Comprehensive Permit Plans
Needham Mews Residential Development
692 & 744 Greendale Avenue - Needham, MA

One Grant Street
Framingham, MA 01701
PHONE: (508) 903-2000 FAX: (508) 903-2001
www.tetratech.com

TETRA TECH

SITE CONTEXT MAP

0 100' 200' 400'
SCALE: 1"=200'

LEGEND

EXISTING		PROPOSED
210X23	SPOT GRADE	140X50
	TOP OF WALL ELEVATION	123.5TW
	BOTTOM OF WALL ELEVATION	120.0BW
136	CONTOUR	136
CB	CONCRETE BOUND	
SB	STONE BOUND	
DH	DRILL HOLE	
	LIGHT POLE	
	UTILITY POLE	
WV	WATER VALVE	
ST	DRAIN LINE	SD
SS	SEWER LINE	SS
G	GAS LINE	G
	UNDERGROUND ELECTRIC	E/T/C
W	WATER LINE	W
OE	OVERHEAD WIRES	OE
CB	CATCH BASIN	CB
	FLARED END OUTLET	
DMH	DRAIN MANHOLE	DMH
SMH	SEWER MANHOLE	SMH
	HYDRANT	
GG	GAS GATE	
MW	MONITORING WELL	
	TEST PIT	
	BOLLARD	
VGC	VERTICAL GRANITE CURB	VGC
CC	CONCRETE CURB	CC

DRAWING LIST:

COVER SHEET
C-1 PLOT PLAN
C-2 LAYOUT PLAN
C-3 GRADING & DRAINAGE PLAN
C-4 UTILITY PLAN
C-5 LIGHTING PLAN
C-6 EROSION & SEDIMENT CONTROL PLAN
C-7 DETAIL SHEET
C-8 DETAIL SHEET
C-9 DETAIL SHEET
C-10 DETAIL SHEET
C-11 DETAIL SHEET
C-12 SEWER EASEMENT CROSSING SECTIONS
C-13 DRIVEWAY PROFILES

ZONING ANALYSIS: DISTRICT - SINGLE RESIDENCE A

ITEM	REQUIRED	PROVIDED
MINIMUM LOT AREA	43,560 S.F.	262,175 S.F.
MINIMUM LOT FRONTAGE	150'	616'
FRONT SETBACK	30'	19.0'
SIDE SETBACK	25'	47.9'
REAR SETBACK	15'	51.8'
MAXIMUM F.A.R.	NO REQUIREMENT	1.91
MAXIMUM % LOT COVERAGE	NO REQUIREMENT	33%
MAXIMUM STORIES	2 1/2	BLDG A,B - 4 Townhouse - 2
MAXIMUM HEIGHT	35' (ROOF RIDGE ELEV. TO AVERAGE GRADE)	BLDG A - 72 BLDG B - 67.5 Townhouse - 32

UNIT DENSITY SUMMARY

NUMBER OF UNITS	268
LOT AREA (ACRES)	6.02
UNITS/ACRE	44.5

LOT COVERAGE SUMMARY

ITEM	AREA (SF)	% OF LOT AREA
TOTAL SITE AREA	262,175	N/A
PROVIDED BUILDING AREA	85,696	33%
PROVIDED DRIVEWAY & PARKING AREAS	66,733	25.4%
PROVIDED SIDEWALK AREA	8,591	3.3%
PROVIDED OPENSPACE	93,543	36%

PARKING SUMMARY - 268 DWELLING UNITS

	PARKING RATIO
REQUIRED NUMBER OF PARKING SPACES	1.5 SPACES PER DWELLING UNIT (SEE NOTE 1)
PROVIDED NUMBER OF PARKING SPACES	1.7 SPACES PER DWELLING UNIT = 458 SPACES
REQUIRED NUMBER OF BIKE STORAGE AREAS	1 PER 20 PARKING SPACES = 23
PROVIDED NUMBER OF BIKE STORAGE AREAS	24

NOTES:
(1) SECTION 5.1.2 REQUIRED PARKING OF THE ZONING BYLAW DOES NOT PROVIDE A REQUIRED NUMBER OF SPACES FOR MULTIFAMILY USES. SECTION 5.1.4 OFF-STREET PARKING REQUIREMENTS FOR MULTI-FAMILY STRUCTURES REQUIRES 1.5 SPACES PER DWELLING UNIT FOR MULTIFAMILY USES IN AN THE APARTMENT DISTRICT.

(2) PARKING SPACE DIMENSIONS PROVIDED:
90 DEGREE STANDARD SPACES 9'x18'
PARALLEL STANDARD SPACES 9'x22'
90 DEGREE HANDICAP SPACES 13'x18'
PARALLEL HANDICAP SPACES 14x22'

(3) ADEQUATE OFF-STREET LOADING FACILITIES AND SPACE WITH UNIMPEDED ACCESS WILL BE PROVIDED IN ACCORDANCE WITH SECTION 5.1.3(b).

APPLICANT:

GREENDALE AVENUE VENTURE LLC
C/O MILL CREEK RESIDENTIAL TRUST, LLC
15 NEW ENGLAND INDUSTRIAL PARK
BURLINGTON, MA 01803
TEL: 781-685-4698

PROJECT ATTORNEY:

GOULSTON & STORRS
400 ATLANTIC AVENUE
BOSTON, MA 02110
TEL: 617-482-1776

ARCHITECT:

THE ARCHITECTURAL TEAM
50 COMMANDANT'S WAY AT ADMIRAL'S HILL
CHELSEA, MA 02150
TEL: 617-889-4402

LANDSCAPE ARCHITECT:

STANTEC
141 PORTLAND STREET
BOSTON, MA 02114
TEL: 617-523-8103

TRAFFIC ENGINEER:

VANASSE & ASSOCIATES, INC.
10 NEW ENGLAND BUSINESS CENTER DRIVE
ANDOVER, MA 01810
TEL: 978-474-8800

PROJECT LOCATION:

692 & 744 Greendale Avenue
Needham, MA

Tt PROJECT No.:

143-82806-13003

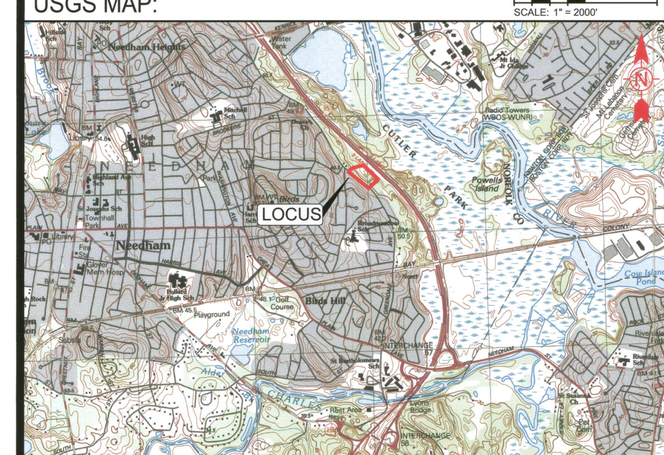
COMMONWEALTH OF MASSACHUSETTS
GLENN R. DOUGHERTY
No. 37824
REGISTERED PROFESSIONAL ENGINEER
11-8-2013

DATE: APRIL 12, 2013

REVISED: 9-16-13 ZBA Submission Set
9-30-13 ZBA Submission Full Set
11-8-13 Revisions Per Town Comments

USGS MAP:

0 1000' 2000' 4000'
SCALE: 1" = 2000'



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PLAN REFERENCES

"PLAN OF LAND NEEDHAM, MASS." DATED JAN. 3, 2002 PREPARED BY NEEDHAM SURVEY ASSOCIATES, INC. (ANR PLAN ENDORSED BY THE NEEDHAM PLANNING BOARD 1-22-2002, PLAN NOT RECORDED AT THE REGISTRY OF DEEDS)

"PLAN OF LAND NEEDHAM---MASS." DATED JUNE 10, 2000 PREPARED BY NEEDHAM SURVEY ASSOCIATES, INC. (ANR PLAN ENDORSED BY THE NEEDHAM PLANNING BOARD 6-6-2000, PLAN NOT RECORDED AT THE REGISTRY OF DEEDS)

"TOWN OF NEEDHAM, MASS DEPT. OF PUBLIC WORKS, EASEMENT TO BE ACQUIRED IN NEEDHAM, MASS., GREENDALE AVE TO ROUTE 128" DATED JUNE 1959.

"PLAN OF LAND IN NEEDHAM, MASS." DATED SEPT. 18, 1937 BY E. WORTHINGTON ENGINEER. PLAN BOOK 2159 PAGE 225.

"PLAN OF LAND IN NEEDHAM, MASS SHOWING DRAIN EASEMENT TO BE ACQUIRED BY THE TOWN", DATED OCTOBER 26, 1990 BY CHENEY ENGINEERING CO., INC., PLAN BOOK 395 NO. 791-1990.

STATE LAYOUT NO. 4548, 1957 DISCONTINUANCE OF STATE HIGHWAY ON GREENDALE AVENUE.

"PLAN OF LAND IN NEEDHAM, MASS." DATED JULY 20, 1961 BY CHENEY ENGINEERING CO., PLAN NO. 13 OF 1962 PLAN BOOK 3957 PAGE 484.

STATE LAYOUT NO. 4062, 1953 ALTERATION ROUTE 128

LOCUS INFORMATION

ASSESSORS MAP 18 PARCELS 42, 43 & 44

LOCUS IS WITHIN FEMA FLOOD ZONE X
AS SHOWN ON COMMUNITY PANEL #25021C0037E
DATED JULY 17, 2012.

ZONING SUMMARY

ZONING DISTRICT: SRA SINGLE RESIDENCE A

MIN. LOT SIZE	43,560 S.F.
MIN. LOT FRONTAGE	150'
MIN. FRONT SETBACK	30'
MIN. SIDE SETBACK	25'
MIN. REAR SETBACK	15'
MAX. BUILDING HEIGHT	35'

OWNERS OF RECORD

ASSESSORS MAP 18, PARCELS 43 & 44
VINCENT P. & MARY D. BORIS
692 GREENDALE AVENUE
NEEDHAM, MA 02192

ASSESSORS MAP 18, PARCELS 42
CHRISTOPHER A. MacDONALD
744 GREENDALE AVENUE
NEEDHAM, MA 02192

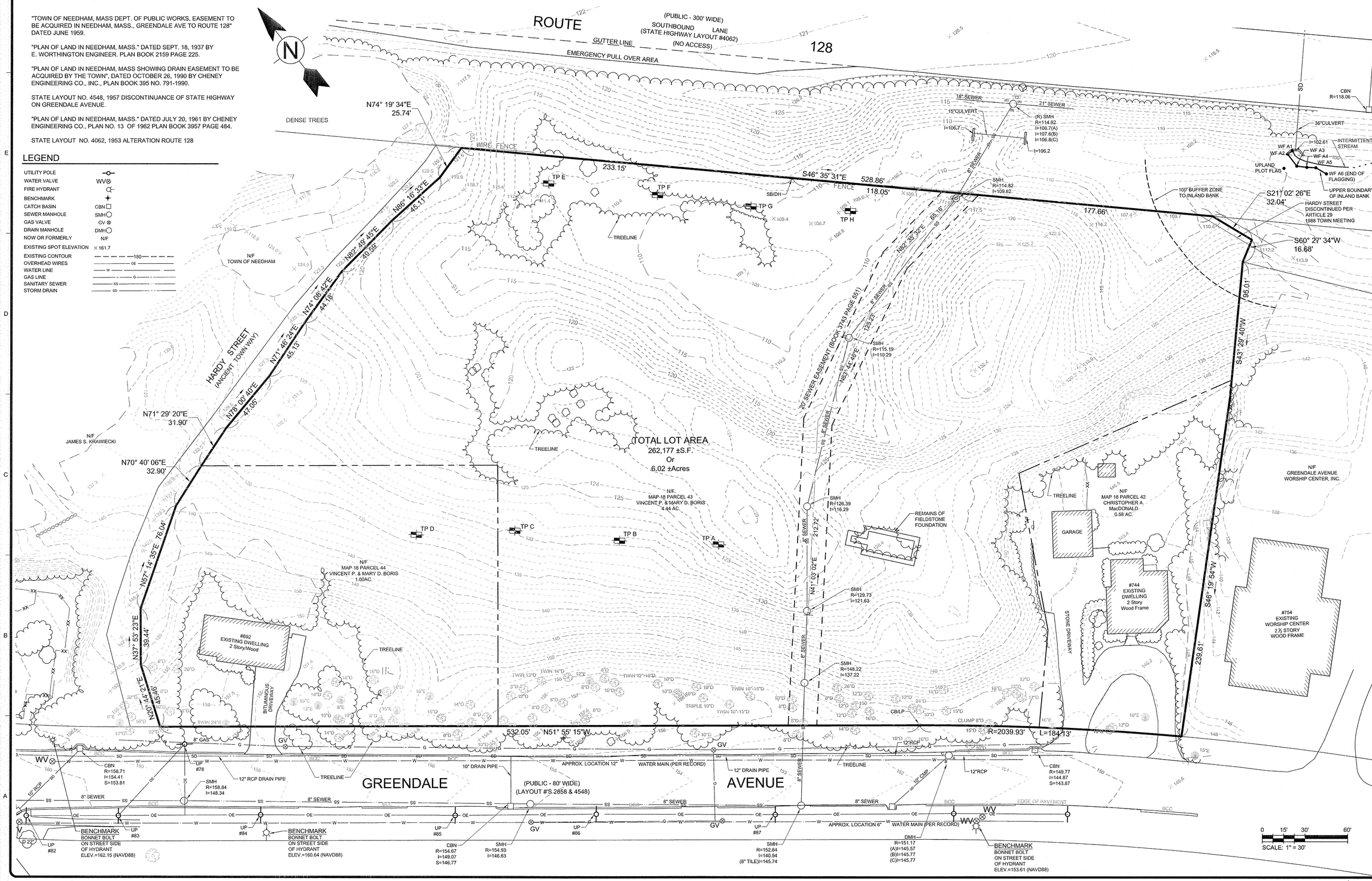
REFERENCE

ASSESSORS MAP 18, PARCELS 43 & 44
DEED BOOK 2985 PAGE 600

ASSESSORS MAP 18, PARCEL 42
DEED BOOK 2473 PAGE 329

LEGEND

UTILITY POLE	
WATER VALVE	WV
FIRE HYDRANT	
BENCHMARK	
CATCH BASIN	CBN
SEWER MANHOLE	SMH
GAS VALVE	GV
DRAIN MANHOLE	DMH
NOW OR FORMERLY	N/F
EXISTING SPOT ELEVATION	× 161.7
EXISTING CONTOUR	150
OVERHEAD WIRES	OE
WATER LINE	W
GAS LINE	G
SANITARY SEWER	SS
STORM DRAIN	SD



Bar Measures 1 inch

TETRA TECH
www.tetratech.com
One Grant Street
Framingham, MA 01701
PHONE: (508) 903-2000 FAX: (508) 903-2001

COMMONWEALTH OF MASSACHUSETTS
ROBERT F. DAYLOR
No. 20109
REGISTERED PROFESSIONAL LAND SURVEYOR
SEAL AND SIGNATURE

MARK	DATE	DESCRIPTION	BY
1	4/12/13	Site Development Plans	G.K.D.
2	9/16/13	ZBA Submission Set	G.K.D.
3	9/30/13	ZBA Submission Full Set	G.K.D.
4	11/8/13	Revisions Per Town Comments	G.K.D.

Client: Greendale Avenue Ventures LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Plot Plan

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A

C-1

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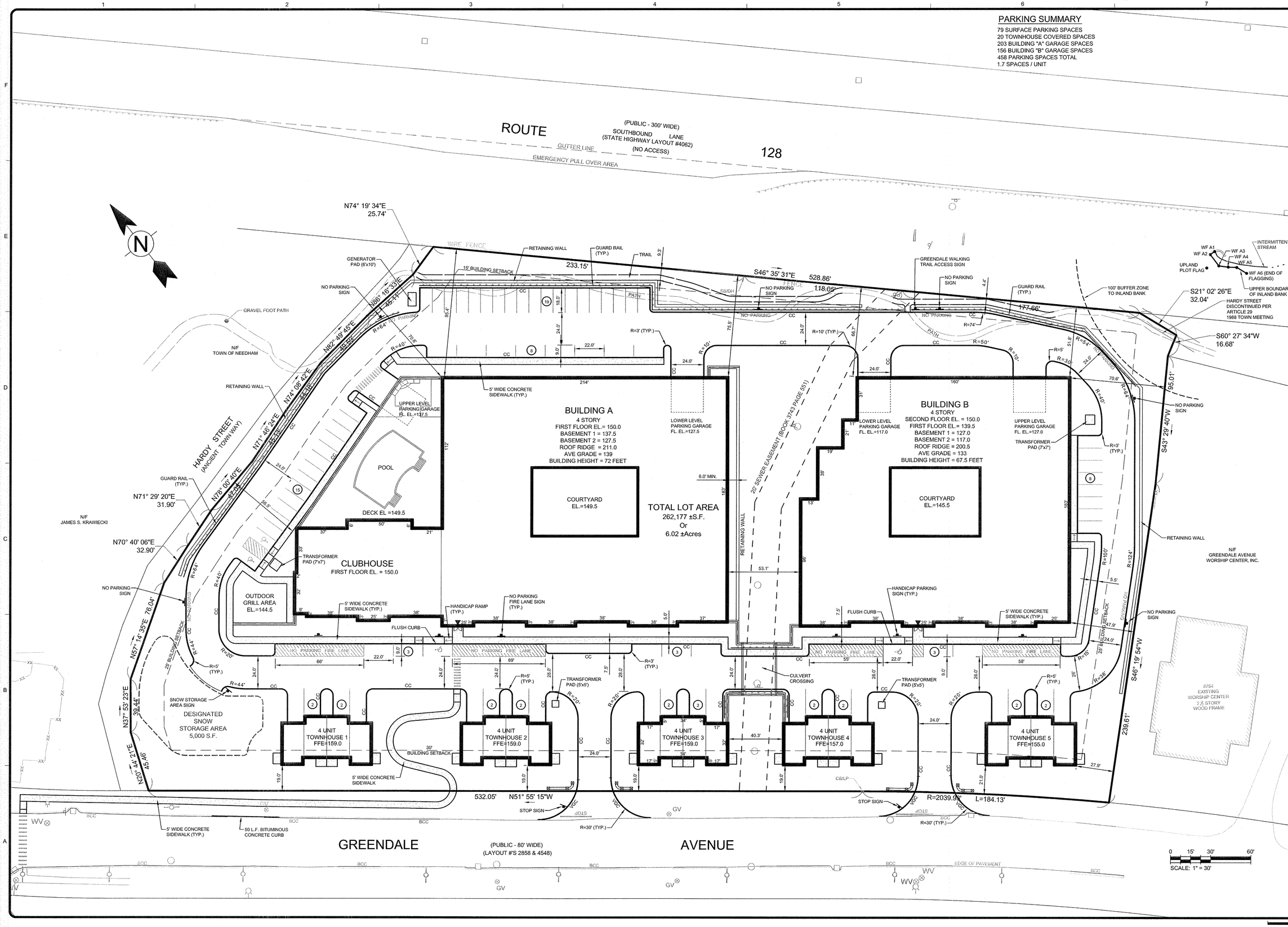
11/6/2013 3:02:25 PM - P:\82806\143-82806-13003\CAD\SHEETFILES\C-1 TOPOGRAPHIC PLAN OF LAND.DWG - PAPPAS, JUD

PARKING SUMMARY

79 SURFACE PARKING SPACES
20 TOWNHOUSE COVERED SPACES
203 BUILDING "A" GARAGE SPACES
156 BUILDING "B" GARAGE SPACES
458 PARKING SPACES TOTAL
1.7 SPACES / UNIT



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COMMONWEALTH OF MASSACHUSETTS
GLENN K. DOUGHERTY
No. 37967
PROFESSIONAL ENGINEER
11-8-2013

MARK	DATE	DESCRIPTION	BY
1	4/12/13	Site Development Plans	G.K.D.
2	9/16/13	ZBA Submission Set	G.K.D.
3	9/30/13	ZBA Submission Full Set	G.K.D.
4	11/8/13	Revisions Per Town Comments	G.K.D.

Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Layout Plan

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A

C-2

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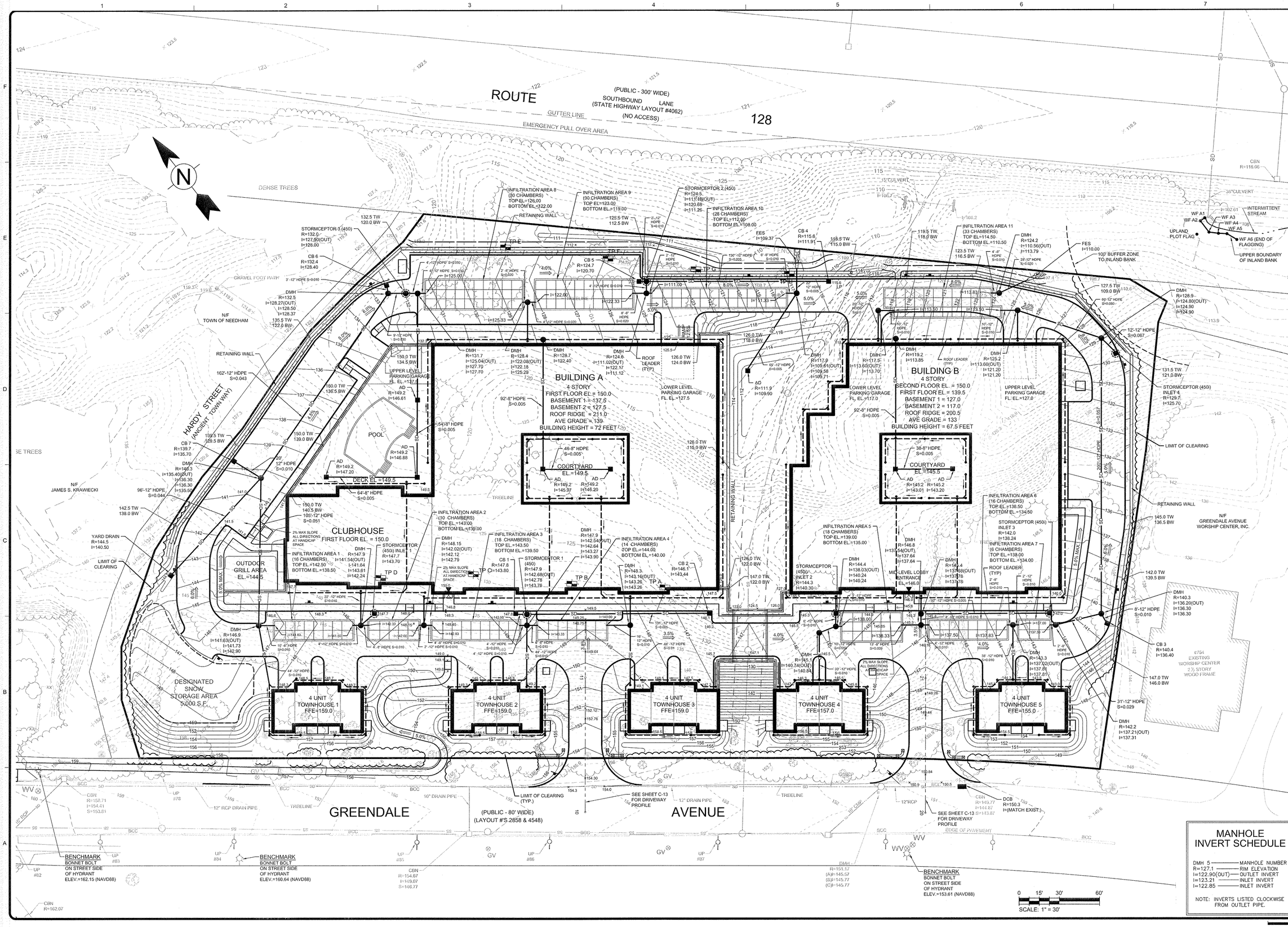
11/8/2013 1:55:46 PM - P:\82806\143-82806-13003\CAD\SHEETFILES\C-2 LAYOUT PLAN.DWG - PAPPAS, JUD



MANHOLE INVERT SCHEDULE

DMH 5 — MANHOLE NUMBER
R=127.1 — RIM ELEVATION
I=122.90(OUT) — OUTLET INVERT
I=123.21 — INLET INVERT
I=122.85 — INLET INVERT

NOTE: INVERTS LISTED CLOCKWISE FROM OUTLET PIPE.

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GLENN K. DOUGHER
No. 37927
CIVIL
PROFESSIONAL ENGINEER
11-8-2013

MARK	DATE	DESCRIPTION	BY
1	4/12/13	Site Development Plans	G.K.D.
2	9/16/13	ZBA Submission Set	G.K.D.
3	9/30/13	ZBA Submission Full Set	G.K.D.
4	11/8/13	Revisions Per Town Comments	G.K.D.

Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Grading & Drainage Plan

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A.

C-3

Bar Measures 1 inch

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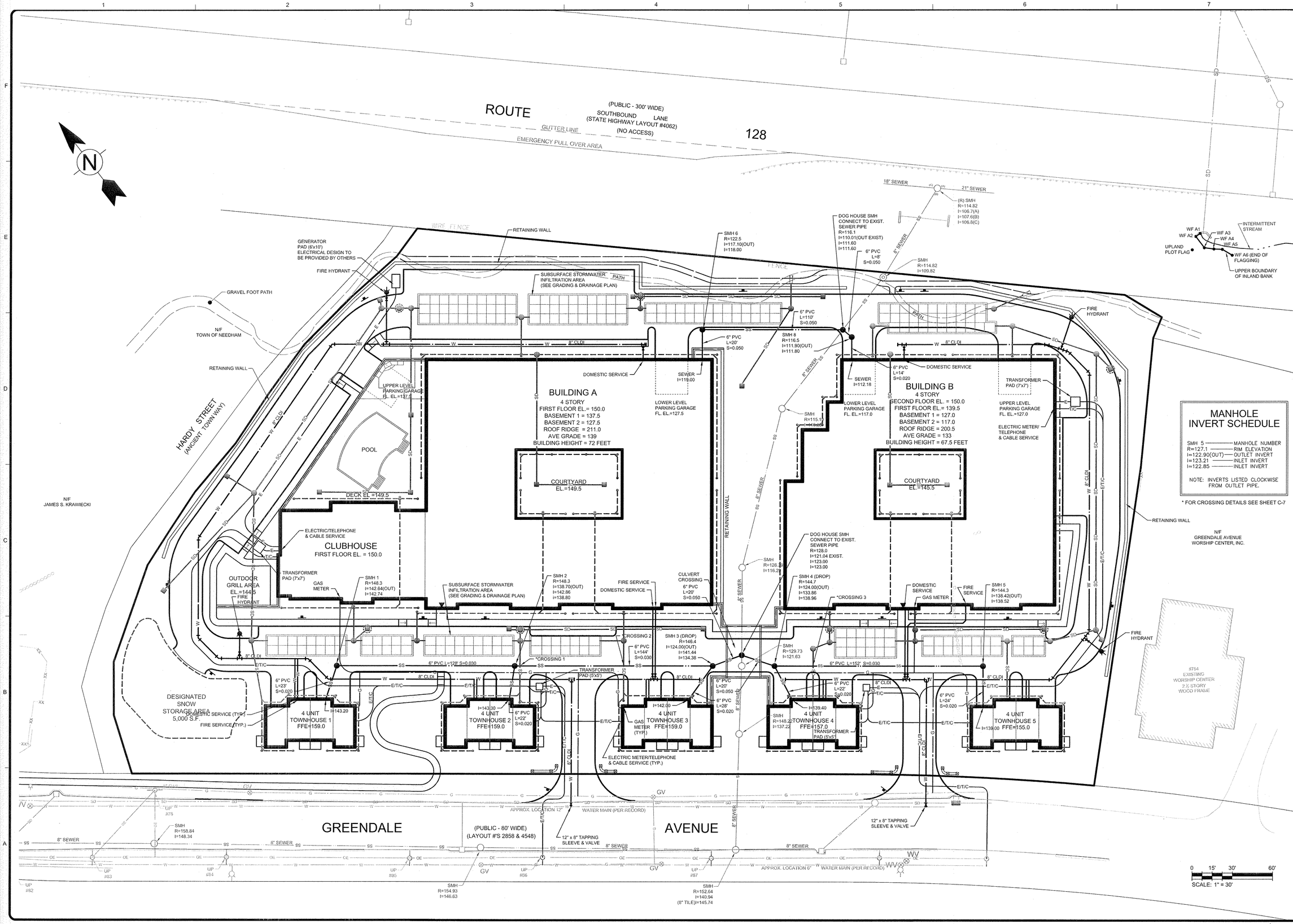

MANHOLE INVERT SCHEDULE

SMH 5 — MANHOLE NUMBER
R=127.1 — RIM ELEVATION
I=122.90(OUT) — OUTLET INVERT
I=123.21 — INLET INVERT
I=122.85 — INLET INVERT

NOTE: INVERTS LISTED CLOCKWISE FROM OUTLET PIPE.

* FOR CROSSING DETAILS SEE SHEET C-7

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COMMONWEALTH OF MASSACHUSETTS
GLENN K. DOUGHERTY
No. 39882
CIVIL
REGISTERED PROFESSIONAL ENGINEER
11-8-2013

MARK	DATE	DESCRIPTION	BY
1	4/12/13	Site Development Plans	G.K.D.
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Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Utility Plan

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A

C-4

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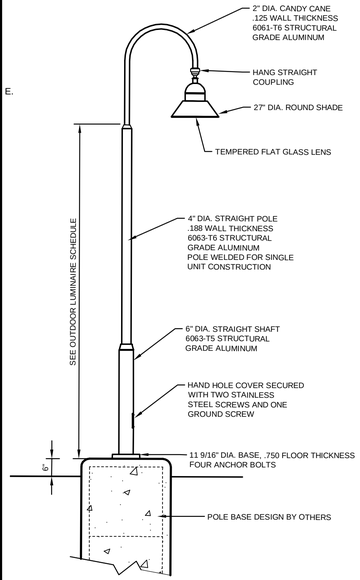
11/8/2013 1:56:44 PM - P:\82806\143-82806-13003\CAD\SHEETFILES\C-4 UTILITY PLAN.DWG - PAPPAS, JUD



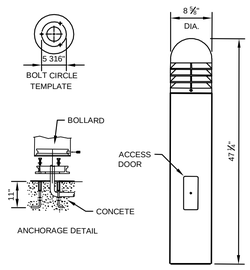
LIGHT POLE DETAIL

NOT TO SCALE

NOTES:
1. LUMINAIRE # 8557MH - SEE SPECIFICATIONS:
70W ELECTRONIC 120-277V MH BALLAST LOCATED INSIDE LUMINAIRE.
(1) 70W T4 G8.5 MH LAMP (PROVIDED BY OTHERS).

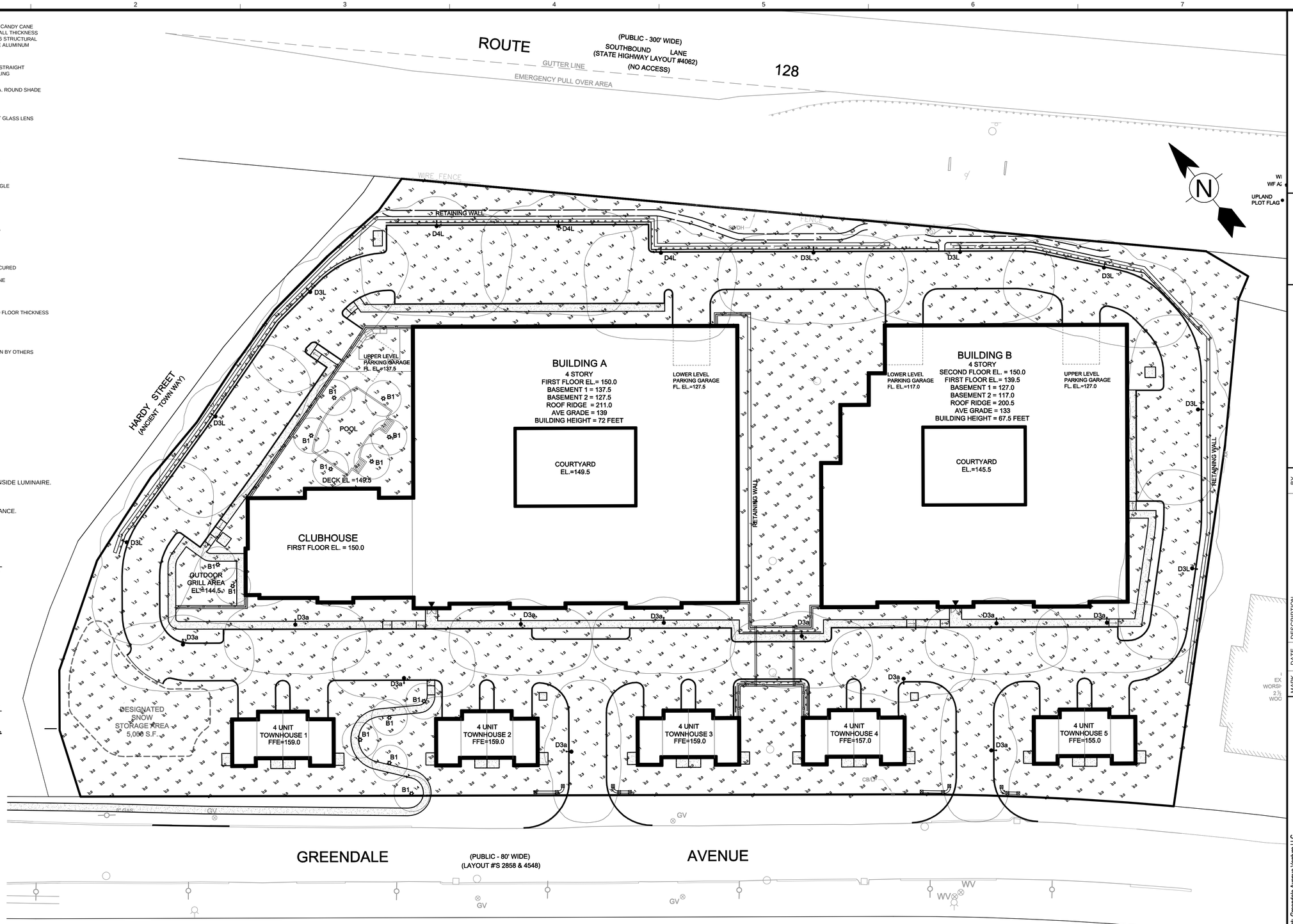
2. LUMINAIRE USES BEGA 896A ANCHORAGE KIT
(SEE DETAIL) SUPPLIED WITH LUMINAIRE OR IN ADVANCE.

3. AVAILABLE IN STANDARD BEGA COLORS.



BOLLARD LIGHT DETAIL

NOT TO SCALE



Outdoor Luminaire Schedule									
Symbol	Qty	Label	Height	Description	Arrangement	Arm	Lumens/Lamp	LLF	Filename
B1	13	B1	4'	8557MH	SINGLE	0	6600	0.800	8557MH.IES
D3a	11	D3a	14'	DSAP1-III-80LED-NW	SINGLE	1.5	N.A.	0.900	DSAP1-3-80LED-NW.IES
D3L	8	D3L	20'	DSAP25-III-120LED-NW	SINGLE	1.5	N.A.	0.900	DSAP25-3-120LED-NW.ies
D4L	3	D4L	20'	DSAP25-IV-120LED-NW	SINGLE	1.5	N.A.	0.900	DSAP25-4-120LED-NW.ies

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
CalcPts	Illuminance	Fc	0.39	4.9	0.0	N.A.	N.A.

NOTE: ALL PARKING AREAS PROVIDE AN ILLUMINATION LEVEL OF AN AVERAGE ONE FOOT CANDLE. ALL ILLUMINATION SHALL BE SHIELDED SO AS NOT TO SHINE DIRECTLY ONTO A PUBLIC WAY OR ONTO ANY ADJACENT PROPERTY.

0 15' 30' 60'
SCALE: 1" = 30'

TETRA TECH
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4	11/8/13	Revisions Per Town Comments	G.K.D.

Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Lighting Plan

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
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C-5

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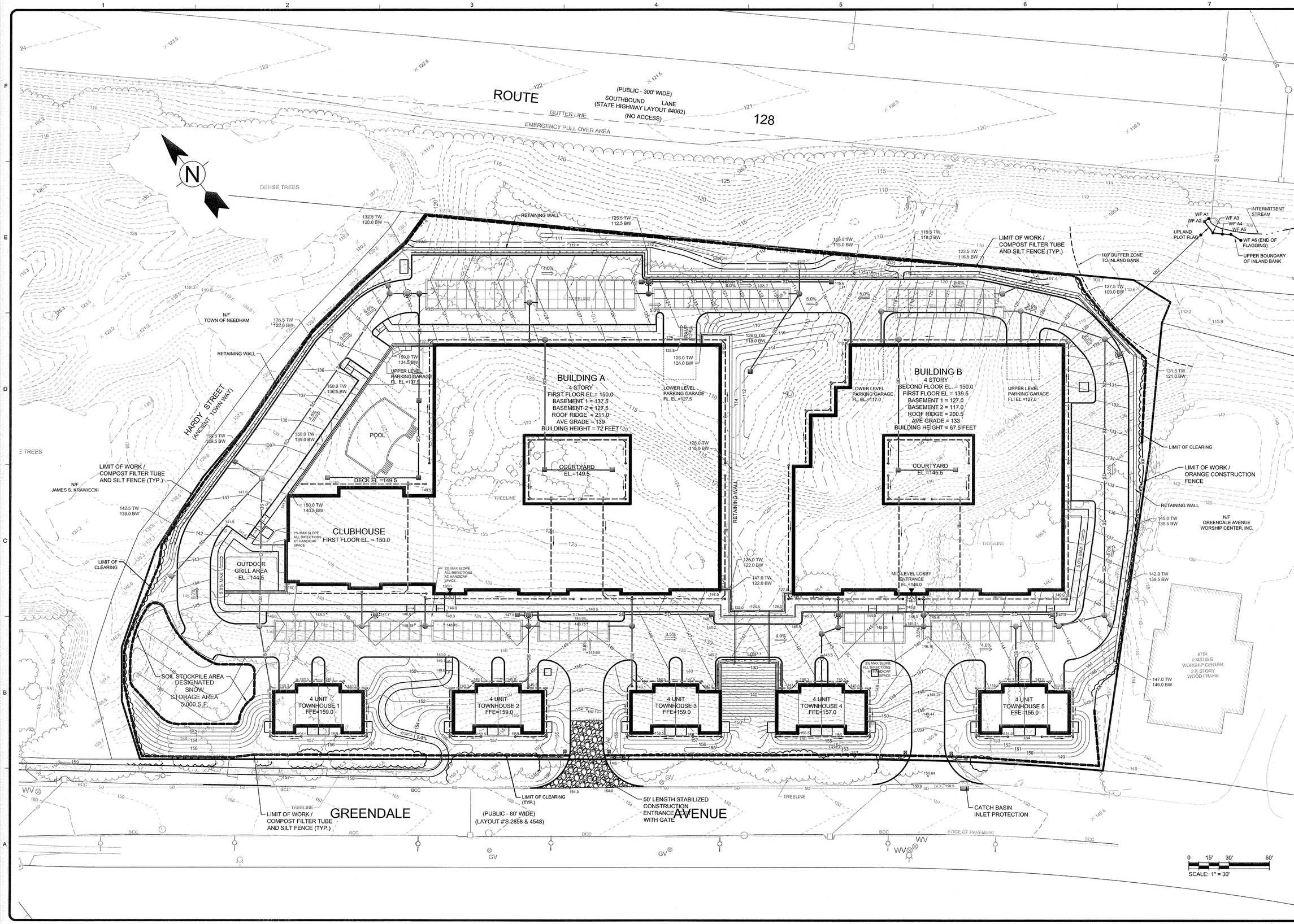

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COMMONWEALTH OF MASSACHUSETTS
GLENN K. DOUGHERTY
NO. 34024
11-8-2013

MARK	DATE	DESCRIPTION	BY
1	4/12/13	Site Development Plans	G.K.D.
2	9/16/13	ZBA Submission Set	G.K.D.
3	9/30/13	ZBA Submission Full Set	G.K.D.
4	11/8/13	Revisions Per Town Comments	G.K.D.

Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Erosion & Sediment Control Plan

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A.

C-6

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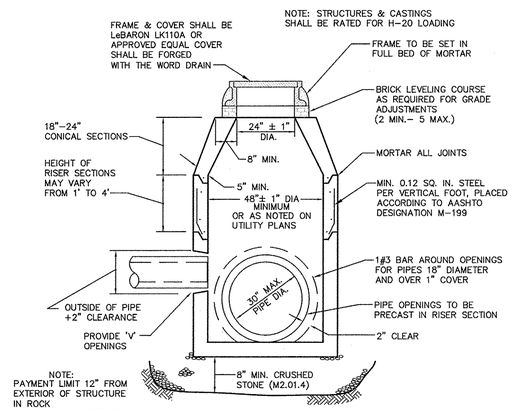
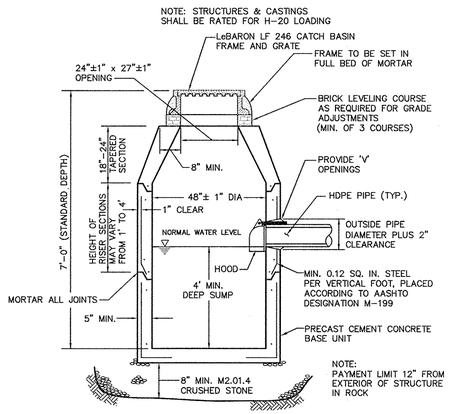


NOTES:
1. MANHOLE DIAMETER TO BE INCREASED AS REQUIRED TO ACCOMMODATE NUMBER OF PIPES ENTERING OR DISCHARGING FROM MANHOLE.
2. STRUCTURE OPENING VOIDS, AFTER PIPE INSTALLATION, SHALL BE FILLED WITH NON-SHRINK WATERPROOF GROUT. GROUT TO BE COMPLETELY AROUND THE PIPE. GROUT SHALL BE SMOOTH AND PARALLEL TO INTERIOR AND EXTERIOR WALLS.

NOTES:
1. CONCRETE = 4000 PSI MINIMUM, CEMENT PER ASTM C-478
2. MANHOLE TO CONFORM TO LATEST ASTM C-478 SPECIFICATIONS FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS"
3. STEEL REINFORCEMENT TO MEET OR EXCEED H20 LOADING.
4. MANHOLE STEPS – POLYPROPYLENE COATED GRADE 60 REINFORCING BAR, PER ASTM C-478 & OSHA (STD 1-1.9)

PRECAST CONCRETE DRAIN MANHOLE

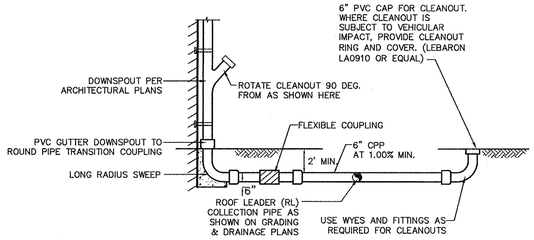
9 FEET OR LESS IN DEPTH
NOT TO SCALE



PRECAST CONCRETE CATCH BASIN

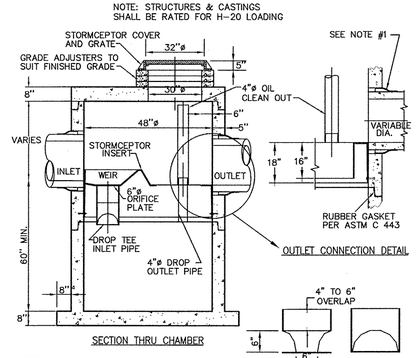
NOT TO SCALE

NOTES:
1. CONCRETE = 4000 PSI MINIMUM, CEMENT PER ASTM C-478
2. MANHOLE TO CONFORM TO LATEST ASTM C-478 SPECIFICATIONS FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS"
3. STEEL REINFORCEMENT TO MEET OR EXCEED H20 LOADING.
4. MANHOLE STEPS – POLYPROPYLENE COATED GRADE 60 REINFORCING BAR, PER ASTM C-478 & OSHA (STD 1-1.9)



DOWNSPOUT CONNECTION

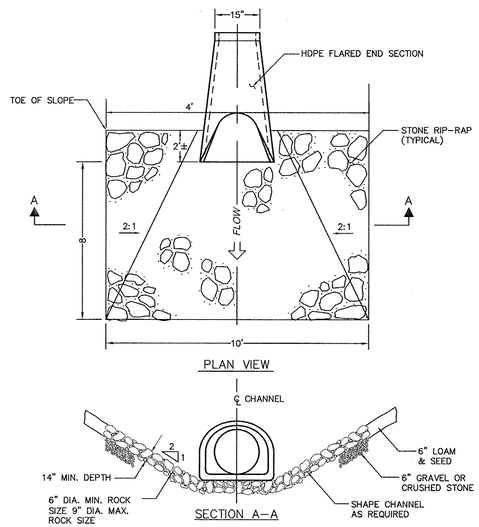
NOT TO SCALE



NOTES:
1. THE USE OF FLEXIBLE CONNECTIONS IS RECOMMENDED AT THE INLET AND OUTLET WHERE APPLICABLE.
2. THE COVER SHOULD BE POSITIONED OVER THE OUTLET DROP PIPE AND THE VENT PIPE.
3. THIS IS A GENERAL ARRANGEMENT DRAWING CONSULT LOCAL REPRESENTATIVE FOR SPECIAL CONDITIONS.
4. STORMCEPTOR STRUCTURE TO BE SET ON 6" MINIMUM OF CRUSHED STONE PLACED ON AN UNDISTURBED OR COMPACTED BASE.

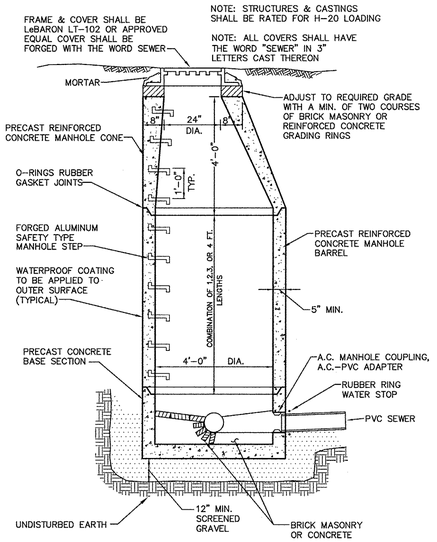
STC 450i PRECAST CONCRETE STORMCEPTOR

(450 US Gallon Capacity)
NOT TO SCALE



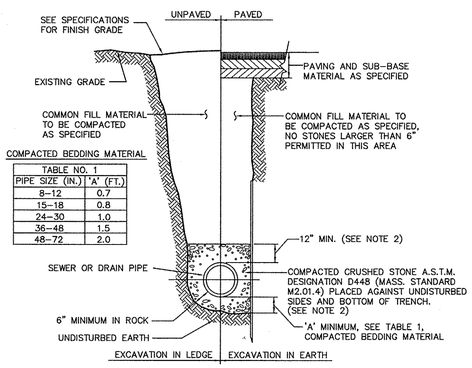
OUTLET EROSION PROTECTION

NOT TO SCALE



NOTES:
1. CONCRETE = 4000 PSI MINIMUM, CEMENT PER ASTM C-478
2. MANHOLE TO CONFORM TO LATEST ASTM C-478 SPECIFICATIONS FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS"
3. STEEL REINFORCEMENT TO MEET OR EXCEED H20 LOADING.
4. MANHOLE STEPS – POLYPROPYLENE COATED GRADE 60 REINFORCING BAR, PER ASTM C-478 & OSHA (STD 1-1.9)
5. EXTERIOR WATERPROOFING TO BE PROVIDED.

SEWER MANHOLE



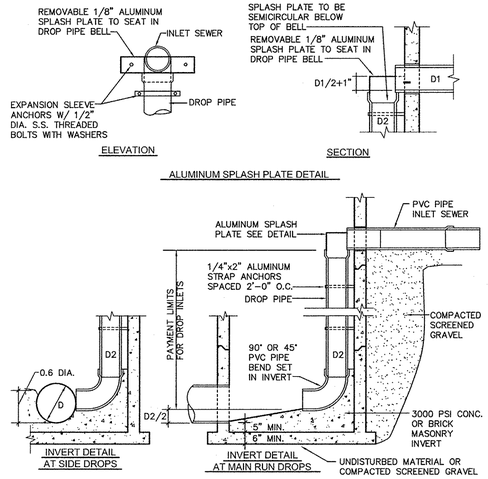
COMPACTED BEDDING MATERIAL

TABLE NO. 1	
PIPE SIZE (IN.)	'A' (FT.)
8–12	0.7
15–18	0.8
24–30	1.0
36–48	1.5
48–72	2.0

NOTES:
1. SHEETING, WHEN REQUIRED, TO BE CUT OFF AT LEAST 5 FEET BELOW STREET AND A MINIMUM OF 1 FOOT ABOVE TOP OF PIPE. WOOD SHEETING DRIVEN BELOW MID-DIAMETER OF THE PIPE SHALL BE LEFT IN PLACE. STEEL SHEETING DRIVEN BELOW MID-DIAMETER MAY BE WITHDRAWN IF APPROVED IN WRITING BY THE ENGINEER. FOR PVC PIPE ALL SHEETING DRIVEN BELOW MID-DIAMETER SHALL BE LEFT IN PLACE.
2. WHEN APPROVED BY THE ENGINEER FOR PIPES OTHER THAN PVC SELECTED GRAVEL FILL MATERIAL MAY BE USED FROM MID-DIAMETER OF PIPE TO 12" ABOVE TOP OF PIPE. NO STONES LARGER THAN 2 INCHES IN ANY DIMENSION WILL BE PERMITTED IN THIS AREA – MASSACHUSETTS STATE MATERIAL STANDARD M1.03.0 TYPE C.
3. TRENCHES LOCATED ON THE ROAD SHOULDER SHALL BE TREATED THE SAME EXCEPT FOR PAVING.
4. PROVIDE AT LEAST ONE IMPERVIOUS DAM IN GRAVEL BEDDING BETWEEN EACH MANHOLE WHERE DIRECTED, OR EVERY 300 FEET, WHICHEVER IS LESS.
5. BEDDING MATERIAL FOR PVC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D2321 CLASS I OR CLASS II EMBEDMENT MATERIALS.

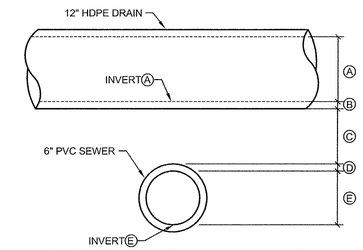
SEWER AND DRAIN TRENCH (PVC OR RCP)

NOT TO SCALE



INSIDE SEWER DROP CONNECTION

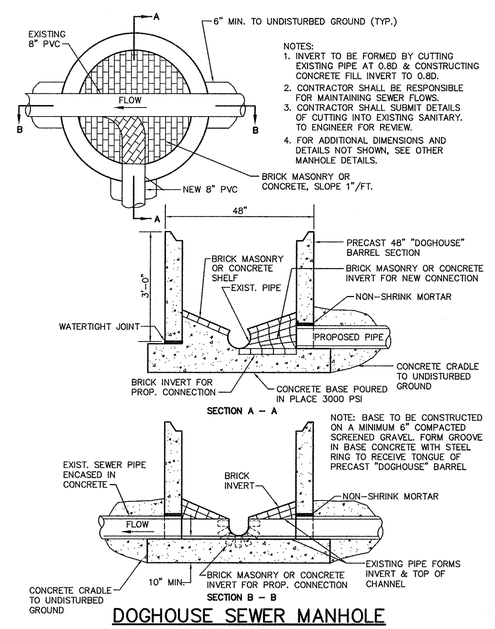
NOT TO SCALE



CROSSING	Ⓐ	INVERT Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	INVERT Ⓔ
1	1.0'	143.66	0.04'	4.50'	0.04'	0.5'	138.58
2	1.0'	143.68	0.04'	8.86'	0.04'	0.5'	136.24
3	1.0'	140.52	0.04'	5.46'	0.04'	0.5'	134.46

UTILITY CROSSING DETAIL

NOT TO SCALE

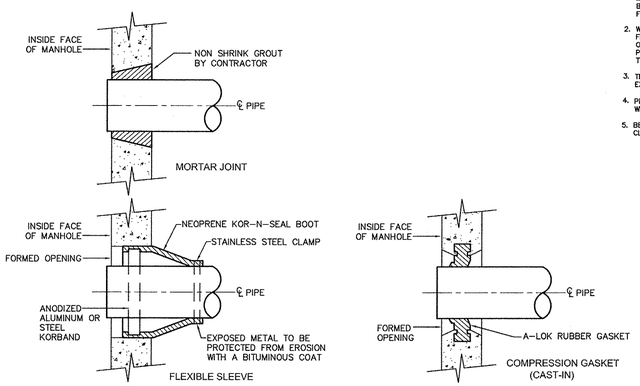


NOTES:
1. INVERT TO BE FORMED BY CUTTING EXISTING PIPE AT 0.80 & CONSTRUCTING CONCRETE FILL INVERT TO 0.8D.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING SEWER FLOWS.
3. CONTRACTOR SHALL SUBMIT DETAILS OF CUTTING INTO EXISTING SANITARY. TO ENGINEER FOR REVIEW.
4. FOR ADDITIONAL DIMENSIONS AND DETAILS NOT SHOWN, SEE OTHER MANHOLE DETAILS.

NOTE: BASE TO BE CONSTRUCTED ON A MINIMUM 6" COMPACTED SCREENED GRAVEL. FORM GROOVE IN BASE CONCRETE WITH STEEL RING TO RECEIVE TONGUE OF PRECAST "DOGHOUSE" BARREL

DOGHOUSE SEWER MANHOLE

NOT TO SCALE



PIPE TO MANHOLE CONNECTIONS

NOT TO SCALE

TETRA TECH
www.tetratech.com
One Grant Street
Framingham, MA 01701
PHONE: (508) 903-2000 FAX: (508) 903-2001

COMMONWEALTH OF MASSACHUSETTS
GLENN K. DOUGHERTY
No. 37864
11-8-2013

MARK	DATE	DESCRIPTION	BY
1	4/12/13	Site Development Plans	G.K.D.
2	9/16/13	ZBA Submission Set	G.K.D.
3	9/30/13	ZBA Submission Full Set	G.K.D.
4	11/8/13	Revisions Per Town Comments	G.K.D.

Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Detail Sheet

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A

C-7

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Bar Measures 1 inch

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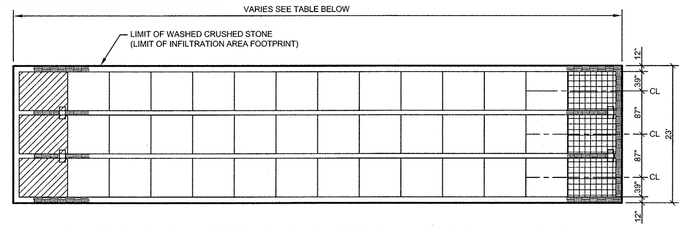
CULTEC RECHARGER® 900HD PRODUCT SPECIFICATIONS

GENERAL

CULTEC RECHARGER® 900HD CHAMBERS ARE DESIGNED FOR UNDERGROUND STORMWATER MANAGEMENT. THE CHAMBERS MAY BE USED FOR RETENTION, RECHARGING, DETENTION OR CONTROLLING THE FLOW OF ON-SITE STORMWATER RUNOFF.

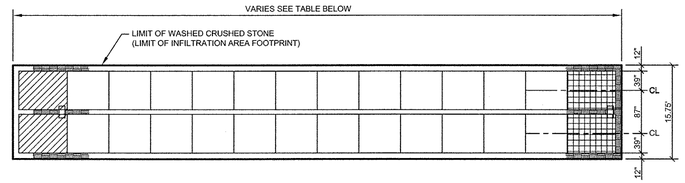
CHAMBER PARAMETERS

1. THE CHAMBERS WILL BE MANUFACTURED BY CULTEC, INC. OF BROOKFIELD, CT. (203-775-4416 OR 1-800-428-5832)
2. THE CHAMBER WILL BE VACUUM THERMOFORMED OF BLACK HIGH MOLECULAR WEIGHT HIGH DENSITY POLYETHYLENE (HMWHDPE).
3. THE CHAMBER WILL BE ARCHED IN SHAPE.
4. THE CHAMBER WILL BE OPEN-BOTTOMED.
5. THE CHAMBER WILL BE JOINED USING AN INTERLOCKING OVERLAPPING RIB METHOD. CONNECTIONS MUST BE FULLY SHOULDERED OVERLAPPING RIBS, HAVING NO SEPARATE COUPLINGS OR SEPARATE END WALLS
6. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC RECHARGER® 900 HD SHALL BE 48.0 INCHES (1219 MM) TALL, 78.0 INCHES (1981 MM) WIDE AND 9.25 FEET (2819 mm) LONG. THE INSTALLED LENGTH OF A JOINED RECHARGER® 900HD SHALL BE 7 FEET (2.13 m).
7. MAXIMUM INLET OPENING ON THE CHAMBER ENDWALL IS 24 INCHES (600 MM).
8. THE CHAMBER WILL HAVE TWO SIDE PORTALS TO ACCEPT CULTEC HVLV™ FC-24 FEED CONNECTORS TO CREATE AN INTERNAL MANIFOLD. THE NOMINAL DIMENSIONS OF EACH SIDE PORTAL WILL BE 10.0 INCHES (254 MM) HIGH BY 12.5 INCHES (318 MM) WIDE. MAXIMUM ALLOWABLE PIPE SIZE IN THE SIDE PORTAL IS 10 INCHES (250 MM).
9. THE NOMINAL CHAMBER DIMENSIONS OF THE CULTEC HVLV™ FC-24 FEED CONNECTOR SHALL BE 12 INCHES (305 MM) TALL, 16 INCHES (406 MM) WIDE AND 24.2 INCHES (614 MM) LONG.
10. THE NOMINAL STORAGE VOLUME OF THE RECHARGER® 900HD CHAMBER WILL BE 17.62 FT^3 / FT (1.64 M^3 / M) - WITHOUT STONE. THE NOMINAL STORAGE VOLUME OF A JOINED RECHARGER® 900HD SHALL BE 123.34 FT^3 / UNIT (3.49 M^3 / UNIT) - WITHOUT STONE.
11. THE NOMINAL STORAGE VOLUME OF THE HVLV™ FC-24 FEED CONNECTOR WILL BE 0.913 FT3 / FT (0.085 M3 / M) - WITHOUT STONE.
12. THE RECHARGER® 900HD CHAMBER WILL HAVE THIRTY-FOUR DISCHARGE HOLES BORED INTO THE SIDEWALLS OF THE UNIT'S CORE TO PROMOTE LATERAL CONVEYANCE OF WATER.
13. THE RECHARGER® 900HD CHAMBER SHALL HAVE 10 CORRUGATIONS.
14. THE ENDWALL OF THE CHAMBER, WHEN PRESENT, WILL BE AN INTEGRAL PART OF THE CONTINUOUSLY FORMED UNIT. SEPARATE END PLATES CANNOT BE USED WITH THIS UNIT.
15. THE RECHARGER® 900RHD STAND ALONE UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING TWO FULLY FORMED INTEGRAL ENDWALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS.
16. THE RECHARGER® 900SHD STARTER UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING ONE FULLY FORMED INTEGRAL ENDWALL AND ONE PARTIALLY FORMED INTEGRAL ENDWALL WITH A LOWER TRANSFER OPENING OF 14 INCHES (356 MM) HIGH X 34.5 INCHES (876 MM) WIDE.
17. THE RECHARGER® 900IHD INTERMEDIATE UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING ONE FULLY OPEN ENDWALL AND ONE PARTIALLY FORMED INTEGRAL ENDWALL WITH A LOWER TRANSFER OPENING OF 27.6 INCHES (701 MM) HIGH X 56.3 INCHES (1430 MM) WIDE.
18. THE RECHARGER® 900IHD END UNIT MUST BE FORMED AS A WHOLE CHAMBER HAVING ONE FULLY FORMED INTEGRAL ENDWALL AND ONE FULLY OPEN END WALL AND HAVING NO SEPARATE END PLATES OR END WALLS.
19. THE HVLV™ FC-24 FEED CONNECTOR MUST BE FORMED AS A WHOLE CHAMBER HAVING TWO OPEN END WALLS AND HAVING NO SEPARATE END PLATES OR SEPARATE END WALLS. THE UNIT WILL FIT INTO THE SIDE PORTALS OF THE RECHARGER® 900 HD AND ACT AS CROSS FEED CONNECTIONS.
20. CHAMBERS MUST HAVE HORIZONTAL STIFFENING FLEX REDUCTION STEPS BETWEEN THE RIBS.
21. THE CHAMBER WILL BE DESIGNED TO WITHSTAND AASHTO H-25 LOAD RATING WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS.
22. HEAVY DUTY UNITS ARE DESIGNATED BY A COLORED STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.
23. THE CHAMBER WILL HAVE A RAISED INTEGRAL CAP AT THE TOP OF THE ARCH IN THE CENTER OF EACH UNIT TO BE USED AS AN OPTIONAL INSPECTION PORT OR CLEAN-OUT.
24. THE UNITS MAY BE TRIMMED TO CUSTOM LENGTHS BY CUTTING BACK TO ANY CORRUGATION ON THE LARGE RIB END.
25. THE CHAMBER SHALL BE MANUFACTURED IN AN ISO 9001:2000 CERTIFIED FACILITY.



CULTEC RECHARGER 900HD TYPICAL 3 ROW LAYOUT

NOT TO SCALE



CULTEC RECHARGER 900HD TYPICAL 2 ROW LAYOUT

NOT TO SCALE

CULTEC RECHARGER 900HD AREA DIMENSION TABLE

INFILTRATION AREA	OVERALL WIDTH	OVERALL LENGTH
1	15.75'	60.25'
2	15.75'	39.25'
3	15.75'	67.25'
4	15.75'	53.25'
5	23.00'	46.25'
6	15.75'	60.25'
7	15.75'	25.25'
8	23.00'	74.25'
9	23.00'	74.25'
10	15.75'	102.25'
11	23.00'	81.25'

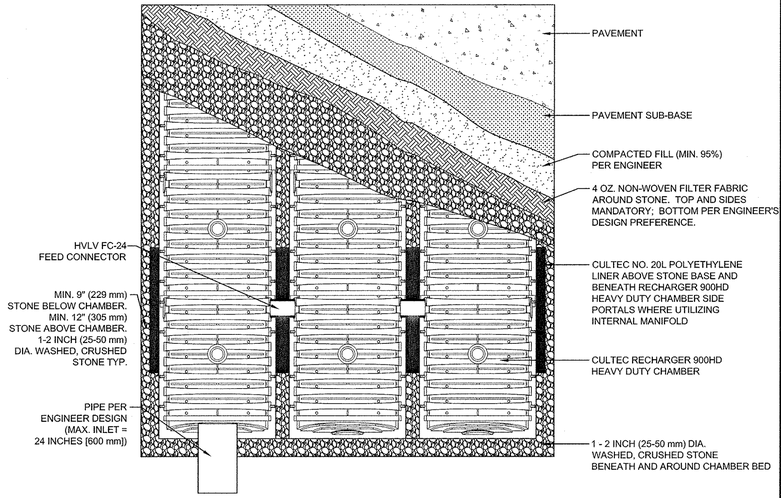
INFILTRATION AREA PIPE INVERT / PEAK ELEVATION COMPARISON

			Infiltration Area Peak Elevations			
Infiltration Area	Outlet Pipe Diameter	Outlet Pipe Invert El.	2-yr	10-yr	25-yr	100-yr
1	8"	141.83	138.04	139.19	139.82	140.99
2	8"	142.33	139.51	140.38	140.89	141.78
3	8"	142.83	139.58	140.73	141.50	142.90
4	8"	143.33	140.31	141.05	141.48	142.17
5	8"	138.33	135.31	136.61	137.47	138.63
6	8"	137.83	134.77	135.82	136.46	138.04
7	8"	137.33	133.24	133.67	13.96	134.54
8	8"	125.33	122.04	123.21	124.00	125.45
9	8"	122.33	119.34	120.09	120.51	121.23
10	8"	111.33	108.18	109.17	109.77	110.81
11	8"	113.83	110.70	111.73	112.37	113.49

Note: No surcharge condition exists at any outlet for each storm event

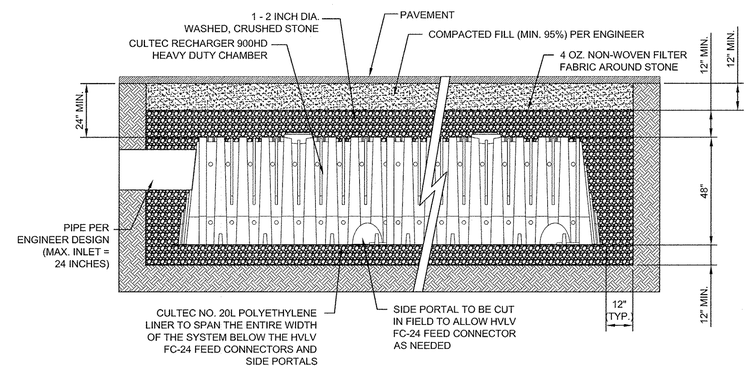
ELEVATIONS TABLE

	INFILTRATION AREA										
	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
MINIMUM COVER / FINISHED GRADE PAVEMENT (18" FROM TOP OF CHAMBER TO F.G. PAVEMENT)	147.00	147.50	148.00	148.00	144.00	143.00	142.00	128.50	126.00	117.00	117.50
Ⓔ TOP OF STONE	144.00	144.50	145.00	145.50	140.50	140.00	139.50	127.50	124.50	113.50	116.00
Ⓓ TOP OF CHAMBER	142.50	143.00	143.50	144.00	139.00	138.50	138.00	126.00	123.00	112.00	114.50
Ⓒ BASE OF CHAMBER	138.50	139.00	139.50	140.00	135.00	134.50	134.00	122.00	119.00	108.00	110.50
Ⓑ BASE OF FOUNDATION STONE	137.50	138.00	138.50	139.00	134.00	133.50	133.00	121.00	118.00	107.00	109.50
Ⓐ SEASONAL HIGH GROUNDWATER	124.4	124.4	122.0	121.5	-----	----	----	99.0	99.0	98.7	----



CULTEC RECHARGER 900HD HEAVY DUTY PLAN VIEW

NOT TO SCALE



CULTEC INTERNAL MANIFOLD DETAIL

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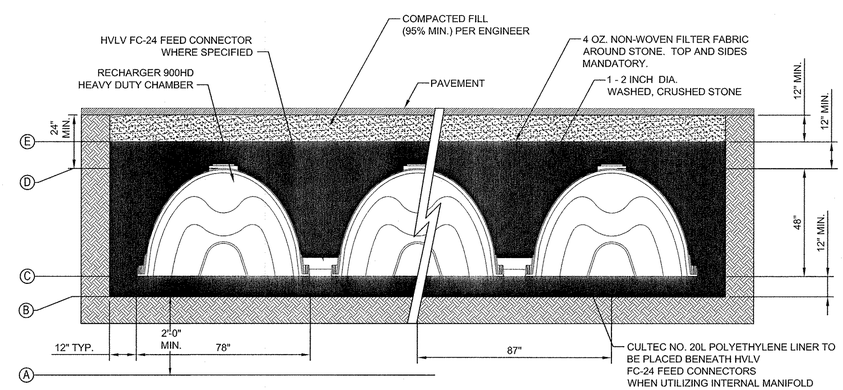

GENERAL NOTES

RECHARGER 900HD BY CULTEC, INC. OF BROOKFIELD, CT.
REFER TO CULTEC, INC.'S CURRENT RECOMMENDED INSTALLATION GUIDELINES.
USE RECHARGER 900HD HEAVY DUTY FOR TRAFFIC AND/OR H-25 APPLICATIONS.

ALL RECHARGER 900HD HEAVY DUTY UNITS ARE MARKED WITH A COLOR STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER.
ALL RECHARGER 900HD CHAMBERS MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

CULTEC RECHARGER 900HD HEAVY DUTY TYPICAL CROSS SECTION

NOT TO SCALE

TETRA TECH
www.tetratech.com
One Grant Street
Framingham, MA 01701
PHONE: (508) 903-2000 FAX: (508) 903-2001

GLENN K. DOUGHERTY
No. 37824
CIVIL
11-8-2013

MARK	DATE	DESCRIPTION	BY
1	4/12/13	Site Development Plans	G.K.D.
2	9/16/13	ZBA Submission Set	G.K.D.
3	9/30/13	ZBA Submission Full Set	G.K.D.
4	11/8/13	Revisions Per Town Comments	G.K.D.

Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Detail Sheet

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A

C-8

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Bar Measures 1 inch

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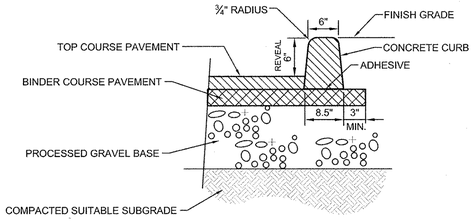

EXTRUDED CONCRETE CURB

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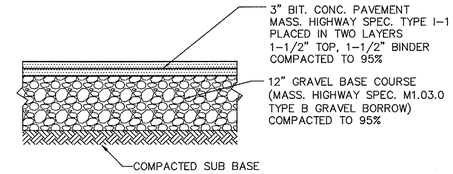

PAVEMENT SECTION

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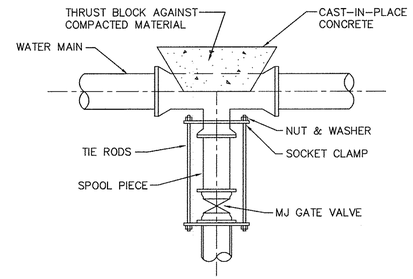
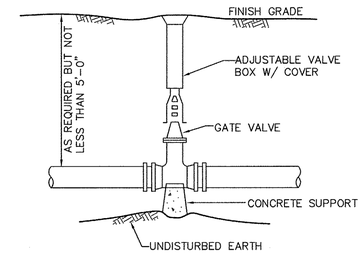


TYPICAL VALVE CONNECTION

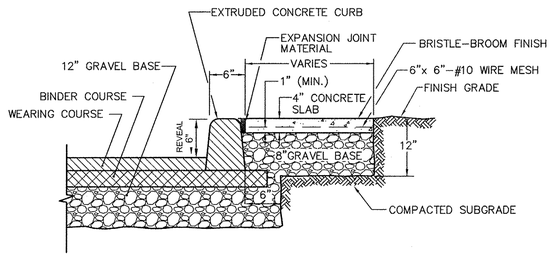
RESTRAINED JOINT TEE

NOT TO SCALE



TYPICAL GATE VALVE

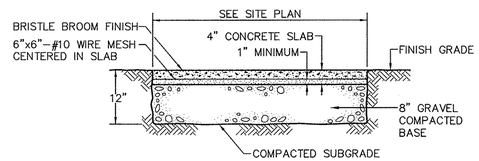
NOT TO SCALE



NOTE:
1.) CONCRETE WALK CROSS SLOPE IS PREFERRED AT 1.5% AND SHALL NOT EXCEED 2.0%
2.) CURB AND SIDEWALK ARE TO BE CONSTRUCTED IN ACCORDANCE WITH EACH RESPECTIVE DETAIL.
3.) EXPANSION JOINT FILLER SEALANT TO BE TREMCO VULKEM 245 TWO PART POURABLE POLYURETHANE SEALANT OR APPROVED EQUAL, INSTALLED PER MANUFACTURER'S INSTRUCTIONS.

CURB & CONCRETE SIDEWALK

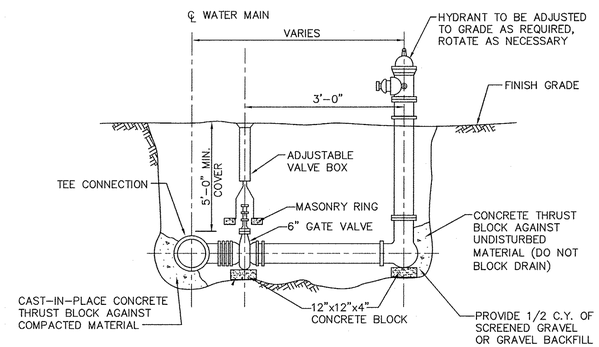
NOT TO SCALE



NOTE:
CROSS SLOPE IS PREFERRED AT 1.5% AND SHALL NOT EXCEED 2.0%

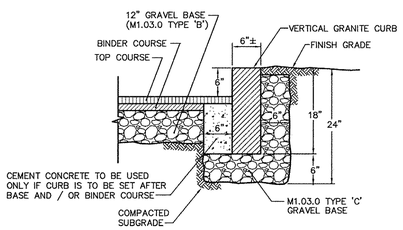
CEMENT CONCRETE WALK

NOT TO SCALE



TYPICAL HYDRANT AND VALVE

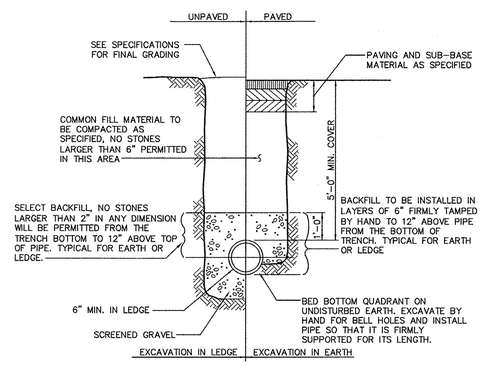
NOT TO SCALE



NOTE:
CEMENT CONCRETE BACKING TO BE PROVIDED AT ALL JOINTS AND AT CURB MID SECTION FOR SPANS GREATER THAN 3 FEET. CONCRETE BACKING TO BE PLACED FROM BASE TO WITHIN 9 INCHES OF GRADE AND SPAN 1 FOOT AT JOINTS AND 1.5 FEET AT MID SECTION.

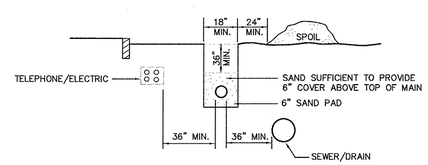
VERTICAL GRANITE CURB

NOT TO SCALE



CEMENT LINED DUCTILE IRON (CLDI) PIPE TRENCH

NOT TO SCALE

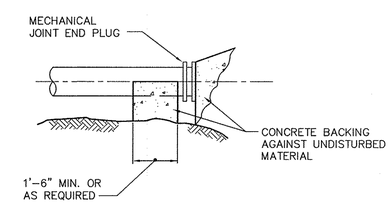


NOTE:
MINIMUM COVER FOR SERVICE LINES IS 24".
CALL DIG SAFE 1-800-322-4844 72 HOURS BEFORE EXCAVATION.

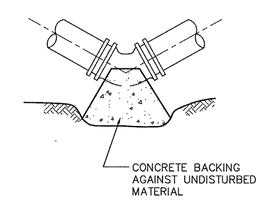
GAS COMPANY TO PROVIDE AND INSTALL GAS MAIN. GENERAL CONTRACTOR SHALL PROVIDE EXCAVATION, SAND BEDDING AND BACKFILL IN ACCORDANCE WITH GAS COMPANY REQUIREMENTS. FINAL LOCATION OF GAS METERS TO BE COORDINATED WITH ARCHITECT AND GAS COMPANY.

GAS MAIN TRENCH

NOT TO SCALE

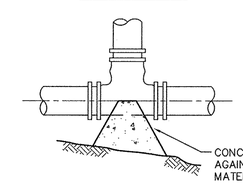


TYPICAL PLUG



TYPICAL BEND

TABLE OF BEARING AREAS IN SQUARE FEET AGAINST UNDISTURBED MATERIAL FOR WATER MAIN FITTINGS			
SIZE OF MAIN (IN.)	45° BEND	TEES & PLUGS	22 1/2° BEND
8" & LESS	4	5	2
10"	6	8	3
12"	9	12	5
16"	12	16	7



TYPICAL TEE

CONCRETE THRUST BLOCKS

NOT TO SCALE

TETRA TECH
www.tetratech.com
One Grant Street
Framingham, MA 01701
PHONE: (508) 903-2000 FAX: (508) 903-2001

GLENN K. DOUCETTE No. 37824 COMMONWEALTH OF MASSACHUSETTS
11-8-2013

MARK	DATE	DESCRIPTION	BY
1	4/12/13	Site Development Plans	G.K.D.
2	9/16/13	ZBA Submission Set	G.K.D.
3	9/30/13	ZBA Submission Full Set	G.K.D.
4	11/8/13	Revisions Per Town Comments	G.K.D.

Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Detail Sheet

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A

C-9

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Bar Measures 1 inch

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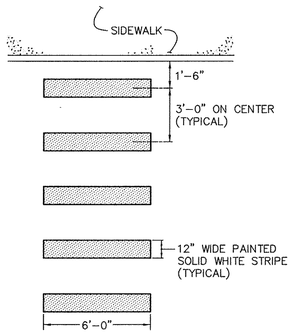

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WATER

1) DUCTILE IRON PIPE SHALL BE CEMENT LINED, COAL TAR ENAMEL, DOUBLE COATED, PUSH-ON TYPE JOINT, AND SHALL CONFORM TO A21.51 (AWWA C151) CLASS 52 FOR SIZES 4 INCH THROUGH 12 INCH.

2) DUCTILE IRON FITTINGS SHALL CONFORM TO ANSI/AWWA C153/A21.53-84 (DUCTILE IRON COMPACT FITTINGS) PRESSURE RATING 350 PSI.

3) GATE VALVES AND TAPPING SLEEVE VALVES SHALL BE RESILIENT SEATED VALVES CONFORMING TO THE REQUIREMENTS OF AWWA STANDARD C509. THE VALVE SHALL OPEN LEFT AND BE PRESSURE RATED FOR 250 PSI WORKING PRESSURE.

4) VALVE BOXES SHALL BE THE 2 PIECE SLIP TYPE, 5 1/4 INCH I.D., FLANGE LOCATED AT THE TOP OF THE BOX, COVER MARKED "WATER" EQUAL TO TYPE CURRENTLY BEING USED BY THE TOWN.

5) WATER PRESSURE REQUIREMENTS AND THE ACTUAL WATER PRESSURE TO BE PROVIDED AT THE BUILDING SHALL BE DETERMINED BY OTHERS.

6) THE CONTRACTOR WILL FURNISH AND INSTALL 1 1/4" CTS DOMESTIC WATER LINES AND WATER METERS AS SPECIFIED BY THE WATER DISTRICT.

7) WATER LINES MUST BE A MINIMUM OF (18) INCHES ABOVE SEWER LINES. IN ADDITION, ONE FULL LENGTH OF WATER MAIN MUST BE CENTERED ON ONE FULL LENGTH OF SEWER LINE SO THAT ALL JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE.

8) WATER SYSTEMS SHALL BE CONSTRUCTED IN ACCORDANCE WITH U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PHS (PUBLIC HEALTH SERVICE) MANUAL OF INDIVIDUAL WATER SYSTEMS, PHS PUBLICATION NO. 24, REVISED 1962, WASHINGTON, GPO (GOVERNMENT PRINTING OFFICE), 1963 AND ANY APPLICABLE CURRENT STATE AND FEDERAL REGULATIONS.

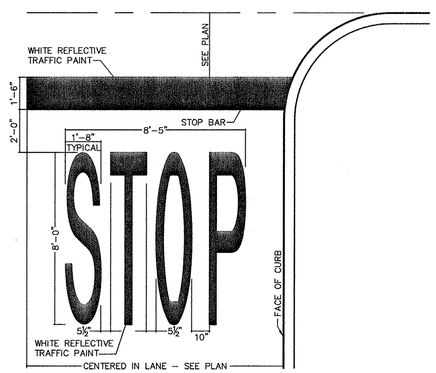
9) CHLORINATION SHALL BE IN ACCORDANCE WITH THE AWWA STANDARD C601 DISINFECTING WATER MAINS.

10) ALL PIPELINES SHALL BE GIVEN COMBINED PRESSURE AND LEAKAGE TESTS AT THE DIRECTION OF THE TOWN WATER DEPARTMENT. HYDROSTATIC AND LEAKAGE TEST SHALL BE MADE IN ACCORDANCE WITH AWWA STANDARD C600 SECTION 4. HYDROSTATIC TESTS SHALL BE MADE AT 1.5 TIMES THE WORKING PRESSURE, BUT NOT LESS THAN 150 PSI FOR A PERIOD OF NOT LESS THAN 2 HOURS IN ACCORDANCE WITH THE ABOVE AWWA STANDARD.

11) INSTALLATION OF WATER UTILITIES TO BE IN CONFORMANCE WITH THE WATER DISTRICT STANDARDS.

12) WHENEVER POSSIBLE WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18" BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER.

13) SHOULD LOCAL CONDITIONS PREVENT AN 18" SEPARATION, BOTH THE WATER MAIN AND THE SEWER SHALL BE ENCASED IN CONCRETE ON EITHER SIDE OF THE CROSSING (SEE DETAIL).



STOP BAR

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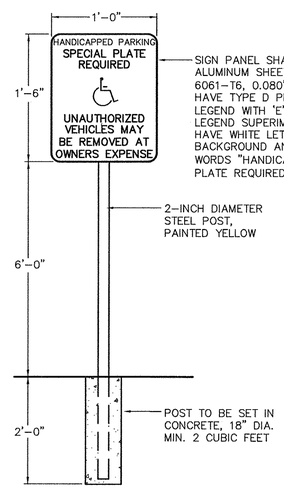


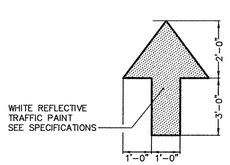
SIGN PANEL SHALL BE FABRICATED FROM ALUMINUM SHEETING ASTM 3209, ALLOY 6061-T6, 0.080" THICK. SIGN SHALL HAVE TYPE D PERMANENTLY APPLIED LEGEND WITH 'E' SILK SCREEN PROCESSED LEGEND SUPERIMPOSED THEREON. SIGN TO HAVE WHITE LETTERING AGAINST A BLUE BACKGROUND AND SHALL BEAR THE WORDS "HANDICAPPED PARKING SPECIAL PLATE REQUIRED"

2-INCH DIAMETER STEEL POST, PAINTED YELLOW

POST TO BE SET IN CONCRETE, 18" DIA. MIN. 2 CUBIC FEET

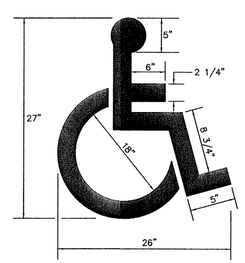
HANDICAP PARKING SIGN

NOT TO SCALE



VEHICLE DIRECTIONAL ARROW

NOT TO SCALE



HANDICAP PARKING PAVEMENT MARKING

NOT TO SCALE

GENERAL NOTES:

1) THIS SET OF PLANS HAS BEEN PREPARED FOR PURPOSES OF MUNICIPAL AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED ON THE DRAWINGS AND EACH DRAWING HAS BEEN REVISED TO INDICATE "ISSUED FOR CONSTRUCTION."

2) THE SEQUENCE OF ALL EXCAVATION OPERATIONS SHALL BE SUCH AS TO INSURE THE MOST EFFICIENT UTILIZATION OF EXISTING LEDGE EMBANKMENTS AND THE USE OF A MINIMUM AMOUNT OF BORROW. PRIOR TO ANY LEDGE REMOVAL, THE LEDGE AREA SHALL BE PARTIALLY OR COMPLETELY STRIPPED OF OVERBURDEN AS DIRECTED BY THE ENGINEER.

3) ALL SLOPES WHICH ARE 3 FT HORIZONTAL TO 1 FT VERTICAL OR FLATTER MAY BE GRASSED SLOPES. ALL SLOPES STEEPER THAN 3 FT HORIZONTAL TO 1 FT VERTICAL SHALL RECEIVE A SLOPE STABILIZATION GEOTEXTILE FABRIC (2:1) OR A RIP-RAP SLOPE TREATMENT (1:1) UNLESS OTHERWISE NOTED ON THE GRADING PLANS.

4) THE TOWN AND ALL UTILITY COMPANIES MUST BE NOTIFIED BY THE CONTRACTOR AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE ONLY AND ARE TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR AT THE TIME OF CONSTRUCTION. ALL UNDERGROUND UTILITIES SHOWN WERE COMPILED ACCORDING TO AVAILABLE RECORD PLANS FROM THE VARIOUS UTILITY COMPANIES AND PUBLIC AGENCIES AND AREA APPROXIMATE ONLY. THE OWNER & TETRA TECH ASSUME NO RESPONSIBILITY FOR DAMAGE INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN.

5) WHILE WORKING IN THE VICINITY OF AN EXISTING UTILITY, REFER TO THE FOLLOWING: ALL UNDERGROUND UTILITIES SHOWN WERE COMPILED ACCORDING TO AVAILABLE RECORD PLANS FROM THE VARIOUS UTILITY COMPANIES AND PUBLIC AGENCIES AND ARE APPROXIMATE ONLY. SEE CHAPTER 370, ACTS OF 1963, MASSACHUSETTS GENERAL LAWS. WE ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN. BEFORE PLANNING FUTURE CONNECTIONS, THE APPROPRIATE PUBLIC ENGINEERING DEPARTMENT SHALL BE CONTACTED AND THE PROPOSED UTILITY WORK SHALL BE COORDINATED. DIG SAFE NUMBER; 1-888-344-7233.

6) THE CONTRACTOR SHALL GIVE TWENTY-FOUR (24) HOUR NOTICE TO PERTINENT TOWN DEPARTMENTS BEFORE COMMENCING ANY WORK.

7) ALL AREAS DISTURBED BY THE CONTRACTOR SHALL BE RESTORED TO EQUAL OR BETTER CONDITION. (SEE PLANTING AND EROSION CONTROL PLANS). ALL FINISHED SURFACES SHALL BE GRADED SMOOTHLY AND EVENLY.

8) AT THE COMPLETION OF THE CONTRACTOR'S OPERATION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING ALL DRAINAGE FACILITIES (NEW AND/OR EXISTING) OF DEBRIS. DRAINAGE SWALES AND STORMWATER BASINS SHALL BE CLEANED FOLLOWING CONSTRUCTION.

9) DO NOT SCALE PLANS. DUE TO REPROGRAPHIC STRETCH, PRINTS MAY NOT SCALE ACCURATELY.

10) LIMITS OF WORK SHALL BE MARKED IN THE FIELD PRIOR TO THE START OF CONSTRUCTION OR SITE CLEARING.

11) THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE RECORDS OF LOCATION AND ELEVATION OF ALL WORK INSTALLED.

12) WATER PRESSURE REQUIREMENTS AND THE ACTUAL WATER PRESSURE TO BE PROVIDED AT THE BUILDING SHALL BE DETERMINED BY OTHERS.

13) IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN THE ELECTRONIC FILE FROM TETRA TECH FOR PROPER COORDINATION OF SURVEY LAYOUT.

14) THE CONTRACTOR MUST VERIFY EXISTING UTILITY LOCATIONS AS SHOWN ON THE DRAWINGS. REPORT DISCREPANCIES TO TETRA TECH AT (508) 903-2000.

15) CONTRACTOR MUST PAY ALL FEES AND PERMITS, INCLUDING BUT NOT LIMITED TO ANY BUILDING PERMIT FEES ASSOCIATED WITH RETAINING WALLS AND SITE FENCING.

16) ALL STORM DRAINS ARE 12" CORRUGATED HIGH-DENSITY POLYETHYLENE PIPE WITH SMOOTH INTERIORS UNLESS OTHERWISE NOTED.

17) PROTECT ALL NEW AND EXISTING UTILITIES TO REMAIN DURING CONSTRUCTION.

18) CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH UTILITY COMPANIES.

19) THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANIES AND "DIGSAFE" (1-888-DIG-SAFE) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST EXACT FIELD LOCATION OF UTILITIES. NOTIFY THE ENGINEER OF ANY UTILITIES INTERFERING WITH THE PROPOSED CONSTRUCTION.

20) THE CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL CONTROL POINTS AND BENCHMARKS NECESSARY FOR THE CONSTRUCTION OF THE PROJECT.

21) THE CONTRACTOR MUST CLEAN ALL NEW & EXISTING DRAINAGE STRUCTURES PRIOR TO PROJECT CLOSEOUT.

DRAINAGE

1) DRAINAGE PIPE SHALL BE HIGH DENSITY POLYETHYLENE (HDPE) BY ADS OR APPROVED EQUAL.

2) PRECAST CONCRETE MANHOLES SHALL CONFORM TO ASTM DESIGNATION C478. CONCRETE REQUIREMENTS SHALL BE 4000 PSI.

3) DRAIN MANHOLE FRAME AND COVER SHALL BE MODEL LC 258-3-000 MARKED WITH THE WORD "DRAIN" AS MANUFACTURED BY E.L. LEBARON COMPANY.

4) AT ALL POINTS OF INTERSECTION BETWEEN STORM DRAIN LINES AND SEWER LINES, ONE FULL LENGTH OF SEWER LINE MUST BE CENTERED OVER THE DRAIN LINE SO THAT BOTH JOINTS WILL BE AS FAR FROM THE DRAIN AS POSSIBLE.

5) INSTALL STEPS IN ACCORDANCE WITH ASTM C-478, 12" O.C. IN ALL CATCHBASINS AND DRAIN MANHOLES DEEPER THAN 4 FEET.

6) MANHOLE AND PIPE JOINT/CONNECTION SHALL BE NEOPRENE KOR-N-SEAL BOOT OR APPROVED EQUAL.

7) ANY AND ALL UTILITY WORK SHALL BE DONE IN ACCORDANCE WITH THE TOWN OF NEEDHAM RULES AND REGULATIONS GOVERNING SAME.

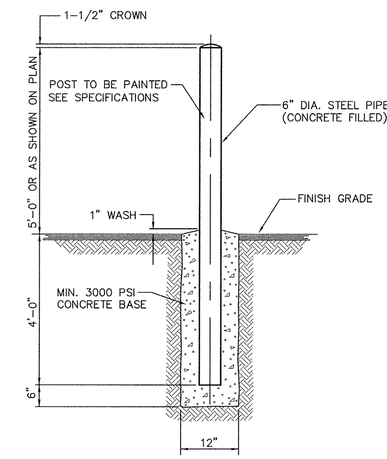
ELECTRIC

1) SPECIFICATIONS: ALL WORK SHALL BE IN ACCORDANCE WITH THE ELECTRIC COMPANY'S STANDARDS. THE NATIONAL ELECTRICAL SAFETY CODE, AND STATE AND LOCAL CODE REQUIREMENTS.

2) APPROVAL: CONTRACTOR SHALL OBTAIN APPROVAL OF PLAN BY THE WIRE INSPECTOR AND THE ELECTRIC COMPANY. PLANS SHALL SHOW THE LOCATION OF CONDUITS AND THEIR TYPE, SIZE, AND NUMBER.

3) PROVIDE ALL EXCAVATION AND BACK FILLING WORK REQUIRED FOR THE INSTALLATION OF ALL ELECTRIC FACILITIES. THIS SHALL INCLUDE EXCAVATING FOR CONDUITS, MANHOLES, AND/OR JUNCTION ENCLOSURES, AND PADS.

4) INSTALL ALL GROUNDING MATERIALS (IE. WIRE, GROUND, RODS, CONNECTORS, ETC.) AS SPECIFIED BY ELECTRIC COMPANY.



CONCRETE FILLED STEEL BOLLARD

NOT TO SCALE

TETRA TECH
www.tetratech.com
One Grant Street
Framingham, MA 01701
PHONE: (508) 903-2000 FAX: (508) 903-2001

GLENN K. DOLLEY
COMMONWEALTH OF MASSACHUSETTS
No. 37431
CIVIL
PROFESSIONAL ENGINEER
11-8-2013

MARK	DATE	DESCRIPTION	BY
1	4/12/13	Site Development Plans	G.K.D.
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Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Detail Sheet

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A

C-10

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Bar Measures 1 inch

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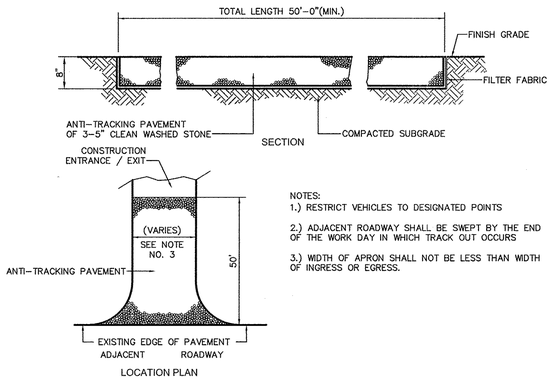


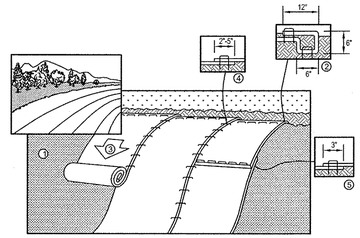
NOTES:
1.) RESTRICT VEHICLES TO DESIGNATED POINTS

2.) ADJACENT ROADWAY SHALL BE SWEPT BY THE END OF THE WORK DAY IN WHICH TRACK OUT OCCURS

3.) WIDTH OF APRON SHALL NOT BE LESS THAN WIDTH OF INGRESS OR EGRESS.

STABILIZED CONSTRUCTION ENTRANCE / EXIT

NOT TO SCALE



1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.

2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACK FILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO PREPARED SOIL AND FOLD REMAINING 12" PORTION OF THE BLANKET BACK OVER SEED AND SOIL. SECURE BLANKET OVER SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE BLANKET.

3. ROLL THE BLANKETS DOWN ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH THE APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN

4. GUIDE. WHEN USING OPTIONAL DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.

5. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2'-5" OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE PREVIOUSLY INSTALLED BLANKET.

6. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE BLANKET WIDTH.

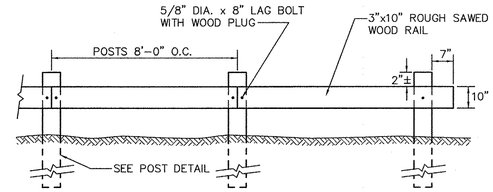
7. EROSION CONTROL BLANKETS SHALL BE INSTALLED FOLLOWING MANUFACTURERS SPECIFICATIONS.

NOTE:

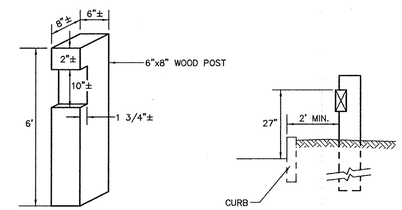
IN LOOSE SOIL CONDITIONS THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE BLANKETS

EROSION CONTROL BLANKET DETAIL FOR SLOPE INSTALLATION

NOT TO SCALE



FRONT ELEVATION



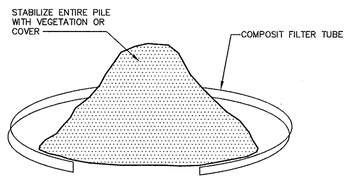
WOOD POST DETAIL

SIDE ELEVATION

NOTES:
1. ALL TIMBER TO BE PRESSURE TREATED.
2. POSTS TO BE SPACED CLOSER THAN 8'-0" ON CENTER AS REQUIRED TO MAINTAIN LOCATION OF GUARD RAIL ALONG EDGE OF DRIVE

WOOD GUARD RAIL

NOT TO SCALE

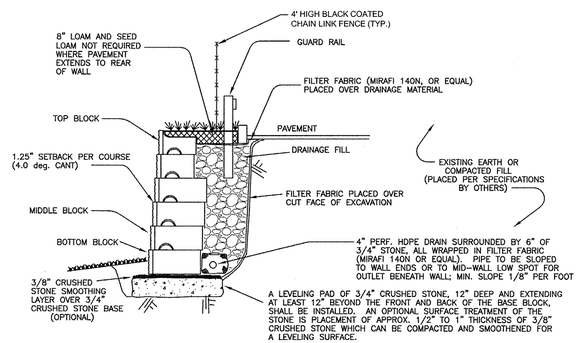


NOTE:

STOCKPILES MUST BE LOCATED OUTSIDE OF BUFFER AREAS AND PHYSICALLY SEPARATED FROM OTHER STORMWATER CONTROLS.

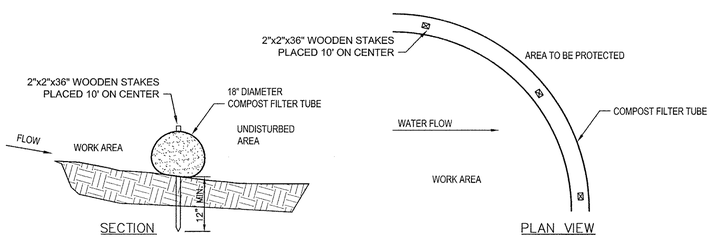
SOIL STOCKPILE CONTROL

NOT TO SCALE



TYPICAL SECTION - REDI ROCK WALL - GRAVITY WALL (TYPICAL DETAIL ONLY - SEE WALL FACE DRAWING FOR SPECIFIC BLOCK CONFIGURATIONS) "REDI-ROCK" SEGMENTAL RETAINING WALL

(NOT TO SCALE)



NOTES:

1. PREFABRICATED COMPOST TUBE SHALL BE FILTREXX SOXX OR APPROVED EQUAL.
2. MATERIAL FOR SOCKS SHALL CONSIST OF SANITIZED MATURE COMPOST, FREE OF VIABLE WEED SEEDS AND FOREIGN DEBRIS SUCH AS GLASS AND PLASTIC. COMPOST SHALL BE IN SHREDDED OR GRANULAR FORM AND FREE FROM HARD LUMPS. IN ADDITION, NO KILN-DRIED WOOD OR CONSTRUCTION DEBRIS SHALL BE ALLOWED.
3. TUBES SHALL CONSIST OF JUTE MESH OR OTHER APPROVED BIODEGRADABLE MATERIAL.

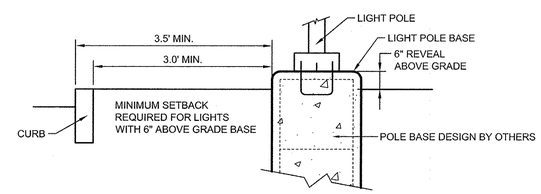
COMPOST FILTER TUBE

NOT TO SCALE

Practice: Compost Filter Tube: A compost filter tube is a type of contained compost filter berm consisting of a mesh tube filled with composted material. The compost filter tube, acts as a filter to retain sediment and other pollutants (e.g., suspended solids, nutrients) while allowing the water to flow through it. Tubes are assembled by tying a knot in one end of the mesh sock, filling the tubes with the composted material (usually using a pneumatic blower) then knotting the other end once the desired length is reached.

Installation Requirements: Filter tube shall be used at the limit of work and at the perimeter of soil stockpiles. The ends of the filter tube should be directed upslope, to prevent stormwater from running around the end of the tube. No trenching is required; therefore, soil is not disturbed upon installation.

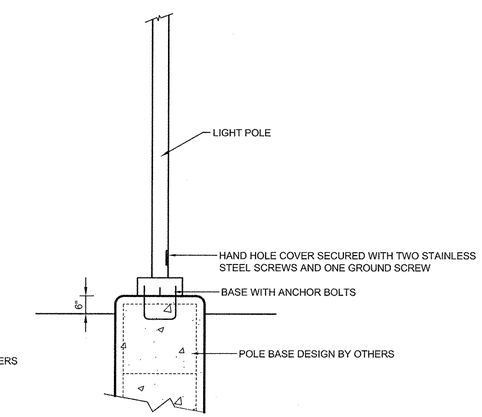
Maintenance Requirements: Tubes must be inspected for sediment accumulation. If there is excessive ponding behind the filter tube or accumulated sediment reaches the top of the tube, an additional tube should be added on top or in front of the existing filter tube in these areas. An adequate reserve of tubes must be kept on site at all times for emergency and/or routine replacement. Tubes shall be removed only after exposed soils in the contributing drainage area achieve final stabilization.



TYPICAL LIGHT POLE BASE HEIGHT ABOVE FINISH GRADE IS 6" UNLESS OTHERWISE SHOWN ON PLAN

LIGHT POLE SETBACK

NOT TO SCALE



LIGHT POLE DETAIL

NOT TO SCALE

TETRA TECH
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Framingham, MA 01701
PHONE: (508) 903-2000 FAX: (508) 903-2001

COMMONWEALTH OF MASSACHUSETTS GLENN K. DCUGNOZZETTI No. 37924 PROFESSIONAL ENGINEER
11-8-2013

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Bar Measures 1 inch

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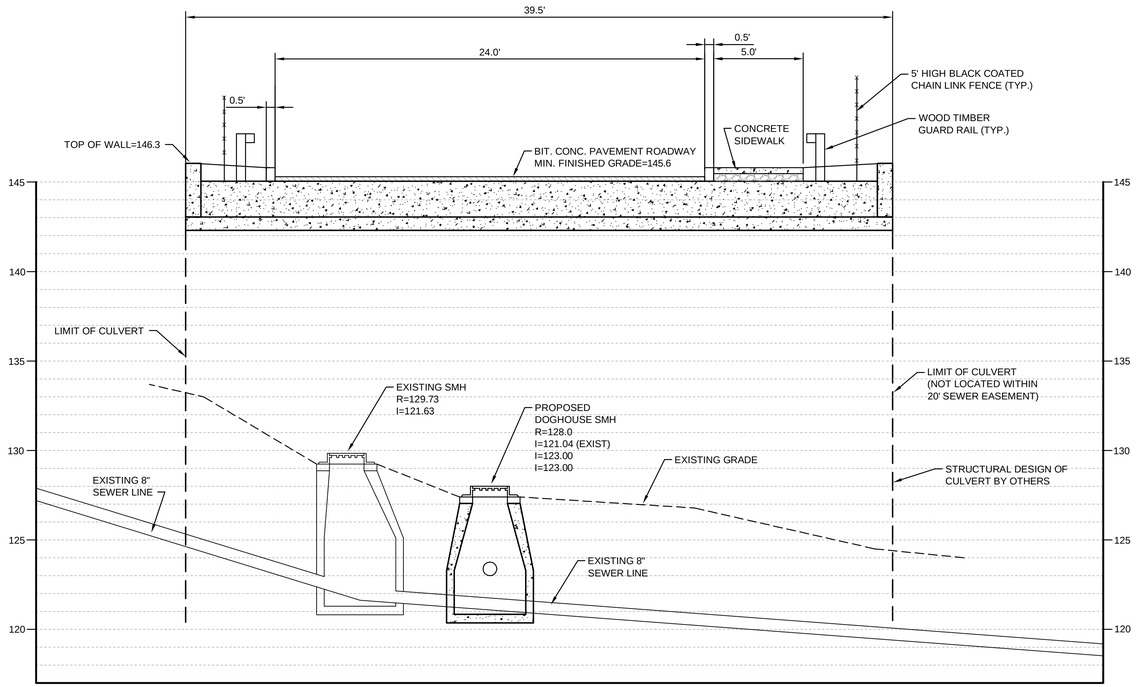
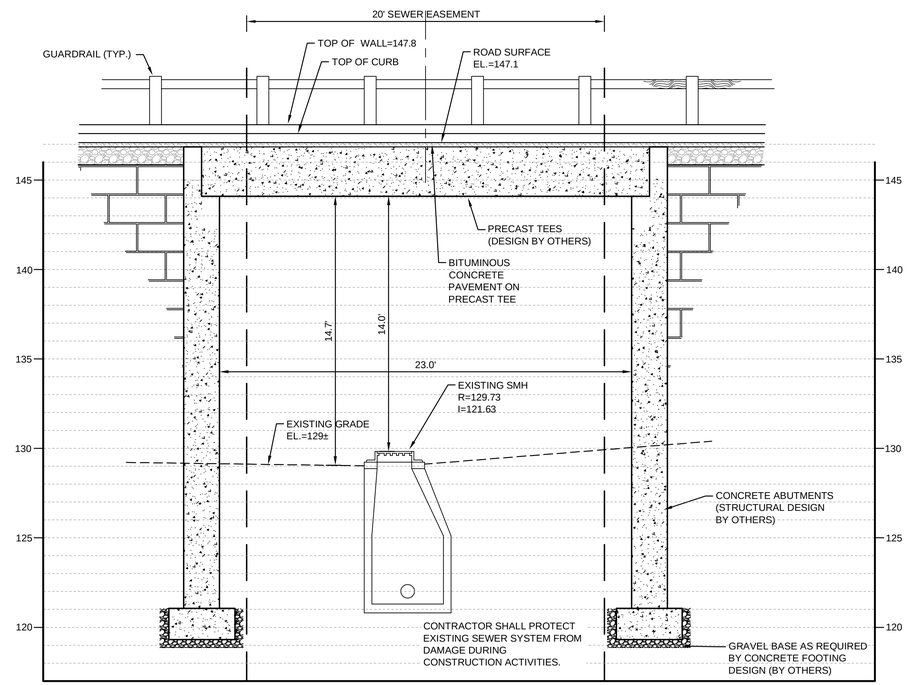


SECTION A-A
SEWER EASEMENT
ARCH CULVERT CROSSING SECTION

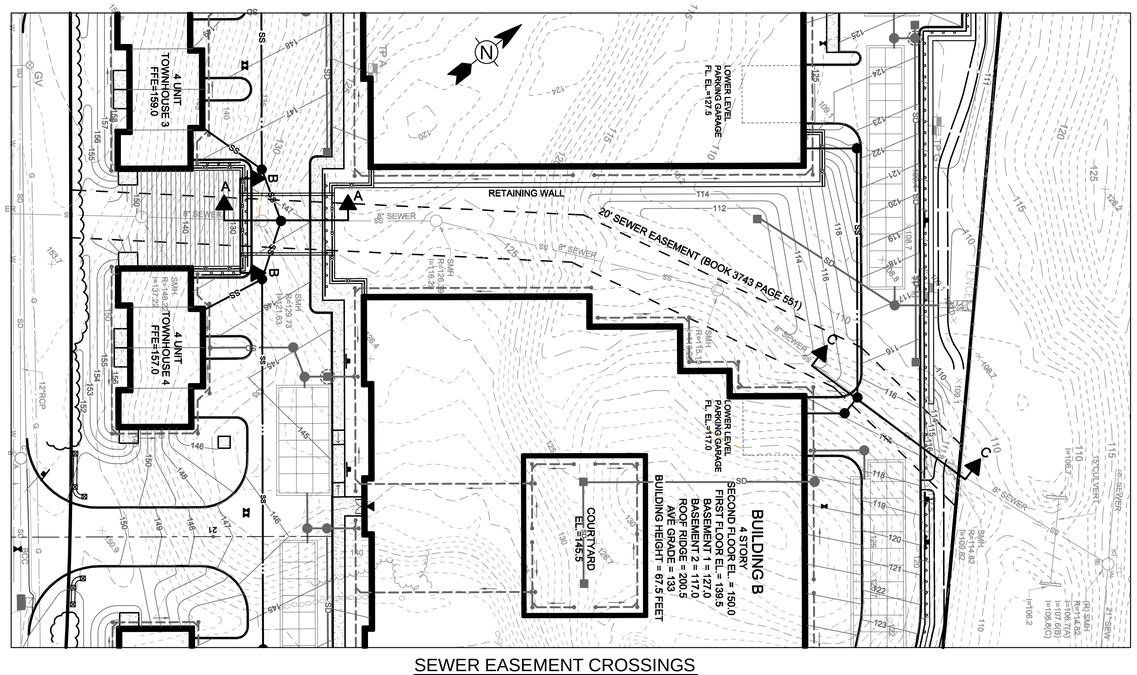
SCALE: 1/4"=1'



SECTION B-B
SEWER EASEMENT
ARCH CULVERT CROSSING SECTION

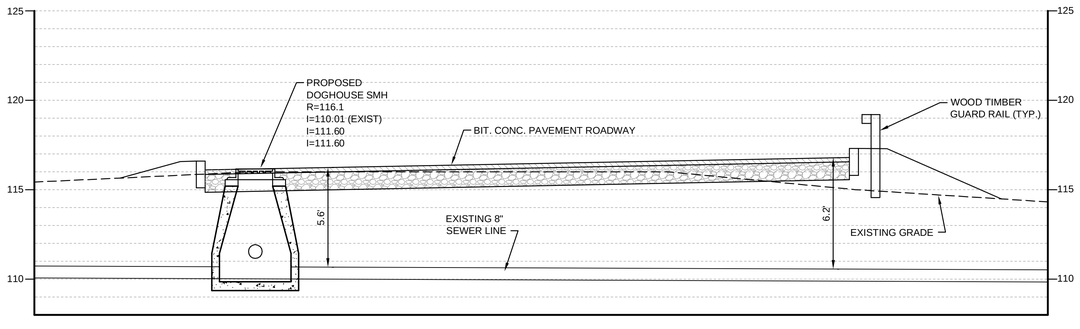
SCALE: 1/4"=1'

NOTE:
ACTUAL STRUCTURAL DESIGN, RAILING, FOOTINGS AND RETAINING WALL DESIGN TO BE PROVIDED BY OTHERS AND SHALL BE STAMPED AND SIGNED BY A MASSACHUSETTS REGISTERED PROFESSIONAL STRUCTURAL ENGINEER PRIOR TO ISSUANCE OF A BUILDING PERMIT.



SEWER EASEMENT CROSSINGS
PLAN VIEW

SCALE: 1"=30'



SECTION C-C
SEWER EASEMENT CROSSING
SECTION

SCALE: 1/4"=1'

TETRA TECH
www.tetratech.com
One Grant Street
Framingham, MA 01701
PHONE: (508) 903-2000 FAX: (508) 903-2001

MARK	DATE	DESCRIPTION	BY
1	4/12/13	Site Development Plans	G.K.D.
2	9/16/13	ZBA Submission Set	G.K.D.
3	9/30/13	ZBA Submission Full Set	G.K.D.
4	11/8/13	Revisions Per Town Comments	G.K.D.

Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Sewer Easement Crossing Sections

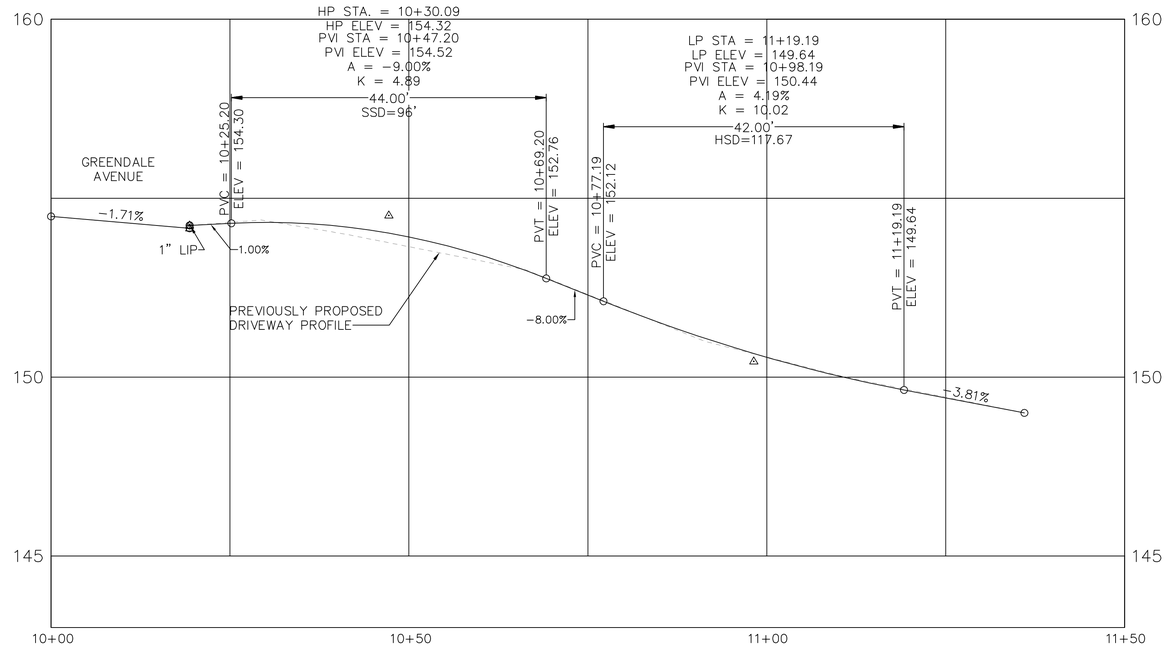
Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A.

C-12

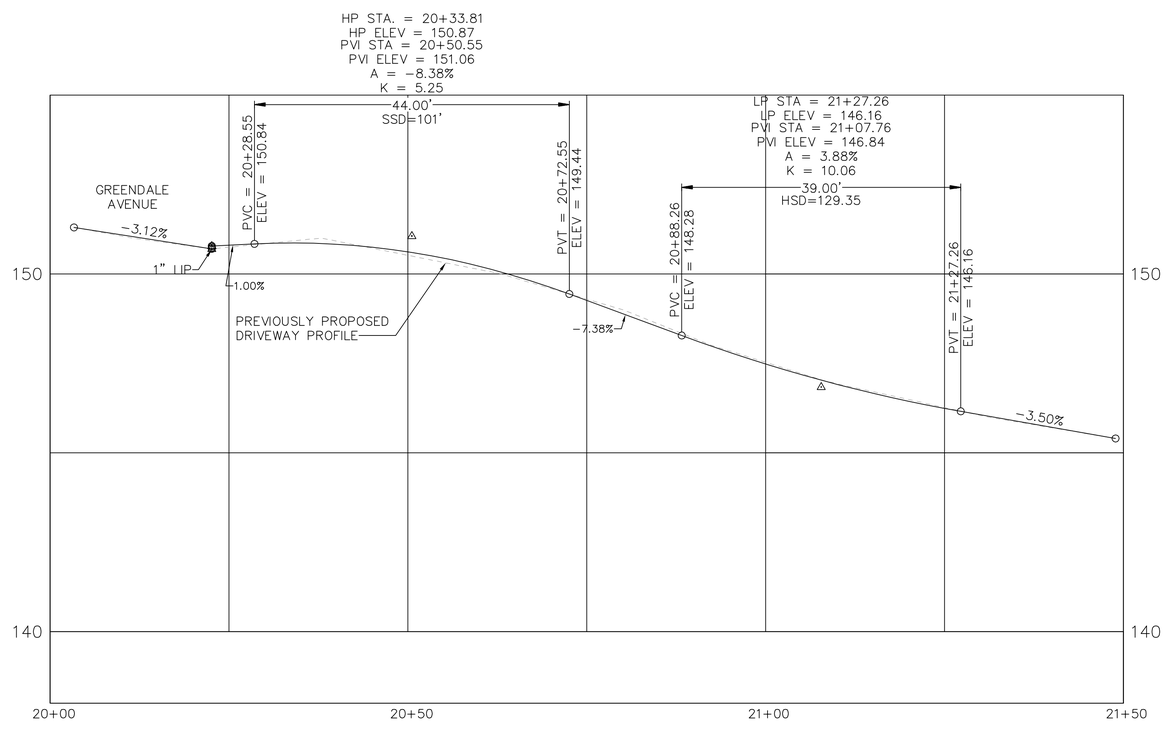
Copyright: Tetra Tech

Bar Measures 1 inch

11/8/2013 2:36:41 PM - P:\82806\143-82806-13003\CAD\SHEETFILES\C-12 SEWER CROSSING SECTIONS.DWG - PAPPAS, JUD



WEST SITE DRIVEWAY



EAST SITE DRIVEWAY

SCALE IN FEET
HOR. 1"=10'
10 0 10 20
2 0 2 4
VERT. 1"=2'

NOTE:
DRIVEWAY PROFILE DESIGN PROVIDED BY VANASSE & ASSOCIATES, INC.

TETRA TECH
www.tetratech.com
One Grant Street
Framingham, MA 01701
PHONE: (508) 903-2000 FAX: (508) 903-2001

VAI Transportation Engineers & Planners
ANDOVER, MASSACHUSETTS
10 N.E. BUSINESS CENTER DRIVE
ANDOVER, MA 01810-1066
TEL: (978) 474-8800
FAX: (978) 688-6508

MARK	DATE	DESCRIPTION	BY
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2	9/16/13	ZBA Submission Set	G.K.D.
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Client: Greendale Avenue Venture LLC
Proj. Loc.: Needham, Massachusetts

Comprehensive Permit Plans
692 & 744 Greendale Avenue - Needham, Massachusetts

Driveway Profiles

Project No.:	143-82806-13003
Designed By:	G.K.D.
Drawn By:	J.L.P.
Checked By:	R.D.A.

C-13

Copyright: Tetra Tech

Bar Measures 1 inch

11/8/2013 1:58:51 PM - P:\82806\143-82806-13003\CAD\SHEETFILES\C-13 ENTRANCE DRIVE PROFILES.DWG - PAPPAS, JUD