NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE GENERAL SPECIFICATIONS
(Zone 1 - Texas)

WATER WELL
Code 642
INSTALLATION OF NEW WATER WELL
(No.)

1. SCOPE

The work shall consist of furnishing and installing a hole drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer with fittings and appurtenances as specified for an agricultural production water well (not applicable for human consumption).

2. PUBLIC AND PRIVATE UTILITIES

Utilities are defined to be overhead and underground power or communication lines, and pipelines. The contractor should conduct their own search and discovery for utilities in order to lessen or avoid potential damages. The owner/operator shall complete TX-ENG-80A, Utilities Inventory, during planning and return it to the NRCS representative. The owner/operator shall also ensure that TX-ENG-80B, Cooperator Confirmation of the One-Call Utility Safety System is completed and returned to the NRCS representative prior to layout or any ground disturbance.

3. LAWS AND REGULATIONS

Well drillers and landowners must comply with the applicable laws and regulations of all Federal, State, Tribal and local agencies including local groundwater conservation districts. It is the responsibility of the landowner to obtain all necessary permits from such entities.

The use of "TDLR rules" throughout this specification refers to the Texas Administrative Code (TAC); Title 16 Economic Regulation; Part 4 Texas Department of Licensing and Regulation (TDLR); Chapter 76 Water Well Drillers and Water Well Pump Installers Administrative Rules, http://www.license.state.tx.us/wwd/wwdrules.htm.

Water well drillers must be licensed by the TDLR to drill wells in the State of Texas. A landowner constructing a well on their own property for their own use is not required to be licensed.

4. LOCATION AND WELL HEAD PROTECTION

The well shall be located as shown on the drawings or as staked in the field. Wells shall be located at safe distances from potential sources of contamination. The separation distances contained in the TDLR rules shall be met (see Well Location drawings in Section 7 of this specification). If applicable, the well buffer zones found in the TAC 30, Chapter 321, Subchapter B, section 321.38 of the Texas Commission on Environmental Quality (TCEQ) Concentrated Animal Feeding Operations (CAFOs) rules shall also be followed when planning the location of wells.

Surface runoff and drainage that might reach the wellhead from potential areas of contamination, such as those used by livestock, shall be diverted.

Any abandoned or deteriorated well in the vicinity of the proposed well shall be capped or plugged in accordance with the TDLR rules.

When a drilled or constructed well produces unacceptable results (either by reason of water quality or yield quantity), or for other reasons the well must be abandoned, the well shall be plugged or completed in accordance with the TDLR rules.

Wells should not be located in a flood prone area unless completed with: (1) a watertight sanitary well seal, (2) steel casing or a steel sleeve extending to an elevation two feet above the 100-year storm event or as required by the TDLR rules, whichever is more stringent.

5. CASING MATERIALS

Casing material shall be new plastic or steel. Plastic casing shall conform to the material, dimensional and quality requirements as specified in ASTM F-480. Steel casing shall meet or exceed the requirements as specified in ASTM A-589. To prevent galvanic corrosion, dissimilar metals are not permitted. Only steel casing shall be used if the bore hole is driven.

Casing and joint strength shall be sufficient to withstand all anticipated static and dynamic pressures imposed during installation, well development, and use. The casing and joints must withstand the maximum, anticipated differential head between the inside and outside of the casing. This is defined as the difference in elevation between the static water surface and the bottom of the well bore.

Joints shall have adequate strength to carry the load due to the casing length and still be watertight, or shall be mechanically supported during installation such that joint integrity is maintained.

Well casing shall be marked in accordance with the specified ASTM designation, which shall include, but not limited to nominal pipe diameter, type of material (i.e. PVC-1120), schedule or SDR as applicable, pressure rating in PSI, manufacturer's name or trademark, and ASTM designation.

The following tables may be used to select the appropriate casing diameter and strength:

DIFFERENTAL HEADS for PVC-12454 PLASTIC, SCHEDULES 40 AND 80 CASINGS

Based on NEH, Part 631-Chapter 32, Well Design and Spring Development, Table 32-7

		Schedule 40			Schedule 80		
Nominal Diameter (inches)	**Outside Diameter** (inches)	**Minimum Wall Thickness** (inches)	**SDR**	**Maximum Head** (feet)	**Minimum Wall Thickness** (inches)	**SDR**	**Maximum Head** (feet)
5	5.563	0.258	21.6	235	0.375	14.8	765
6	6.625	0.280	23.7	175	0.432	15.3	690
8	8.625	-----	-----	-----	0.500	17.3	470
10	10.750	-----	-----	-----	0.593	18.1	405
12	12.750	-----	-----	-----	0.687	18.6	375

MAXIMUM ALLOWABLE DIFFERENTIAL HEAD FOR SDR-PR PLASTIC CASINGS

Based on NEH, Part 631-Chapter 32, Well Design and Spring Development, Table 32.6

Wall Thickness (uncoated)		PVC-12454 PVC-1120, 1220	ABS-434	SR & PVC 14333 PVC-2110,2112,2116,2120	ABS-533
SDR	**Inches**	**Maximum Allowable Differential Head** (feet)			
13.5	*	1,020	920	815	665
17.0	*	495	445	395	320
21.0	*	255	230	205	165
26.0	*	130	120	105	85

* Wall Thickness Varies with Diameter.

DIFFERENTIAL HEAD LIMITATIONS FOR NEW STEEL CASINGS

Based on NEH, Part 631-Chapter 32, Well Design and Spring Development, Table 32-5

		Nominal Casing Size (inches)									
		4	5	6	8	10	12	14	16	18	24
Wall Thickness		**Outside Diameter** (inches)									
(uncoated)		4.50	5.563	6.625	8.625	10.75	12.75	14.00	16.00	18.00	24.00
Gage	**Inches**	**Maximum Differential Head Limitations** (feet)									
10 Ga	0.135	1,810	1,140	750	390	220	135	105	70	50	0
8 Ga	0.164	2,660	1,740	1,190	640	360	230	180	125	90	0
7 Ga	0.179	3,130	2,090	1,450	790	460	290	230	160	110	0
3/16	0.188	3,415	2,300	1,610	890	520	330	260	180	130	60
7/32	0.219	4,430	3,070	2,200	1,260	750	500	390	270	200	90
Sch. 40	0.237	5,035	---	---	---	---	---	---	---	---	---
1/4	0.250		3,880	2,840	1,680	1,030	690	550	390	290	130
Sch. 40	0.258		4,090	---	---	---	---	---	---	---	---
Sch. 40	0.280			3,490	---	---	---	---	---	---	---
9/32	0.280				2,140	1,350	910	730	520	390	180
5/16	0.312				2,625	1,690	1,160	930	680	510	240
Sch. 40	0.322				2,785	---	---	---	---	---	---
11/32	0.344					2,065	1,445	1,175	860	650	310
Sch. 40	0.365					2,325	---	---	---	---	---
3/8	0.375						1,970	1,420	1,055	800	390
Sch. 40	0.406						2,045	---	---	---	---
Sch. 40	0.438							1,975	---	---	---
7/16	0.438								1,490	1,145	580
Sch. 40	0.500								1,970	---	---
Sch. 40	0.562									1,965	---
Sch. 40	0.688										1,645

6. INSTALLATION

The installation and completion of the well shall comply with the TDLR rules.

The bore hole shall be sufficiently round, plumb, and of adequate diameter to permit satisfactory installation of the inlet, casing, filter pack, annular seal, and passage of the tremie pipe (including couplings), if used. The bore hole shall be 3-inches larger in diameter than the outside diameter of the casing to a depth of not less than 10-feet below the land surface and not less than the minimum specified in the TDLR rules or local requirements.

All wells shall be cased to a sufficient height (minimum of 12 inches) above the ground surface to prevent entry of surface and near-surface water, and to support the side of the hole through unstable earth materials. Casing shall extend from above the ground surface down through unstable earth materials to an elevation of at least 2-feet into stable material or to the top of the screen.

The well driller and the supplier or manufacturer of the screen, if a screen is used, will select the screen and design the gravel pack. The well screen shall be installed in any earth material likely to produce silt or sand. Well screens may be constructed of commercially manufactured screen sections, well points, or field-perforated sections. Depth of the aquifer below ground surface and the thickness of the aquifer shall govern the position and length of the screen. The filter (gravel) pack shall be determined by local geographic conditions.

The annulus surrounding the casing at the top of the well shall be filled with expansive hydraulic cement as specified in ASTM C-845, bentonite-based grout, or bentonite chips, to a depth of not less than 10-feet below the land surface and not less than the minimum specified in the TDLR rules or local requirements.

A concrete surface slab, sleeve placed around PVC casing, or pitless adapter shall be installed according to the TDLR rules to protect the well from contamination. If a concrete surface slab is installed, it shall slope away from the casing and be separated from the casing by a plastic or mastic coating to prevent bonding.

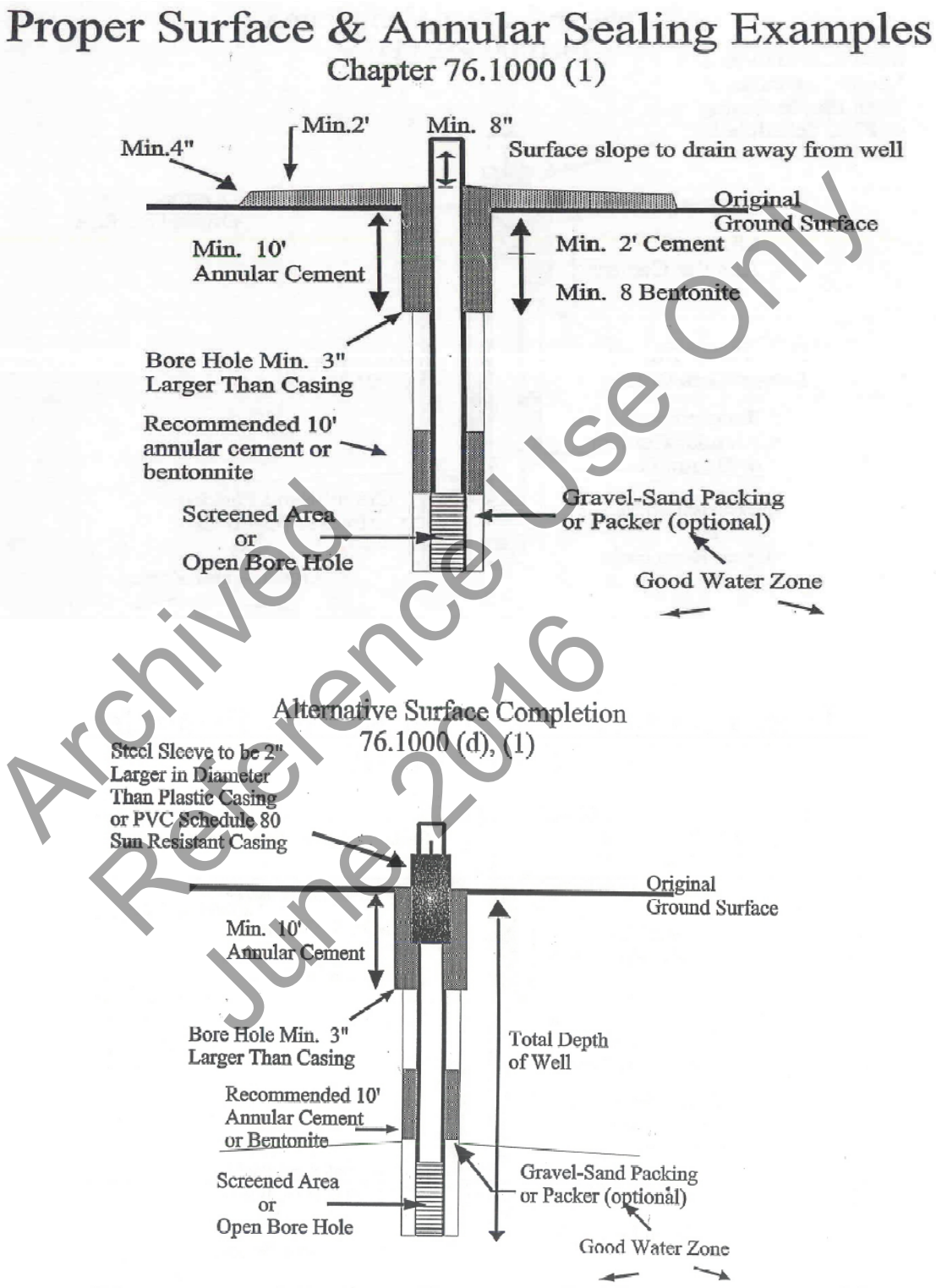
A positive seal (grouted in place) or packer shall be provided between the casing and the less pervious material overlying the aquifer of artesian wells, and in all aquifers where co-mingling of waters is undesirable. Grouting and sealing requirements are found in the TDLR rules.

An access port with a minimum diameter of 0.5-inches shall be installed to allow for unobstructed measurement of the depth of the water surface, or for a pressure gage for measuring shut-in pressure of a flowing well. Access ports, pressure gages or other openings in the cover shall be sealed or capped to prevent entrance of surface water or foreign material into the well. Removable caps are acceptable as access ports.

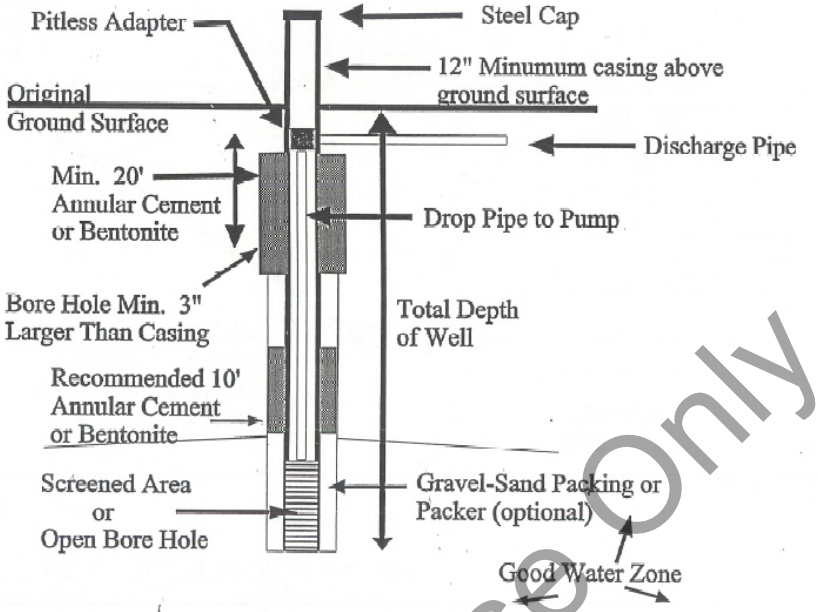
Wells shall be disinfected immediately following construction or repair to neutralize any contamination from equipment, material, or surface drainage introduced during construction activities. The disinfection process shall comply with the TDLR rules and local requirements.

7. TDLR DRAWINGS

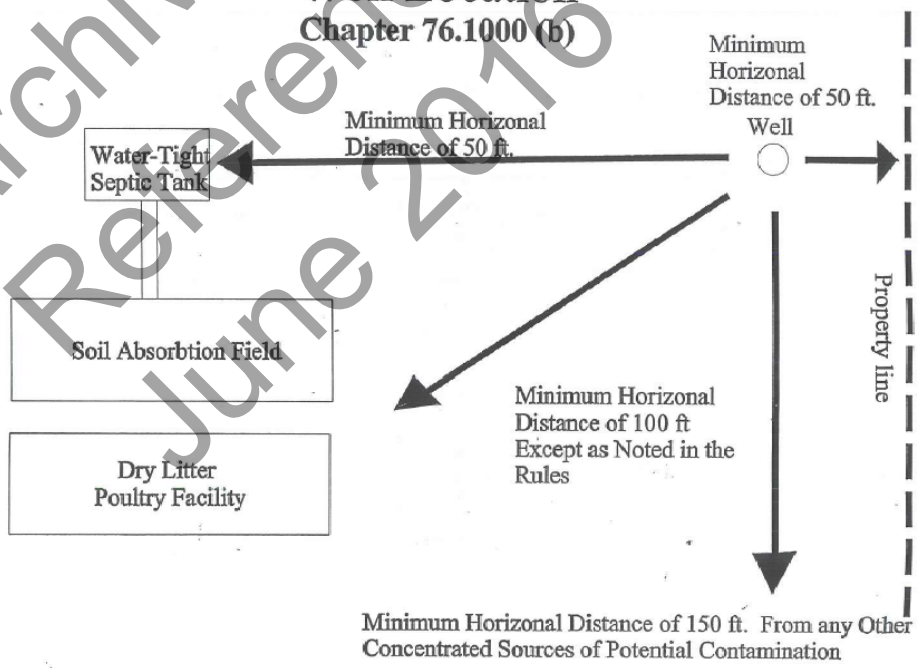
The following drawings are from the Texas Administrative Code; Title 16 Economic Regulation; Part 4 Texas Department of Licensing and Regulation (TDLR); Chapter 76 Well Construction and Plugging Specifications, http://www.license.state.tx.us/wwd/wwdspecs.htm



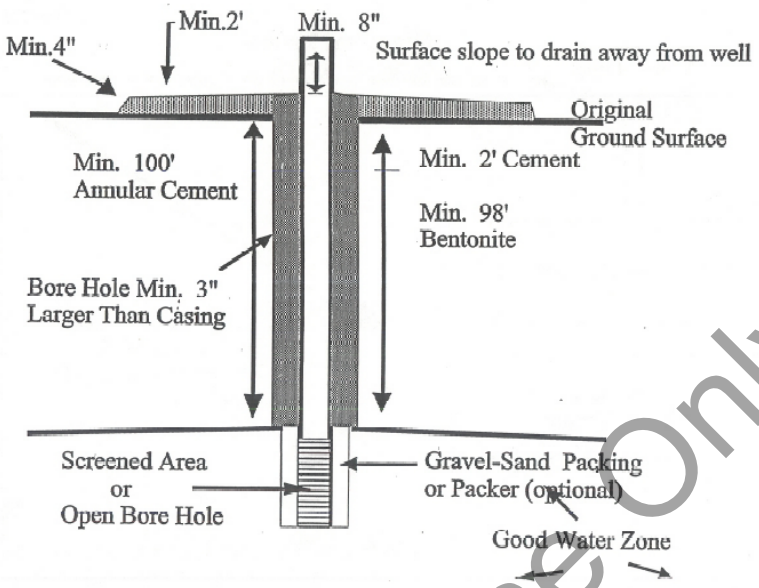
Pitless Adapter Surface Completion
Chapter 76.1000 (d), (2)



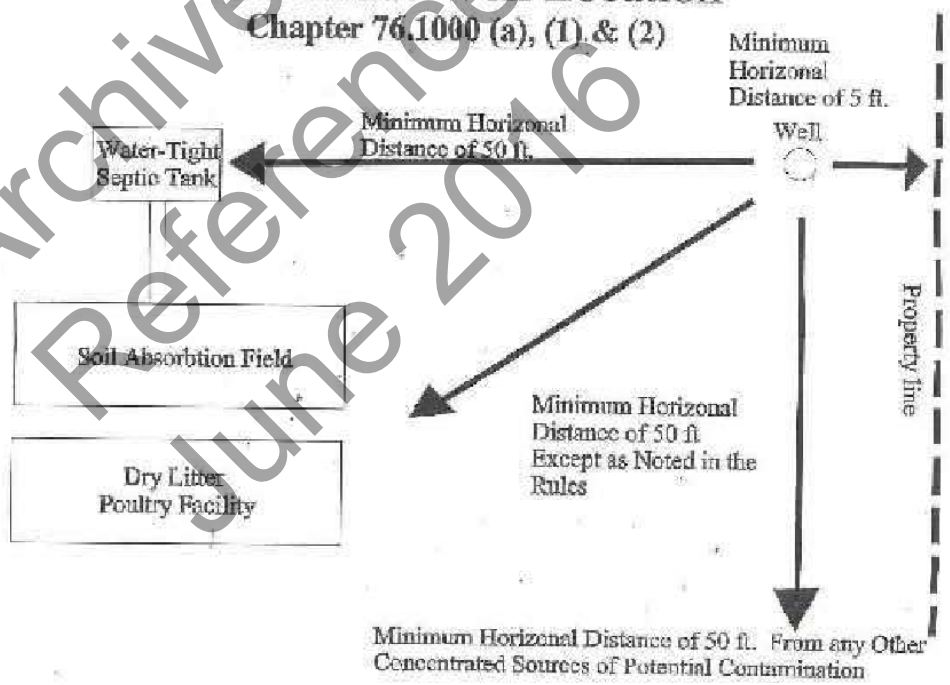
Well Location
Chapter 76.1000 (b)



Annular Sealing Example For Distance Reduction
Chapter 76.1000 (2)



Alternative Well Location
Chapter 76.1000 (a), (1) & (2)



Drawings downloaded January 24, 2014 from the Texas Department of Licensing and Regulation website (http://www.license.state.tx.us/wwd/wwdspecs.htm)

8. CERTIFICATION

The installer shall furnish the owner/operator a written certification (with a copy provided to USDA-NRCS) that the installed well, appurtenances, and installation conform to the requirements of this specification and to the Texas Administrative Code; Title 16 Economic Regulation; Part 4 Texas Department of Licensing and Regulation (TDLR); Chapter 76 Water Well Drillers and Water Well Pump Installers Administrative Rules, http://www.license.state.tx.us/wwd/wwdrules.htm. The installer shall also certify that they are licensed by the State of Texas as a well installer.

The certification shall also provide the following:

A. Copy of the TDLR Well Report and driller's log
B. NRCS Contractor's Certification Sheet for Wells

9. MEASUREMENT

Payment will only be made for wells completed that meet all of the minimum criteria. No payment will be made for any well that produces unacceptable results (either by reason of water quality or yield quantity). No payment will be made for the costs of plugging unacceptable wells.

The measurement for payment will be made for the amount of casing installed in the completed well; or in the cases that casing is not required due to consolidated material the entire depth of the well not to exceed 5 feet past the last water bearing strata, as reported in feet on the well driller's log. Payment will be one price per foot of depth which includes the cost of drilling, casing, sealing and other costs of completing the well. An onsite check of the completed installation will be performed by a USDA-NRCS representative.

10. CONSTRUCTION DETAILS

Planned flow rate of well, GPM _____

Planned well depth, ft. _____

Planned casing diameter, in. _____

Planned casing type, i.e. PVC, 160-PSI _____

ATTACHMENTS:

1. TX-ENG-80B, Cooperator Confirmation of the One-Call Utility Safety System
2. Texas Department of Licensing and Regulation Well Report and Driller's Log
3. NRCS Contractor's Certification Sheet for Wells

This construction specification, attached construction details and the requirement for completion of a TX-ENG-80B have been reviewed with me and I agree to install the water well according to these construction specifications.

_____ _____

Owner/Operator ***Date***