

CITY OF NIEDERWALD, TEXAS
ENGINEERING DESIGN STANDARDS
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SECTION 1

GENERAL PROVISIONS

Section 1.0 Definitions

A. For the purpose of these standards, the following terms and words are defined as indicated below:

- (1) "Electric Utility lateral lines" mean those electric lines from which Electric Utility service lines emanate.
- (2) "Electric Utility service lines" mean those electric lines that directly provide service to a consumer.
- (3) "Multi-family" means for purposes of these standards, any development which proposes more than one living unit on one lot, excluding duplexes.

B. The following terms used herein shall be defined in the same manner as they are, defined in the City's Subdivision Ordinance:

- (1) "City";
- (2) "City Engineer";
- (3) "Person";
- (4) "Street";
- (5) "Subdivider";
- (6) "Subdivision"

Section 1.1 Plans and Specifications

A. The plans and specifications for subdivision and site development improvements, including, but not limited to, water and wastewater facilities and street and drainage improvements, shall be drafted by a licensed engineer on plan-profile sheets and shall either be accompanied by a separate specifications document for each set of plans or clearly reference and demonstrate in the plans that they are complying with the City of Niederwald Construction Standards. All specifications shall be in accordance with the current City of Niederwald Construction Standards, Subdivision Ordinance, and all other ordinances or regulations of the City, as applicable, as approved by the City Engineer. In case of any conflict between these Engineering Design Standards and the City's Subdivision Ordinance, the City's Subdivision Ordinance shall control.

B. The plans and specifications shall be presented in a manner which provides for a timely and efficient review.

Section 1.2 Variances

The City Council may grant a variance from the requirements of these standards in specific cases where, owing to special conditions, a literal enforcement of the provisions of these standards would result in unnecessary hardship, the requirement does not appear to be reasonably applicable in the specific case, or compliance with the requirement would result in an undesirable situation; and in its opinion, such a variance would not be contrary to the public interest or would not destroy the intent of the provisions of these standards.

Section 1.3 Effective Date

The provisions herein adopted shall take effect on _____.

SECTION 2

STREETS

Section 2.0 General

- A.** Concrete curbs and gutters shall be provided on all streets and parking areas and shall be constructed in accordance with current City of Niederwald Construction Standards. Curbs shall be a standard six (6) inches in height. Alternate street standards with ribbon curbs and bar ditches may be approved by the City of Niederwald.
- B.** Street signs shall be required at all intersections. Signs shall conform to current City Sign standards and the standards set forth in the Texas Department of Transportation Manual on Uniform Traffic Control Devices for Streets and Highways.
- C.** All Major Collectors, Industrial Streets, and Major and Minor Arterial Streets shall have pavement markings in conformance with the latest edition of the Texas Department of Transportation Manual on Uniform Traffic Control Devices for Streets and Highways.
- D.** The crowns for undivided roadways shall be parabolic, six (6) inches above the gutter flow line and shall be centered between the curbs.
- E.** The crown height and location may be varied if the City Engineer finds that pedestrian and vehicular safety will be enhanced by the variance and that the variance will not impede traffic progression.
- F.** The sight distance at all intersections shall meet or exceed the minimum for stopping.

Section 2.1 Pavement Width

- A. Pavement widths shall be measured from face of curb to face of curb.
- B. Pavement widths for different street classifications shall be in accordance with Table 2.1.
- C. Cul-de-sac bubbles shall meet the following requirements:
 - (1) for Non-Industrial Streets of 150 linear feet or less in length, be constructed so that the closed end has a paved cul-de-sac of at least eighty (80) feet in diameter on a street right-of-way of at least one hundred (100) feet in diameter;
 - (2) for Non-Industrial Streets more than 150 linear feet in length, be constructed so that the closed end has a paved cul-de-sac of at least one hundred (100) feet in diameter on a street right-of-way of at least one hundred and twenty (120) feet in diameter; and
 - (3) for Industrial Streets, be constructed so that the closed end has a paved cul-de-sac of at least one hundred and fifty (150) feet in diameter on a street right-of-way of at least one hundred and eighty (180) feet in diameter.
- D. Changes in pavement alignment shall be gradual, and based on the design speed, shall allow for vehicular movement without a reduction in speed. This requirement includes turning lanes.
- E. The pavement shall be centered in the ROW. Additional ROW may be required to allow for a continual and consistent curb base behind the curb. However, where roadway construction is proposed in existing ROW, the City Engineer may allow for the pavement be off-set if the acquisition of future ROW will provide the necessary curb base.
- F. A roadway median for a Major or Minor Arterial street shall have a typical cross-section width of from fourteen (14) to thirty-five (35) feet. The exact widths and design shall be subject to approval by the City Engineer, who shall take into consideration safety, maintenance, effect on nearby property, the existing median width of connecting streets, and other factors deemed appropriate by the City Engineer.

Table 2.1 STREET DESIGN REQUIREMENTS

Category	Travel ROW*	Lanes	Pavement Width	Median Width	Curve Radius	Design Speed	Curb Return Radius	Maximum Grade (%)
Major Arterials	120	6	100	14-35	2000	50	25	7
Minor Arterials	90	4	70	14-35	800	45	25	7
Major Collectors	70	4	48	N/A	400	35	25	10

Minor Collectors	60	2	40	N/A	300	35	25	10
Local Streets	50	2	30	N/A	150	30	15	15
Industrial Streets	80	4	60	N/A	800	35	40	8

* ROW width may be required to be increased if the City approves "bar-ditch" style drainage.

G. Curbs at acute angle intersections and intersections of Major and Minor Arterial streets and Major and Minor Collector streets shall have not less than twenty-five (25) foot radii at acute comers. Curbs at intersections with industrial streets shall have not less than a fifty (50) foot radius. Curbs for the intersection of two Local streets shall not have less than fifteen (15) foot radii.

Section 2.2 Vertical Design

A. The maximum permitted street grade shall conform to Table 2.1.

B. The minimum permitted grade for streets with curbs and gutters shall be one-half of one percent (0.5%).

C. Changes in vertical gradient shall be by means of vertical curves. Grade breaks are not permitted. The vertical curves shall be designed using the design speeds established in Table 2.1.

D. Grades approaching an intersection shall not exceed six percent (6%) for a distance of fifty feet (50') from the intersecting gutter.

E. Curb splits are not permitted.

F. Super-elevation of curves is not permitted.

G. The right-of-way behind the curb shall be graded at a constant 1/4" per foot grade away from the curb and shall facilitate runoff toward the street.

H. Guardrails conforming to Texas Department of Transportation specifications are required for all bridges and culverts.

Section 2.3 Pavement Design

A. A soil evaluation report by a registered professional engineer acceptable to the City shall be required unless, in certain cases, the City Engineer submits a written determination that a report is not necessary, including the reasons for such a determination. The soil evaluation report shall be submitted in connection with the plans and specifications for street improvements, and shall demonstrate that the proposed paving section is adequate.

B. At a minimum all streets shall be paved with either:

(1) a minimum of twelve (12) inches of flexible base compacted to one hundred percent (100%) maximum density in accordance with Test 99 of the American Association of State Highway and Transportation Officials, latest revision, or as recommended by the soil evaluation report, and one and one-half inches (1.5") of compacted hot mix asphaltic concrete (Class A) in accordance with Texas Department of Transportation specifications; or

(2) five (5) inches of compacted reinforced Portland cement concrete (Class A) in accordance with Texas Department of Transportation specifications.

SECTION 3

SIDEWALKS AND PEDESTRIAN AND BICYCLE FACILITIES

Section 3.0 General

A. Sidewalks shall be required along the curb line of both sides of every street and sidewalk ramps for disabled access shall be required at each intersection of a sidewalk and a street. The City will consider the need for sidewalks along streets with "bar-ditch" style drainage on a case-by-case basis.

B. Construction of sidewalks shall conform to current City of Niederwald Construction Standards.

C. Residential lots and lots that are adjacent to Local Streets and Minor Collectors shall have sidewalks at least four (4) feet in width; commercial lots and lots that are adjacent to Major and Minor Arterial streets, Major Collector, and Industrial Streets shall have sidewalks at least six (6) feet in width.

D. Sidewalks shall conform to the following standards:

(1) be located parallel to the curb line, one (1) foot inside the dedicated right-of-way and no more than two (2) feet above or below the adjacent curb grade;

(2) have a continuing, common, non-slip surface that is not interrupted by steps or abrupt changes in level; and

(3) have a gradual adjustment in level when approaching an intersecting street or parking area with a common level at the point of such intersection.

(4) Sidewalk ramps are required at all street intersections including on the "through" street at "T" intersections.

E. The area between the curb and the sidewalk shall be excavated or filled to provide a uniform grade comparable to the adjacent street grade and shall be located so that the ground level at the right-of-way line is no more than two (2) feet, nor less than three (3) inches, above or below the adjacent curb grade.

F. Pedestrian and bicycle facilities shall be constructed in conformance with current City of Niederwald Construction Standards, have barriers to prevent motor vehicle access, and have pavement markings in conformance with the current edition of the Texas Department of Transportation Manual on Uniform Traffic Control Devices for Streets and Highways.

G. Pedestrian handrails conforming to Texas Department of Transportation specifications are required wherever the grade adjacent to a sidewalk or pedestrian and bicycle facility may be hazardous to pedestrians and/or bicycles.

H. Variances in texture, grade or alignment must be approved by the Texas Department of Licensing and Regulation prior to City Council consideration of the variance.

SECTION 4

DRAINAGE

Section 4.0 General

A. The design of all storm drainage facilities shall be in accordance with these standards and the City of Austin Drainage Criteria Manual (COA DCM). Where conflicts between these standards and the COA DCM occur, these standards shall govern.

B. Drainage easements or rights-of-way shall be dedicated to the public and shall include all drainage, open or enclosed, to the limits of the one hundred (100) year flood plain as the same is calculated to exist under fully developed conditions in accordance with the COA DCM. Additional easements shall be required, as necessary, to provide continuous access for purposes of maintenance.

C. Where possible, drainage shall be facilitated by means of paved sections or by use of swales to drain lots into a street without necessitating drainage easements being placed through a lot. The depth of a swale shall be that required for conveyance of the 100-year peak storm flow. The minimum longitudinal slope toward a street or drainage easement shall be one percent (1.0%).

D. Peak runoff rates shall not be increased at any point downstream for the two (2), twenty-five (25), and one hundred (100) year storms. The regulation of peak runoff rates to allowable levels as determined by the provisions of this policy shall be achieved by temporary storage on-site or off-site or by participation in the construction of a regional storm water management facility.

E. All drainage facilities shall be designed to minimize the potential for erosion at the outfall.

F. Drainage facilities and their access ways may not be located across lot lines but must instead be located adjacent to lot lines.

G. All earth structures shall be compacted to 95% maximum density. Earth slopes shall not exceed 4H:1V. The flow line of all earth structures shall include a pilot channel.

H. All proposed drainage facilities must be designed so that runoff will not gather in pools and become stagnant or foul.

I. If the design of a drainage system is based upon contours developed from an aerial survey it shall be verified on the ground with certification provided by a licensed engineer.

J. All drainage systems within public rights-of-way or public easements shall be constructed in accordance with these standards and City of Niederwald Construction Standards.

Section 4.1 Runoff Computations

A. Runoff computations must be prepared by a licensed engineer authorized by education and experience to perform such calculations.

B. Runoff calculations are required with the preliminary plan to the extent needed to verify that the proposed easements are adequate to contain the runoff as required above.

C. Runoff computations with construction drawings shall include calculations for runoff from the twenty-five (25) and one hundred (100) year storms, except for detention basins where the calculations must include consideration of the two (2) year storm. However, where the subdivision is designed such that the runoff from the one hundred (100) year storm is contained in the storm sewer system, the calculations for the storm sewer system need only include calculations for the one hundred (100) year storm.

D. For drainage areas less than fifty (50) acres, the Rational Method may be used for runoff computations in accordance with the COA DCM. For areas larger than ten (10) acres, a hydrograph methodology using the Soil Conservation Service unit hydrograph may be used. When the runoff from two (2) or more drainage areas is to be combined, the same methodology must be used for both areas and the methodology should be appropriate for both.

Section 4.2 Stormwater Conveyance

A. Runoff computation for runoff conveyance shall be based on a fully developed drainage area or watershed.

B. All concrete structures shall have a minimum flow line slope of 0.4%. Earth structures shall have a minimum flow line slope of 1%.

C. All drainage facilities including street curbs, gutters, inlets, channels and ponds shall be designed to intercept and transport runoff from the 100-year frequency storm. Storm sewers and inlets on grade may be designed to intercept and convey runoff from the 25-year storm provided that the runoff from the 100-year storm does not exceed the gutter capacity.

4.2.1 Streets

A. Where storm sewers are required, inlets shall be located to intercept runoff where the depth of runoff will exceed the top of curb.

B. Gutter and inlet capacity will be calculated in accordance with the COA DCM. Inlets shall have a throat height of five (5) inches and shall be designed so as to conform to City of Niederwald Construction Standards.

C. No lowering of the standard street crown height shall be allowed for the purpose of obtaining additional hydraulic capacity. Similarly, curb heights may not be raised to increase the hydraulic capacity of a street.

4.2.2 Stormsewer

A. Pipe for storm drains shall be Class III reinforced concrete pipe (RCP) and shall have a minimum cover of 36". However, where, in the opinion of the City Engineer, added strength is needed for traffic loads over a minimum cover or for excessive height of backfill, pipe for storm drains shall be Class IV or Class V RCP.

B. Pipe for storm drains shall be constructed to the bank of the receiving driveway and shall have a minimum cover of not less than one (1) foot over the top of the pipe. Erosion control measures shall be taken at the outlet of the pipe.

C. Stormsewer in rights-of-way shall be located on the low side of the street, five (5) feet from the street centerline to the center of the pipe.

D. Pipes shall be joined such that the soffets of the pipes are at the same elevation.

E. Manholes (inlets or junction boxes) shall be provided at all connections of greater than forty-five (45) degrees, at the junction of three (3) or more lines and at a maximum of eight hundred (800) feet on straight lines. Design of manholes shall conform to the current City of Niederwald Construction Standards.

4.2.3 Channels

- A.** Open drainage channels or ditches are not permitted on a residential lot.
- B.** Subject to the approval of the City Council, drainage ditches may be used for outfalls to natural or major drainage channels, provided that individual lots are not crossed. Drainage structures shall be designed to have a minimum of one (1) foot of freeboard at design flow and side slopes no steeper than 4:1.
- C.** Wherever possible, outfalls from stormsewers and ditches into natural drainage ways shall enter at the grade of the natural drainage channel. The outfall shall be designed with drop-type outfall structures or shall otherwise provide adequate protection against erosion.
- D.** Waterways through a subdivision and major structures such as box culverts and bridges shall be designed to carry a one hundred (100) year frequency storm.
- E.** All constructed channels are required to have one (1) foot of freeboard.

Section 4.2.4 Culverts and Bridges

- A.** Construction plans for box culverts, bridges and related structures may be adaptations of the Texas Department of Transportation (TXDOT) specifications.
- B.** For culverts and bridges conveying runoff in excess of 1,200 cfs, the predicted water surface elevation shall be one (1) foot lower than the low chord of the structure.

Section 4.2.5 Flood Plain

- A.** For areas of flow with less than 64 acres of contributing area, no flood plain shall be defined; however with regards to the drainage requirements contained in these standards, any concentrated flow necessitates the dedication of a drainage easement. When considering the capacity of any facilities, the downstream conditions must be considered.
- B.** In all cases where a floodplain determination is required, the determination shall be based on the projected fill development of all properties contributing to the point of consideration. It is the responsibility of the design engineer to determine, based on the most accurate information available, what the fully-developed drainage area is.
- C.** Floodplain limits shall be determined by a backwater analysis. The direct-step method of calculating water surface profiles is required. The HEC-2 and HEC-RAS computer programs may be used for calculating the water surface profile.

D. For natural waterways of less than 64 acres, a backwater analysis is required when downstream structures will impede the flow of runoff, or where irregularities in the shape of the channel create significant energy losses.

Section 4.3 Stormwater Control

A. All development is responsible for control in its stormwater runoff and insuring that no increase in peak runoff will occur downstream as a result of the development. All detention ponds shall control the increase in runoff for the 2-, 25-, and 100-year storms. In addition, all ponds must convey runoff from the 100 year storm, assuming fully-developed upstream conditions.

B. Where the City Engineer determines that the development poses no immediate flooding hazard downstream, the applicant may pay a fee to the City of Niederwald for the purpose of performing watershed wide drainage improvements or flood mitigation measures. Where adequate conveyance of runoff does not exist downstream of a proposed development or no improvements are anticipated, on-site stormwater detention is required.

Section 4.3.1 Methodology

A. For drainage basins serving less than ten (10) acres, the Modified Rational Method (MRM) or the HEC-HMS may be used to determine the minimum detention volume required. The MRM shall be used in accordance with the procedure outlined in the COA DCM. The outlet structure used must be designed so that it meets the assumptions of the MRM. The runoff coefficients shall be calculated based on the actual proposed and probable impervious cover of the site. The time of concentration shall be calculated using the methodology described in Section 2, COA DCM.

B. Where detention ponds serving greater than ten (10) acres are utilized, a hydrographic methodology is required to analyze the adequacy of the proposed structure. The Soil Conservation Service (SCS) unit hydrograph shall be used. The times of concentration or lag times used in the analysis shall be calculated using the methodology of TR-55 or the Uplands Method described in NEH-4. The runoff curve numbers used shall be calculated based on the actual soil class in the analysis area and the actual proposed and probable impervious cover. The City of Austin 3-hour rainfall distributions shall be utilized for precipitation. The HEC-1, HEC-HMS and TR-20 computer programs are accepted programs for utilizing the SCS hydrographs.

Section 4.3.2 Design Consideration

A. The minimum freeboard and embankment requirements shall be those outlined in Chapter 8, COA DCM.

B. Ponds which serve public facilities or which are to be maintained by public entities must meet the maintenance requirements outlined in the COA DCM and in Section 4.4 of these standards.

C. All detention facilities shall be designed to allow complete drainage within 24 hours.

Section 4.4 Additional Maintenance Requirements

All existing and proposed drainage facilities within or utilized by a development must meet the following requirements for access for maintenance.

A. Barrier-type fences, such as chain link, solid woods, masonry, stone or wrought iron, at least six (6) feet in height, are required to prevent access to drainage facilities that have interior slopes greater than 3H:1V, including facilities that are not maintained by the City but are located within five hundred (500) feet of a residential structure. Galvanized fence posts shall be set in concrete footings a minimum of eighteen inches (18") deep with a minimum footing diameter of twelve inches (12"). Gates, a minimum of twelve feet (12') wide, are required to allow access by maintenance equipment. Facilities which are not readily accessible for maintenance shall, at the discretion of the City Engineer, include a turn-around to facilitate the movement of maintenance equipment.

B. A twelve foot (12') maintenance access strip is required around the perimeter of detention ponds and on both sides of channels. The access strip shall not have a grade steeper than fifteen percent (15%) and shall be designed to the horizontal geometric standards of a local street.

C. A standard driveway approach is required where the drainage access way leaves the roadway.

SECTION 5

WATER

Section 5.0 General

A. These water standards shall apply to water improvements that will be reviewed and/or inspected by the City of Niederwald. The City retains the right to review and approve construction plans and inspect construction of water improvements within the City or the City's extraterritorial jurisdiction ("ETJ"). Where there is a conflict in requirements of the water system owner and City requirements, the highest standard for water construction shall be used, and will be approved by the City Engineer.

B. The subdivider shall provide all water lines required to properly serve each lot of the subdivision and to ensure that existing and/or new water facilities can supply the required demand at the desired pressure for both domestic use and for fire protection. The subdivider shall bear all costs for extending water service from existing City water lines that have sufficient capacity to serve the subdivision. All water lines and service connections shall conform to the

current City Construction Standards, requirements of the Texas Department of Health, the fire insurance standards of the State Board of Insurance, and any other applicable federal, state or local laws and regulations.

C. Water connections shall be made readily available by the subdivider to proposed park sites with water lines located along the street frontage of the park. The subdivider must demonstrate that there is sufficient water line capacity available to serve the park.

Section 5.1 General Design Requirements

A. Piping for water mains and connections shall be in accordance with current City Niederwald Standards. All pipe and fittings shall be new and shall conform to the current standards of the American Water Works Association

B. Water lines shall be at least six (6) inches in diameter. Larger lines shall be required when recommended by the City Engineer and approved by the City Council.

C. At the intersection of water distribution lines, the number of valves shall be one (1) less than the number of radiating lines [two (2) valves for tee connections and three (3) for cross connections]. Valves shall be located at the Point of Curve (PC) or the Point of Tangency (PT) of the nearest property line. All valves shall conform to the current standards of the American Water Works Association.

D. If water lines twelve (12) inches in diameter or larger are required to be installed, the plans shall show lines and grades in both plan and profile. Lines smaller than twelve (12) inches may be shown only in plan, but must be detailed and clearly show the depth of bury under streets, drainage ditches and culverts, other utilities, etc.

E. Water lines shall have a minimum of thirty-six (36) inches of cover measured from either the top of the pipe or valve actuating nut (whichever is applicable) to the finished ground surface.

Section 5.2 Fire Protection

A. Threading on fire hydrant outlets shall be the National Standard Hose Thread.

B. Fire hydrants shall be provided at least every six hundred (600) feet in residential areas and at least every three hundred (300) feet in commercial and industrial areas. All fire hydrants shall be standard three-way, post-type, dry barrel hydrants, be in compliance with American Water Works Association Standards, have at least six (6) inch connections to mains, and have at least five and one quarter inch (5.25") valve openings. All hydrant leads served by twelve (12) inch or larger lines shall have a six (6) inch gate valve. Fire hydrants shall conform to the current City Construction Standards.

C. For fire flow conditions, the maximum velocity shall not exceed ten (10) fps and the minimum static pressure shall not be less than twenty (20) psi. For Single-family and duplex development, 1,000 gpm is required. For development other than single-family and duplex development, the minimum flow rate shall be in accordance with Table 4-A of the City of Austin Fire Protection Criteria Manual.

SECTION 6

WASTEWATER

Section 6.0 General

A. These wastewater standards shall apply to wastewater improvements that will be reviewed and/or inspected by the City of Niederwald. The City retains the right to review and approve construction plans and inspect construction of wastewater improvements within the City or the ETJ. Where there is a conflict in requirements of the wastewater system owner and City requirements, the highest standard for wastewater construction shall be used, and will be approved by the City engineer.

B. Septic tanks shall not be permitted in areas where a wastewater collection and treatment system is available. Where septic systems must be used, they must meet all regulatory requirements, including those of Hays or Caldwell County, as applicable.

C. The subdivider shall provide all wastewater lines required to properly serve each lot of the subdivision and to ensure that existing wastewater lines and facilities can adequately serve the subdivision. The subdivider shall bear all costs for extending existing City wastewater lines and wastewater facilities to have sufficient capacity to serve the subdivision. All wastewater lines and service connections shall conform to current City Construction Standards and the requirements of the Texas Department of Health, and any other applicable federal, state or local laws and regulations.

D. Wastewater connections shall be readily available to proposed park sites with lines located along the street frontage of the park. The subdivider must demonstrate that there is sufficient wastewater line capacity available to serve the park.

6.1 General Design Requirements

A. Piping for wastewater lines shall be polyvinyl chloride (PVC) with elastomeric joints and be at least eight (8) inches in diameter. The minimum house connection size shall be four (4) inches in diameter. All pipe and accessories shall be new. PVC pipe shall conform to American Society of Testing Materials, Standard D3034. PVC sewer pipe joints shall comply with American Society of Testing Materials, Standard D3212. All piping shall be installed in accordance with current City Construction Standards.

B. Manholes shall be constructed at all changes in direction, changes in grade, and sewer line intersections but in no case shall the distance between manholes exceed four hundred (400) feet.

C. Sewer manholes shall be a nominal four (4) feet in diameter and be made of precast concrete. Steps shall not be provided. The outside diameter of the lid shall be thirty-two (32) inches. Lids shall be solid with no pick holes and have the words "sanitary sewer" cast into their surface. All manholes shall be installed in accordance with current City Construction Standards.

Section 6.2 Lift Stations

A. Lift station capacity and design methodology shall be as required by the City.

B. All lift station designs must be accompanied by a report detailing the adequacy of the design.

C. Lift stations shall be designed to facilitate maintenance and repairs.

D. Lift stations must be equipped with the necessary sensors and hardware for connection to the City's monitoring system.

SECTION 7

POLLUTION CONTROL

Section 7.0 Temporary Controls

Temporary controls shall be used during construction to prevent the erosion of soil and sedimentation of waterways until restoration is complete. Temporary controls shall be used in accordance with the City of Austin Environmental Criteria Manual and shall meet the requirements of the City of Austin Standards and Standard Specifications.

Section 7.1 Permanent Controls

A. The subdivider shall restore all areas within public rights-of-way that have been stripped or filled as a result of construction activities. Such areas shall be covered with a minimum of four (4) inches of topsoil prior to the application of grass seed. Grass seed shall be applied in accordance with Figure 7.1, hereof.

FIGURE 7.1

Reseeding Standards

Time of Year	Seed Type	Amount of Seed Per 1,000 S.F.
October -February	Unhulled Bermuda	1 lb
	Or Winter Rye	3 lbs.
March -September	Hulled Bermuda	1 lb.

B. Seedlings shall be watered until uniform growth is established. During the first two (2) months after application of the seed, the planted area shall be irrigated or sprinkled at ten (10) day intervals in a manner that will not erode the topsoil but at a rate sufficient to thoroughly soak the soil to a depth of six (6) inches. Rainfall occurrences of one-half inch (0.5") or greater shall postpone the watering schedule by ten (10) days.

C. Restoration shall be considered to be acceptable when the grass has grown to a height of at least one-half inch (0.5") and covers eighty-five (85%) percent of the area, with bare spots being no greater than ten (10) square feet in size.

SECTION 8

MISCELLANEOUS DESIGN STANDARDS

Section 8.0 Survey Requirements

A. Monuments shall be of iron pipe or reinforcing steel, one-half (1/2) inch or larger in diameter and at least twenty-four (24) inches in length, and be placed at all corners of block lines and at the point of block line tangents of the subdivision.

B. Lot markers shall be of iron pipe or reinforcing steel, one-half (1/2) inch or larger in diameter and at least eighteen (18) inches in length, placed at each corner of all lots, flush with the average ground elevation, or countersunk, if necessary, to avoid being disturbed.

Section 8.1 Underground Utility Lines

A. All telephone and cable television utility lines and all electric utility lateral and service lines and wires shall be underground, except as otherwise herein provided.

B. Where electrical service is to be placed underground, electric utility service lines for street or site lighting shall also be placed underground.

C. All electrical, cable television, and telephone support equipment (transformers, amplifiers, switching devices, etc.) necessary for underground installations in subdivisions shall be pad mounted or placed underground in a public utility easement rather than a right-of-way.

D. Nothing herein set forth shall prohibit or restrict any utility company from recovering the difference between the cost of overhead facilities and underground facilities. The subdivider shall be required to reimburse the utility company for such cost differential.

E. Each utility company whose facilities are subject to the provisions of these standards shall develop policies and cost reimbursement procedures with respect to the installation and extension of underground service.

F. The electric utility company may plan and construct overhead lines in accordance with an Electric Master Plan approved by the City Council. Telephone and cable television lines may be constructed overhead where overhead electric utility lines are permitted.

G. Notwithstanding the provisions of these standards, temporary construction utility service may be provided by overhead utility lines and facilities without obtaining a variance or exception from the provisions hereof.

H. All utility installations regulated by the provisions set forth herein shall conform to all City of Niederwald ordinances and regulations, as well as the regulations and specifications of the applicable utility companies.

Section 8.2 Public Utility Easements

Where necessary to adequately serve a subdivision with public utilities, easements shall retained for poles, wires, conduits, storm sewers, sanitary sewers, water or wastewater lines, gas lines, or other utilities. Where feasible, easements shall be along a front or rear lot line, but when deemed to be warranted by the City Engineer and the City Council, such easements may be permitted across a lot or along side lot lines.

Section 8.3 Street Lights

Street lights shall be provided by the subdivider and shall conform to the latest edition of the Illuminating Engineering Society Handbook. Lighting levels shall be in accordance with Figure 8.1 (for residential areas) and Figure 8.2 (for nonresidential areas).

Figure 8.1

Street Lighting Levels for Residential Areas

Street Category	Minimum Average Maintained Foot-Candles	Uniformity Ratio
Local Streets	0.4	6:1
Major & Minor Collectors	0.6	3:1
Major & Minor Arterials & Industrial Streets	1.0	3:1

Figure 8.2

Street Lighting Levels for Non-Residential Areas

Street Category	Minimum Average Maintained Foot-Candles	Uniformity Ratio
Local Streets	0.6	3:1
Major & Minor Collectors	0.9	3:1
Major & Minor Arterials & Industrial Streets	1.4	3:1

Section 8.4 Conservation Areas

All streets, utilities, drainage improvements, and buildings shall be constructed and located so as to protect conservation areas designated in the Comprehensive Master Plan.

Section 8.5 Landscape Requirements

RESERVED

Section 8.6 Tree Preservation

RESERVED