

PIPE DIA.	BEND ANGLE			
	11 1/2°	22 1/2°	45°	90°
4	2	4	8	18
6	3	5	11	25
8	4	7	14	33
10	4	8	16	39
12	5	9	19	45
16	5	9	19	45
20	6	11	23	54
24	8	16	26	62

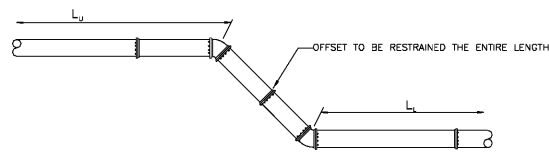
PVC DESIGN:
SOIL TYPE: SM
TRENCH TYPE: 3
COVER: 3' $\leq 12''$ DIA.
$4' > 12''$ DIA.
TEST PRESSURE: 150 PSI

PIPE DIA.	BEND ANGLE			
	11 1/2°	22 1/2°	45°	90°
4	3	5	9	20
6	3	6	12	28
8	4	8	16	36
10	5	9	19	43
12	6	11	22	51
16	7	14	28	65
20	8	16	33	79
24	9	19	38	92

PE WRAPPED DIP:
SOIL TYPE: SM
TRENCH TYPE: 3
COVER: 3'
TEST PRESSURE: 150 PSI

MINIMUM RESTRAINED LENGTH (L)

- NOTES:
- LENGTH OF RESTRAINT SHOWN IS IN FEET. PIPE DIAMETERS ARE IN INCHES.
 - WHERE LINES CONSIST OF BOTH DUCTILE IRON AND PVC WITHIN THE LIMITS OF REQUIRED RESTRAINT, LIMITS FOR PVC SHALL APPLY.
 - INFORMATION IN THE TABLES ABOVE ARE BASED ON THE DESIGN INFORMATION SHOWN. THE ENGINEER SHALL PROVIDE AMENDED RESTRAINT LENGTHS IF SITE CONDITIONS DIFFER.



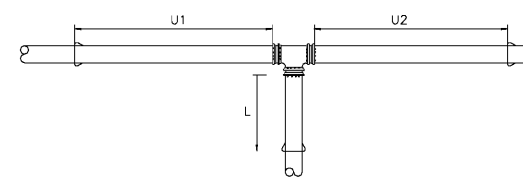
PIPE DIA.	BEND ANGLE					
	11 1/2°	22 1/2°	45°	90°		
4	4	1	8	2	17	3
6	6	1	11	2	23	4
8	8	2	15	3	30	6
10	9	2	18	4	36	7
12	11	2	21	4	43	8
16	10	3	21	5	42	10
20	13	3	25	6	51	12
24	15	4	29	7	60	15

PVC DESIGN:
SOIL TYPE: SM
TRENCH TYPE: 3
COVER: 3' $\leq 12''$ DIA.
$4' > 12''$ DIA.
TEST PRESSURE: 150 PSI

PIPE DIA.	BEND ANGLE					
	11 1/2°	22 1/2°	45°	90°		
4	6	1	12	2	24	4
6	9	2	17	3	34	5
8	11	2	22	3	45	7
10	13	2	26	4	53	8
12	15	3	30	5	63	9
16	19	3	39	6	80	12
20	23	4	47	7	97	15
24	27	4	55	8	113	17

PE WRAPPED DIP:
SOIL TYPE: SM
TRENCH TYPE: 3
COVER: 3'
TEST PRESSURE: 150 PSI

- NOTES:
- LENGTH OF RESTRAINT SHOWN IS IN FEET. PIPE DIA. IS IN INCHES.
 - WHERE LINES CONSIST OF BOTH DUCTILE IRON AND PVC WITHIN THE LIMITS OF REQUIRED RESTRAINT, LIMITS FOR PVC SHALL APPLY.
 - INFORMATION IN THE TABLES ABOVE ARE BASED ON THE DESIGN INFORMATION SHOWN. THE ENGINEER SHALL PROVIDE AMENDED RESTRAINT LENGTHS IF SITE CONDITIONS DIFFER.

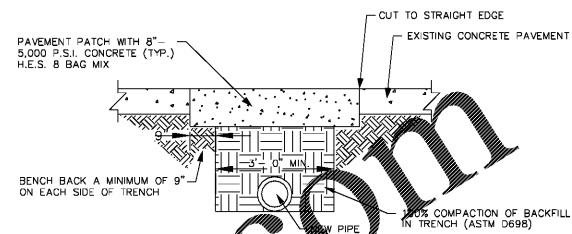


TEE DIA.	U1				U2			
	10'	10'	20'	20'	10'	10'	20'	20'
6X4	3	*	*	*	16X10	4	*	*
6X6	5	*	*	*	16X16	8	1	24
8X4	*	*	*	*	20X6	*	*	*
8X6	*	*	*	*	20X8	*	*	*
8X8	18	*	*	*	20X10	*	*	*
10X4	*	*	*	*	20X12	10	*	*
10X6	*	*	*	*	20X16	48	2	*
10X8	8	*	*	*	20X20	81	44	*
10X10	28	11	*	*	24X6	*	*	*
12X4	*	*	*	*	24X8	*	*	*
12X6	*	*	*	*	24X10	*	*	*
12X8	*	*	*	*	24X12	*	*	*
12X10	20	*	*	*	24X16	35	*	*
12X12	39	3	*	*	24X20	69	25	*
16X8	*	*	*	*	24X24	101	63	*
16X12	*	*	*	*				

PVC DESIGN:
SOIL TYPE: SM
TRENCH TYPE: 3
COVER: 3' $\leq 12''$ DIA.
$4' > 12''$ DIA.
TEST PRESSURE: 150 PSI

MINIMUM RESTRAINED LENGTH (L)

- NOTES:
- LENGTH OF RESTRAINT SHOWN IS IN FEET. FITTING DIAMETERS ARE IN INCHES.
 - WHERE LINES CONSIST OF BOTH DUCTILE IRON AND PVC WITHIN THE LIMITS OF REQUIRED RESTRAINT, LIMITS FOR PVC SHALL APPLY.
 - U1 AND U2 = UNINTERRUPTED STRAIGHT RUNS OF PIPE IN EACH DIRECTION.
 - U_r = THE SMALLER OF U1 OR U2.
 - L = MINIMUM RESTRAINED LENGTH ALONG THE BRANCH.
 - WHERE U_r IS LESS THAN 3', RESTRAIN TEE AS A 90° HORIZONTAL BEND.
 - INFORMATION IN THE TABLES ABOVE ARE BASED ON THE DESIGN INFORMATION SHOWN. THE ENGINEER SHALL PROVIDE AMENDED RESTRAINT LENGTHS IF SITE CONDITIONS DIFFER.



- NOTES:
- COMPACT BASE AND SUB-BASE TO 100% STANDARD (ASTM D698) PER SECTION 02200, PART 3.01B OF CITY TECHNICAL SPECIFICATIONS.
 - CONCRETE TO BE 5000PSI PER SECTION 03300, CHAPTER 3.2 AND REINFORCED WITH FIBERGLASS OR STEEL PER SECTION 3300, CHAPTER 5 OF CITY TECHNICAL SPECIFICATIONS.
 - ALL LATERAL STREET CUTS MUST BE COVERED WITH STEEL PLATES OF SUFFICIENT THICKNESS TO SPAN THE CUT WITHOUT NOTICABLE DEFLECTION. PLATES TO REMAIN IN PLACE UNTIL THE CONCRETE HAS GAINED SUFFICIENT STRENGTH TO WITHSTAND TRAFFIC LOADS (24 HOUR MINIMUM).
 - ALL STREET PATCHES TO BE SQUARE OR RECTANGULAR WITH STRAIGHT, SAW CUT EDGES.

HORIZONTAL BEND RESTRAINT

VERTICAL BEND RESTRAINT

TEE RESTRAINT (PVC PIPE)

STANDARD CONSTRUCTION DETAILS

STANDARD CONSTRUCTION DETAILS



SCALE: N.T.S.
DATED: JAN 2017
PLATE NUMBER: W28

STANDARD CONSTRUCTION DETAILS



SCALE: N.T.S.
DATED: JAN 2017
PLATE NUMBER: W29

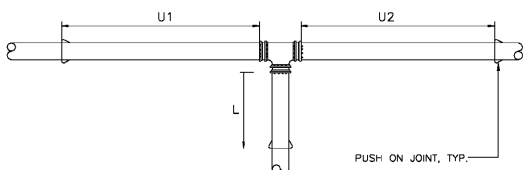
STANDARD CONSTRUCTION DETAILS



SCALE: N.T.S.
DATED: JAN 2017
PLATE NUMBER: W30

CONCRETE PAVEMENT REPLACEMENT

APPROVED: SIGNATURE ON FILE
CITY ENGINEER
SCALE: N.T.S.
DATED: FEBRUARY 2009
PLATE NUMBER: P08

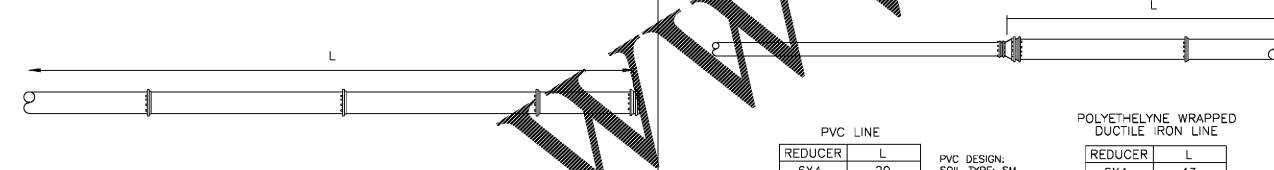


TEE DIA.	U1				U2			
	10'	10'	20'	20'	10'	10'	20'	20'
4X4	*	*	*	*	16X10	*	*	*
6X4	*	*	*	*	16X16	68	*	*
6X6	27	*	*	*	20X6	*	*	*
8X4	*	*	*	*	20X8	*	*	*
8X6	9	*	*	*	20X10	5	*	*
8X8	52	*	*	*	20X12	42	*	*
10X4	*	*	*	*	20X16	111	40	*
10X6	*	*	*	*	20X20	175	116	*
10X8	35	*	*	*	24X6	*	*	*
10X10	72	16	*	*	24X8	*	*	*
12X4	*	*	*	*	24X10	*	*	*
12X6	*	*	*	*	24X12	19	*	*
12X8	20	*	*	*	24X16	87	5	*
12X10	58	*	*	*	24X20	151	82	*
12X12	94	38	*	*	24X24	212	152	*
16X8	*	*	*	*				
16X12	*	*	*	*				

PE WRAPPED DIP:
SOIL TYPE: SM
TRENCH TYPE: 3
COVER: 3'
TEST PRESSURE=150 PSI

MINIMUM RESTRAINED LENGTH (L)

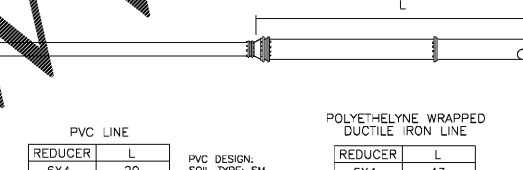
- NOTES:
- LENGTH OF RESTRAINT SHOWN IS IN FEET. FITTING DIAMETERS ARE IN INCHES.
 - WHERE LINES CONSIST OF BOTH DUCTILE IRON AND PVC WITHIN THE LIMITS OF REQUIRED RESTRAINT, LIMITS FOR PVC SHALL APPLY.
 - U1 AND U2 = UNINTERRUPTED STRAIGHT RUNS OF RESTRAINED JOINT PIPE IN EACH DIRECTION.
 - U_r = THE SMALLER OF U1 OR U2 (E.G., U1, IN THE ABOVE DIAGRAM).
 - L = MINIMUM RESTRAINED LENGTH ALONG THE BRANCH.
 - WHERE U_r IS LESS THAN 3', RESTRAIN TEE AS A 90° HORIZONTAL BEND.
 - INFORMATION IN THE TABLES ABOVE ARE BASED ON THE DESIGN INFORMATION SHOWN. THE ENGINEER SHALL PROVIDE AMENDED RESTRAINT LENGTHS IF SITE CONDITIONS DIFFER.



PIPE DIA.	L
4	58
6	82
8	107
10	132
12	157
16	234
20	311
24	388

MINIMUM RESTRAINED LENGTH (L)

- NOTES:
- LENGTH OF RESTRAINT SHOWN IS IN FEET. FITTING DIAMETERS ARE IN INCHES.
 - WHERE LINES CONSIST OF BOTH DUCTILE IRON AND PVC WITHIN THE LIMITS OF REQUIRED RESTRAINT, LIMITS FOR PVC SHALL APPLY.
 - FOR LINE STUBS (SEE DETAIL W34), THE LENGTH OF RESTRAINT (L) SHALL BE FROM THE VALVE AND NOT THE CAP.
 - INFORMATION IN THE TABLES ABOVE ARE BASED ON THE DESIGN INFORMATION SHOWN. THE ENGINEER SHALL PROVIDE AMENDED RESTRAINT LENGTHS IF SITE CONDITIONS DIFFER.



REDUCER	L
6X4	29
8X4	52
8X6	31
10X4	71
10X6	53
10X8	29
12X4	89
12X6	74
12X8	54
12X10	30
16X6	111
16X8	96
16X10	78
16X12	56
20X10	117
20X12	100
20X16	56
24X12	137
24X16	101
24X20	56

- NOTES:
- LENGTH OF RESTRAINT SHOWN IS IN FEET. FITTING DIAMETERS ARE IN INCHES.
 - WHERE LINES CONSIST OF BOTH DUCTILE IRON AND PVC WITHIN THE LIMITS OF REQUIRED RESTRAINT, LIMITS FOR PVC SHALL APPLY.
 - INFORMATION IN THE TABLES ABOVE ARE BASED ON THE DESIGN INFORMATION SHOWN. THE ENGINEER SHALL PROVIDE AMENDED RESTRAINT LENGTHS IF SITE CONDITIONS DIFFER.

TEE RESTRAINT (DUCTILE IRON PIPE)

DEAD END RESTRAINT

REDUCER RESTRAINT

STANDARD CONSTRUCTION DETAILS

STANDARD CONSTRUCTION DETAILS



SCALE: N.T.S.
DATED: JAN 2017
PLATE NUMBER: W31

STANDARD CONSTRUCTION DETAILS



SCALE: N.T.S.
DATED: JAN 2017
PLATE NUMBER: W32

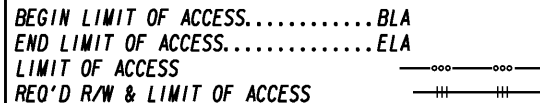
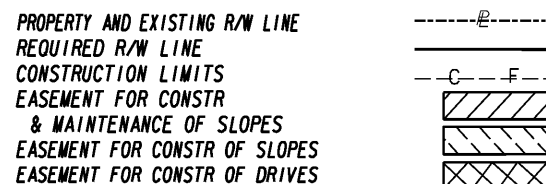
STANDARD CONSTRUCTION DETAILS



SCALE: N.T.S.
DATED: JAN 2017
PLATE NUMBER: W33

BRICK PAVEMENT REPLACEMENT

APPROVED: SIGNATURE ON FILE
CITY ENGINEER
SCALE: N.T.S.
DATED: FEBRUARY 2009
PLATE NUMBER: P09



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REVISION DATES

NO.	DATE	DESCRIPTION

UTILITY RELOCATION PLANS
DELESSEPS/LA ROCHE AVE FM
WATERS AVE TO SKIDAWAY RD

CHECKED:	DATE:	DRAWING NO.
BACKCHECKED:	DATE:	44-0017
CORRECTED:	DATE:	
VERIFIED:	DATE:	