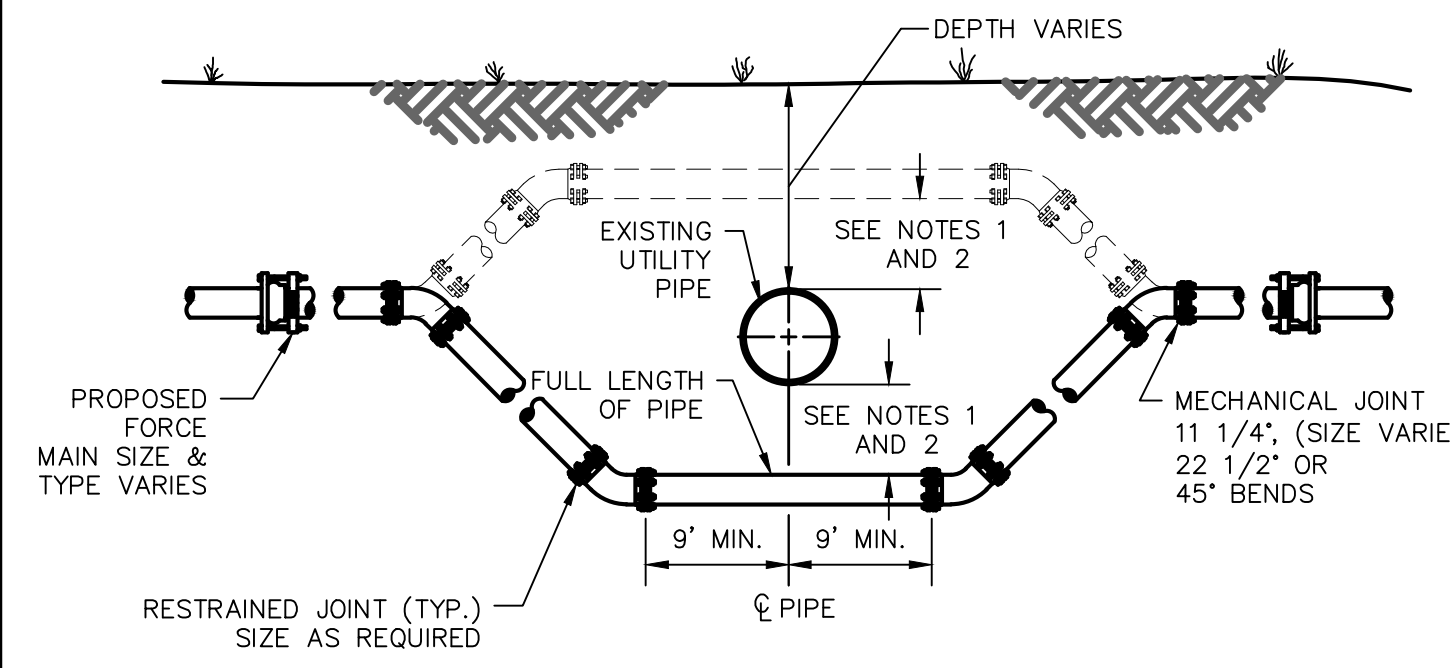


1. NEW OR RELOCATED, UNDERGROUND WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST THREE FEET BETWEEN THE OUTSIDE OF THE MAIN AND THE OUTSIDE OF ANY EXISTING OR PROPOSED STORM SEWER, STORMWATER FORCE MAIN, OR RECLAIMED WATER MAIN REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C., (TYPICAL MUNICIPAL RECLAIMED WATER).
2. NEW OR RELOCATED, UNDERGROUND WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST THREE FEET, AND PREFERABLY TEN FEET, BETWEEN THE OUTSIDE OF ANY EXISTING OR PROPOSED VACUUM SANITARY SEWER.
3. NEW OR RELOCATED, UNDERGROUND WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST SIX FEET, AND PREFERABLY TEN FEET, BETWEEN THE OUTSIDE OF THE MAIN AND THE OUTSIDE OF ANY EXISTING OR PROPOSED GRAVITY OR PRESSURE SANITARY SEWER, WASTEWATER FORCE MAIN, OR RECLAIMED WATER MAIN NOT REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C. THE MINIMUM HORIZONTAL SEPARATION DISTANCE BETWEEN WATER MAINS AND GRAVITY SANITARY SEWERS SHALL BE REDUCED TO THREE FEET WHERE THE BOTTOM OF THE WATER MAIN IS LAID AT LEAST SIX INCHES ABOVE THE TOP OF THE SEWER.
4. NEW OR RELOCATED, UNDERGROUND WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST TEN FEET BETWEEN THE OUTSIDE OF MAIN AND ALL PARTS OF ANY EXISTING OR PROPOSED "ON SITE SEWAGE TREATMENT AND DISPOSAL SYSTEM".
5. NEW OR RELOCATED, UNDERGROUND WATER MAINS CROSSING ANY EXISTING OR PROPOSED GRAVITY OR VACUUM SANITARY SEWER OR STORMSEWER SHALL BE LAID SO THE OUTSIDE OF THE MAIN IS AT LEAST SIX INCHES, ABOVE OR AT LEAST TWELVE INCHES, BELOW THE OUTSIDE OF THE OTHER PIPELINE. HOWEVER, IT IS PREFERABLE TO LAY THE WATER MAIN ABOVE THE OTHER PIPELINE.
6. NEW OR RELOCATED, UNDERGROUND WATER MAINS, CROSSING ANY EXISTING OR PROPOSED PRESSURE SANITARY SEWER, WASTEWATER OR STORMWATER FORCE MAIN, OR RECLAIMED WATER MAIN SHALL BE LAID SO THE OUTSIDE OF THE WATER MAIN IS AT LEAST TWELVE INCHES ABOVE OR BELOW THE OUTSIDE OF THE OTHER PIPELINE. HOWEVER, IT IS PREFERABLE TO LAY THE WATER MAIN ABOVE THE OTHER PIPELINE. AT THE UTILITY CROSSING ONE FULL LENGTH OF THE MAIN PIPE SHALL BE CENTERED ABOVE OR BELOW THE OTHER PIPELINE SO THE MAIN JOINTS WILL BE AS FAR AS POSSIBLE FROM THE OTHER PIPELINE. ALTERNATELY, AT SUCH CROSSINGS, THE PIPES SHALL BE ARRANGED SO THAT THE WATER MAIN JOINTS ARE AT LEAST THREE FEET FROM ALL JOINTS IN VACUUM SANITARY SEWERS, STORM SEWERS, STORMWATER FORCE MAINS, OR PIPELINES CONVEYING RECLAIMED WATER, AND AT LEAST SIX FEET FROM ALL JOINTS IN PRESSURE SANITARY SEWERS, WASTEWATER FORCE MAINS, OR RECLAIMED WATER MAINS NOT REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.
7. FOR SEPARATION BETWEEN WATER MAINS AND SANITARY SEWER MANHOLE, NO WATER MAIN SHALL PASS THROUGH, OR COME INTO CONTACT WITH ANY PART OF A SANITARY SEWER MANHOLE.
8. WATER MAINS SHALL NOT BE CONSTRUCTED OR ALTERED TO PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A STORM SEWER MANHOLE OR INLET STRUCTURE.



- NOTES:
1. NEW OR RELOCATED, UNDERGROUND WATER MAINS CROSSING ANY EXISTING OR PROPOSED GRAVITY OR VACUUM SANITARY SEWER OR STORMSEWER SHALL BE LAID SO THE OUTSIDE OF THE MAIN IS AT LEAST SIX INCHES, ABOVE OR AT LEAST TWELVE INCHES, BELOW THE OUTSIDE OF THE OTHER PIPELINE. HOWEVER, IT IS PREFERABLE TO LAY THE WATER MAIN ABOVE THE OTHER PIPELINE.
 2. NEW OR RELOCATED, UNDERGROUND WATER MAINS, CROSSING ANY EXISTING OR PROPOSED PRESSURE SANITARY SEWER, WASTEWATER OR STORMWATER FORCE MAIN, OR RECLAIMED WATER MAIN SHALL BE LAID SO THE OUTSIDE OF THE WATER MAIN IS AT LEAST TWELVE INCHES ABOVE OR BELOW THE OUTSIDE OF THE OTHER PIPELINE. HOWEVER, IT IS PREFERABLE TO LAY THE WATER MAIN ABOVE THE OTHER PIPELINE.

MINIMUM LENGTH OF PIPE (IN FEET) REQUIRED TO BE RESTRAINED ON EACH SIDE OF A VALVE OR FITTING FOR CLAYEY AND SILTY SOILS (CL, CH, ML, MH)

PIPE TYPE	PIPE SIZE	90° BEND	45° BEND	≤22.5° BEND	TEE OR CROSS	VERTICAL OFFSET ^a		REDUCER ^b	VALVE	DEAD END
						LOW	HIGH			
PVC	≤4	19	18	18	18	18	23	36	18	55
	6	26	18	18	18	18	32	40	36	77
	8	35	18	18	18	18	42	73	36	101
PIPE	10	42	18	18	18	18	50	98	54	121
	12	50	21	18	18	18	59	104	54	143
	14	57	23	18	18	18	67	106	72	163
	16	64	27	18	18	18	76	109	72	183
	18	71	29	18	18	18	84	109	72	202
	20	78	32	18	18	18	92	110	72	221
	24	92	38	18	18	18	107	140	90	258
30	110	46	22	54	40	127	193	90	308	

PIPE TYPE	PIPE SIZE	90° BEND	45° BEND	≤22.5° BEND	TEE OR CROSS	VERTICAL OFFSET ^a		REDUCER ^b	VALVE	DEAD END
						LOW	HIGH			
DUCTILE	≤4	18	18	18	18	18	18	18	18	35
	6	22	18	18	18	18	20	25	36	49
	8	29	18	18	18	18	27	46	36	64
ILE	10	35	18	18	18	18	32	62	54	77
	12	41	18	18	18	18	37	66	54	90
	14	47	20	18	18	18	43	67	72	103
IRON	16	53	22	18	18	18	48	68	72	115
	18	59	24	18	18	18	53	69	72	127
	20	65	27	18	18	18	58	70	72	140
	24	76	31	18	18	18	67	89	90	162
	28	85	35	18	18	18	76	93	90	180
	30	91	38	18	18	18	84	122	90	194

PIPE THRUST RESTRAINTS: MECHANICAL RESTRAINERS SHALL BE INSTALLED AS REQUIRED TO PROPERLY RESTRAIN ALL PIPING SYSTEMS. AT A MINIMUM, RESTRAINERS SHALL BE PROVIDED ON ALL BELOW-GRADE VALVES AND FITTINGS AND AT THE REQUIRED NUMBER OF PIPE JOINTS IN EACH DIRECTION. REQUIRED LENGTHS OF RESTRAINED PIPE SHALL BE AS SHOWN IN PIPE RESTRAINT SCHEDULES BELOW.

BASIS OF SCHEDULES

1. TEST PRESSURE 150 PSIG
2. MINIMUM PIPE DEPTH 3 FEET
3. TYPE 3 LAYING CONDITION
4. FACTOR OF SAFETY = 2.0

A "LOW" REPRESENTS THE MINIMUM LENGTH OF PIPE (IN FEET) REQUIRED TO BE RESTRAINED ON THE LOW SIDE OF THE VERTICAL OFFSET, WHICH IS TYPICALLY DOWNSTREAM OF THE OFFSET FITTING. "HIGH" REPRESENTS THE MINIMUM LENGTH OF PIPE (IN FEET) REQUIRED TO BE RESTRAINED ON THE HIGH SIDE OF THE VERTICAL OFFSET, WHICH IS TYPICALLY UPSTREAM OF THE OFFSET FITTING. REQUIRED RESTRAINED LENGTHS ASSUME AN OFFSET ANGLE # 45°.

B DISTANCE REPRESENTS THE LINEAR FEET OF LARGE DIAMETER PIPE UPSTREAM OF THE REDUCER REQUIRED TO BE RESTRAINED. RESTRAIN SMALL DIAMETER PIPE AT REDUCER AT A MINIMUM. IF THERE IS AN UNOBSTRUCTED RUN DOWNSTREAM OF THE REDUCER (I.E. SMALL DIAMETER PIPE) OF AT LEAST 2.5 TIMES THE REQUIRED LENGTH OF LARGE DIAMETER PIPE TO BE RESTRAINED, THEN RESTRAINT IS REQUIRED ONLY AT THE REDUCER FITTING. IF SMALL END OF REDUCER IS MORE THAN THREE PIPE SIZES SMALLER THAN LARGE END, CONSULT ENGINEER FOR REQUIRED LENGTH TO BE RESTRAINED.

CITY OF GROVELAND STANDARD DETAILS: GENERAL

PIPING CLEARANCE NOTES

DATE: JULY 7, 2008
SCALE: N.T.S.

G-11

CITY OF GROVELAND STANDARD DETAILS: GENERAL

ADJUSTMENTS TO CLEAR EXISTING UTILITIES

DATE: JULY 7, 2008
SCALE: N.T.S.

G-12

CITY OF GROVELAND STANDARD DETAILS: WATER

PIPE RESTRAINT SCHEDULE

DATE: JULY 7, 2008
SCALE: N.T.S.

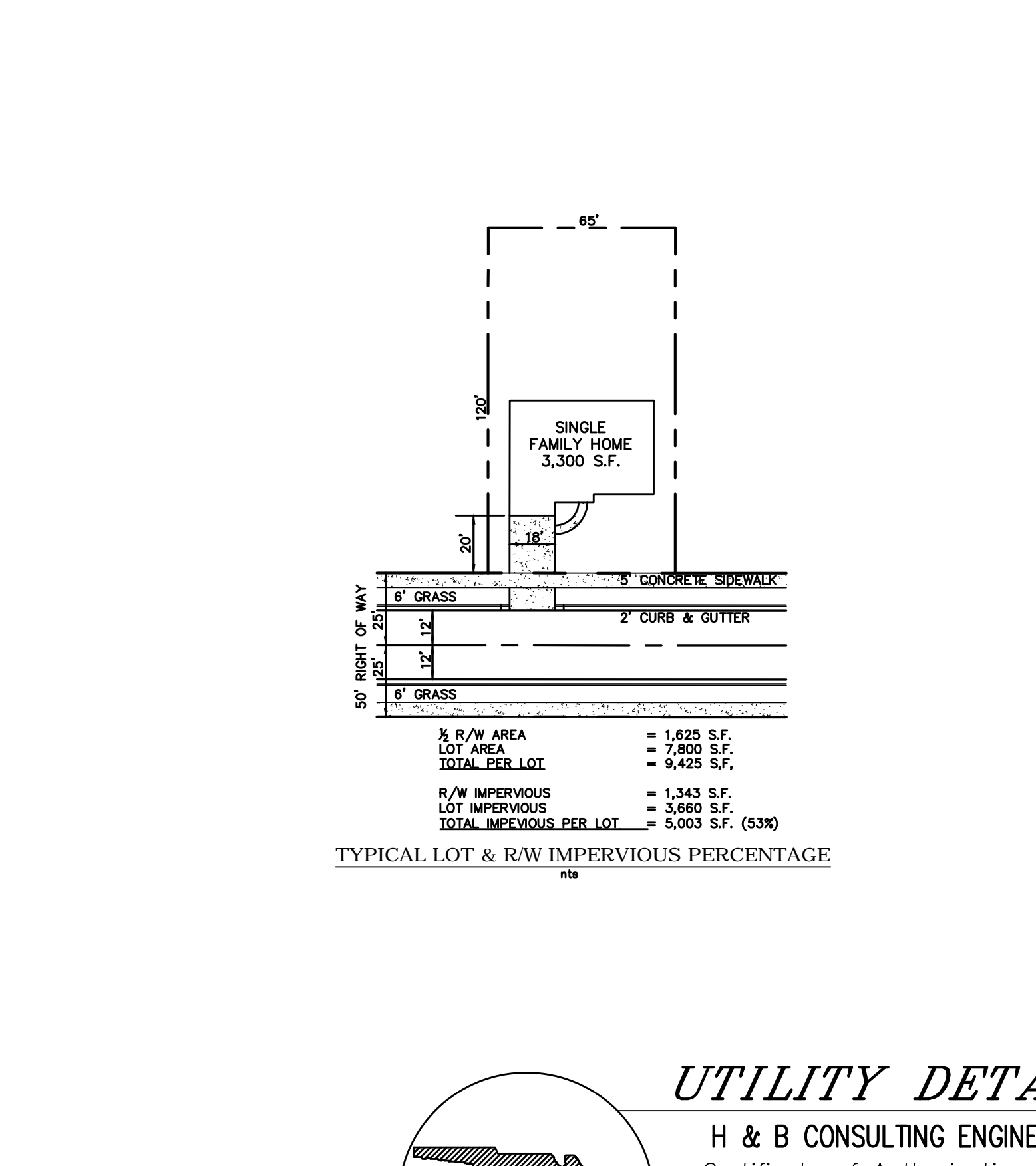
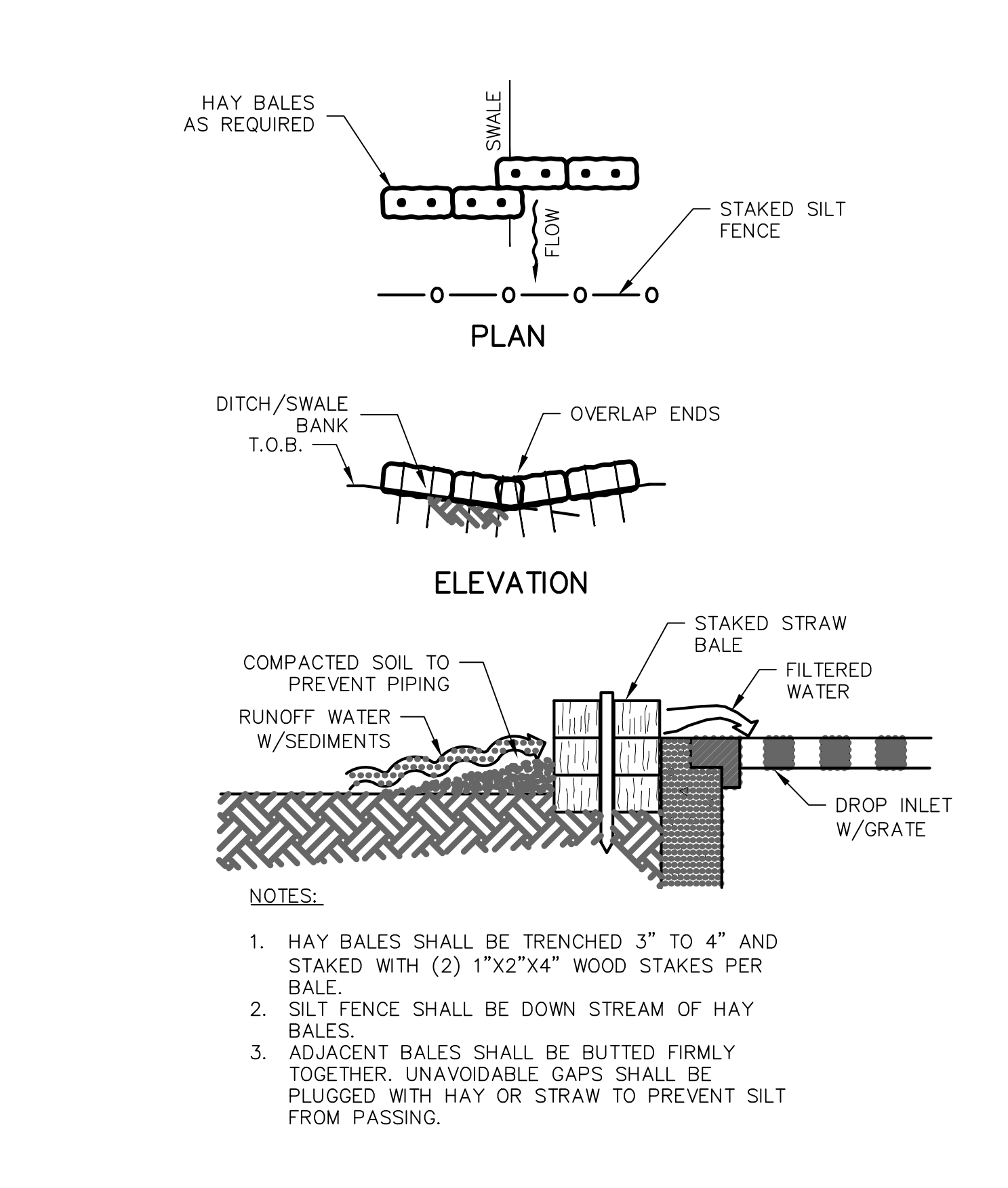
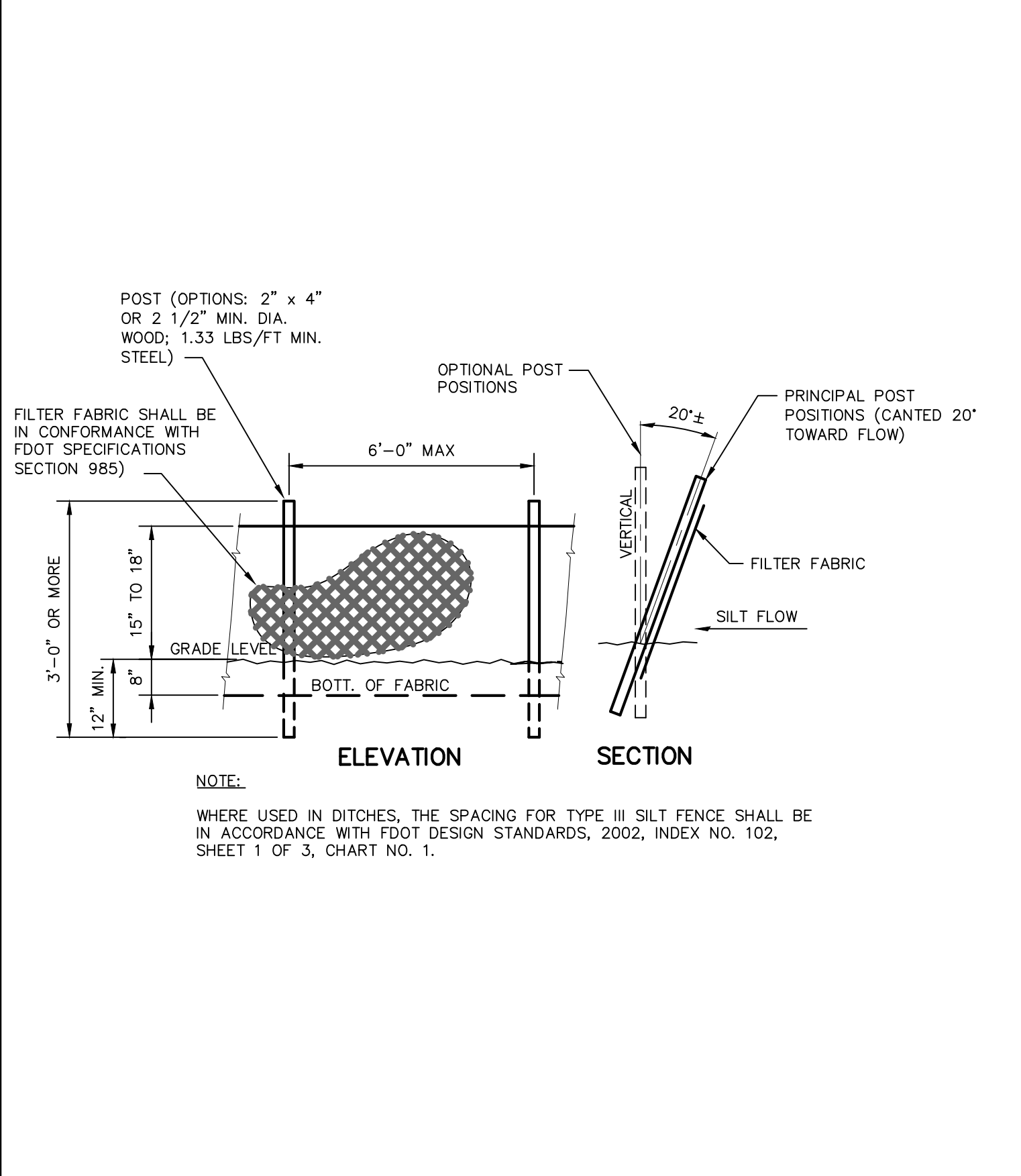
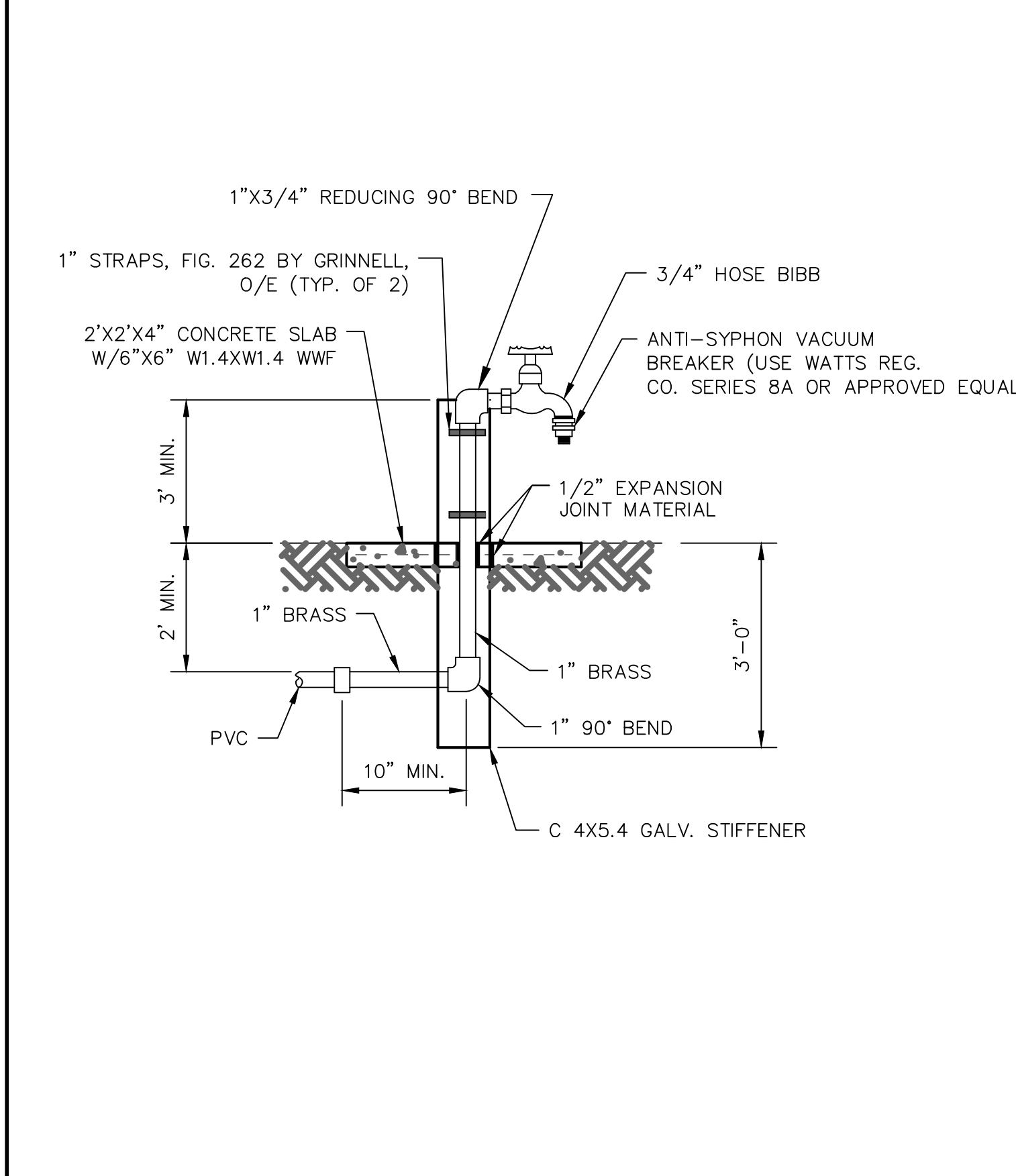
W-14B

CITY OF GROVELAND STANDARD DETAILS: WATER

PIPE RESTRAINT SCHEDULE

DATE: JULY 7, 2008
SCALE: N.T.S.

W-14C



CITY OF GROVELAND STANDARD DETAILS: GENERAL

HOSE BIBB & VACUUM BREAKER

DATE: JULY 7, 2008
SCALE: N.T.S.

G-15

CITY OF GROVELAND STANDARD DETAILS: GENERAL

TYPE III SILT FENCE

DATE: JULY 7, 2008
SCALE: N.T.S.

G-2

CITY OF GROVELAND STANDARD DETAILS: GENERAL

EROSION CONTROL FEATURES

DATE: JULY 7, 2008
SCALE: N.T.S.

G-1

UTILITY DETAILS

H & B CONSULTING ENGINEERS, INC.
Certificate of Authorization # 4829
P.O. Box 520
218 N. Florida Street - Suite 3
Bushnell, Florida 33513
Phone : (352) 793-2113

Lake Minneola Landings
C.R. 561
Groveland, FL 34711

REVISIONS	
10/15	Added Turn Lanes CR 561A
10/15	Listed lot No's. per Lake Co.
4/16	Lake County comments from 4-11-16