide a haven for birds which, in tum, assists in the control of insects;

f. Aid in energy conservation;

g. Are physiologically, psychologically, sociologically, and aesthetically necessary counterpoints to the man-made urban setting.

Section 6.4 The owners or developers of all developments requiring a site plan as defined in Article 1, Section 10 of the "Zoning Ordinance of the City of Prattville" and which are one acre or larger shall submit the following to the City Engineer.

a. A landscaping plan showing the following:

(1) The outline of existing groupings of trees. Physically outstanding or specimen trees within the groups shall also be shown if they are to be removed;

(2) All individual trees with a caliper of five (5) inches or more at a height of two (2) feet above the ground or ornamental trees over twelve (12) feet shall be shown on the plan and labeled as to whether they will be saved or removed.

(3) A plan for proposed new trees and other plant material. A range of species may be shown to allow flexibility during construction. The plan should compensate for the amount and size of trees which have to be removed.

b. A plan for landscaping of parking areas as required by Article IX, Section 1.19.

Section 6.5 The City Engineer may request the review and concurrence of the Prattville Tree Commission prior to approval of said landscaping plan and no building permits shall be issued for any development for which a landscaping plan is required until said plan is approved by the City Engineer.

Section 6.6 Plans meeting the specifications preceding shall be prepared for all City building and parking lot construction and shall be approved by the City Council and the Mayor prior to construction of any building or parking lot.

Section 6.7 Green buffers, wherever required by this or other ordinances or regulations of the City of Prattville, shall meet the specifications of suitable references as approved by the City Engineer.

Section 7 CHEMICALS USED IN CONSTRUCTION

Section 7.1 All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with manufacturer's instructions.

Section 8 HANDLING OF MATERIALS

Section 8.1 In the event it is necessary to haul soft or wet materials over the streets or pavements of the City, the Developer shall provide suitably tight vehicles, approved by the City's Engineer, to prevent deposits on the streets or pavements. In all cases where any materials are dropped from the vehicles of the Developer,

he shall clean-up the same as often as directed and keep the streets clean and free from any dirt or mud, due to his operations.

Section 8.2 The Developer shall at all times provide for the control of dust within residential areas and such other areas where dust is a nuisance to the public by sprinkling with water.

Section 8.3 Any operation, use or any activity involving the manufacture, utilization, or storage of flammable, combustible and/or explosive materials shall be conducted in accordance with the regulations required by the City of Prattville.

Section 8.4 All flammable, explosive and/or combustible material shall be stored in accordance with the Fire Prevention Code of the City of Prattville.

Section 8.5 All outdoor storage facilities for fuel, raw materials and products stored outdoors, shall be enclosed by an approved safety fence and suitable landscaping to screen such areas from public view and shall conform to all storage area requirements imposed by the City of Prattville.

Section 8.6 No materials, wastes or other substance shall be stored or maintained upon a lot in such a manner that natural run-off from such areas on a site with an approved storm water drainage plan can impair the existing water quality of a stream, watercourse or aquifer more than the primary use intended for the lot.

Section 8.7 All materials or wastes which might cause fumes or dust or which constitute a fire hazard or which may be edible or otherwise attractive to rodents or insects shall be stored outdoors only if enclosed in containers which are adequate to eliminate such hazards.

Section 8.8 All sewers, gutters, storm drains, etc. shall be kept clear of trash, mud, or other debris that may result in an obstruction to normal flow.

Section 9 EROSION CONTROL

Section 9.1 Development shall proceed so as not to adversely affect the quality of the land to be developed or properties in the vicinity of the land to be developed.

Section 9.2 Development shall proceed in such a way that erosion is controlled. When feasible, land shall be cleared in stages so that a particular section of land is cleared only as required for its development, with the remainder of the undeveloped land left in its natural state. Where land has been cleared, erosion shall be controlled by such means as grassing, mulching, etc. Silt screens and/or retention basins shall be constructed to control the erosion run-off unless the City Engineer determines that this is not necessary. Erosion shall be controlled to the extent that erosion both during and after development is not increased over erosion that naturally occurred prior to development.

Section 10 PROPERTY CONTROL

Section 10.1 Adequate provisions shall be made for the flow of sewers, drains and water courses encountered during construction. The lines and structures which may have been disturbed shall be immediately restored to their original condition.

Section 10.2 Trees, grass, fences, signboards, poles, and all other property shall be protected unless their removal is authorized, and any property damage shall be satisfactorily restored.

Section 11 CLEAN-UP, SITE RESTORATION, AND SITE MAINTENANCE

Section 11.1 It shall be the joint responsibility of the owners, contractors and developers to see that project sites shall be kept clean at all times. Loose dirt shall not be allowed to clog ditches or cover sidewalks. Soft clay or other undesirable material removed from the trenches shall be removed from the streets, sidewalks, or ditches.

Section 11.2 All pavement, sidewalks, driveways, curbs, gutters, drains or similar items, removed or damaged during or by construction shall be replaced with construction of first-class materials and workmanship. All pavement shall be replaced in accordance with provisions in other sections of this manual.

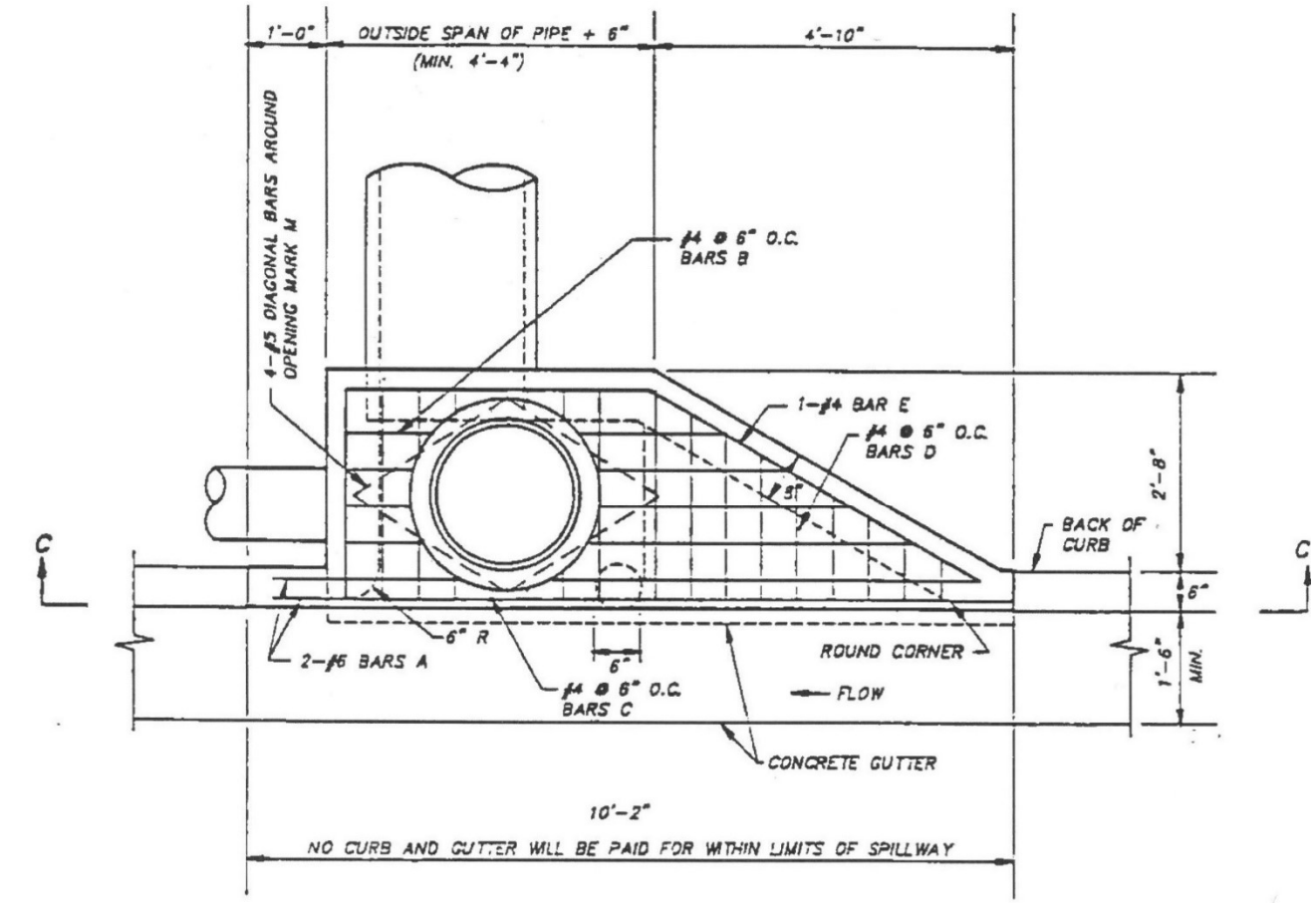
Section 12 BONDS

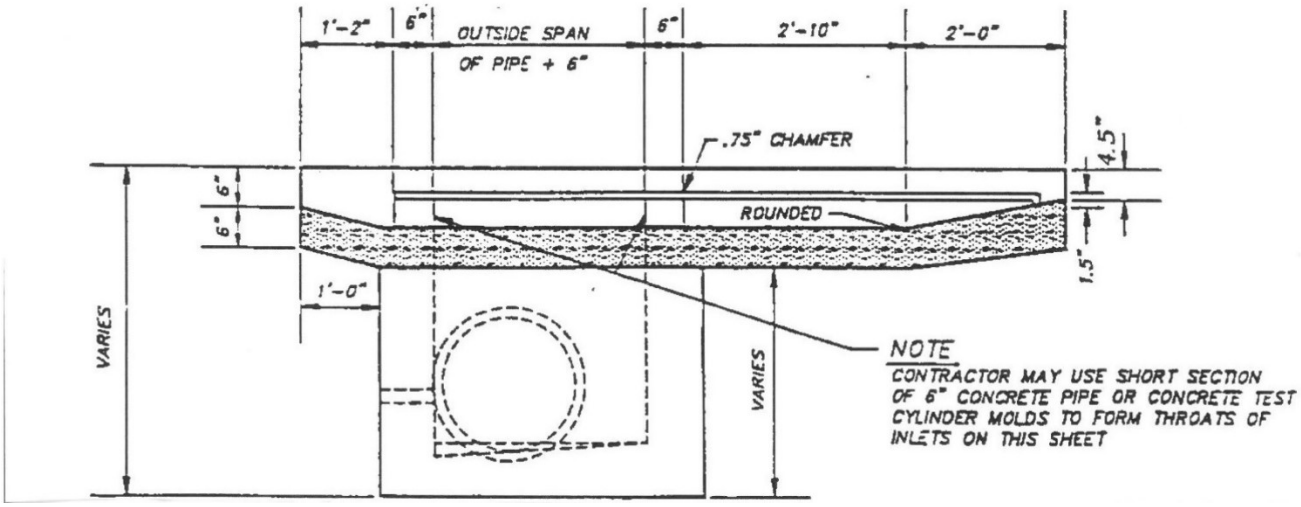
Section 12.1 The workmanship on any public improvements to subdivisions shall be bonded in accordance with the City's Subdivision regulations. For all other types of projects where a developer will offer improvements for public maintenance, the City's Engineer may require a one (1) year bond, not to exceed ten percent of the cost of constructing the improvement, in order to guarantee the quality of construction to the City.

APPENDIX

ILLUSTRATION NO. 1

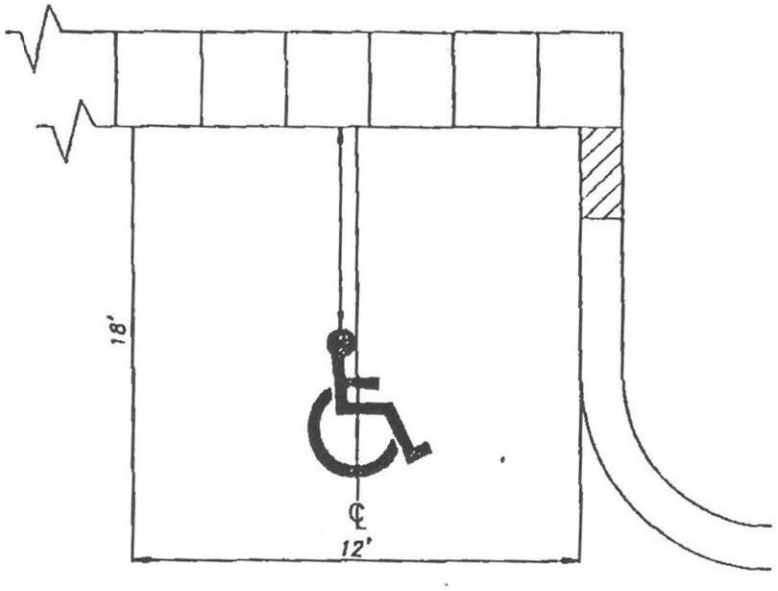
TYPE S INLET DETAILS





SECTION C-C TYPE A

HANDICAP SYMBOL NOTES:
EACH HANDICAP SPACE SHALL BE MARKED
WITH THE UNIVERSAL HANDICAP SYMBOL



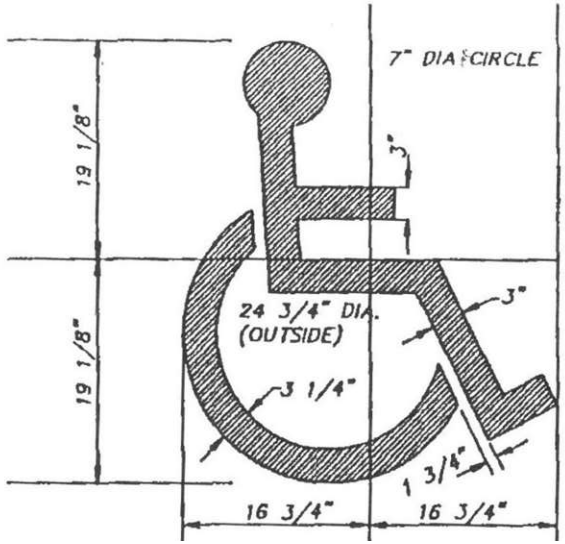
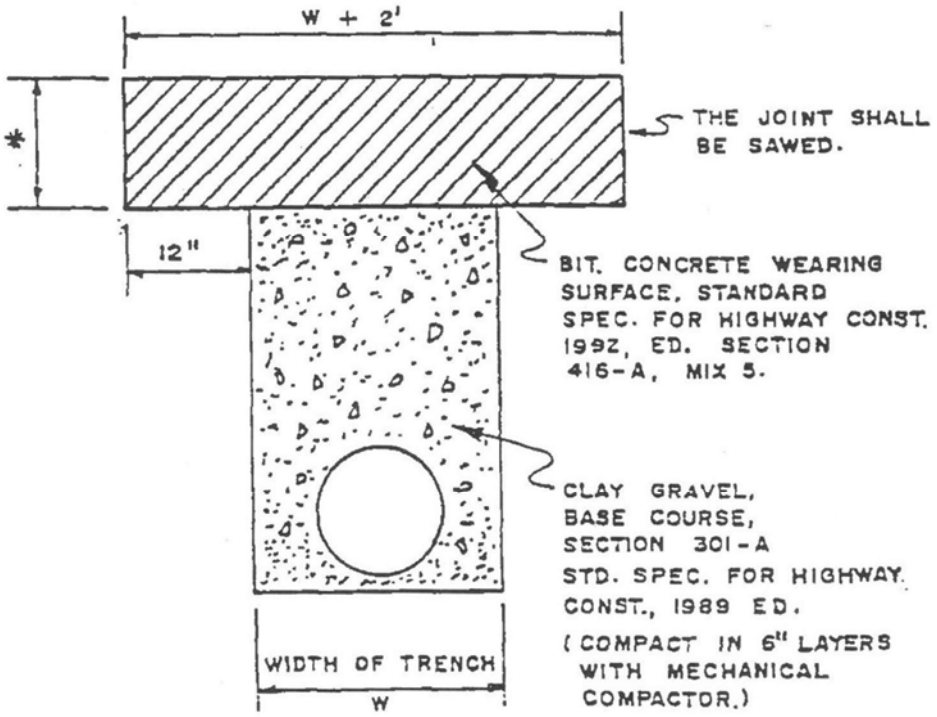


ILLUSTRATION NO. 2

HANDICAP PARKING DETAIL

NOT TO SCALE

ILLSUTRATION NO. 3

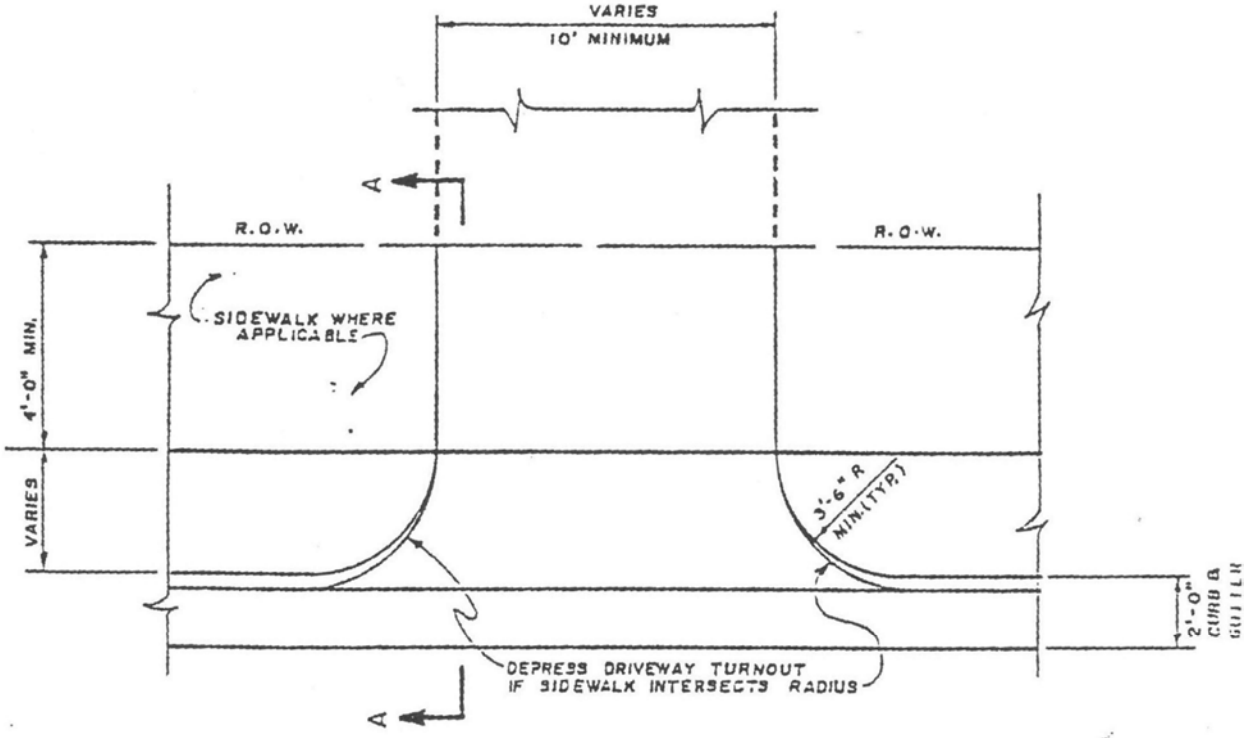


* BIT. CONCRETE WEARING SURFACE - THE DEPTH SHALL MATCH THE DEPTH OF EXISTING PAVEMENT, BUT NOT LESS THAN 6". MIX SHALL BE PLACED AND COMPACTED IN LAYERS NOT GREATER THAN 3".

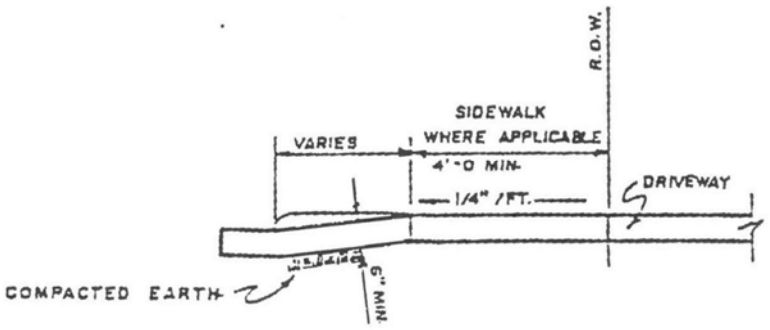
FLEXIBLE PAVEMENT PATCH

NOT TO SCALE

ILLUSTRATION NO. 4



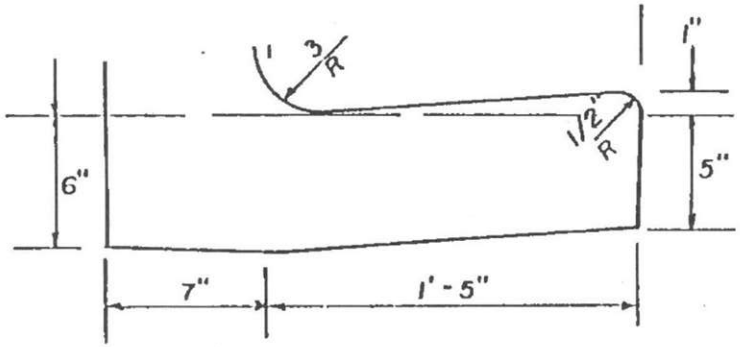
PLAN



SECTION A-A

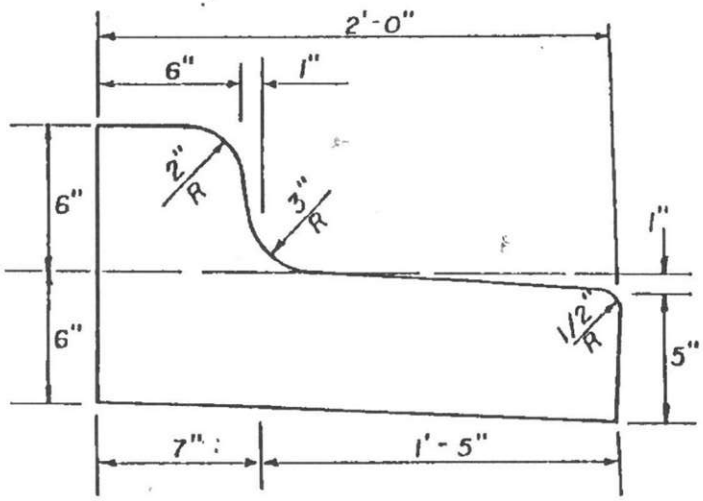
TYPICAL DRIVEWAY TURNOUT

NOT TO SCALE



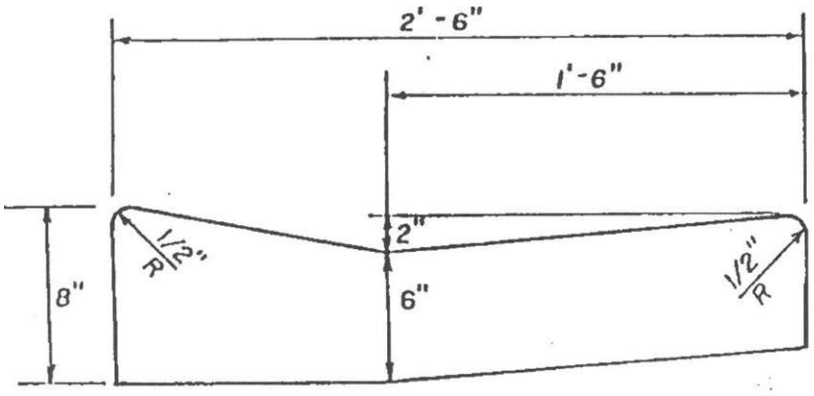
STANDARD CURB & GUTTER

NOT TO SCALE



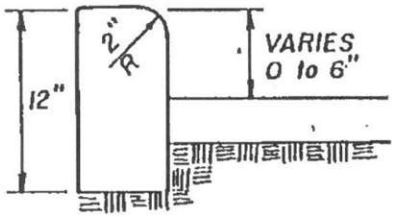
SPILL-OUT CURB & GUTTER

NOT TO SCALE



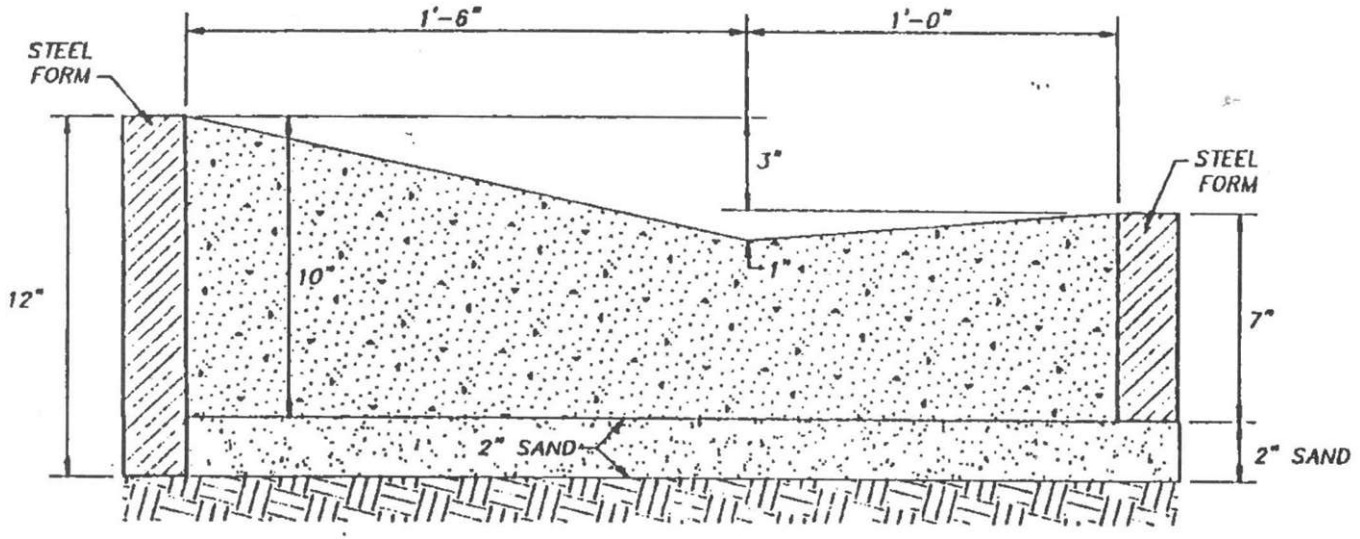
DRIVE-OVER CURB & GUTTER

NOT TO SCALE



VERTICAL CURB DETAIL

NOT TO SCALE



FORMING DETAIL FOR DRIVE-OVER CURB

NOT TO SCALE