SECTION 4: Standards and Specifications

No completed improvements shall be accepted by the Director of Public Works or Harlingen Waterworks unless they conform to the following standards and specifications:

Section 4.1 Standards for Plats within the City Limits

4.1.1 General

A. Conformity with comprehensive plan: The subdivision should conform to the current comprehensive plan, of the City of Harlingen, as defined herein, as adopted or amended by the City Commission.

B. Reserve strips prohibited: There shall be no reserve strips controlling access to land dedicated or intended to be dedicated to public use.

4.1.2 Lots

A. All lots must front on a public street or other approved access. All streets accessing the development must have an all weather surface for emergency vehicle access.
B. Lots with a length to width ratio in excess of 4 to 1, as calculated by City staff, shall be prohibited.
C. Lots of irregular shape shall not be allowed unless they have a street frontage of at least 50 feet measured at the front building setback line and no less than 20 feet at the front lot line.
D. Lot sizes, set back lines, rear yards and side yards shall be in accordance with the Zoning Ordinance of the City of Harlingen.
E. Side lot lines shall be substantially at right angles to straight street lines or radial to curved street lines.

4.1.3 Streets

A. Street layout: Adequate streets shall be provided by the subdivider and the arrangement, character, extent, width, grade, and location of each shall conform to the Major Thoroughfare Plan in the Transportation Chapter of the current Comprehensive Plan of the City and shall be considered in relation to existing and planned streets, to topographical conditions, to public safety and convenience, and in their appropriate relationship to the proposed uses of land to be served by such streets. Local street layout shall be devised for the most advantageous current and future development of the entire neighborhood/area, as determined by the P&Z Commission and City Staff.

B. Relation to adjoining street system: Where necessary to the neighborhood pattern, existing streets in adjoining areas shall be continued, and shall be at least as wide as such existing streets and in alignment therewith.

C. Projection of streets: Where adjoining areas are not subdivided, the arrangement of streets in the subdivision being considered shall make provision for the proper projection of these streets into unsubdivided areas adjacent to it in the most logical and orderly fashion.

D. Street jogs: Street jogs with center line offsets of less than 125 feet measured center line to center line shall be prohibited. (See Exhibit E).

E. Perimeter streets: When a perimeter street of a subdivision is deficient, the subdivider shall either improve the perimeter street or deposit an amount into escrow as described in Section 6 of this ordinance.

F. Street intersections: Street intersections shall be as nearly at right angles as practicable.

G. Dead-end streets: Dead-end streets shall be prohibited, except where necessary to provide for future extension of arterial or collector streets, in which case they may be no longer than 150 feet. (per fire dept req. Standard 1141 NFPA)

H. Cul-de-sacs: Temporary or permanent cul-de-sac streets that do not exceed 750 feet in length shall have a right-of-way of no less than 50 feet in width and no less than 33 feet of pavement width; however, the turnaround area (bulb) shall contain no less than 100 feet of right-of-way and no less than 80 feet of pavement width. In non-residential areas, the right-of-way and pavement widths shall be no less than 120 feet and 100 feet, respectively.

Temporary or permanent cul-de-sac streets in excess of 750 but not exceeding 1,000 feet in length must meet the right-of-way requirements above, but have 37 feet of pavement width and place the fire hydrants on alternating sides of the street. The water line must also be looped for adequate water pressure and flow. Cul-de-sac streets shall not exceed 1,000 feet in length.

The measurement of cul-de-sac street length shall be calculated as the distance from the centerline of the nearest intersecting through street to the center point of the cul-de-sac turnaround.

I. Access Points: Any subdivision with 75 or more lots must have a minimum of two points of access separated from each other by a distance of at least 250 feet whenever possible.

J. Local streets: Local streets shall be laid out so as to discourage their use by through traffic.

K. Pavement widths and rights-of-way within subdivision shall be follows:

1. Major arterial streets shall have a right-of-way width of at least 120 feet, with a pavement width of at least 80 feet. Such streets shall occur, at a minimum, every one mile (5280') as near as practical.

2. Minor arterial streets shall have a right-of-way width of at least 100 feet with a pavement width of at least 60 feet. Such streets shall occur, at a minimum, every one-half mile (2640') as near as practical.

3. Collector streets shall have a right-of-way of at least 80 feet and pavement width of at least 48 feet. Such streets shall, at a minimum, occur every one-quarter (1320') to one-half (2640') mile as near as practical and between arterial streets.

4. Local streets shall have a right-of-way of at least 60 feet and a pavement width of at least 37 feet from back of curb to back of curb unless the land use density dictates the need for wider rights-of-way and paving as determined by the P & Z Commission. Local streets which are looped off perimeter local streets, collectors or arterials, and cul-de-sacs not exceeding the maximum length may be 33 feet in pavement width with a minimum right-of-way of 50 feet (See Exhibit E). Such streets shall occur as needed for efficient local property access.

5. Cross streets are required at a minimum of every ¼ mile (1320') as near as practical.

L. Pavement widths and rights-of-way of streets forming part of the subdivision boundaries (perimeter streets): shall be as follows

1. The subdivider shall dedicate a minimum of one half of the right-of-way required from centerline for new adjacent major arterial, minor arterial, collector or local streets as defined in the most recently adopted Major Thoroughfare Plan of the City and/or the County Thoroughfare Plan. If the two plans conflict, that requiring the greater right-of-way dedication shall prevail. The right-of-way dedication shall conform to Paragraph J above.

2. All right-of-way dedicated by plat shall have a statement indicating so on the final plat. (See Exhibit F for owner's signature block.)

3. Required right-of-way dedications may be eligible for charitable contribution certificates. If the property owner gets an appraisal

for the property (either the entire property or the section to be dedicated) and presents such to the City along with a "Noncash Charitable Contributions" Form 8283 at the time of plat recordation the Planning Director or appointed designee shall execute the form to acknowledge the donation for the value of the right-of-way portion dedicated by the plat upon its recordation.

M. Corner clips: shall be provided as follows:

30' corner clip on major/minor arterials
30' corner clip on collector streets
15' corner clip on local streets
10' corner clip on alleys

N. Curbs: Curbs shall be installed by the subdivider on both sides of all interior streets, and on the subdivision side of all streets forming part of the boundary of the development.

O. Street names: Names of new streets shall not duplicate or cause confusion with the name of existing streets, unless the new streets are a continuation of or in alignment with existing streets, in which case names of existing streets shall be used.

P. Street light: Street lights shall be installed by the subdivider at all street intersections and cul-de-sac ends within the subdivision, in accordance with City of Harlingen standards. If a block exceeds 600' in length, street lights shall be installed mid-block to accommodate a maximum spacing of 600'.

Q. Street signs: Street name signs shall be installed by the city at the expense of the subdivider at all intersections within or abutting the subdivision. Such signs shall be of a type approved by the City.

R. Traffic control signs: Traffic signs such as stop and yield signs shall be installed by the City at the expense of the subdivider at all necessary locations as determined by City staff.

S. Private Streets: If streets are recorded as private streets, the City shall never have any obligation or duty to receive, adopt, repair or maintain any private street within the limits of the City of Harlingen. They shall be labeled as private on the final subdivision plat.

4.1.4. Alleys

Alleys dedicated to the public may only be proposed and constructed with the approval of the Public Works Director, City Engineer or authorized designee.

A. Width and Paving: Alleys shall be 20' wide and constructed of asphalt covering 18 feet of the right-of-way, in accordance with city standards.

B. Intersecting alleys or utility easements: Where two alleys and/or utility easements intersect or turn at a right angle, a corner clip of not less than 10 feet from the normal intersection of the property or easement line shall be provided along each property or easement line.

C. Dedication by Plat: All right-of-way dedicated by plat shall have a statement indicating so on the final plat. (See Exhibit F for owner's signature block.)

D. Dead-end alleys: Dead-end alleys shall not be permitted.

E. Half alleys: Half alleys shall not be permitted.

F. Curb Cuts: Standard curbs shall be required where alleys intersect streets.

4.1.5. Utility Easements

A. Each block that does not contain an alley as provided for in this Section shall have a utility easement either at the front of all lots next to street right-of-way or along the rear of the property which is to be reserved for the use of all public utility lines, conduits, and equipment. These utility easements shall be no less than 10 feet in width, and shall be continuous for the entire length of the block. Front easements shall be contiguous with and parallel as closely as possible the street line frontage of the block. Rear easements shall provide access back to a public street. There shall be no "dead end" utility easements permitted.

B. On phased developments all easements must be provided in their entirety in each phase as developed.

C. No new utilities will be permitted to run parallel under street pavement with the exception of sewer lines. Such utilities will be required to be located in remaining street right-of-way according to utility assignments laid out in Exhibit L.

D. Any utilities requiring sole dedication easements must take easements behind the 10' utility easement for general utility assignments indicated above if adjacent to street line frontage unless otherwise approved by the Planning Director.

E. Drainage Easements may not be shared with utility easements and drainage right-of-way may not be shared with street or alley right-of-way unless approved by the appropriate drainage authority and the City.

F. Planting of trees, placement of fences and driveways should be discouraged on utility easements as they may later need to be removed by the entity accessing the easement and property owner will not be compensated for replacement or destruction of such items.

4.1.6 Sidewalks

Sidewalks shall be required as follows:

A. On the subdivision side of all arterial streets adjacent to the subdivision and on both sides of arterial streets within the subdivision (except on rural section roads – roads without curb and gutter).

B. On the subdivision side of all collector streets adjacent to the subdivision, and on both sides of all collector streets within the subdivision (except on rural section roads – roads without curb and gutter).

C. Sidewalks shall be five feet in width (except when necessary to match existing mid-block terminations in which case a transition area of 10 feet or less will be acceptable).

D. Such additional sidewalks as the City staff or Planning & Zoning Commission may deem necessary or as the subdivider may desire;

E. Additionally, a sidewalk shall be installed on both sides of all streets within 1,000 feet of a school;

F. No sidewalk shall be terminated in mid block, and shall be continued to the next street intersection or to the boundary of the subdivision.

G. Sidewalks shall be installed at subdivider's expense at the time the curb and gutter is installed and may be contiguous with the curb and gutter. Provided however that they shall be installed with due consideration being given to existing trees and shrubbery or proposed mailboxes which may require installation away from the curb for a short distance in order to prevent removal of such features.

H. All sidewalks installed shall connect with any existing sidewalks adjacent to, or part of the subdivision.

I. All sidewalks installed shall have ramps and pull outs installed for the handicapped in accordance with all State and Federal ADA requirements.

J. All sidewalks installed shall meet the specifications as set forth in the sidewalk ordinance section of the Zoning Ordinance. (Additional sidewalks

not required by the Subdivision Ordinance may be required by the Zoning Ordinance in commercial areas.)

4.1.7 Street Lights

Installation: Street lights shall be installed at the cost of the subdivider to City standards at all street intersections within the subdivision, at cul-de-sac ends and mid-block if the block exceeds 600' in length. A street lighting plan shall be submitted with preliminary plat for all subdivisions inside city limits. Such plan shall receive the approval of city staff prior to submission to electric utility company.

4.1.8 Fire Hydrants

A. Hydrants must be installed at a maximum of 300 foot intervals in commercial and industrial districts and 600 foot intervals in single family residential areas with a minimum arrangement being so that a 500 foot linear hose distance shall not be exceeded measured along roadway and other right-of-way surfaces.

B. Fire hydrants are required not to exceed 150 feet distance from any building requiring sprinklers and/or standpipes.

4.1.9 Water Facilities

Plans shall indicate the locations, size, depths and proposed and existing water lines, fire hydrants and service laterals. When connections to a water system other than to the City water system is proposed, the plan shall show the point of connection and/or source of supply. When a separate water system is planned, the plans shall show point of connection and/or source of supply along with the plans and specification of any treatment facilities.

4.1.10 Wastewater Facilities

All subdivisions shall be provided with an approved wastewater disposal system. Plans shall be submitted indicating the location and dimensions of existing and proposed sanitary sewer lines, indicating the depth and grades of the lines. When a separate sewer system or treatment plant is proposed, the point of discharge or disposal area shall be shown. When a separate sewer system is planned the plans shall show point of connection along with plans and specifications of the treatment plant and a copy of the permit issued by TCEQ.

4.1.11 Utility Lines

All utility lines that are underground and run under a street or alley shall be approved by the City and Harlingen Waterworks, where applicable, before the

street or alley is paved. When it is necessary that utility lines pass under the street or alley pavement service lateral shall be installed to a point at least two feet beyond the back of the curb or eighteen inches from the property line in alleys. All underground utilities installed in a utility easement at the rear of the lot shall be offset from the centerline of the easement.

4.1.12 Monuments

A. Monument locations shall be prescribed by the Director of Public Works, City Engineer and shall be sufficient to furnish survey control of the subdivision.

B. Monuments shall be set with concrete around an iron pin

C. Where, due to topographic conditions, permanent structures, or other conditions, the view is obstructed between any two adjacent monuments, intermediate monuments shall be so set as to assure a clear view between adjacent monuments.

D. Monuments shall be set after grading all lots to finish grade.

E. Elevations of all monuments shall be printed on the plats.

4.1.13 Drainage

A. Rights-of-Way: Where a subdivision is traversed by a water course, drainage way, natural channel or stream, there shall be a dedicated right-of-way provided conforming substantially to the high bank of such water course as determined by the Director of Public Works/City Engineer. Additionally, a minimum of 20 feet on both sides of said water course shall be dedicated to accommodate future needs and maintenance as determined by the Director of Public Works/City Engineer. The Drainage District or Irrigation District authority shall determine drainage right-of-way where applicable for facilities to be maintained by such agency.

B. Drainage facilities: Drainage facilities shall be provided and constructed as specified by the Director of Public Works, City Engineer or authorized agent.

Preliminary drainage plans must indicate direction of flow and outfall locations with a preliminary report. Final plats must be submitted with drainage plans that have detailed calculations and a final drainage report.

All street widths and grades with elevations shall be indicated on the plans. Final drainage reports shall have runoff figures in cubic feet per second (cfs) and shall be indicated on the outlet and inlet side of all drainage ditches and storm sewers, and at all points in the street at changes of grade, or where the

water enters another street or storm sewer or drainage ditch. Drainage easements shall be indicated.

A general location of the subdivision showing the drainage area of any existing or proposed drainage facilities shall be provided. Calculations must be submitted showing the anticipated storm water flow, utilizing a rainfall frequency of not less than 5 years including watershed area, percent runoff, and time of concentration. When a drainage ditch or storm sewer is proposed, calculations shall be submitted showing basis for design.

When a drainage channel or storm sewer is proposed, complete plans, profiles, and specifications shall be submitted, showing complete construction details. When construction is complete a set of "as-built" drawings shall be submitted electronically.

All property must be identified as being in a flood zone "A", "B", or "C". Property located in a flood zone "C" will be required to be no less than 18" above top of curb or highest point of the street (absent a curb). Property located in a flood zone "B" or "A" will be required to present a flood elevation certificate and be 24" above top of curb or highest point of street or at a level as determined by the engineer's flood certificate.

4.1.14 Planned Unit Developments

A. Planned Unit Developments shall be developed in accordance with the City of Harlingen Zoning Ordinance. A planned development may include a combination of different dwelling types and/or a variety of land uses which complement each other and harmonize with existing and proposed land uses in the vicinity.

B. The regulations below will serve to identify maximum deviations from requirements that may be negotiated as follows:

1. Lots: may be smaller than the minimums provided overall density of the tract is not increased.
2. Streets: may be smaller than the minimum required local street, but in no case smaller than 30' of pavements width. (R-O-W must conform to the Major Thoroughfare Plan regardless of pavement width.)
3. Front Building Setbacks: may be reduced to 10' except at boundaries of the zone or street corners where ordinance requirements shall apply.

C. Site Plan as required in the Zoning Ordinance must be submitted with the subdivision. A "PD" zoning must be obtained prior to, or concurrent with, subdivision development.

Section 4.15 Standards for Plats Outside City Limits On An Adopted Municipal Annexation Plan (3 Year Plan)

All standards shall meet those required within the City Limits except that an escrow may be paid on required street lights so that they may be placed when the subdivision comes into city limits. (If for some reason, said subdivision does not get annexed within ten years from the date funds were received by the City, the original depositer shall be entitled to a refund of the escrow amount deposited. No interest shall be paid on such sums. The depositor must request such refund within one year of entitlement, in writing to the Finance Director of the City of Harlingen, or such right shall be forfeited.

Section 4.2 Standards for Plats Outside City Limits (in 3.5 Mile ETJ) and Not On An Adopted Municipal Annexation Plan (3 Year Plan)

4.2.1 Lots
All requirements are identical to inside city requirements. No flag lots will be permitted.

4.2.2 Streets
All requirements for interior streets are identical to inside city requirements. It is strongly suggested that deficient perimeter streets are improved to the minimum county standard to allow for safe and orderly two-way vehicular travel; however, the perimeter street requirements described in Section 6 of this ordinance do not apply.

4.2.3 Alleys
Same as inside city limit requirements.

4.2.4 Utility Easements
Same as inside city limits requirements.

4.2.5 Sidewalks
Not required.

4.2.6 Street Lights
Not required.

4.2.7 Fire Hydrants
Same as inside city limits requirements.

4.2.8 Water Facilities
Requirements shall meet standards of the utility in whose CCN it is located.

4.2.9 Wastewater Facilities
Requirements shall meet standards of the utility in whose CCN it is located.

4.2.10 Utility Lines

Same as inside city limits requirements.

4.2.11 Monuments
Same as inside city limits requirements.

4.2.12 Drainage
Same as inside city limits requirements.

Section 4.3 Standards for Plats Outside The 3.5 Mile ETJ (in 5 Mile ETJ) and Not On An Adopted Municipal Annexation Plan (3 Year Plan)

4.3.1 Lots
Lots shall meet City standards except that flags as allowed by County regulations will be allowed.

4.3.2 Streets
Pavement standards for interior streets shall, at a minimum, meet County standards. It is strongly suggested that deficient perimeter streets are improved to the minimum county standard to allow for safe and orderly two-way vehicular travel; however, the perimeter street requirements described in Section 6 of this ordinance do not apply.

4.3.3 Alleys
Not required.

4.3.4 Utility Easements
Same as inside city limits requirements.

4.3.5 Sidewalks
Not required.

4.3.6 Street Lights
Not required.

4.3.7 Fire Hydrants
Shall meet County standards.

4.3.8 Water Facilities
Requirements shall meet standards of the utility in whose CCN it is located.

4.3.9 Wastewater Facilities
Requirements shall meet standards of the utility in whose CCN it is located.

4.3.10 Utility Lines
Same as inside city limits requirements.

4.3.11 Monuments
Same as inside city limits requirements.

4.3.12 Drainage
Drainage requirements shall meet County standards.

Section 4.4 Model Homes

For the purpose of allowing the early construction of model homes in a subdivision, the developer shall comply with one (1) of the following methods:

A. The Planning Department may permit a portion of a major subdivision involving no more than two (2) lots to be created in accordance with the procedures for minor subdivisions, provided the portion derives access from an existing city, township, county, or state highway, and provided no future road or other improvement is anticipated where the lots are proposed. The subdivision plat for the "minor" portion shall be submitted to the Planning Department simultaneously with the preliminary plat for the entire major subdivision. Subsequent to minor plat approval, the model homes may be constructed with the approval of the appropriate building permit(s).
B. The property proposed for the model home(s) is exempt from the City's platting requirements as it was divided into its current configuration prior to November 1, 1978, and owner can provide proof of such. In this event, a building permit for only one (1) main building may be issued on each such original separately owned parcel.

Section 4.5 Construction Plans Submission

4.5.1 Time for Submittal

Prior to commencing construction of subdivision improvements, three sets of construction plans and specifications must be submitted to and approved by the City Engineer, or the duly authorized representative, and/or Harlingen Waterworks Engineer.

4.5.2 Review Process

The City Engineer's Office shall review the construction plans for conformance to subdivision regulations for roadways and drainage improvements. The Harlingen Waterworks Engineer's Office shall also review the construction plans for general conformance to TCEQ requirements for water and wastewater improvements. This review shall be for conformance to subdivision regulations and the responsibility and liability for the adequacy of the design shall remain with the engineer sealing the documents.

4.6 Specifications

Three sets of construction plans and profiles shall be submitted with the following information:

4.6.1 Streets and Alleys – All temporary facilities necessary to complete the job are the responsibility of the contractor. Any traffic control as required shall follow the most current version of the Texas Manual of Uniform Traffic Control Devices.

For details see Exhibit M.

4.6.1.1. SITE PREPARATION AND GRADING

A. Protection of Facilities

Existing utility lines (either overhead or underground), pavement and sidewalks designated on the drawings, shown to Contractor or mentioned in the specifications, shall be kept free of damage from Contractor's operations. If damaged, any utilities or pavement shall be restored at the Contractor's expense. Any utility not known in time to prevent damage, and if inadvertently damaged during operations, the Contractor shall notify Engineer and Owner of said utility at once so that emergency repair may be made. Some valve boxes and manhole lids will require adjustment to insure proper grades.

B. Excavation

Excavation of every description and of whatever material encountered within the grading limits of the project shall be performed to the lines and grades as shown on the drawings. Waste excavation shall be disposed of by the Contractor.

During construction, excavation and filling shall be performed in a manner in sequence that will provide drainage at all times.

If the material of the subgrade for paved areas is of unstable character and unfit for foundation, the Contractor shall make such additional excavation as the Engineer may direct, and refill with approved material.

C. Subgrade Preparation

The subgrade shall be shaped in conformity with the typical sections shown on the plans and to the lines and grades established by the Engineer. All unstable or otherwise objectionable material shall be removed from the subgrade and replaced with approved material. All holes, ruts, and depressions shall be filled with approved material. The surface of the

subgrade shall be finished to the lines and grades established, and be in conformity with the typical sections shown on the plans. Any deviation in excess of one-half inch in cross section and sixteen feet in length measured longitudinally shall be corrected by loosening, adding, or removing, sufficient subgrade and shall be prepared in advance to insure satisfactory execution of the work.

Unless otherwise indicated on plans, the surface of the ground of all unpaved areas which are to receive embankment shall be loosened by scarifying or plowing to a depth of not less than six inches. The loosened material shall be recompacted with the new embankment as hereinafter specified. The embankment shall be placed in layers not to exceed six inches in thickness for the full width of the individual roadway cross section and in such lengths as are best suited to the sprinkling and compacted methods utilized.

Where embankments are to be placed adjacent to or over existing roadbeds, the roadbed slopes shall be plowed or scarified to a depth of not less than six inches and the embankment built up in successive layers, as hereinafter described if height is increased. Then if directed, the top of the old roadbed shall be scarified, and recompacted with next layer of new embankment. The total depth of the scarified and added material shall not exceed the permissible depth layer.

Except as otherwise required by the plans, all embankment shall be constructed in layers approximately parallel to the finished grade of the roadbed and unless otherwise specified each layer be so constructed as to provide a uniform slope of one quarter inch per foot to drain.

Subgrade materials shall be compacted by approved mechanical tamping equipment to an apparent dry density of the total material of not less than 95 percent of the maximum dry density as determined in accordance with THD Test Method Tex-114-E. Test for density will be made within 24 hours after compacting operations are completed. If tests show the density to be less than the specified minimum or the moisture content to be more than 3% above or below the optimum, the course shall be reworked as necessary to obtain the specified compaction and moisture content.

Unsuitable excavation or excavation in excess of that needed for construction shall be known as "waste" and shall become the property of the Contractor and it shall become his sole responsibility to dispose of this material in a manner approved by the Engineer.

D. Protection of Finish Grading

During construction, embankment and excavation shall be kept shaped and drained.

Ditches and drains shall be maintained in such manner as to drain effectively at all times. Graded areas shall be protected against action of elements prior to acceptance of the work. Settlement or washing that may have occurred shall be repaired and grades shall be re-established to the required elevations and slopes. The Contractor is required to maintain pumping equipment to remove all standing water after a rainfall event. No water shall remain standing longer than twelve hours after it has stopped raining.

4.6.1.2. SUBGRADE STABILIZATION WITH LIME

A. Scope

This item shall consist of treating the subgrade, scarifying area to be treated, addition of lime, mixing and compacting the mixed material to the required density. This item applies to natural ground and embankment, and shall be constructed as specified herein and in conformity with the typical section lines and grades as shown on the plans.

It is the primary requirement of this specification to secure a completed (lime stabilized subgrade) course of treated material containing a lime mixture, of uniform density and moisture content, well bound for its full depth and with a smooth surface for placing subsequent course. It shall be the responsibility of the Contractor to regulate the sequence of his work, to use the proper amount of lime, maintain the work and rework the courses as necessary to meet the above requirements.

Prior to the application of the lime slurry, the road bed shall be excavated to subgrade, shaped to conform to the typical sections, lines and grades as shown on the plans or as established by the Engineer. The material, before lime is added, shall be scarified and/or excavated to the secondary grade (proposed bottom of the lime stabilized subgrade) and removed or windrowed to expose the secondary grade. Any wet or unstable materials below the secondary grade shall be corrected, as directed by the Engineer, by scarifying, adding lime, and compacting until it is of uniform stability.

If the Contractor elects to use a cutting and pulverizing machine that will remove the subgrade material at the same time, he will not be required to expose the secondary grade nor windrow the material. However, the Contractor shall be required to roll the subgrade, as directed by the Engineer, before using any of the pulverizing machines and correct any soft areas that this rolling may reveal. This method will be permitted only where a machine is provided which will insure that the material is cut

uniformly to the proper depth and which has cutters that will plane the secondary grade to a smooth surface over the entire width of the cut. The machine shall be of such design that a visible indication is given at all times that the machine is cutting to the proper depth.

B. Materials and Equipment

1. Lime shall meet the following requirements for hydrated lime slurry. Hydrated lime shall consist of dry powder obtained by treating quick lime with enough water to satisfy its affinity for water under the conditions of its hydration. This material is to consist essentially of calcium hydroxide or a mixture of calcium hydroxide and a small allowable percentage of calcium oxide, magnesium oxide and magnesium hydroxide.

   a. The hydrated lime, when tested, shall conform to the following requirements for chemical composition:

      Hydrate alkalinity, percent by weight CA(OH) minimum 90.0%.

      Unhydrated lime content, percent by weight CaO maximum 5.0%.

      The percent by weight of residue retained shall conform to the following requirements:

      1. Residue retained on No. 6 (3360-micron) sieve – none
      2. Residue retained on No. 10 (2000-micron) sieve – maximum 10%
      3. Residue retained on No. 30 (590-micron) sieve – maximum 2.5%

      The above specifications apply specifically to the normal hydrate of lime made from "High-Calcium" type limestone. Hydrated lime shall be applied as provided in these specifications by mixing with water to form a slurry.

      The use of commercial lime slurry is acceptable under these specifications. The lime slurry shall be a pumpable suspension of solids in water. The water or liquid portion of the slurry shall not contain dissolved material in sufficient quantity and/or nature injurious or objectionable for the purpose intended. The solids portion of the mixture, when considered on the basis of "solids content," shall

consist principally of hydrated lime of a quantity and fineness sufficient to meet the following requirements:

b. Chemical Composition: The solids content of the lime slurry shall have a hydrate alkalinity Ca(OH) of not less than 90% by weight.

c. Residue: The percent by weight of the residue in the solids content of the lime slurry shall conform to the requirements listed above for hydrated lime.

The "Dry Solids Contents" shall be at least 31 percent by weight of the slurry.

d. Mixing Water: Only water from City water mains shall be used. Contractor will make arrangements with the water department to obtain a meter and pay for water used.

2. Equipment: The machinery, tools and equipment necessary for proper execution of the work shall be on the project and approved by the Inspector prior to the beginning of construction operations.

a. Hydrated lime shall be stored and handled in closed weatherproof containers until immediately prior to mixing with water to form a slurry consistency for application with the material to be stabilized. If storage bins are used they shall be completely closed. Hydrated lime in bags shall be stored in waterproof buildings with adequate protection from ground dampness.

b. If the lime is furnished in trucks, each truck shall have the weight of lime certified on public scales.

c. If the lime is furnished in bags each bag shall bear the manufacturers certified weight.

d. Lime Slurry Machine: The use of a lime slurry machine (mixer) will be permitted. The lime slurry machine shall be capable of mixing and delivering an acceptable lime slurry suitable for use in the work, meeting all specification requirements.

C. Construction Methods

1. Slurry Placing: The required amount of lime, as shown on the plans, or as recommended by the Materials Engineering

Laboratory, at the City's option, shall be mixed with water in trucks with approved distributors and applied as a thin water suspension or slurry. The lime slurry (including commercial lime slurry) shall be applied with a lime percentage meeting the limits and requirements as set out above. The distribution of lime at the rates shown on the plans, as directed herein, and/or as directed by the Engineer shall be attained by successive passes over the measured section of roadway until the proper moisture and lime content has been secured. The distributor truck shall be equipped with an agitator that will keep the lime and water at a uniform consistent mixture.

2. Dry Placing: The lime shall be spread by an approved spreader or by bag distribution at the rates shown on the plans or as directed by the Engineer.

   The lime shall be distributed at a uniform rate and in such manner as to reduce the scattering of lime by wind conditions such that blowing lime does not become objectionable to traffic or adjacent property owners. A motor grader shall not be used to spread lime.

   The material shall be sprinkled as directed by the Engineer, until the proper moisture content has been secured.

3. First Mixing: The material and lime shall be thoroughly mixed by approved road mixers or other approved equipment, and the mixing continued until, in the opinion of the inspector a homogeneous friable mixture of material and lime is obtained, free from all clods or lumps. Materials containing plastic clays or other material which will not readily mix with lime shall be mixed as thoroughly as possible at the time of the lime application brought to the proper moisture content and left to cure for one to four days as directed by the inspector. During the curing period the material shall be kept moist as directed.

4. Final Mixing: After the required curing time, the material shall be uniformly mixed by approved methods. If the solid binder lime mixture contains clods, they shall be reduced in size by raking, blading, discing, harrowing, scarifying or the use of other approved pulverizing methods so that when all nonslaking material retained on the No.4 sieve are removed, the remainder of the material shall meet the following requirements when tested dry by laboratory sieves:

   Minimum Passing 1-3/4" Sieve.....100%
   Minimum Passing No. 4 Sieve.....60%

During the interval of time between application and mixing, hydrated lime that has been exposed to the open air for a period of six hours or more or to excessive loss due to washing or blowing will not be accepted.

5. If the total thickness of the stabilized subgrade material to be treated cannot be mixed in one operation, the previously mixed material shall be bladed to a windrow just beyond the area to be treated and the next layer mixed with lime (slurry) as specified above. The first layer of the treated material shall be compacted in such a manner that the treated material will be mixed with the underlying material.

   The lime slurry mixed material shall be sprinkled as necessary and rolled as directed by the inspector. All irregularities, depressions, or weak spots that develop in the grade shall be corrected immediately by scarifying the area affected, by adding or removing the material as required and reshaping and recompacting by sprinkling and rolling. The surface of the (subgrade) course shall be maintained in a smooth condition, free from undulations and ruts, until the base course and/or pavement is placed, or the work is otherwise accepted.

   The stabilized subgrade course shall be sprinkled as required and compacted to an apparent dry density of not less than 95% of the dry density (standard density) of the samples of the stabilized materials as determined by the Proctor Compaction Test (AASHO Designation: T99 and T-180 or ASTM Designation: D-698-70 and D-1557-70 with subsequent revisions).

D. Testing

The materials Engineering Laboratory will sample and evaluate the subgrade material in accordance with established criteria to determine the percent of hydrated lime (lime slurry form) that will be required and successfully used as chemical stabilizing agent to accomplish satisfactory work. These tests will include Atterburg limit determinations of the raw soil and evaluations of Plasticity Index and/or strength with varying amounts of lime required for the stabilizing additive.

The hydrate lime, in slurry form, mixtures will be sampled to establish the quality and compliances with the project plans and specifications. The moisture density relationship will be established in accordance with the specified procedures, AASHO Designation: T-99 and T-180 and/or ASTM Designation: D-698-70 and D-1557-70 with subsequent revisions.

The Materials Engineering Laboratory will perform "in-place" the density and moisture tests of the "raw" or lime established subgrade soil to assure that the required compaction is maintained during the construction operations.

The frequency for performing the tests shall be at least one moisture and density test for each 1000 square yards of area.

The testing shall be as outlined above. In addition to the requirements specified for density, the full depth of the stabilized material shown on the plans shall be compacted to the extent necessary to remain firm and stable under construction equipment. After the subgrade (section) is completed, tests as necessary will be made. If the material fails to meet the density requirements, it shall be reworked to meet these requirements. Throughout the entire operation the shape of the subgrade course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with typical section shown on the plans and to the established lines and grades. Should the material due to any reason or cause, lose the required stability, density and finish before base or pavement is placed, it shall be reconstructed and refinished at the sole expense of the Contractor.

E. Finishing, Curing and Preparation for Base Course

After the lime treated subgrade has been compacted, it shall be brought to the required lines and grades in accordance with the plan typical sections. The completed section shall then be finished by rolling as directed with a pneumatic tire roller or other suitable roller sufficiently light to prevent hairline cracking. The complete section shall be moisture-cured for a period of one to four days, or as directed by the Engineer. In cases, where the stabilized subgrade sets up sufficiently to prevent objectionable damage from traffic, such sections of the completed subgrade may be opened to traffic two days after completion.

F. Measurement

Lime Stabilized Subgrade of the depth indicated on the plans shall be measured by the square yards completed with lime and accepted in place, to neat lines as shown on the Plan Typical Cross-Section.

Approved truck and/or vehicles delivering lime slurry on the job site shall surrender on request, to the Inspector, a certified weight certificate for verification of the truck vehicle contents signed by the operator (Public Weighter) from a certified public truck scale. The weight of the lime slurry shall be calculated from the number of gallons of slurry applied to

the subgrade material as directed by the Engineer. The calculations shall be based on the percent of solids by weight of the lime in the slurry, as delivered and incorporated into the subgrade material.

4.6.1.3. FLEXIBLE BASE

A. Materials

The material shall be crushed or uncrushed as necessary to meet the requirements hereinafter specified, and shall consist of durable stone or gravel, crushed and/or screened to the required particle size, with or without other approved fine sized materials. The material shall be from approved sources.

B. Testing

Testing of flexible base materials shall be tested in accordance with the following standard laboratory test procedures:

Preparation for Soil

Constants and Sieve Analysis	THD Tex101E
Liquid Limit	THD Tex104E
Plastic Limit	THD Tex105E
Plasticity Index	THD Tex106E
Linear Shrinkage	THD Tex107E
Sieve Analysis	THD Tex110E

When requested by the Engineer, samples for testing the material shall be taken prior to the compaction operation.

The flexible base will be composed of caliche calcareous limestone, calcareous or calcareous clay particles with or without stone, conglomerate, gravel, sand or granular materials.

Flexible base (Type D Grade 6) shall conform to the following requirements:

Before lime is added

Retained on Sq. Sieve	Percent Retained
2"	0
½”	20 – 60
No. 4	40 – 75
No. 40	75 – 85
Max. P.I.	12
Min. CBR at 95% (Standard) maximum by density	50 minimum

Los Angeles Abrasion 40 maximum

If caliche base materials fail to meet the above requirements then the following shall apply:

Lime shall be added to unlimed material to meet the following requirements:

Max. P.I. 10
CBR at 95% (standard) maximum dry density >60
The material shall be well graded and when tested shall meet the requirements as outlined in TXDOT 1993 Standard Specifications, Items 247, Type A, Grade 1.

C. Placement

The flexible base material shall be placed on the approved subgrade in course not to exceed eight (8) inches compacted depth. It shall be the responsibility of the Contractor that the required amount of material shall be delivered and uniformly spread and shaped. All material shall be moved from the place where it is dumped by cutting into windrows. After the material has been cut into windrows, it shall be sprinkled, spread, shaped and rolled in proper sequence to prevent segregation and as necessary for required compaction.

The surface upon completion shall be smooth and in conformity with typical sections and to the established lines and grades. Any deviation in excess of 1/4 inch in cross section and sixteen feet in length measured longitudinally, shall be corrected. All irregularities, depressions, or weak spots that develop shall be corrected.

Flexible base shall be compacted to an apparent dry density of not less than 98 percent of the maximum dry density as determined in accordance with ASTM D698. Tests for density will be made within 24 hours after compaction operations are completed. If the material fails to meet the density specified, it shall be reworked as necessary to meet the density required. Prior to placing succeeding courses of flexible base or surfacing on a previously completed course, the moisture shall be no more than 3 percent above or below the optimum content. The in-place density and depth tests shall be made as desired by the Engineer.

The base material, when compacted to 98% standard proctor density shall be capable of passing a California Bearing Ratio (CBR) Test Value of 50 (80 for alternate limestone base). Prior to final acceptance, the Testing Laboratory will determine strength. Materials not meeting the strength requirements shall be removed and replaced.

Samples for testing the material for soil constants, gradation and CBR shall be taken from production or stockpile as directed by the engineer.

4.6.1.4. PRIME COAT

A. Scope

"Prime Coat" shall consist of an application of asphaltic material on the completed base course and/or other approved areas in accordance with these specifications as directed by the Inspector.

B. Materials

The asphalt materials for Prime Coat shall meet the requirements for Cut-Back Asphalt, MC-30, Item 300, "Asphalts, Oils, and Emulsions" of the Texas Highway Department Standard Specifications.

C. Placement

When, in the opinion of the Engineer, the area and/or base is satisfactory to receive the prime coat, the surface shall be cleaned by sweeping or other approved methods as directed by the Engineer. If directed by the Engineer, the surface shall be lightly sprinkled with water just prior to application of the asphaltic material. The asphaltic material shall be applied on the clean surface by an approved type of self-propelled pressure distributor so operated as to distribute the prime coat at a rate not to exceed 0.20 gallon yard of surface, evenly and smoothly, under a pressure necessary for proper distribution. During the application of prime coat, care shall be taken to prevent splattering of adjacent pavement, curb and gutters or structures. The entire caliche surface shall be covered with the prime coat. Any uncovered areas shall be manually covered in an approved method.

D. Curing

Prime coat shall not be applied when the air temperature is below 60 degress Fahrenheit and falling, but may be applied when the air temperature is about 50 degrees Fahrenheit and is rising. The air temperature shall be taken in the shade and away from artificial heat. Asphaltic material shall not be placed when general weather conditions, in the opinion of the Engineer, are not suitable.

The Prime Coat must cure for a minimum of 48 hours before the succeeding course is placed.

4.6.1.5. HOT MIX ASPHALTIC CONCRETE PAVEMENT

See Appendix "V"

4.6.1.6. CONCRETE CURB AND GUTTER/CONCRETE VALLEY GUTTER (See Exhibit M)

"Concrete curb and gutter" and "Concrete Valley Gutter" shall consist of Portland cement combined concrete curb and gutter or separate concrete gutter or concrete valley gutter with or without reinforcing steel as required, constructed on an approved subgrade or foundation material in accordance with these specifications, in conformity with the lines and grades established by the Engineer and details shown on the plans. Width of valley gutter will be as shown on the plans.

A. Materials

The concrete mix will be designed with the intent of producing concrete which, when cured and tested, will have either compressive strength of flexural strength equal to or greater than the following:

Maximum Size Aggregate	Minimum Cement	Compressive Strength Pounds per (Square inch)	Flexural Strength (Pounds per (Square inch)
1 1/2"	5 sacks	7 Day - 2,000 28 Day - 3,000	4 Day - 400 7 Day - 500

Fiber mesh (Polypropylene fibers) 1.5 lbs. per cubic yard of concrete shall be added during mixing.

B. Construction Methods

The subgrade or foundation shall be excavated and shaped to line, grade and cross section, and, if considered necessary in the opinion of the Engineer, hand tamped and sprinkled. If dry, the subgrade or foundation material shall be sprinkled lightly immediately before concrete is deposited thereon.

Outside forms shall be of wood or metal, of a section satisfactory to the Engineer, straight, free of warp and at a depth equal to the depth of the curb and gutter. They shall be securely staked to line and grade, and maintained in a true position during placement of approved material. They shall be of such design as to provide the curb required and shall be rigidly attached to the outside forms. Where specifically permitted by the

Engineer, the Contractor may place concrete curb and gutter with an extension machine.

The reinforcing steel, if required, shall be placed in position as shown on the typical sections. Care shall be exercised to keep all steel in its proper location.

Concrete for curb and gutter and valley gutter shall be mixed in a manner satisfactory to the Engineer. The curb and gutter and valley gutter shall be poured in sections of the lengths and thickness indicated on the plans, and each section shall be separated by a premoulded or board joint section.

After the concrete has been struck and after it has become sufficiently set the exposed surfaces shall be thoroughly worked with a wooden float. The exposed edges shall be rounded by the use of an edging tool to the radius indicated on plans. All exposed surfaces of curb and gutter, valley gutter, or gutter shall be brushed to a smooth and uniform surface.

The completed curb and gutter, valley gutter, or gutter shall be thoroughly sprayed with a curing compound containing a fugitive dye, satisfactory to the Engineer.

The curb and gutter shall be backfilled to the full height of the concrete, tamped and sloped as directed.

C. Testing

Concrete shall be tested during the progress of work. Beam test samples in sets of two or three cylinders will be made in accordance with Texas Highway Department Bulletin C-1.

A test shall be made to represent each 60 cubic yards of concrete when continuous pouring is done or each 25 cubic yards when inlets, riprap, etc. are being poured. Min, strength requirements will be as shown above in these specifications.

4.6.2 Backfill and Excavation– For details see Exhibit N.

A. General

Excavation shall conform to the line and grades shown on the plans or as directed by the Engineer.

B. Disposal of Excavation

All material from excavation operations not required for backfilling will become the property of the Contractor. All surplus material shall be

removed from the work site promptly following the completion of the portion of structure involved and disposed of in a manner satisfactory to the Engineer.

C. Excavation in Streets

Where the structures are installed in streets, highways or other paved areas, the work shall include the cutting of pavement and base to neat lines and the restoration of pavement structure after structural excavation and backfill are completed. The type and thickness of replacement materials shall be as shown on the plans. Any work done or any damage to the base and/or pavement incurred outside the limits shown on the plans or authorized by the Engineer shall be restored at the contractor's expense. Maintenance and control of traffic shall be in accordance with the approved traffic control plan and the Texas Manual on Uniform Traffic Control Devices.

D. Protection of Utilities

The contractor shall conduct his work with a minimum disturbance of existing utilities and it shall be his responsibility to coordinate all work in or near the utilities with the utility owners. The Contractor shall inform utility owners sufficiently in advance of his operations to enable them to identify and locate, reroute, provide temporary detours, or to make other adjustments to the utility lines in order that work may proceed with a minimum of delay. The Contractor shall cooperate with all utility owners concerned for any utility adjustments necessary.

Particular care shall be exercised to avoid the cutting or damaging of underground utility lines that are to remain in place. Such lines, if damaged, shall be restored promptly. When active sanitary sewer lines are cut during excavation operations, temporary flumes shall be provided across the excavation while open, and the lines shall be restored when the backfilling has progressed to the original bedding lines of the cut sewer.

E. Removing Old or Abandoned Structures

When old or abandoned structures or foundations are encountered in the excavation, such obstruction shall be removed for the full width of the excavation and to a depth of one foot below the bottom of the excavation. When old inlets or manholes are encountered and no plan provision is made for adjustment or connection to new structure, such manhole and/or inlet shall be removed completely to a depth of one foot below the bottom of the excavation. In each instance, the bottom of the excavation shall be restored to grade by backfilling and compacting by the methods provided hereinafter for backfill. Where the excavation cuts through abandoned sewers, these sewers shall be removed as required to clear the new structure and plugged in a manner approved by the Engineer.

F. Backfill

Initial backfill from the bottom of the ditch to the top of the box culvert shall be placed in six inch layers (loose measure) and consolidated by jetting. Water jets shall be long enough to reach through the material being tamped. Backfill below top of box culvert shall be placed and compacted along sides of the box culvert equally to prevent strain on or displacement of the box culvert. It is the intent of this specification that water tamping shall continue until all cavities have been eliminated and the material is completely consolidated. When the density is not shown on the plans, compaction shall be 95% standard proctor density (ASTM D-698).

Final backfill from a level at the top of the box culvert to the top of the subgrade shall be placed in six (6) inch layers (loose measure) and mechanically tamped to the density shown on the plans. When the density is not shown on the plans, compaction shall be 95% standard proctor density (ASTM D-698).

Unless otherwise shown on the plans, suitable material selected from the excavation shall be used for this portion of the backfill. Material selected shall be free of large lumps or clods, which will not readily break down under compaction. Sand must meet the requirements of no more than 20% passing 200 sieve, or preapproved equal by the City Engineer.

4.6.3 Driveways and Curb Cuts – For Details see figures in Exhibit O.

Residential driveways may be a maximum of 12’ wide for a single drive, or 24’ for a double drive. Commercial driveways which are one-way drive cuts are to be no more than 24’ in width. Two-way drive cuts maximum width vary depending on front footage (See table in Appendix O). Full radius requirements shall apply to all commercial driveways.

Specifications for concrete curb as described above in Section 4.6.1 shall apply for all concrete work.

4.6.4 Storm Drainage – For Details see figures in Exhibit P.

4.6.4.1 REINFORCED CONCRETE PIPE STORM SEWERS

This specification shall govern for furnishing all plant, labor, equipment, supplies, materials and performing all operations required to complete the precast reinforced concrete pipe storm sewers of the sizes shown on the plans in accordance with the specifications herein.

A. Materials

1. Pipe

a. All pipe shall conform to the standard specification for reinforced concrete culvert pipe, ASTM Designation C-76, latest edition (Class III, Wal E) for standard strength pipe. Pipe joints shall be the tongue and groove, bell and spigot type.

b. In addition to the tests specified in governing ASTM specification, the pipe shall be subject to inspection by the Engineer after delivery and immediately before being laid. Sections not meeting the specification requirements shall be rejected, plainly marked by the Engineer, and such sections shall be promptly removed from the site by the Contractor and replaced with acceptable pipe at his expense.

2. Concrete

All concrete required for connections, encasement, or other details shown on the drawings shall have a minimum compressive strength of 3,000 psi at 28 days and shall conform to the requirements of the ACI Codes.

3. Jointing Material

All jointing material shall be "Talcote" cold plastic sewer joint compound No. 052 as manufactured by American Petrofina, Dallas, Texas or approved equal. Primer shall be "Talcote" asphalt primer No. 041 or approved equal. A single gasket of "Ram-Nek" plastic joint material applied in accordance with the manufacturer recommendation will be accepted as equal.

B. Construction Methods

1. Excavation, General

All excavation for storm sewer shall be performed at such time and in such sequence as to present the least interference with other items of the work and to permit installation of storm sewers for drainage of roadways at the earliest practicable time.

2. Excavation in Streets

Excavation in existing streets or alleys shall be executed in such a manner as to result in a minimum of interruption to traffic.

3. Trenches

Unless otherwise specified, all storm sewers shall be constructed in open cut trenches with vertical sides. All trenches shall be sheathed and braced to the extent necessary to maintain the sides of the trench in a vertical position under all conditions. Trenches adjacent to railroad tracks, along streets or alleys, or in any other location where slides or cave-ins could damage or endanger adjoining property or installations, shall be sheathed and braced in a manner approved by the Engineer within twenty-four (24) hours following completion of each section of excavation. Security of the sheathing and bracing shall be the responsibility of the Contractor, but shall be subject to the approval of the Engineer.

The minimum width of trench for pipe storm sewers shall be the outside diameter of the pipe plus two (2') feet and the maximum width shall be the outside diameter of the pipe plus three (3') feet. The bottom of the trench shall be excavated to the shape of an arc of a circle to provide full support for the lower third of each pipe.

4. Dewatering Trench

No storm sewer shall be constructed or laid in a trench in the presence of water. All water shall be removed from the trench sufficiently ahead of the pipe placing operation to insure a dry, firm bed on which to place the storm sewer pipe. The trench shall be maintained in an unwatered condition until all concrete and mortar is set. Removal of water may be accomplished by bailing, pumping, or pumping in connection with a well-point installation or as the particular situation may warrant.

5. Removing Existing Structures

Where old masonry structures or foundations are encountered in the excavation they shall, unless otherwise provided, be removed for the full width of the trench and to a depth one foot below the bottom of the trench. In each case, the bottom of the trench shall be restored to grade by backfilling with selected backfill material and compacted by the methods provided hereinafter for initial backfill. Where the trenching operations cut through storm or sanitary sewers which are known to be abandoned, these sewers shall be cut off flush with the sides of the trench and plugged with concrete in a manner satisfactory to the Engineer.

6. Protecting Utilities

The Contractor shall so conduct this work as to result in a minimum of disturbances to existing utilities. Particular care shall be exercised to avoid breaking water and gas lines. Such lines, if broken, shall be promptly restored by the Contractor at his expense. When active sanity sewer lines above the storm sewer pipe are cut in the trenching operation,

temporary flumes shall be provided across the trench and the lines shall be restored at the Contractor's expense when backfill has progressed to the original bedding lines of the sewer so cut.

7. Disposition of Excavated Materials

Excavated material shall be used for backfill except under pavements unless noted otherwise on the drawings. When disposal areas are not indicated on the drawings all excess excavated material shall become the property of the Contractor to dispose of as he wishes, without injury to the Owner or any individual. Such excess material shall be removed from the site promptly following the completion of the portion of sewer involved.

8. Laying Pipe

No pipe shall be laid in the trench until the bedding and condition of the trench has been approved by the Engineer. The trench shall be free of water and maintained in that condition until the pipe has been laid and the joints have been completed.

The Contractor shall, at his own expense, furnish and place in position as directed by the Engineer, all the necessary batter boards for controlling the work. The batter boards shall be of such size timber as the Engineer directs and shall be substantially supported. The boards and all location stakes must be protected from drainage or change of location. The Contractor shall also furnish, at his own expense, good sound twilled lines for use in giving lines and grades, and the necessary glummets and graduated poles of a form approved by the Engineer.

9. Jointing

All pipe shall be closely jointed and sealed with plastic sewer jointing compound, so placed as to form a durable water-tight joint. Jointing material shall be applied in strict accordance with the manufacturer's instructions and recommendations. The annular space of the joint is to be completely filled with jointing material unless directed otherwise by the Engineer. Excess plastic jointing compound shall be struck off the inside of the pipe to achieve a smooth interior surface. After placement, any pipe which is not in true alignment which shows any undue settlement after laying, or is damaged, shall be taken up and relaid or replaced, as may be required, without extra compensation.

10. Connections

Where pipe storm sewers are connected to manholes, inlets or headwalls, and the section of pipe making the connections cannot be set flush with

the inside wall face, the pipe shall be set or cut a minimum of three (3") inches short of a junction with that face and the inside pipe diameter formed to complete the intersection.

Stub ends for the connection of future storm sewer pipe not included in this Contract shall be furnished by inserting a suitable plug, of a design acceptable to the Engineer, into the free end of the pipe and mortaring it into place to form a water-tight end which may be readily removed for future connections.

11. Embedment and Backfill

a. Initial Backfill: Backfill from the bottom of the ditch to the spring line of the pipe shall be mechanically tamped. When a density is not shown on the drawings, compaction shall be 95% standard proctor density (ASTM D-698).

   Approved Riversand compacted to 95% standard proctor density shall be used for this portion of the backfill and embedment. Material will be subject to approval by the Engineer. Backfill below the top of the pipe shall be placed and compacted along the sides of the pipe equally to prevent strain on, or displacement of the pipe.

b. Final Backfill

   Contractor shall have the option of either mechanically tamping or water tamping the final backfill as follows:

   Mechanically Tamped: Backfill from a level at the top of the pipe to subgrade or ground surface shall be placed in layers and mechanically tamped to the density shown on the drawings. When a density is not shown on the drawings, compaction shall be 90% standard proctor density (ASTM D-698) throughout the fill and 95% standard proctor density in the final twelve (12) inches of the fill. Unless shown otherwise on the drawings suitable material selected from the excavation shall be used for this portion of the backfill and embedment. The material selected shall be free of large lumps or clods, which will not readily break down under compaction. Material will be subject to approval by the Engineer. Tractors for pulling rollers used to obtain compaction shall have a weight not exceeding eight (8) tons.

   Water Tamped: Backfill shall be with the excavated material approved for backfilling, not containing clods larger than 2-1/3 inches in diameter. Compaction shall be with water by jetting in

combination with ditch tamping machines or other approved compactors. After the final lift has been jetted, twelve (12) hours shall be allowed for the reduction of the materials moisture content. When the backfill moisture content is acceptable, the surface shall be compacted to the required density by the material being tamped. It is the intent of this specification that water tamping shall continue until all cavities have been eliminated and the material is completely consolidated. When a density is not shown on the drawings, compaction shall be 95% standard proctor density (ASTM C-698).

4.6.4.2 STORM SEWER INLETS

This specification shall govern for furnishing of all materials and the construction of inlets composed of concrete constructed in conformity with the requirements of this specification and the lines, grades, and dimensions shown on the plans or established by the Engineer. Special care shall be taken in the construction of the inlets to insure the proper installation of the outlet pipe as provided for the respective inlets as shown on the plans. Inlet bottoms shall be shaped to provide proper slope to the outlet pipe.

A. Materials

Inlets shall be constructed of 3000 psi concrete conforming to requirements of the TxDOT standard specifications for “Reinforced Concrete Structures”.

Reinforcing steel shall conform to requirements of Standard Specifications 420 and ASTM A-432.

The manhole rings and covers shall be of the sidewalk type Alamo Iron Works #860-93, or equal, and shall have the seating surfaces of Ring and Cover machined in order to secure a snug fit.

B. Excavation

The Contractor shall do all necessary excavation for the various inlets. Such excavations shall be of sufficient size as to permit the proper installation of the base and wall forms, and allow room for the stripping of such forms. All such excavating shall conform to the size and dimensions as shown on plans plus a maximum of four (4) feet to permit working room. Care shall be taken to insure that the excavation is not carried to a greater depth than required. If it becomes necessary to shore the walls of the excavated area, such shoring shall be of two (2) inch material and shall be braced in such manner as to insure support of the walls and permit the

construction of the inlet itself without necessitating the removal of any shoring until such time as the entire inlet is completed. No shoring shall be left or backfilled around unless authorized by the Engineer. Shoring shall remain in place at least twenty-four (24) hours after concrete work has been completed.

C. Construction

Inlets shall be constructed of 3000 psi concrete. Forms shall be constructed of either wood or metal. If wood is used, the material shall be of the standard type used for such construction. The forms shall be built true to line and grade and conforming to the dimensions for inlets shown on the plans. All inserts and openings shall be so formed that the concrete will not be injured when the forms are stripped. The forms shall be so braced and tied as to prevent spreading or bulging and shall meet the approval of the Engineer before placing the concrete. Forms shall remain in place a minimum of twenty four (24) hours after the concrete is placed before being stripped and shall be removed within a maximum of seven (7) days after completion of the work.

Reinforcing steel shall conform to the details shown on the plans as to size, length, and location.

The bottom of inlets shall be shaped to provide proper slope to the outlet pipe. All pipes shall be cut to fit the inside surface of the wall and particular attention shall be given to providing water-tight joints between the pipes and walls. After the walls have been furnished the bottom of the inlet shall be shaped to conform to the details shown on the plans by the use of additional concrete.

Where existing inlets are to be adjusted to new lines and grades, the surface of such inlets, which will be in contact with new construction, shall be thoroughly cleaned and coated with "Weldcrete", or equal, before new concrete is placed. Requirements of materials and construction, as herein specified, shall govern for adjusting or rebuilding existing inlets. The new portion of adjusted inlets shall conform to the dimensions as shown on the inlet details of the plans as near as possible.

D. Backfilling

Backfill will be with sand at streets areas, and excavated material behind curb. Backfilling adjacent to inlets shall begin as soon as the concrete has been cured in accordance with these specifications and the forms and the shoring have been removed. Backfill shall be placed in layers of not more than six (6) inches depth, wetted or dried to approximate optimum moisture content and compacted by mechanical hand tampers to 95%

Standard Proctor Density, as determined by AASHO Standard Method T99-49.

4.6.5 Sidewalks – If there is any conflict of the specifications contained herein, those in the Zoning Ordinance Section 13, shall prevail. For details see figures in Exhibit Q.

A. Construction Methods.

Conventionally Formed Concrete. Prior to sidewalk construction, the subgrade, foundation or pavement surface shall be shaped to the line, grade and cross section shown on the plans and, if considered necessary by the Engineer, hand tamped and sprinkled. When directed by the Engineer, the subgrade or foundation material shall be sprinkled lightly immediately before the concrete is deposited thereon.

Forms, where needed, shall be of wood or metal, of a section satisfactory to the Engineer, straight, free of warp and of the depth required. They shall be securely staked to line and grade and maintained in a true position during the placing of the concrete.

The reinforcing steel shall be placed in a position as shown on the plans. Care shall be exercised to keep all steel in its proper location during concrete placement.

Sidewalks shall be constructed in sections of the lengths shown on the plans. Unless otherwise shown on the plans or approved by the Engineer, no section shall be less than 8 feet or more than 40 feet in length. Sections shall be separated by premolded or board joint of the thickness shown on the plans, placed vertically and at right angles to the longitudinal axis of the sidewalk. Where the sidewalk abuts a curb or retaining wall, approved expansion material shall be placed along their entire length. Similar expansion material shall be placed around all obstructions protruding through sidewalks. Sidewalks shall be marked every 4 feet in length, by the use of approved jointing tools. Each day's production will be terminated at an expansion joint.

The clear width for walkways should be free of all trees, signs, utility poles, hydrants, parking meters, planters, newspaper boxes, and other similar appurtences.

B. General.

The completed work shall be cured for a period of not less than 72 hours.

Regardless of the method of construction, hand finishing will be permitted. All Wheelchair ramps shall be in conformance with the details shown on the plans.

4.6.6 Street Lights

A. Installation: Street lights shall be installed at the cost of the subdivider to City standards at all street intersections within the subdivision, at cul-de-sac ends and mid-block if the block exceeds 600' in length

B. Wattage of all bulbs shall be 250 watts

C. High Pressure Sodium Lamps with a single arc tube shall be used with a type "M" ballast and a nickel/brass base.

4.6.7 Fire Hydrants

For details see figures in Exhibit R.

A. Private Hydrants located on public streets should be painted red or some other color to distinguish them from public hydrants which shall be yellow.

B. Standard fire hydrants shall be Mueller (Super Centurion 250 A-423) or American Darling B-84-B only.

C. Installation.

1. Oil shall be placed in hydrant at the time of installation.
2. Pumper nozzle shall face roadway. (4-1/2" N.S.T.)
3. In certain instances, where distances permits, a parallel tee or union-tite 90 degree elbow with restraining lugs may be used in lieu of a standard tee. Final approval is required by Harlingen Waterworks System.
4. If American Darling model B-84-B is used, coat valve plate and interior shoe with epoxy.
5. All valves, fittings, valve boxes, meter boxes, covers and other accessories will be of domestic origin and approved by Harlingen Waterworks.
6. Tapping sleeves must have stainless steel bolts and nuts.

D. Single Family Homes may be constructed in the ETJ on a one lot subdivision on Lots of 1 to 9.99 acres in size without the requirement to install a fire hydrant, provided the property/homeowner agrees to and signs a notarized affidavit indemnifying and holding the City of Harlingen harmless of any liability that might occur to the subject property, due to fire or any other incident that would require a fire hydrant to assist the City of Harlingen in dealing with the fire or incident.

This document must be recorded by the property owners with the Cameron County Clerks Office. Any and all subsequent property owners and heirs shall be bound by this document.

No plats will be recorded by the City until the recorded document is submitted by the property owner to the City of Harlingen Planning and Zoning Department

4.6.8 Water Facilities

For details see figures in Exhibit S.

A. Public Water Systems.

1. Where potable water is to be supplied to a subdivision by connection to Harlingen Waterworks System, the distribution system within the subdivision shall be designed and constructed in accordance with the minimum criteria set forth in 25 TAC 337.201-337.212, "Rules and Regulations for Public Water Systems" and the standards and requirements of the Harlingen Waterworks System.

2. Where potable water is to be supplied by connection to another potable water supply system, the system must meet the minimum criteria of 25TAC 337.1-337.18, "Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Supply Systems". A written statement by the water purveyor must be provided that indicates the water purveyor agrees to provide potable water to the development at the demand, both daily and peak flow rates, for a minimum period of 30 years.

B. Non-Public Water Systems where individual wells are proposed for the supply of potable water to any residential lot within the subdivision, the following conditions and requirements shall be observed:

1. Existing wells within one-quarter mile radius of the subdivision or a test well or wells shall be drilled and the water(s) sampled and submitted to a private laboratory for a complete chemical and bacteriological analysis of the parameters on which there are potable water standards. The results of such analysis shall be made available to prospective property owners and copies of the laboratory results shall be provided the City and Harlingen Waterworks.

2. The water quality of individual wells must, after treatment, meet the standards of quality for community water systems established by 25 TAC Sections 337.3, 337.4, 337.10 and 337.14.

3. If additional treatment is necessary to provide water meeting the above standards for potable water a report of such treatment shall accompany the laboratory results.

C. Reinforced Concrete Low-Head Pressure Pipe (for irrigation)

Concrete or PVC pipes may be used, but must meet the specificiations as set out by the Harlingen Irrigation District.

4.6.9 Sanitary Sewer Facilities

For details see figures in Exhibit T.

A. Organized Wastewater Facility

1. Connection to Harlingen Waterworks wastewater system shall be required except where Harlingen Waterworks determines such connection will require unreasonable expenditure when compared with other methods of wastewater disposal.

2. Subdividers who propose the development of an organized wastewater collection and treatment system must obtain a permit to dispose of wastes from the TNRCC in accordance with 31 TAC Chapter 305 "Consolidated Permits" and obtain approval of engineering planning materials for such systems under 31 TAC Chapter 317 "Design Criteria for Sewerage Systems" from the TNRCC.

3. Subdividers who propose to dispose of wastewater by connecting to an existing permitted facility must provide a written agreement with the permittee. The agreement must accommodate the total flow anticipated from the ultimate development and occupancy of the proposed subdivision for a minimum of thirty years. Engineering plans for the proposed wastewater collection lines must be in accordance with TNRCC rules and approved by the water provider prior to construction.

B. On-Site Facilities

1. On-site facilities which serve single-family or multi-family residential dwellings with anticipated wastewater production of one thousand or more gallons per day must be designed by a registered professional engineer or registered professional sanitarian.

2. Proposals for on-site sewerage facilities for the on-site disposal of sewage in the amount of five thousand gallons per day or greater must

be presented to the TNRCC for determination of the necessity for a wastewater permit from that agency. Each such disposal facility must be designed by a registered professional engineer.

3. On-site sewerage facilities not required to obtain a wastewater permit from the TNRCC must apply for and receive a permit from the Texas Department of Health or its authorized agent as required by the procedures established in 25 TAC 301.101 through 301.109.

4. The Texas Department of Health or its authorized agent shall review proposals for on-site sewage disposal systems and make inspections of such systems as necessary to assure that the system is in compliance with Chapter 366 of the Texas Health and Safety Code and rules 25 TAC Sections 301.11 through 301.17 and any additional applicable sections, "Construction Standards for On-Site Sewerage Facilities". In addition to the unsatisfactory on-site disposal systems listed in 25 TAC 301.16, pit privies and portable toilets are not acceptable waste disposal systems for lots platted under these rules.

Section 4.7 Construction Inspection

During construction of the subdivision improvements, periodic inspection of the quantities and quality of workmanship of the construction shall be provided by the City to oversee compliance with the plans and specifications, as provided, for those improvements that will be dedicated for public use.

A pre-construction meeting shall be held with the Engineering Department representative of the City to discuss construction specifics and requirements for every subdivision.

The developer shall ensure that the construction contractor notifies the City Engineering Department of key construction activities, milestones and testing appointments to allow for the witnessing of said activities by City inspection personnel.

All testing shall be paid for by the developer and copies of the test reports shall be provided to the City Engineer for review.

Any field modifications shall be reported to the City Engineer or inspection personnel. Final acceptance of any changes from plans and specifications shall be approved by the City Engineer or duly authorized representative.

Section 4.8 Final Acceptance

Upon completion of construction a request for final inspection walk through shall be submitted. After final inspection by city inspection personnel, the subdivider and Planning Department shall be notified in writing of acceptance or rejection of the construction. **A letter of construction warranty for a minimum period of one year is required from the contractor prior to final acceptance by public entity**.

Section 4.9 Warranty Period Inspection Required

A follow-up inspection of construction improvements is to be scheduled prior to the end of the one year warranty period. This inspection is to be requested by the designing engineer for final release of liability.

Pavement shall be inspected for unwanted depressions. Any depressions which retain water in any area with any dimension greater than 12 inches and a water depth greater than one eight of one inch (measurable any where in the depression) is considered an unwanted depression. These areas shall be repaired so as not to retain water in a manner approved by the Engineer.

Any cracks which appear prior to acceptance and at any time during the one year period shall be promptly repaired in a manner approved by the Engineer. In general, an approved rubberized tar sealer neatly applied to the cracks will be accepted.

If the Contractor fails to repair depressions, cracks and other problems outlined by the warranty calls within 30 days after notification, the Bonding Company will be notified and asked to remedy the problem.