

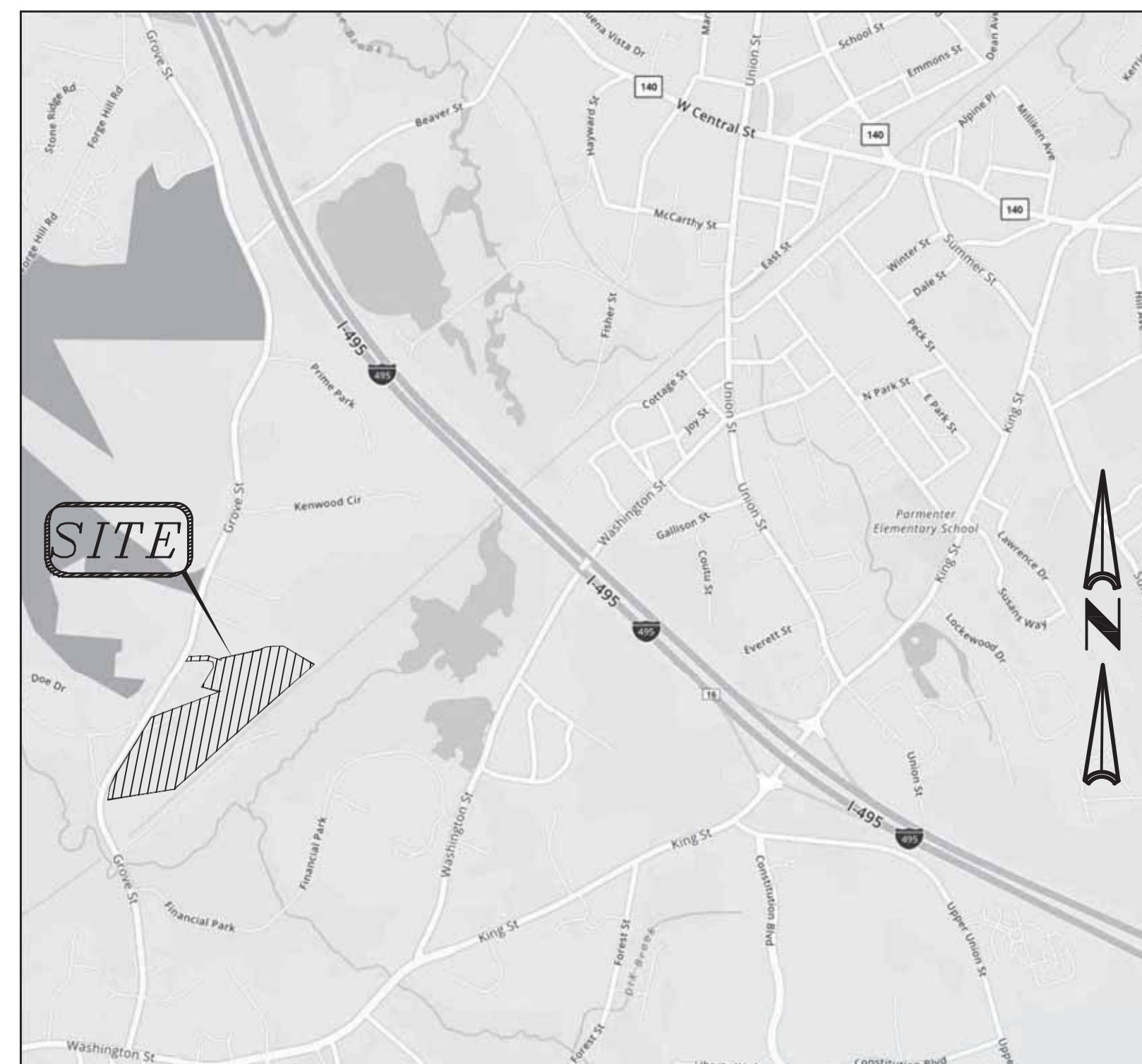
# SITE DEVELOPMENT PLANS

FOR

## 176- 210 GROVE STREET FRANKLIN, MA

FEBRUARY 14, 2020

SHEET INDEX			
SHEET No.	DESCRIPTION	LATEST REVISED DATE	CONSTRUCTION REVISIONS
1	COVER SHEET	10/01/20	
2	OVERALL LAYOUT PLAN	10/01/20	
3	EXISTING CONDITIONS PLAN	10/01/20	
4	LAYOUT PLAN	10/01/20	
5	GRADING PLAN	10/01/20	
6	SEWER, DRAIN PLAN	10/01/20	
7	UTILITY PLAN	10/01/20	
8	DETAIL SHEET	10/01/20	
9	DETAIL SHEET	10/01/20	
10	DETAIL SHEET	10/01/20	
11	DETAIL SHEET	10/01/20	
12	DETAIL SHEET	10/01/20	



LOCATION MAP

### OWNER/APPLICANT:

MCP III 176 GROVE LLC & MCP III 210 GROVE LLC  
260 FRANKLIN STREET, STE 620  
BOSTON, MA 02110

### CIVIL ENGINEERS:

KELLY ENGINEERING GROUP, INC.  
0 CAMPANELLI DRIVE  
BRAINTREE, MA 02184

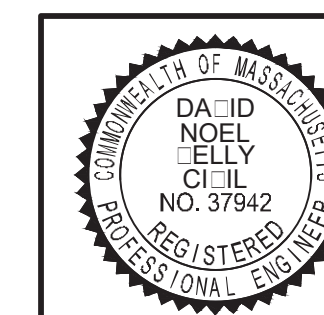
### LANDSCAPE ARCHITECT:

HAWK DESIGN INC.  
P.O. BOX 1309  
SANDWICH, MA 02563

APPROVED BY THE FRANKLIN PLANNING BOARD

APPROVED DATE \_\_\_\_\_

Digitally signed by David Noel  
Kelly P.E.  
DN: cn=David Noel Kelly P.E.,  
o=Kelly Engineering Group,  
Inc., ou,  
email=dkelly@kellyenggroup.com,  
nggroup.com, c=US  
Date: 2020.10.08 10:34:21  
-0400



SCALE NA	JOB # F:\P\2019-127
DATE 02/14/20	DRAWN BY C.J.L.
SHEET 1 OF 12	CHKD BY GSH
FILE # 2019-127-TS04	APPD BY DNK



176- 210 GROVE STREET  
FRANKLIN, MA  
KELLY ENGINEERING GROUP  
civil engineering consultants  
0 Campanelli Drive, Braintree, MA 02184  
Phone: 781-843-4333 www.kellyengineeringgroup.com

SHEET NO.  
**1**

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**ZONE: INDUSTRIAL, WATER RESOURCE DISTRICT**

(NOTE 5)

	REQUIRED	PROVIDED (176) LOT 1	PROVIDED (206) LOT 2	PROVIDED (210) LOT 3	COMPLIANCE
MIN LOT AREA	40,000 S.F.	669,813 S.F.	427,456 S.F.	457,130 S.F.	YES
MIN. FRONTAGE	175'	175'	>175'	>175'	YES
MIN. DEPTH	200'	>200'	>200'	>200'	YES
MIN. WIDTH	157.5' DIA. CIRCLE	>157.5'	>157.5'	>157.5'	YES
MIN YARD					
FRONT	40'	448.4' +/-	249.7' +/-	125.5' +/-	YES
SIDE	30'	31.8' +/- (NOTE 2)	38.0' (NOTE 2)	30.1' +/- (NOTE 2)	YES
REAR	30'	92.2' +/-	125.4'	44.7' +/-	YES
MAX STORIES	3	1	1	1	YES
MAX HEIGHT	NA	<45'	<45'	<45'	N/A
LOT COVERAGE	80%	58.6%	68.9%	72.2%	YES
BUILDING COVERAGE	70%	25.1%	35.1%	36.5%	YES
PARKING					
TOTAL	487	(NOTE 3)	(NOTE 3)	(NOTE 3)	(NOTE 3)
SIZE	9'X19'	9'X19'	9'X19'	9'X19'	YES
HAZLE	24'	24'	24'	24'	YES
HANDICAP	PARKING LEGEND	PARKING LEGEND	PARKING LEGEND	PARKING LEGEND	YES
PARKING SETBACKS					
FRONT	10'	>10'	>10'	70' +/-	YES
SIDE	N/A	N/A	N/A	N/A	N/A
REAR	N/A	N/A	N/A	N/A	N/A
BUILDING	N/A	N/A	N/A	N/A	N/A

**NOTES:**

1. PARKING: REQUIRED PARKING FOR WAREHOUSE = 1 SPACE PER 1000 SF
2. BUILDINGS 176 AND 210 ARE LESS THAN 30' HIGH. SIDE YARD SETBACKS ARE GREATER THAN 30'. PROPOSED BUILDING 206 WILL BE APPROX. 45' HIGH. SIDE YARD SETBACK IS 102' AND THEREFORE SIDE YARD COMPLIES WITH BY LAW SECTION ATTACHMENT 9 FOOT NOTE 8 FOR SETBACKS TO A RESIDENTIAL USE.
3. PER PLANNING BOARD DETERMINATION.
4. 55 SPACES LOCATED ON LOT 1 ARE FOR USE BY LOT 2
5. SEE APPROVAL NOT REQUIRED PLAN DATED 09/01/20 FOR ACTUAL METES AND BOUNDS, CIRCLE DIAMETER ETC.

**PARKING LEGEND**

BUILDING	BUILDING AREA (SF)	PARKING REQUIRED (NOTE 1)	PARKING PROVIDED	HANDICAP PARKING REQUIRED	HANDICAP PARKING PROVIDED	LOADING PROVIDED
176 GROVE	169,968	170	195	6	6	65 +/-
206 GROVE	150,000	150	107 (NOTE 4)	5	6	33
210 GROVE	166,757	167	113 (NOTE 4)	5	5	15 +/-
TOTAL	486,725	487	415	16	17	113 +/-

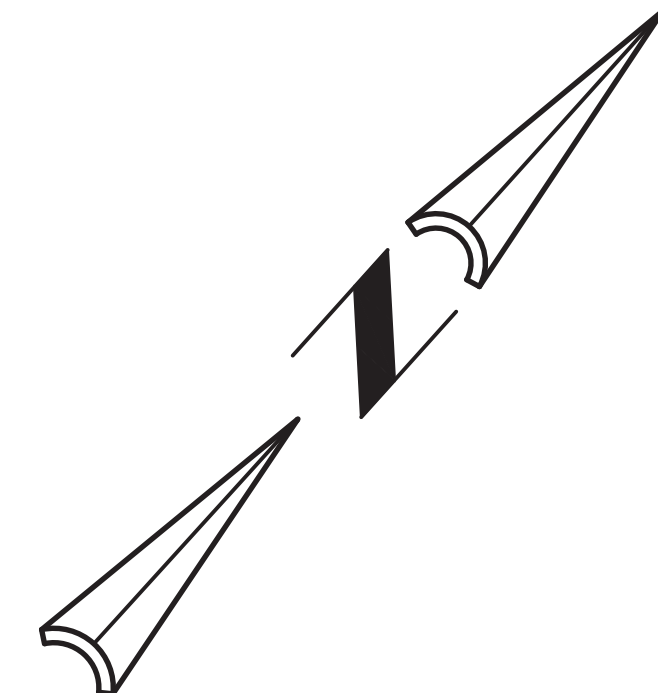
\*ALLOWED BY 9/15/2015 PLANNING BOARD DECISION

**EXISTING LEGEND**

	HANDICAP SPACE
	UTILITY POLE
	PROPERTY LINE
	INTERIOR LOT LINE TO BE ELIMINATED

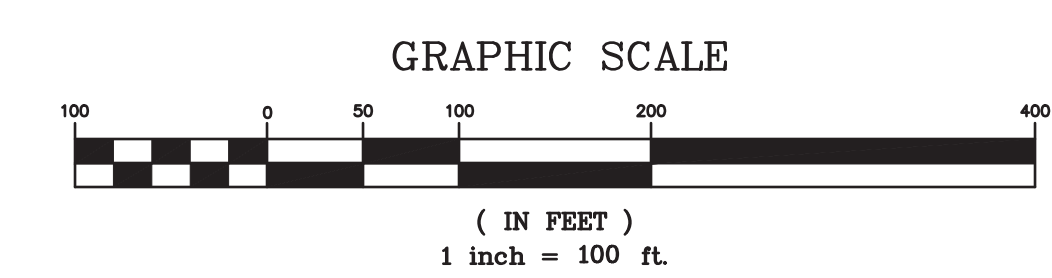
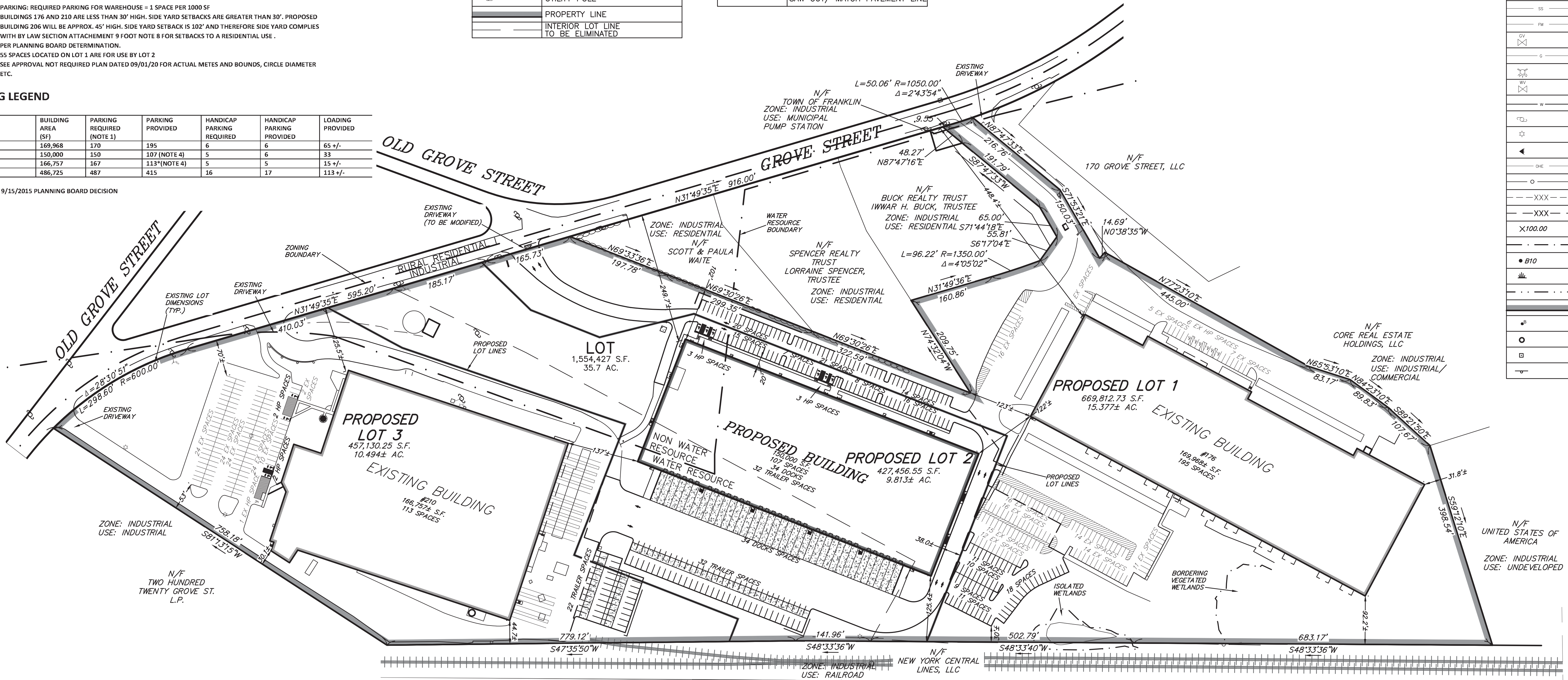
**PROPOSED LEGEND**

	HANDICAP SPACE
	SAW CUT/ MATCH PAVEMENT LINE



**SHEET 2 LEGEND**

CCB	CAPE COD BERM
VGC	VERTICAL GRANITE CURB
CONC.	CONCRETE
BCC	BITUMINOUS CONCRETE CURB
	HANDICAP SPACE
L.S	LANDSCAPED AREA
	CATCH BASIN
	DOUBLE CATCH BASIN
	AREA DRAIN
	TRENCH DRAIN
	DRAIN MANHOLE
	STORM CEPTOR
	DRAIN LINE
	ROOF DRAIN LINE
	AREA DRAIN LINE
	SEWER MANHOLE
	SEWER LINE
	SEWER FORCE MAIN
	GAS VALVE
	GAS LINE
	HYDRANT
	WATER VALVE
	WATER LINE
	UTILITY POLE
	LIGHT POLE
	FLOOD LIGHT
	OVERHEAD ELECTRIC LINE
	CHAIN LINK FENCE
	CONTOUR LINE (MNR)
	CONTOUR LINE (MJR)
	SPOT GRADE
	EDGE OF WETLANDS
	WETLANDS FLAG
	WETLANDS
	FLOOD PLAIN
	PROPERTY LINE
	BOLLARD
	IRON PIPE
	BOUND
	SIGN



APPROVED BY THE FRANKLIN PLANNING BOARD

APPROVED DATE \_\_\_\_\_

**CURRENT OWNER**  
210 GROVE ST  
CURRENT OWNER: MCP III 210 GROVE LLC  
C/O MARCUS PROPERTIES INC.  
PARCEL ID: 311-002

176 GROVE ST  
CURRENT OWNER: MCP III 176 GROVE LLC  
C/O MARCUS PARTNERS INC.  
PARCEL ID: 311-001

- NOTES: (FOR SHEET 3)**
- 1.) UNDERGROUND FEATURES HAVE BEEN COMPILED, IN PART, BASED UPON INFORMATION FURNISHED BY OTHERS. THIS INFORMATION IS TO BE CONSIDERED APPROXIMATE AND KELLY ENGINEERING GROUP, INC. DOES NOT TAKE RESPONSIBILITY FOR SUBSEQUENT ERRORS OR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED INTO THIS PLAN AS A RESULT. ADDITIONALLY, OTHER SUCH FEATURES WHICH MAY EXIST ON THE SITE, THE EXISTENCE OF WHICH ARE UNKNOWN TO KELLY ENGINEERING GROUP, INC. THE SIZE, LOCATION, AND EXISTENCE OF ALL SUCH FEATURES MUST BE VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION.
  - 2.) THE LOCATION OF ALL UTILITIES SHOWN HEREON HAVE BEEN ESTABLISHED USING ASCS 38-02 (STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA) QUALITY LEVEL C.
  - 3.) THE SITE DETAIL AND SURFACE IMPROVEMENTS DEPICTED HEREON WERE OBTAINED FROM AN ON THE GROUND SURVEY PERFORMED BY KELLY ENGINEERING GROUP IN NOVEMBER AND DECEMBER OF 2019.
  - 4.) ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) ESTABLISHED BY RTX GPS CONNECTED TO MOCCORS. CONTOURS SHOWN WERE OBTAINED FROM ON THE GROUND SURVEY AND LIDAR DATA OBTAINED FROM NOAA AND CONFIRMED BY KELLY ENGINEERING GROUP, INC.
  - 5.) WETLAND FLAGS SHOWN WERE FLAGGED BY ECOTEC, INC AND WERE LOCATED BY KELLY ENGINEERING GROUP, INC.

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SCALE	4. 10/01/20	PER TENANT COORDINATION	
1"= 100'	3. 07/28/20	PLANNING BOARD COMMENTS	
DATE	2. 06/02/20	PER PEER REVIEW	
02/14/20	1. 04/10/20	PER PEER REVIEW	
SHEET	REV	DATE	BY
2 of 12			
FILE #	MARCUS PARTNERS		
2019-127-LA04	176- 210 GROVE STREET		
JOB #	FRANKLIN, MA		
F:\P\2019-127	OVERALL LAYOUT		
DRAWN BY	PLAN		
C.J.			
CHKD BY	KELLY ENGINEERING GROUP		
GSH	civil engineering consultants		
APPD BY	0 Campanelli Drive, Braintree, MA 02184		
DNK	Phone: 781-843-4333 www.kellyengineeringgroup.com		



Steven Horsfall  
2020.10.08  
10:52:04  
-04'00"



DAVID MOFEL  
No. 37942  
PROFESSIONAL ENGINEER

SHEET NO.  
**2**

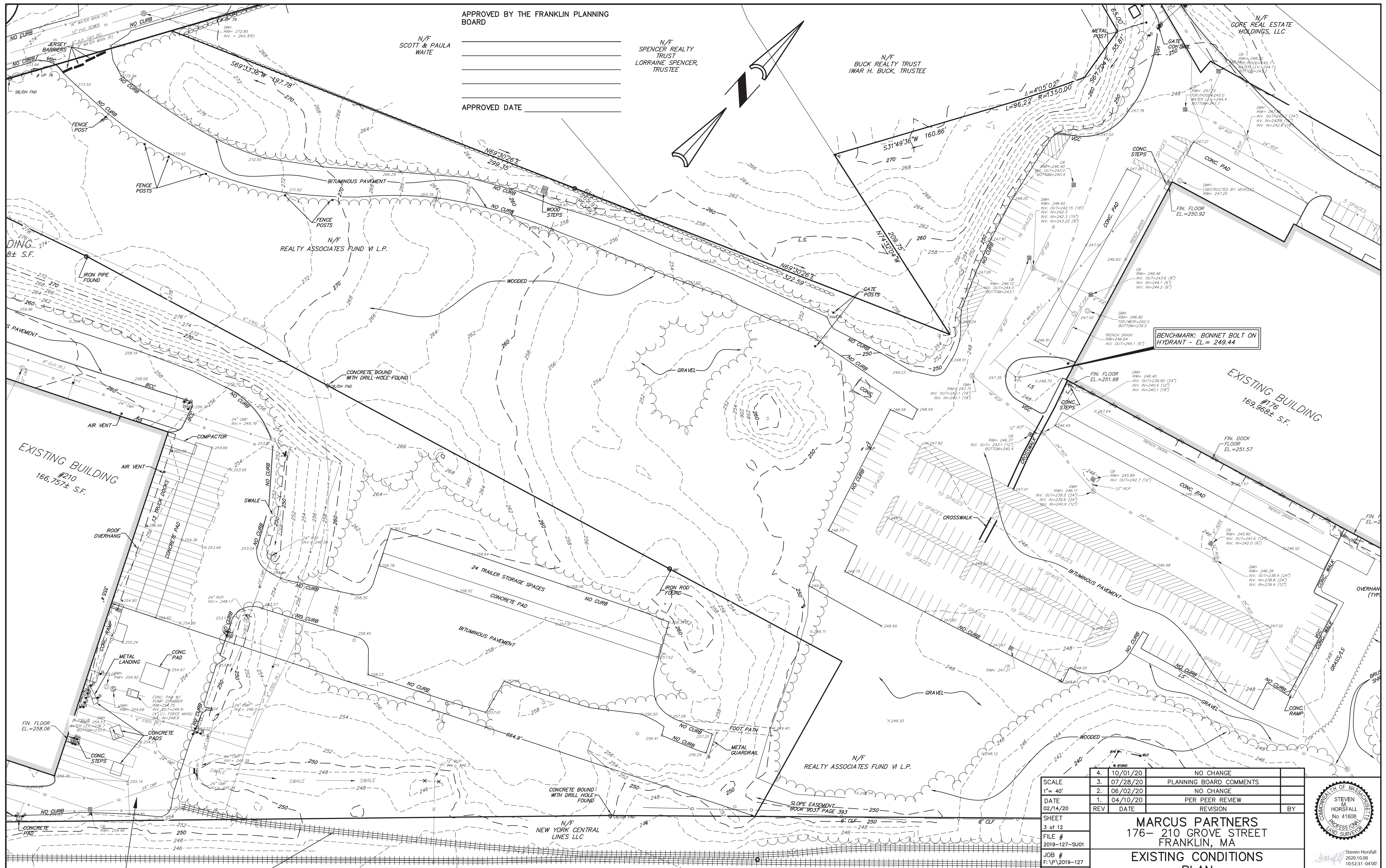
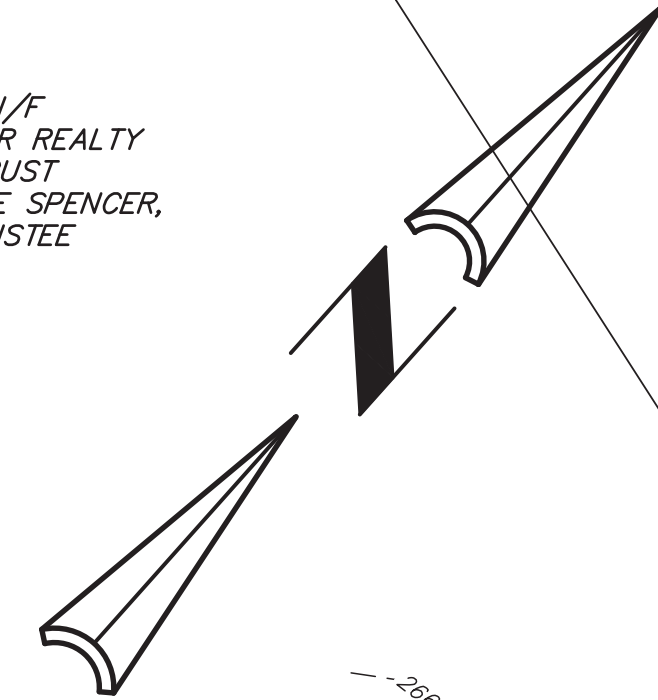
APPROVED BY THE FRANKLIN PLANNING BOARD

N/F SCOTT & PAULA WAITE

N/F SPENCER REALTY TRUST  
LORRAINE SPENCER, TRUSTEE

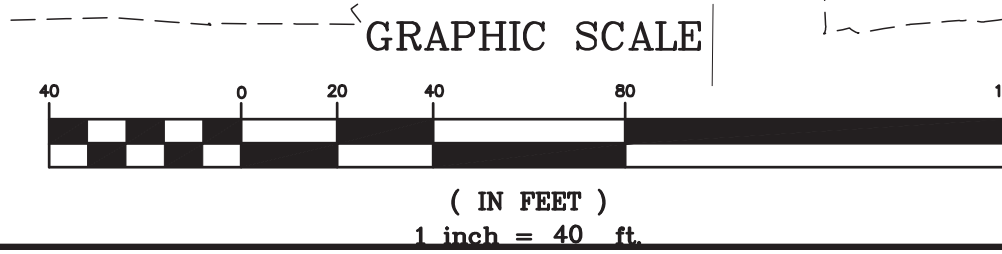
N/F BUCK REALTY TRUST  
IWAR H. BUCK, TRUSTEE

APPROVED DATE \_\_\_\_\_



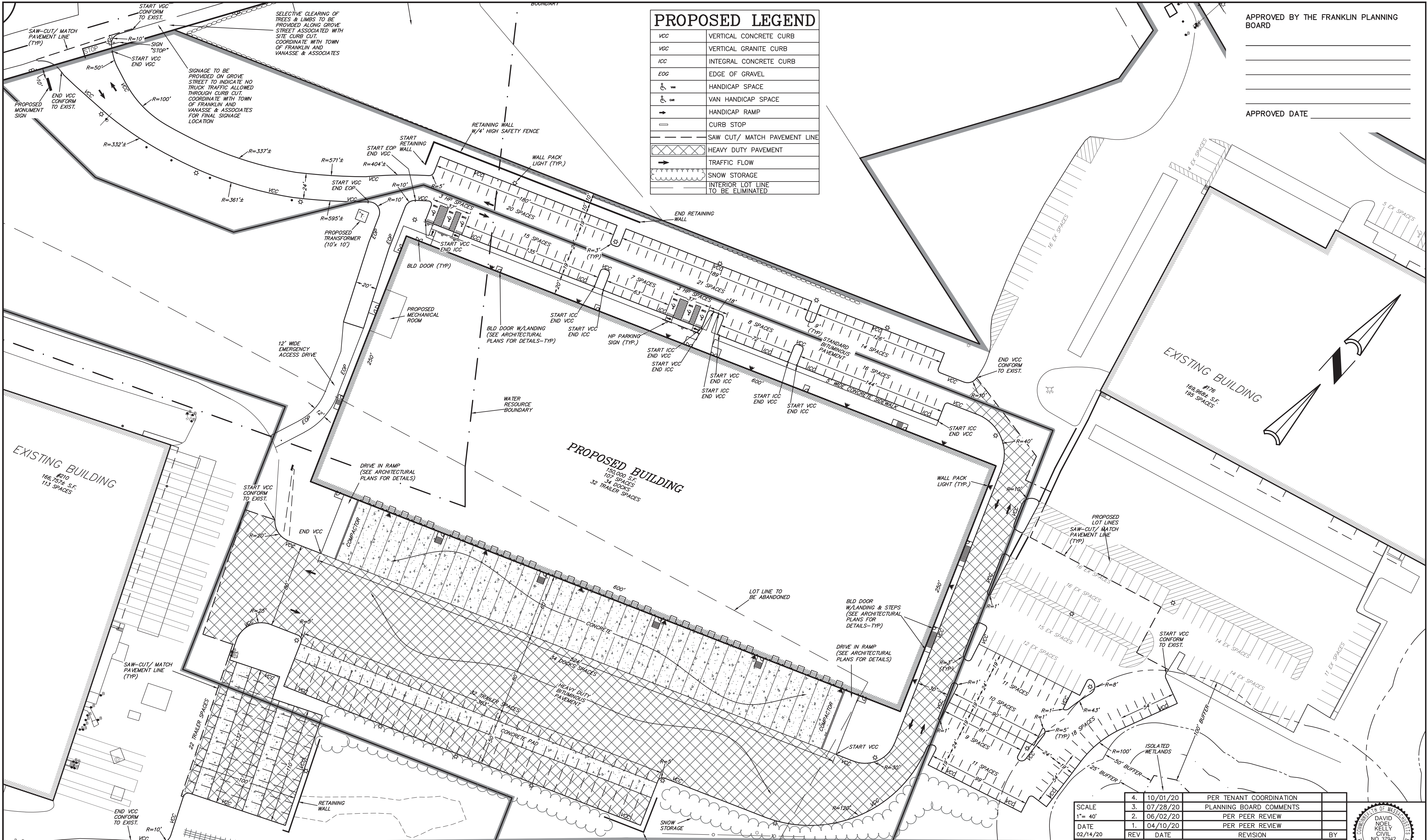
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SEE SHEET 2 FOR NOTES & SYMBOL LEGEND

SCALE	4. 10/01/20	NO CHANGE	
1" = 40'	3. 07/28/20	PLANNING BOARD COMMENTS	
DATE	2. 06/02/20	NO CHANGE	
02/14/20	1. 04/10/20	PER PEER REVIEW	
REV	DATE	REVISION	BY
SHEET	3 of 12		
FILE #	2019-127-SU01		
JOB #	F:\P\2019-127		
DRAWN BY	JPM		
CHKD BY	SMH		
APPD BY	SMH		
MARCUS PARTNERS 176- 210 GROVE STREET FRANKLIN, MA			
EXISTING CONDITIONS PLAN		Steven Horsfall 2020.10.08 10:52:31 -04'00'	
KELLY ENGINEERING GROUP civil engineering consultants 0 Campanelli Drive, Braintree, MA 02184 Phone: 781-843-4333 www.kellyengineeringgroup.com		SHEET NO. <b>3</b>	

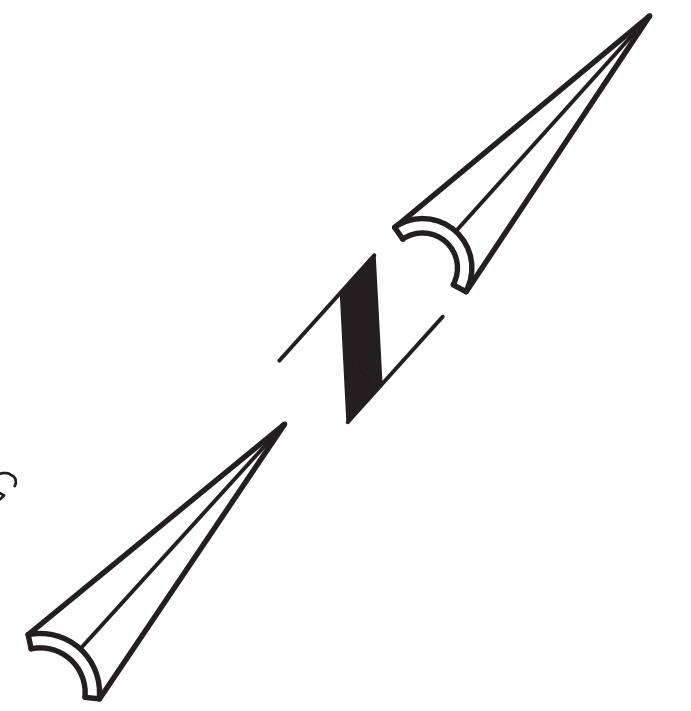


### PROPOSED LEGEND

VCC	VERTICAL CONCRETE CURB
VGC	VERTICAL GRANITE CURB
ICC	INTEGRAL CONCRETE CURB
EOG	EDGE OF GRAVEL
♿	HANDICAP SPACE
♿	VAN HANDICAP SPACE
→	HANDICAP RAMP
—	CURB STOP
---	SAW CUT/ MATCH PAVEMENT LINE
▨	HEAVY DUTY PAVEMENT
→	TRAFFIC FLOW
☁	SNOW STORAGE
---	INTERIOR LOT LINE TO BE ELIMINATED

APPROVED BY THE FRANKLIN PLANNING BOARD

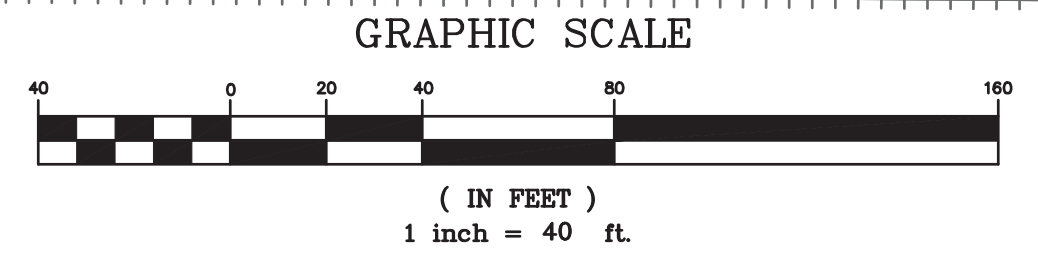
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SCALE	4.	10/01/20	PER TENANT COORDINATION	
1" = 40'	3.	07/28/20	PLANNING BOARD COMMENTS	
DATE	2.	06/02/20	PER PEER REVIEW	
02/14/20	1.	04/10/20	PER PEER REVIEW	
REV	DATE	REVISION	BY	

SHEET 4 of 12  
 FILE # 2019-127-LA04  
 JOB # F:\P\2019-127  
 DRAWN BY C.L.  
 CHKD BY GSH  
 APPD BY DNK

**MARCUS PARTNERS**  
 176- 210 GROVE STREET  
 FRANKLIN, MA

**LAYOUT PLAN**

**KELLY ENGINEERING GROUP**  
 civil engineering consultants  
 0 Campanelli Drive, Braintree, MA 02184  
 Phone: 781-843-4333 www.kellyengineeringgroup.com



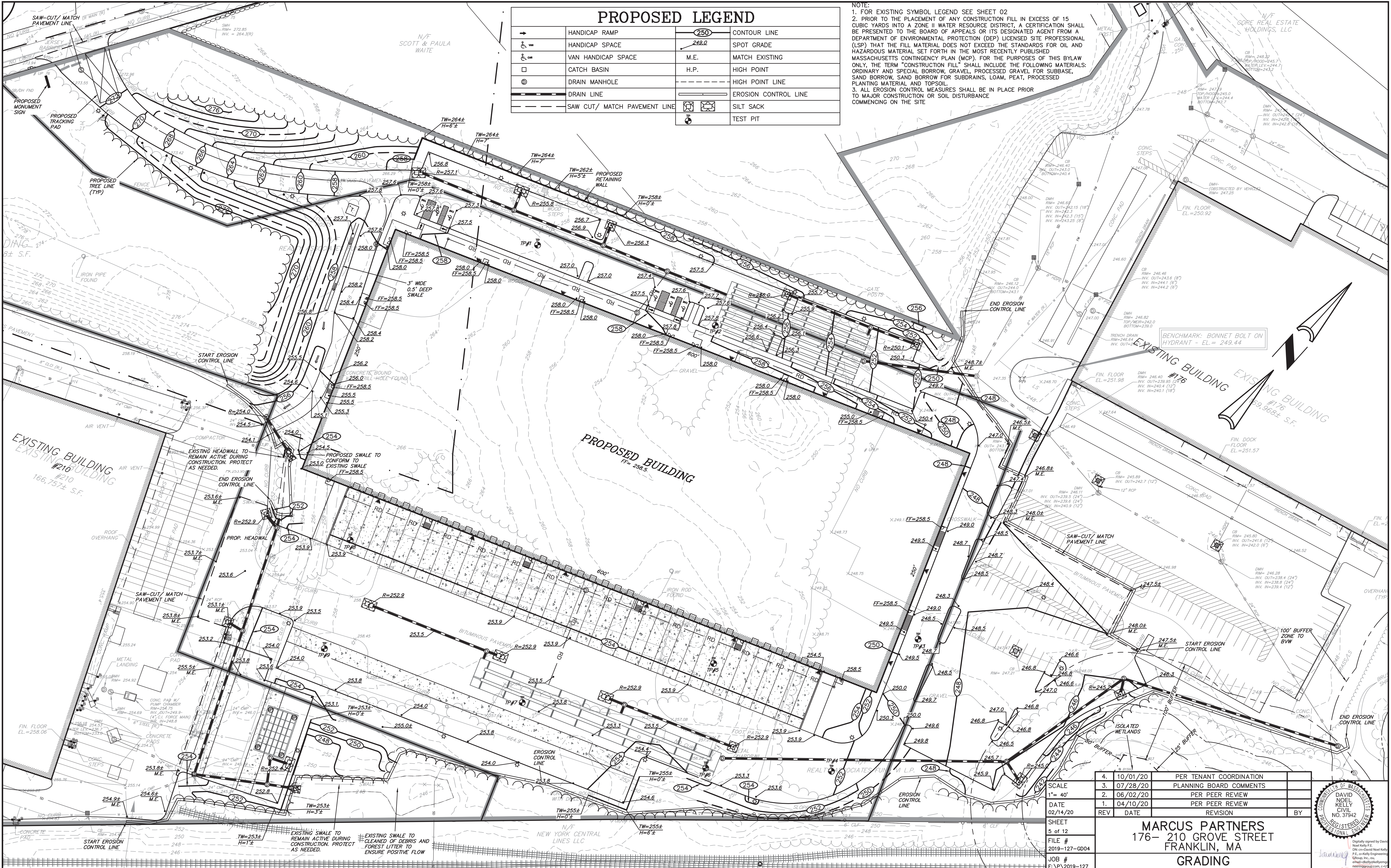
Signature signed by David Noel Kelly P.E., No. 57942, State of Massachusetts. Kelly Engineering Group, Inc. is an Equal Opportunity Employer. Date: 2020.10.08 10:44:45 -0400

SHEET NO. **4**

### PROPOSED LEGEND

	HANDICAP RAMP		CONTOUR LINE
	HANDICAP SPACE		SPOT GRADE
	VAN HANDICAP SPACE	M.E.	MATCH EXISTING
	CATCH BASIN	H.P.	HIGH POINT
	DRAIN MANHOLE	---	HIGH POINT LINE
	DRAIN LINE	---	EROSION CONTROL LINE
	SAW CUT / MATCH PAVEMENT LINE		SILT SACK
			TEST PIT

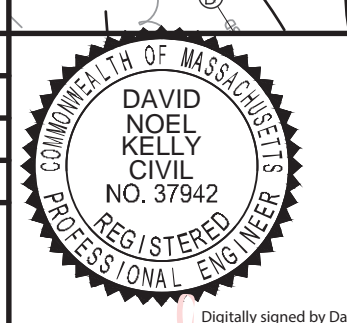
NOTE:  
 1. FOR EXISTING SYMBOL LEGEND SEE SHEET 02  
 2. PRIOR TO THE PLACEMENT OF ANY CONSTRUCTION FILL IN EXCESS OF 15 CUBIC YARDS INTO A ZONE II WATER RESOURCE DISTRICT, A CERTIFICATION SHALL BE PRESENTED TO THE BOARD OF APPEALS OR ITS DESIGNATED AGENT FROM A DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) LICENSED SITE PROFESSIONAL (LSP) THAT THE FILL MATERIAL DOES NOT EXCEED THE STANDARDS FOR OIL AND HAZARDOUS MATERIAL SET FORTH IN THE MOST RECENTLY PUBLISHED MASSACHUSETTS CONTINGENCY PLAN (MCP). FOR THE PURPOSES OF THIS BYLAW ONLY, THE TERM "CONSTRUCTION FILL" SHALL INCLUDE THE FOLLOWING MATERIALS: ORDINARY AND SPECIAL BORROW, GRAVEL, PROCESSED GRAVEL FOR SUBBASE, SAND BORROW, SAND BORROW FOR SUBDRAINS, LOAM, PEAT, PROCESSED PLANTING MATERIAL AND TOPSOIL.  
 3. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO MAJOR CONSTRUCTION OR SOIL DISTURBANCE COMMENCING ON THE SITE



4.	10/01/20	PER TENANT COORDINATION	
3.	07/28/20	PLANNING BOARD COMMENTS	
2.	06/02/20	PER PEER REVIEW	
1.	04/10/20	PER PEER REVIEW	
REV	DATE	REVISION	BY

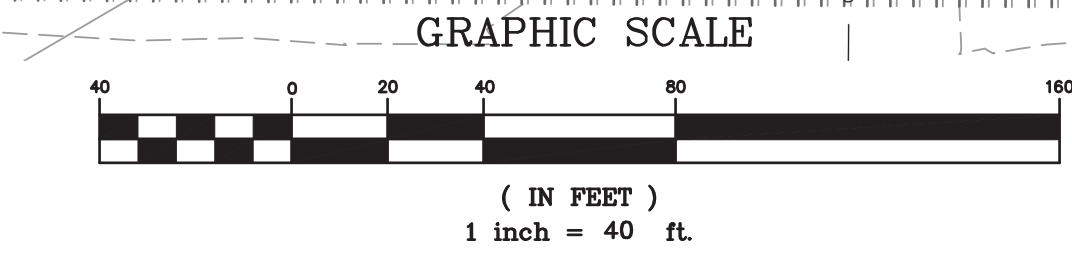
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 1" = 40'  
 DATE  
 02/14/20  
 SHEET  
 5 of 12  
 FILE #  
 2019-127-G04  
 JOB #  
 F:\P\2019-127  
 DRAWN BY  
 C.J.  
 CHKD BY  
 GSH  
 APPD BY  
 DNK

**MARCUS PARTNERS**  
 176- 210 GROVE STREET  
 FRANKLIN, MA  
**GRADING PLAN**



Digitally signed by David Noel Kelly P.E.  
 DN: cn=David Noel Kelly P.E., o=Kelly Engineering Group, Inc., email=dnk@kellyengr.com, c=US  
 Date: 2020.02.14 10:46:00-0500

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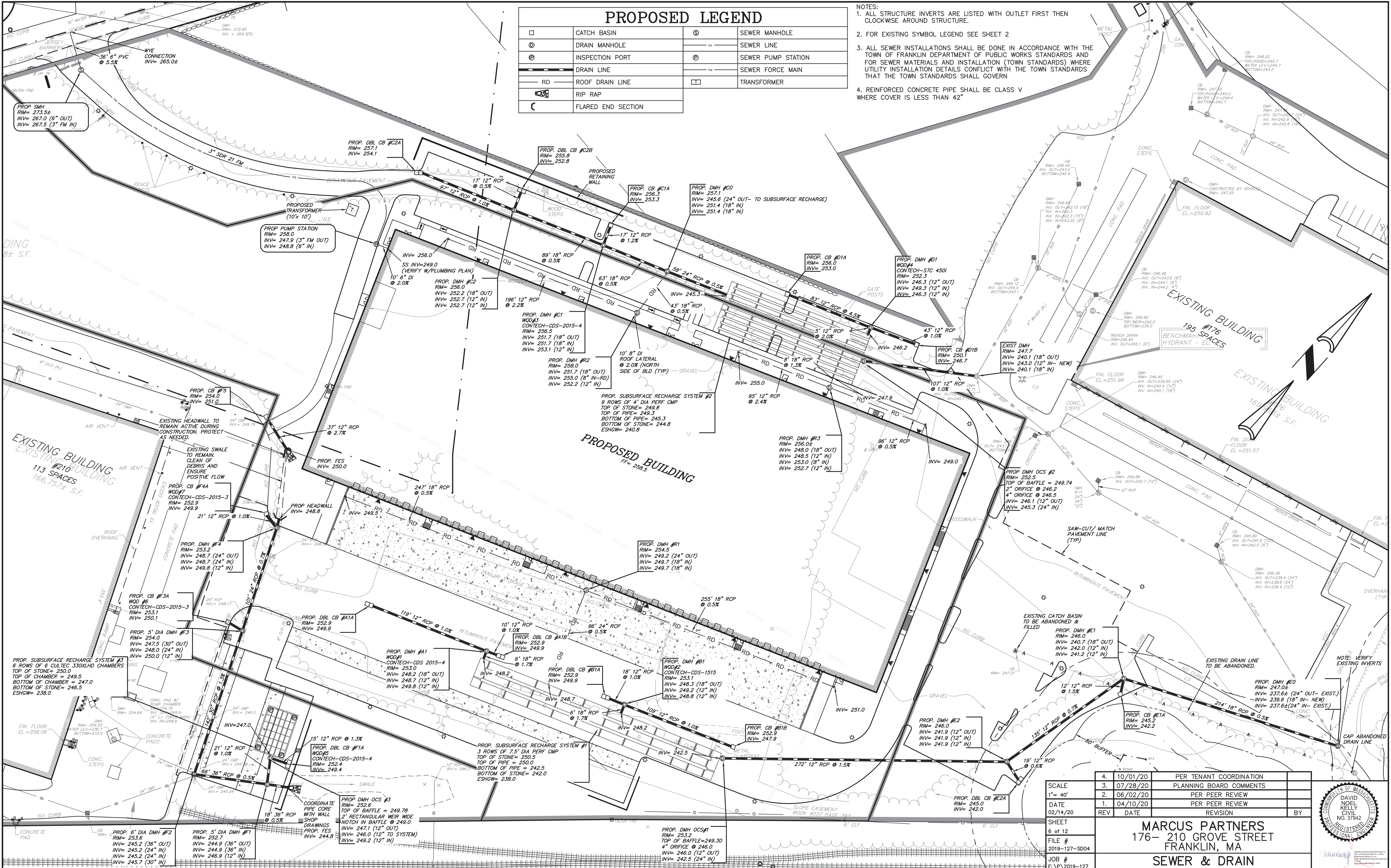


SHEET NO.  
**5**

### PROPOSED LEGEND

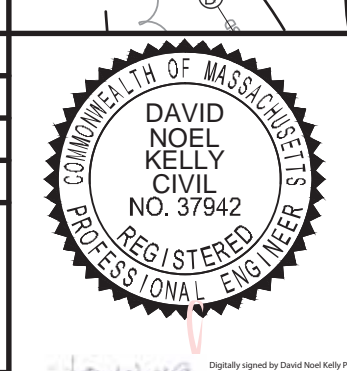
□	CATCH BASIN	⊙	SEWER MANHOLE
⊙	DRAIN MANHOLE	—	SEWER LINE
⊙	INSPECTION PORT	⊙	SEWER PUMP STATION
—	DRAIN LINE	—	SEWER FORCE MAIN
—	RD	□	TRANSFORMER
—	ROOF DRAIN LINE		
—	RIP RAP		
—	FLARED END SECTION		

- NOTES:
1. ALL STRUCTURE INVERTS ARE LISTED WITH OUTLET FIRST THEN CLOCKWISE AROUND STRUCTURE.
  2. FOR EXISTING SYMBOL LEGEND SEE SHEET 2
  3. ALL SEWER INSTALLATIONS SHALL BE DONE IN ACCORDANCE WITH THE TOWN OF FRANKLIN DEPARTMENT OF PUBLIC WORKS STANDARDS AND FOR SEWER MATERIALS AND INSTALLATION (TOWN STANDARDS) WHERE UTILITY INSTALLATION DETAILS CONFLICT WITH THE TOWN STANDARDS THAT THE TOWN STANDARDS SHALL GOVERN
  4. REINFORCED CONCRETE PIPE SHALL BE CLASS V WHERE COVER IS LESS THAN 42"



4.	10/01/20	PER TENANT COORDINATION
3.	07/28/20	PLANNING BOARD COMMENTS
2.	06/02/20	PER PEER REVIEW
1.	04/10/20	PER PEER REVIEW
REV	DATE	REVISION

**MARCUS PARTNERS**  
 176-210 GROVE STREET  
 FRANKLIN, MA  
**SEWER & DRAIN PLAN**



SHEET 6 of 12  
 FILE # 2019-127-SD04  
 JOB # F:\P\2019-127  
 DRAWN BY C.J.L.  
 CHKD BY GSH  
 APPD BY DNK

SHEET NO. **6**

**GRAPHIC SCALE**  
 0 20 40 60 80 100  
 (IN FEET)  
 1 inch = 40 ft.

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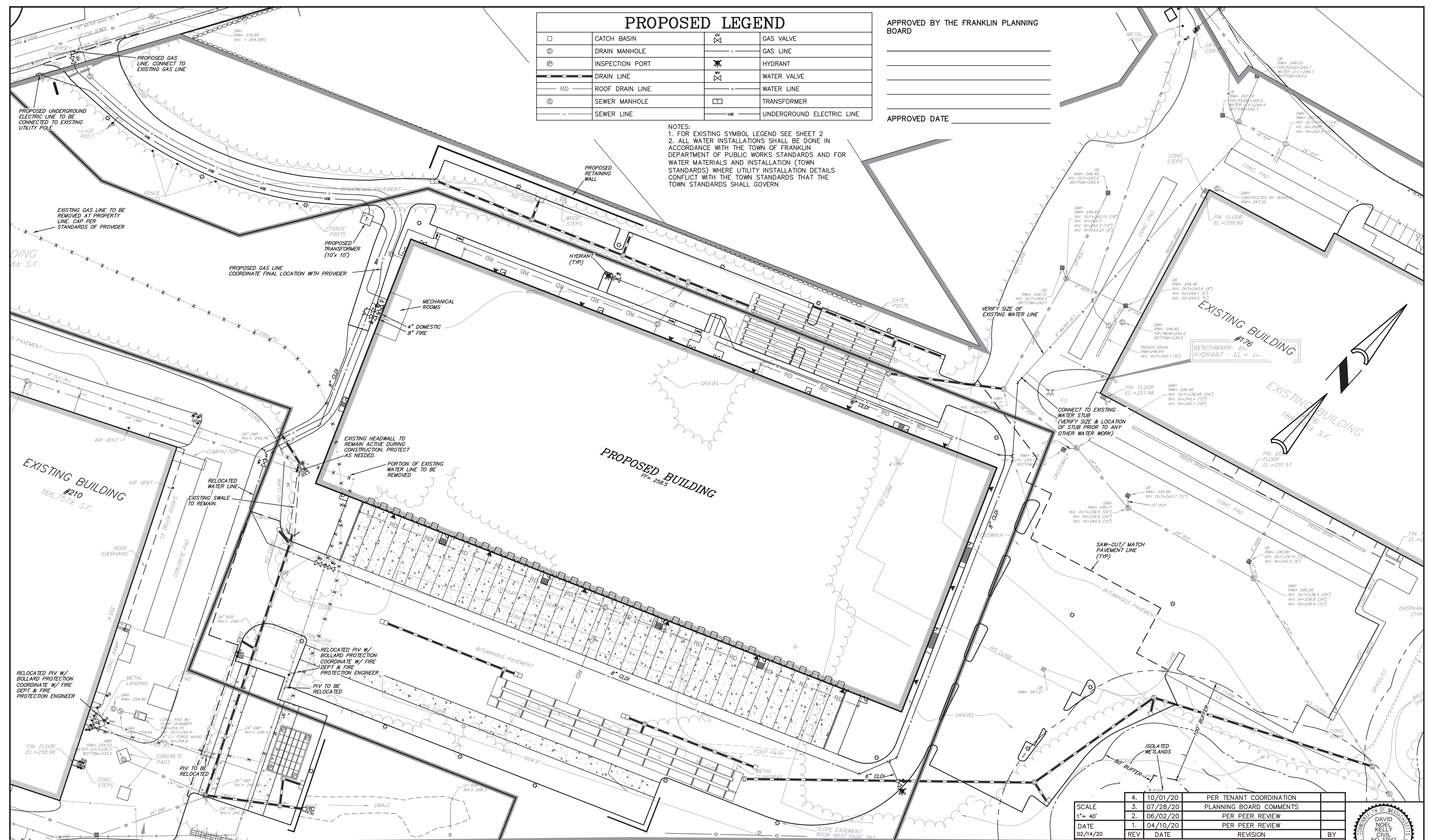
### PROPOSED LEGEND

□	CATCH BASIN	⊗	GAS VALVE
⊙	DRAIN MANHOLE	—	GAS LINE
⊕	INSPECTION PORT	⊗	HYDRANT
—	DRAIN LINE	⊗	WATER VALVE
—	RD	—	WATER LINE
—	ROOF DRAIN LINE	—	TRANSFORMER
—	SEWER MANHOLE	—	UNDERGROUND ELECTRIC LINE
—	SEWER LINE		

APPROVED BY THE FRANKLIN PLANNING BOARD

APPROVED DATE \_\_\_\_\_

NOTES:  
 1. FOR EXISTING SYMBOL LEGEND SEE SHEET 2  
 2. ALL WATER INSTALLATIONS SHALL BE DONE IN ACCORDANCE WITH THE TOWN OF FRANKLIN DEPARTMENT OF PUBLIC WORKS STANDARDS AND FOR WATER MATERIALS AND INSTALLATION DETAILS CONFLICT WITH THE TOWN STANDARDS THAT THE TOWN STANDARDS SHALL GOVERN



SCALE	4. 10/01/20	PER TENANT COORDINATION	
1" = 40'	3. 07/28/20	PLANNING BOARD COMMENTS	
DATE	2. 06/02/20	PER PEER REVIEW	
02/14/20	1. 04/10/20	PER PEER REVIEW	
SHEET	REV	DATE	REVISION
7 of 12			
FILE #	2019-127-UT04		
JOB #	F:\P\2019-127		
DRAWN BY	C.J.L.		
CHKD BY	G.S.H.		
APPD BY	D.N.K.		

**MARCUS PARTNERS**  
 176- 210 GROVE STREET  
 FRANKLIN, MA

**UTILITY PLAN**

Digitally signed by David Noel Kelly  
 DN: cn=David Noel Kelly, o=Kelly Engineering Group, Inc., ou=, email=dkelly@kellyeng.com, serial=37942, c=US  
 Date: 2020.10.08 10:51:00Z

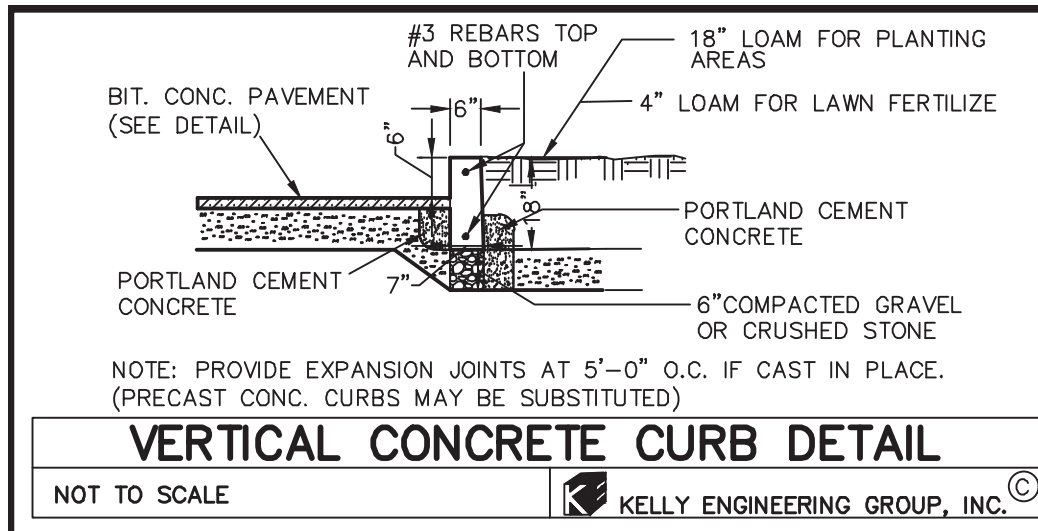
SHEET NO. <h1 style="font-size: 2em;">7</h1>	SHEET NO. <h1 style="font-size: 2em;">7</h1>
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GRAPHIC SCALE  
 1 inch = 40 feet

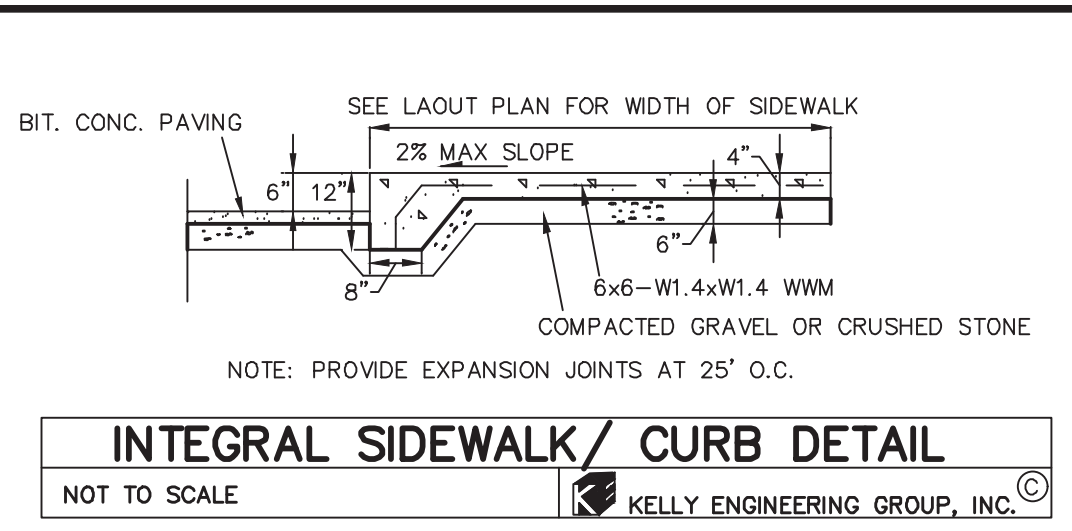
KELLY ENGINEERING GROUP SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, OR PROCEDURES UTILIZED BY THE CONTRACTOR NOR FOR THE SAFETY OF FRAMES OF CONTRACTOR'S EMPLOYEES; OR FOR THE FAILURE OF THE CONTRACTOR TO CARRY OUT THE WORKING ACCORDING WITH THE CONTRACT DOCUMENTS.  
 THE EXTENT OF KELLY ENGINEERING GROUP'S LIABILITY FOR THIS PLAN IS LIMITED TO THE EXTENT OF ITS FEE LESS THIRD PARTY COST

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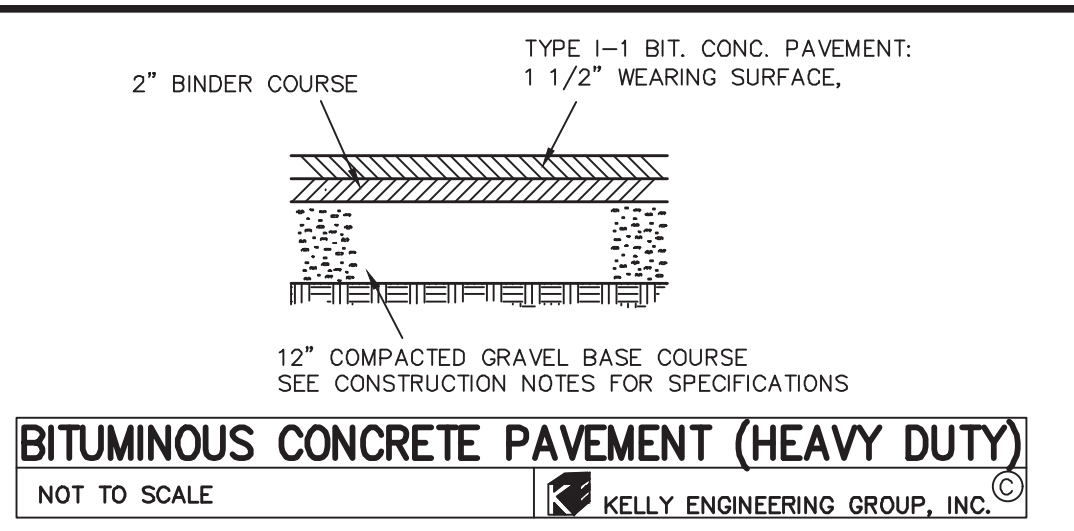
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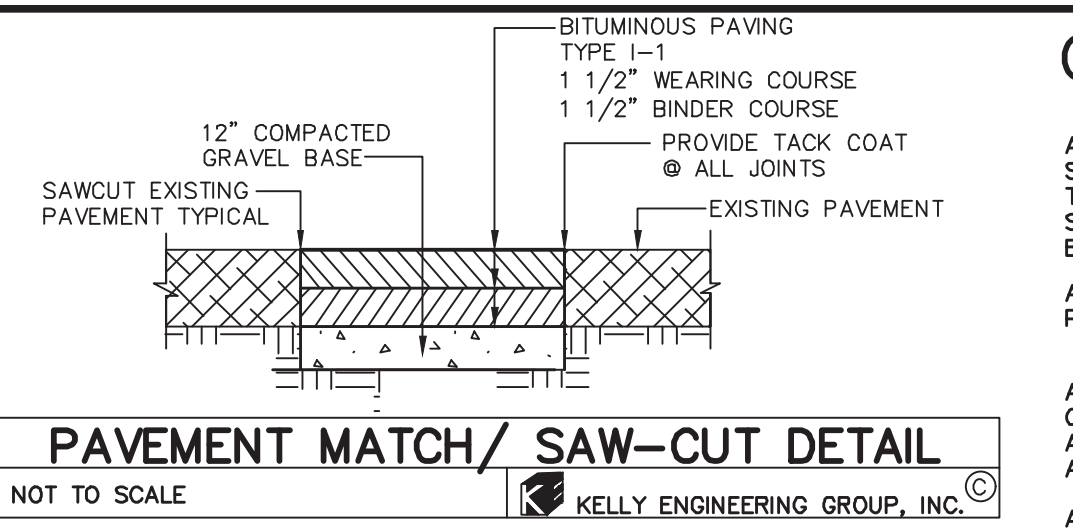
**VERTICAL CONCRETE CURB DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



**INTEGRAL SIDEWALK CURB DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



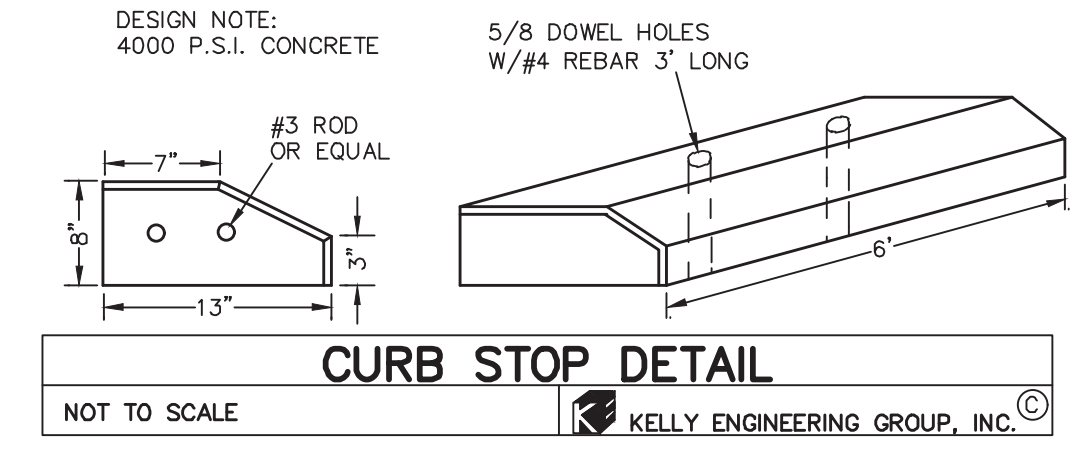
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NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



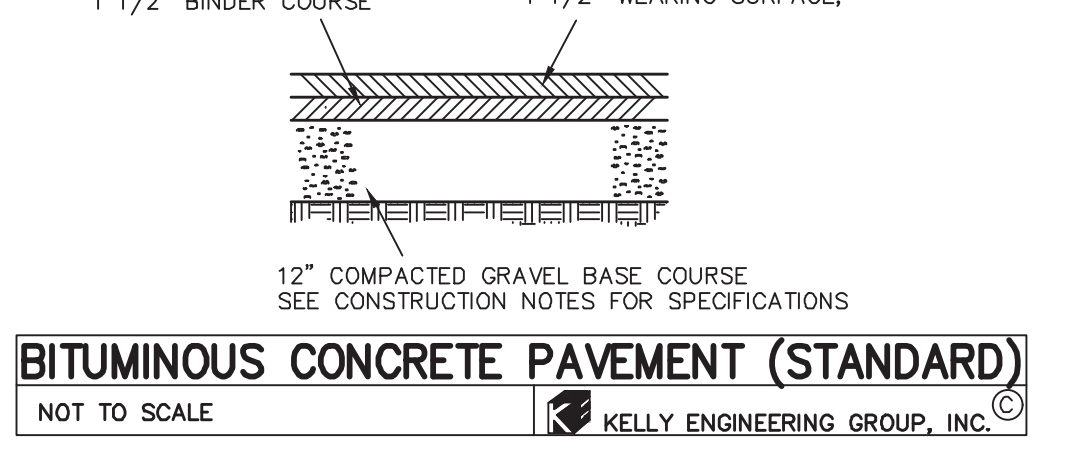
**PAVEMENT MATCH/SAW-CUT DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



**CURB STOP DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



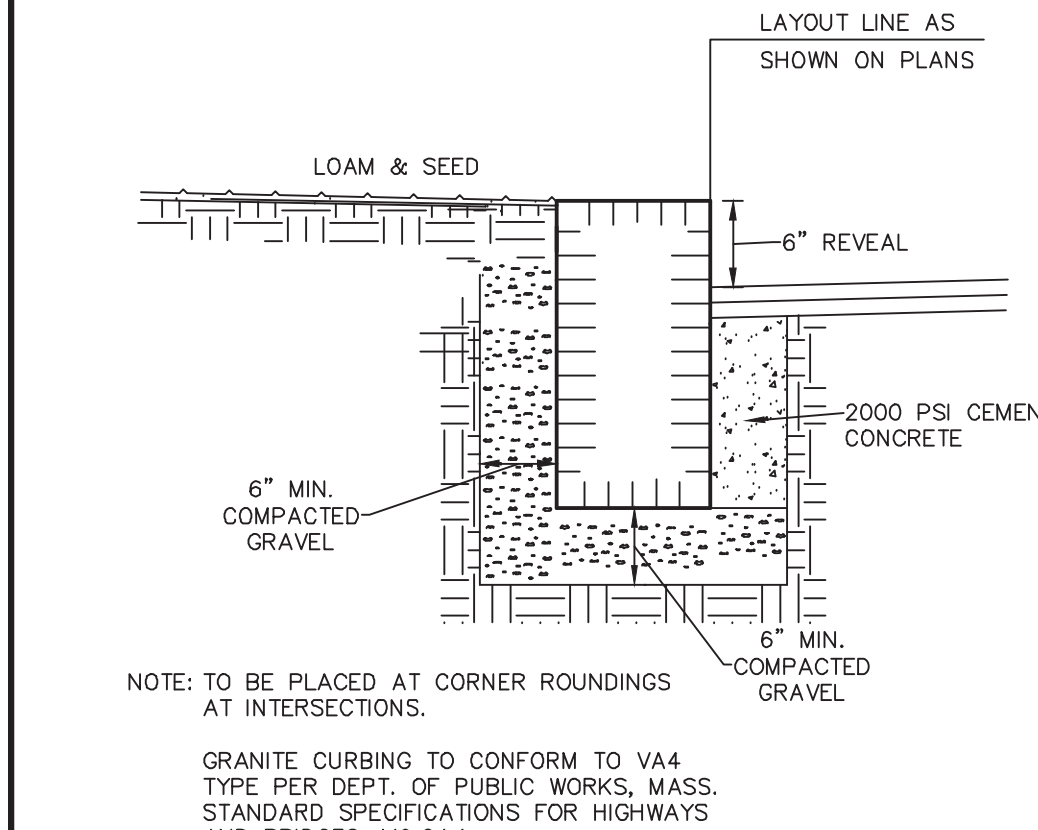
**BITUMINOUS CONCRETE PAVEMENT (STANDARD)**  
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KELLY ENGINEERING GROUP, INC.



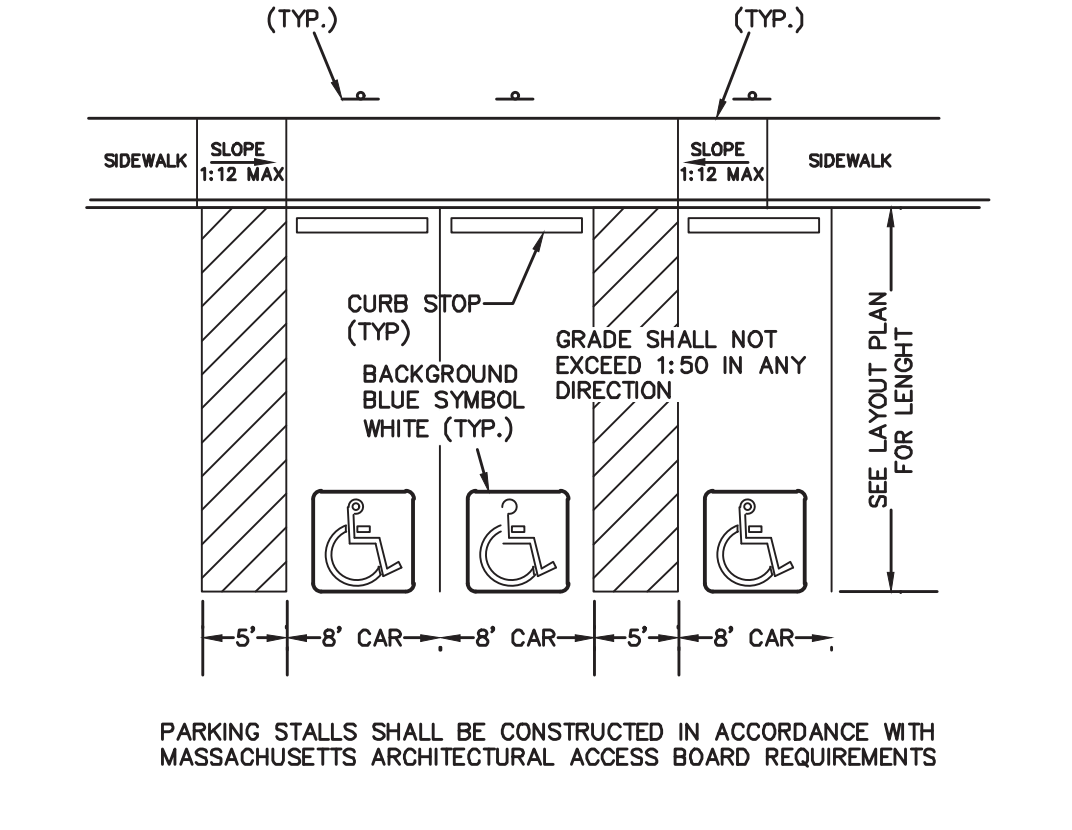
**HANDICAP PARKING DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



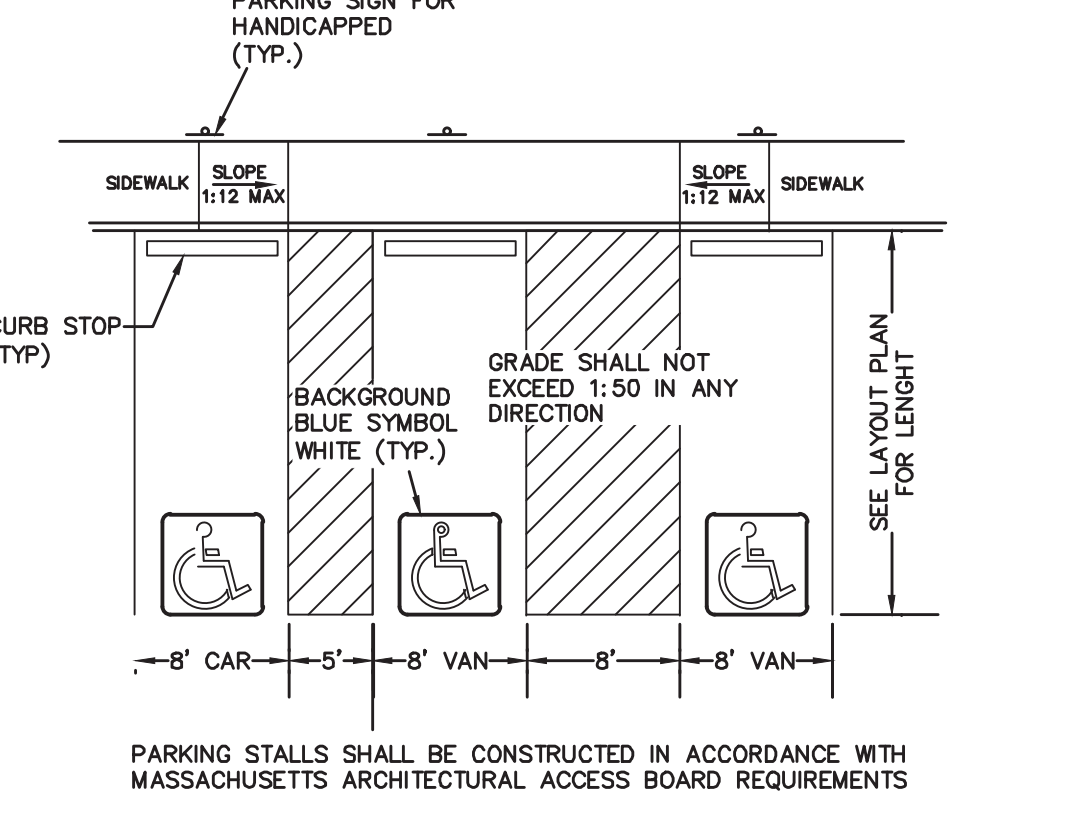
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KELLY ENGINEERING GROUP, INC.



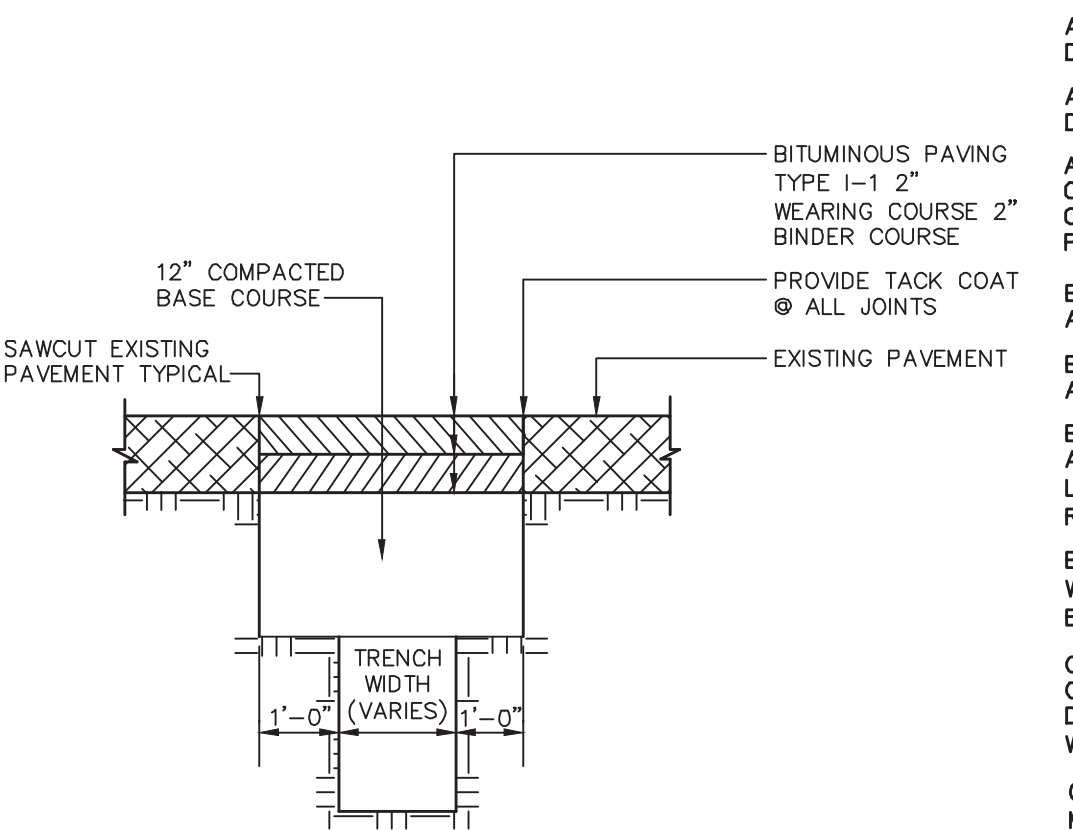
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KELLY ENGINEERING GROUP, INC.



**HANDICAP PARKING DETAIL**  
NOT TO SCALE  
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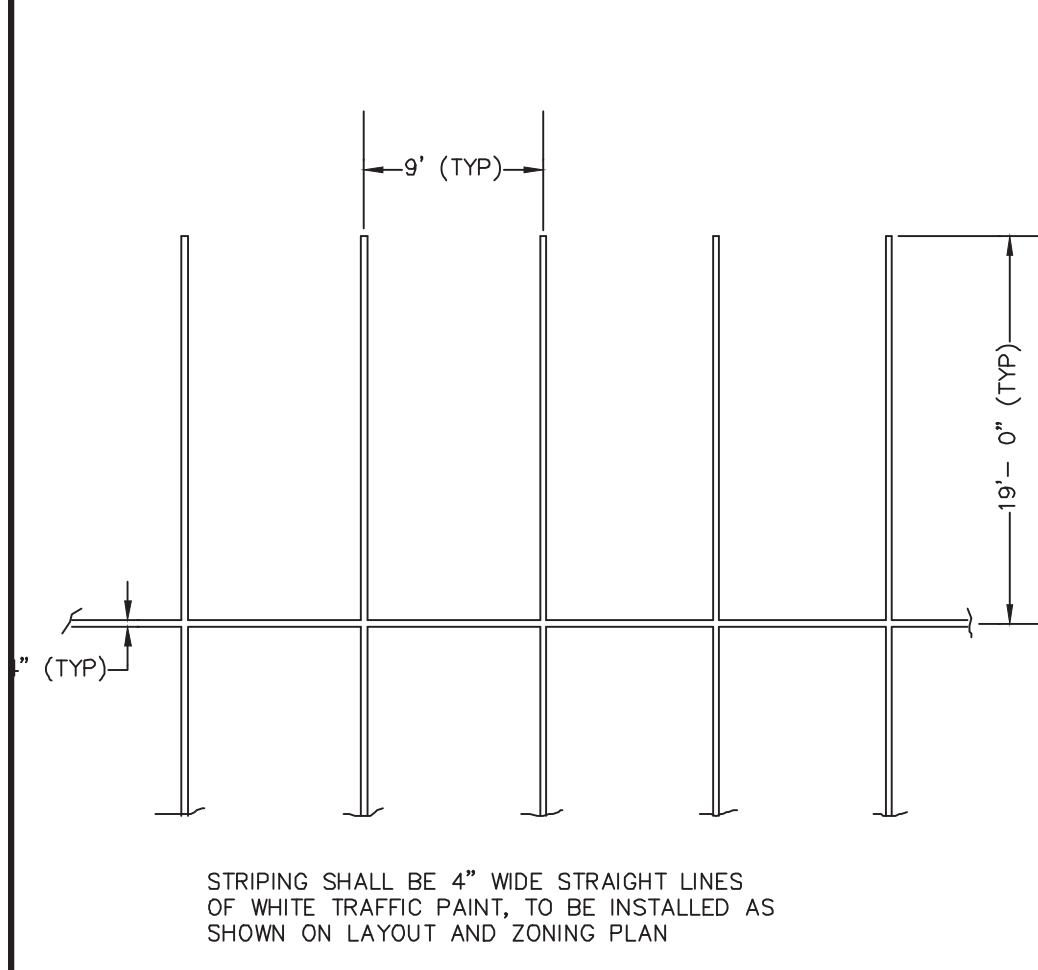
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KELLY ENGINEERING GROUP, INC.



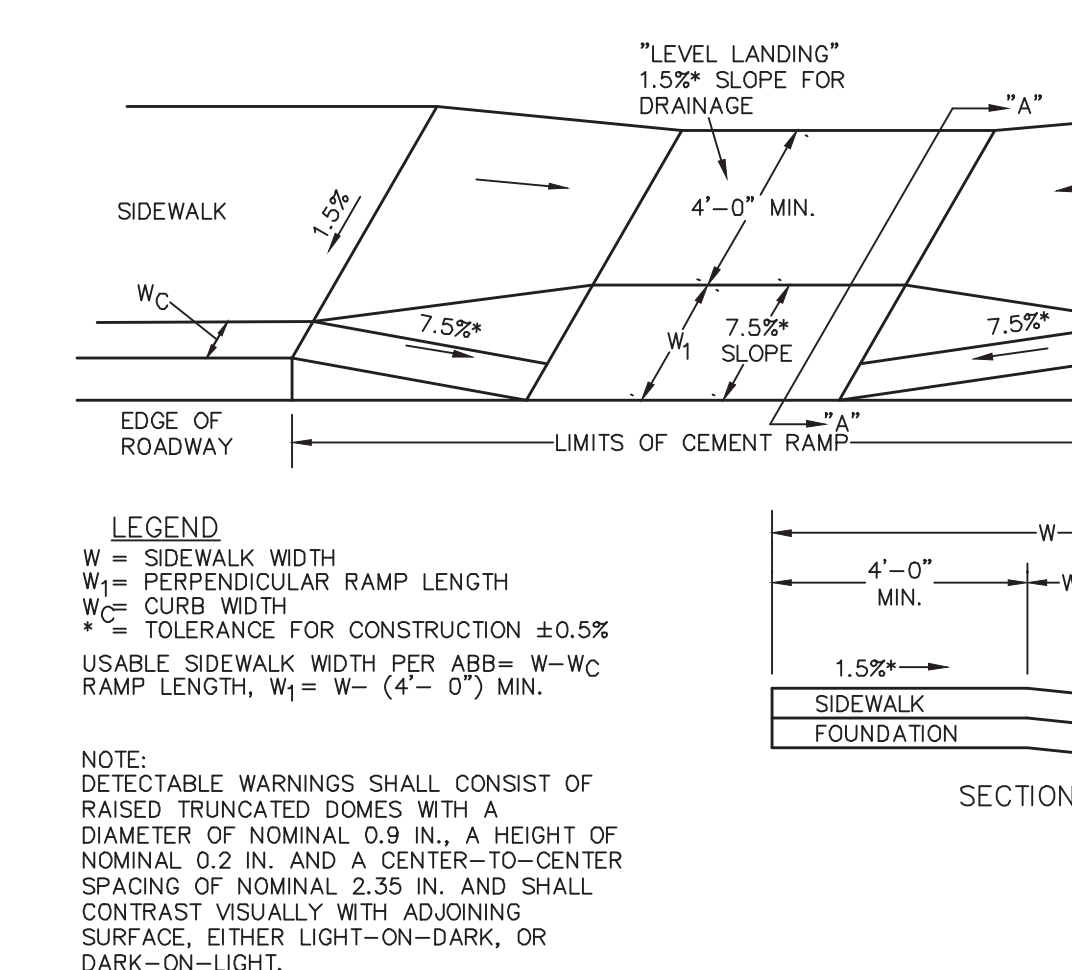
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NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.

**CONSTRUCTION NOTES**

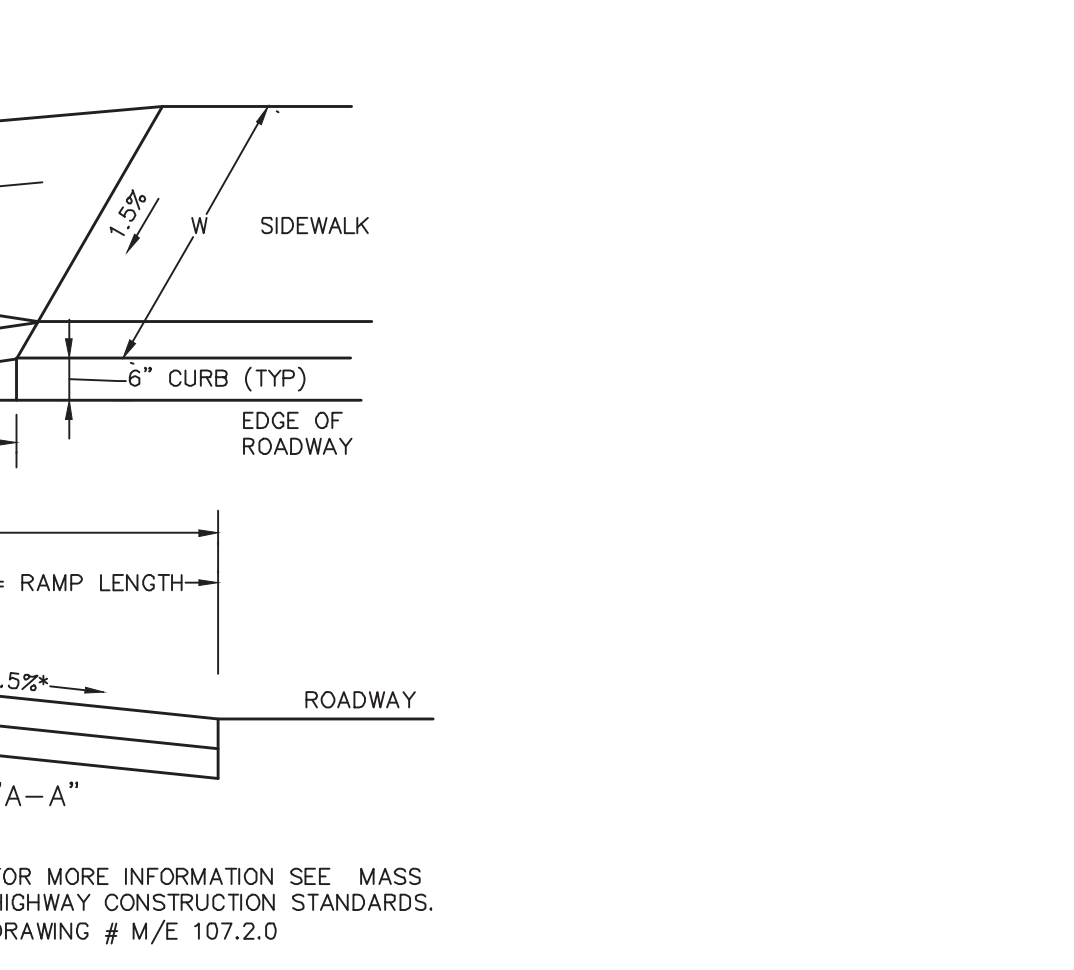
- THE CONTRACTOR SHALL REPORT TO THE OWNER AND ENGINEER OF ANY SIGNIFICANT VARIATIONS IN EXISTING SITE CONDITIONS FROM THOSE SHOWN ON THESE PLANS. ANY PROPOSED REVISIONS TO THE WORK, IF REQUIRED BY THESE SITE CONDITIONS, SHALL NOT BE UNDERTAKEN UNTIL REVIEWED AND APPROVED BY THE OWNER AND THE ENGINEER.
- THE CONTRACTOR SHALL NOTIFY THE TOWN OF FRANKLIN DEPARTMENT OF PUBLIC WORKS AT LEAST 48 HOURS IN ADVANCE OF ANY REQUIRED INSPECTIONS.
- IN ORDER TO PROTECT THE PUBLIC SAFETY DURING CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING AT ALL TIMES ALL NECESSARY SAFETY DEVICES AND PERSONNEL, WARNING LIGHTS, BARRICADES, AND POLICE OFFICERS.
- ALL WORK SHALL CONFORM TO A SITE PLAN PERMIT TO BE ISSUED BY THE TOWN OF FRANKLIN.
- FOR ANY PROJECT THAT INVOLVES 1 ACRE OR MORE OF DISTURBANCE, THE CONTRACTOR SHALL SECURE A NPDES PERMIT PRIOR TO BEGINNING ANY GRADING ACTIVITIES.
- ALL WORK SHALL CONFORM TO THE GEOTECHNICAL REPORT BY MCARDLE & GANNON.
- THE LOCATION OF UNDERGROUND UTILITIES AS REPRESENTED ON THESE PLANS IS BASED UPON PLANS AND INFORMATION PROVIDED BY THE RESPECTIVE UTILITY COMPANIES OR MUNICIPAL DEPARTMENTS SUPPLEMENTED BY FIELD IDENTIFICATION WHEREVER POSSIBLE. NO WARRANTY IS MADE AS TO THE ACCURACY OF THESE LOCATIONS OR THAT ALL UNDERGROUND UTILITIES ARE SHOWN. THE CONTRACTOR SHALL CONTRACT AT LEAST 72 HOURS PRIOR TO THE START OF CONSTRUCTION. DIG SAFE TELEPHONE NUMBER IS 1-888-344-7233.
- THE CONTRACTOR SHALL VERIFY THE LOCATION, SIZE AND DEPTH OF EXISTING UTILITIES PRIOR TO TAPPING INTO, CROSSING OR EXTENDING THEM. IF THE NEW WORK POSES A CONFLICT WITH EXISTING UTILITIES, THE ENGINEER SHALL BE NOTIFIED PRIOR TO THE CONTRACTOR CONTINUING.
- REFER TO ARCHITECTURAL PLANS FOR EXACT BUILDING DIMENSION AND DOOR LOCATIONS.
- BENCHMARK ELEVATION IS 249.44 LOCATED AT BONNET BOLT ON HYDRANT. DATUM IS NAVD.
- ALL PROPOSED SITE GAS, ELECTRIC, TELEPHONE, CATV FEATURES SHOWN ON SITE DEVELOPMENT PLANS ARE INTENDED AS A GUIDE ONLY. FINAL CONFIGURATION TO BE CONFIRMED WITH PROJECT MEP ENGINEER AND UTILITY PROVIDER.
- REFER TO PLUMBING PLANS FOR EXACT SIZE AND LOCATION OF SANITARY AND WATER CONNECTIONS.
- REFER TO ELECTRICAL PLANS FOR THE LIGHTING CIRCUITS, FIXTURE DETAIL AND BUILDING CONNECTION LOCATION.
- ALL H.D.P.E. HIGH DENSITY POLYETHYLENE PIPE SHALL BE ADS N-12 OR APPROVED EQUAL. SEWER SHALL BE SDR 35 WITH RUBBER RING JOINTS. WATER LINES SHALL BE CL 52 D.I.P. (DUCTILE IRON PIPE). REINFORCED CONCRETE PIPE RCP SHALL BE CLASS III OR CLASS V WHEN COVER IS LESS THAN 42\".
- NO LEDGE, Boulders, OR OTHER UNYIELDING MATERIALS ARE TO BE LEFT WITHIN 6\" OF THE SEWER IN THE TRENCH, NOR ARE THEY TO BE USED FOR BACKFILL FOR THE FIRST 12\" ABOVE THE PIPES.
- WALKS SHALL BE 4\" THICK AND SHALL BE CONSTRUCTED ON 6\" OF COMPACTED BANK GRAVEL. CONCRETE FOR WALKS SHALL HAVE A MINIMUM 28 DAY COMPRESSION STRENGTH OF 4,000 PSI. WALKS SHALL BE REINFORCED WITH WMM 6x6 W1.4/W1.4 CONFORMING TO ASTM A184.
- BASE MATERIAL SHALL BE CLEAN BANK RUN GRAVEL, CONFORMING TO M.D.P.W. M1.03.1, WITH NO STONES LARGER THAN THREE (3) INCHES IN DIAMETER AND SHALL BE PLACED AND ROLLED WITH AT LEAST A TEN TON ROLLER. THE SURFACES SHALL BE WET DURING ROLLING TO BIND THE MATERIAL. ALL STONES OF 4\" DIAMETER OR LARGER SHALL BE REMOVED FROM THE SUB-BASE PRIOR TO PLACING BASE MATERIAL. PULVERIZED MATERIAL MAY BE USED AS BASE MATERIAL PROVIDING IT MEETS THIS SPECIFICATIONS. AREAS TO BE REPAVED SHALL BE PULVERIZED AND REGRADED TO PROVIDE POSITIVE FLOW TO DRAINAGE AND AWAY FROM BUILDING. PAVE WITH 1 1/2\" WEARING COURSE ON 1 1/2\" BINDER COURSE. ALL VALVES BOXES, MANHOLES AND OTHER UTILITIES APERTURES SHALL BE ADJUSTED TO CONFORM TO FINAL GRADE.
- STABILIZATION MEASURES (SEEDING OR PLANTING, APPLYING MULCH OR OTHER NON-VEGETATIVE PRODUCT) OF EXPOSED SOILS SHALL BEGIN AS SOON AS PRACTICABLE AND IMMEDIATELY AFTER EARTH-DISTURBING ACTIVITIES HAVE PERMANENTLY OR TEMPORARILY CEASED. STABILIZATION TO BE COMPLETED WITHIN 14 DAYS.
- SILT SOCKS SHALL BE INSTALLED ON THE DOWNSTREAM SIDE OF ALL STOCK PILES.
- SPARE EROSION/SEDIMENT CONTROL MATERIALS SHALL BE AVAILABLE ON SITE FOR USE IN CONTINGENCY CONDITIONS OR AT THE DIRECTION OF FRANKLIN CODE ENFORCEMENT PERSONNEL.
- TRANSFORMER PAD SHALL BE INSTALLED PER PROVIDERS SPECIFICATIONS. GENERATOR PADS SHALL BE INSTALLED PER MANUFACTURING SPECIFICATIONS.
- PAVEMENT AREA SHALL BE PAVED TO A THICKNESS AS SHOWN ON THE PLANS MEASURED AFTER COMPACTION, WITH A BINDER COURSE AND TOP COURSE OF CLASS I BITUMINOUS CONCRETE PAVEMENT, TYPE 1-1.
- THE AGGREGATE SHALL BE COMPOSED, MIXED AND LAID HOT IN TWO COURSES AS SPECIFIED IN THE "COMMONWEALTH OF MASSACHUSETTS STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGE", 1988 EDITION, SECTION 460 FOR CLASS I BITUMINOUS CONCRETE PAVEMENT, AS SPECIFICALLY SET FORTH IN SECTION 460.20 AND 460.82.
- ALL EXISTING PAVING TO BE DISTURBED SHALL BE CUT ALONG A STRAIGHT LINE THROUGH ITS ENTIRE THICKNESS. BUTT NEW PAVING INTO THE EXISTING PAVEMENT TO REMAIN AND TACK COAT THE JOINT.
- ANY PAVEMENT REMOVED FOR UTILITY TRENCH EXCAVATION OR OTHERWISE DAMAGED DURING CONSTRUCTION SHALL BE REPLACED WITH A PAVEMENT SECTION CONSISTING OF 1 1/2\" WEARING COURSE OVERLAYING A 1 1/2\" BINDER COURSE OVERLAYING A 12\" COMPACTED GRAVEL BASE COURSE.
- ALL AREAS TO BE PLANTED WITH GRASS SHALL BE TREATED WITH 100 POUNDS OF GROUND LIMESTONE PER 1,000 S.F. OF AREA PLANTED. ALL AREAS TO BE PLANTED WITH GRASS SHALL BE FERTILIZED WITH 10-10-10 AT THE RATE OF 1,000 POUNDS PER ACRE OR AS REQUIRED BY SOIL TEST. 40% OF THE NITROGEN SHALL BE ORGANIC FORM.
- ALL LANDSCAPED AREAS TO BE LOAMED AND SEEDED SHALL HAVE THE FOLLOWING MIX:  
PERENNIAL RYE 25%  
KENTUCKY BLUE 25%  
GREeping RED FESCUE OR PENNLAWN FESCUE 50%  
SEED AT THE RATE OF 5#/1,000 S.F.
- ALL DISTURBED AREAS TO BE LOAMED AND SEEDED SHALL HAVE A MINIMUM OF 4 INCHES OF TOPSOIL SPREAD EVENLY THROUGHOUT. PROVIDE EROSION CONTROL MEASURES AS NECESSARY TO PROVIDE SLOPE STABILITY UNTIL VEGETATION IS ESTABLISHED. (NOTE: IF THERE IS A CONFLICT BETWEEN THESE PLANS AND LANDSCAPE PLANS THE LANDSCAPE PLANS SHALL DICTATE.)
- THE CONTRACTOR SHALL REGULARLY INSPECT THE PERIMETER OF THE PROPERTY TO CLEANUP AND REMOVE LOOSE CONSTRUCTION DEBRIS BEFORE IT LEAVES THE SITE. ALL DEMOLITION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE SITE TO A LEGAL DUMP SITE. ALL TRUCKS LEAVING THE SITE SHALL BE COVERED.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTITUTE EROSION CONTROL MEASURES ON AN AS NECESSARY BASIS, SUCH THAT EXCESSIVE SOIL EROSION DOES NOT OCCUR. MEASURES SHALL INCLUDE SILT SACKS IN DRAINAGE INLETS, MULCHING AND PLANTING OF DISTURBED AREAS.
- PRIOR TO THE COMMENCEMENT OF ANY OTHER WORK A SILT SACK SHALL BE INSTALLED IN EACH EXISTING DRAINAGE INLET.
- AFTER INSTALLATION OF EACH DRAINAGE INLET A SILT SACK SHALL BE INSTALLED IN EACH INLET TO PREVENT SEDIMENT FROM ENTERING THE STORM DRAIN SYSTEM.
- AT THE END OF CONSTRUCTION ALL DRAINAGE STRUCTURES ARE TO BE CLEANED OF SILT, STONES AND OTHER DEBRIS.
- DURING CONSTRUCTION THE EROSION CONTROL MEASURES SHALL BE INSPECTED ONCE PER WEEK AND WITHIN 24 HOURS OF ANY STORM EVENT GENERATING MORE THAN 1/2\" OF RAINFALL. THE EROSION CONTROL MEASURES SHALL BE CLEANED REGULARLY AND ADJUSTED IF NECESSARY TO ENSURE THAT NO SILT OR DEBRIS LEAVES THE SITE.



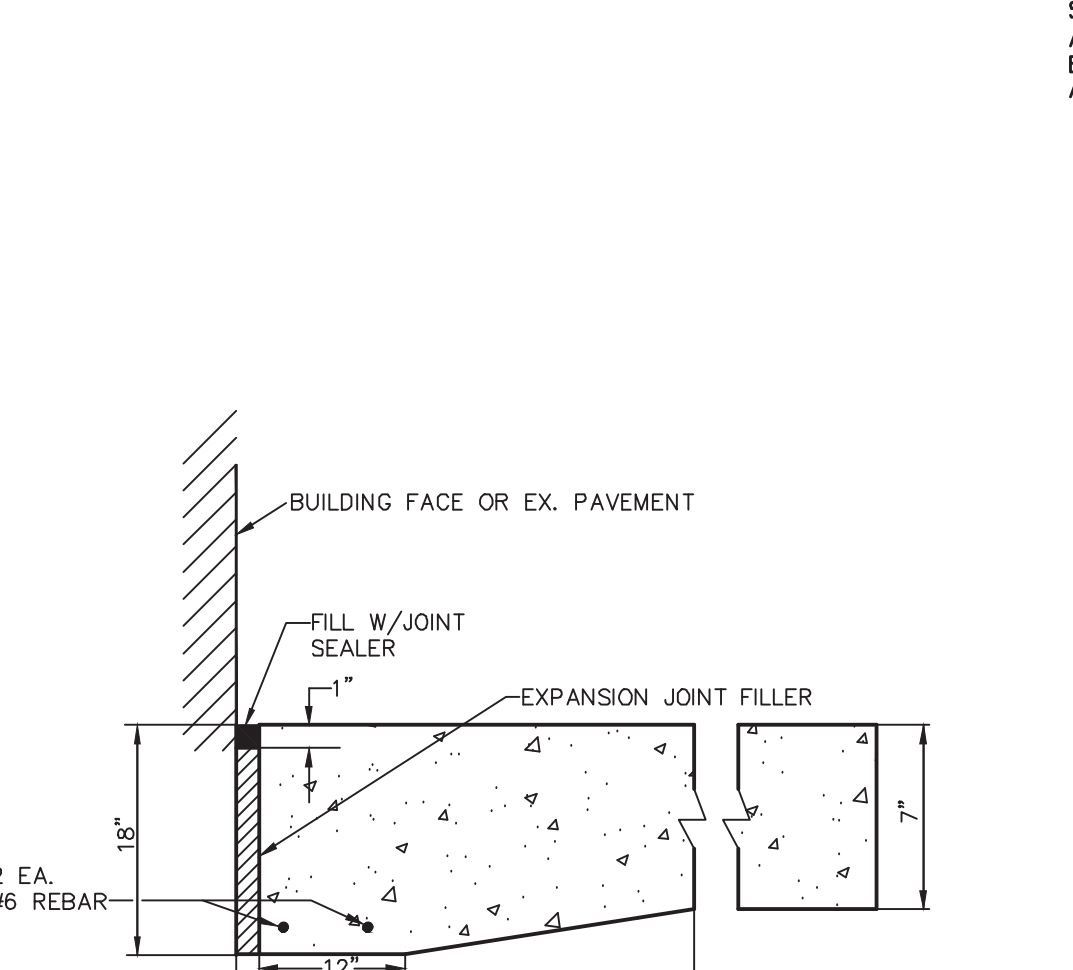
**TYPICAL STRIPING DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



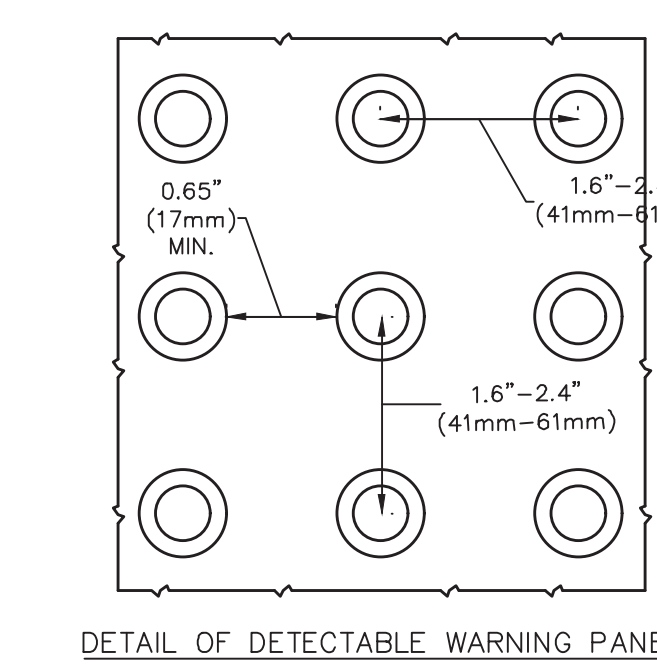
**WHEELCHAIR RAMPS**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



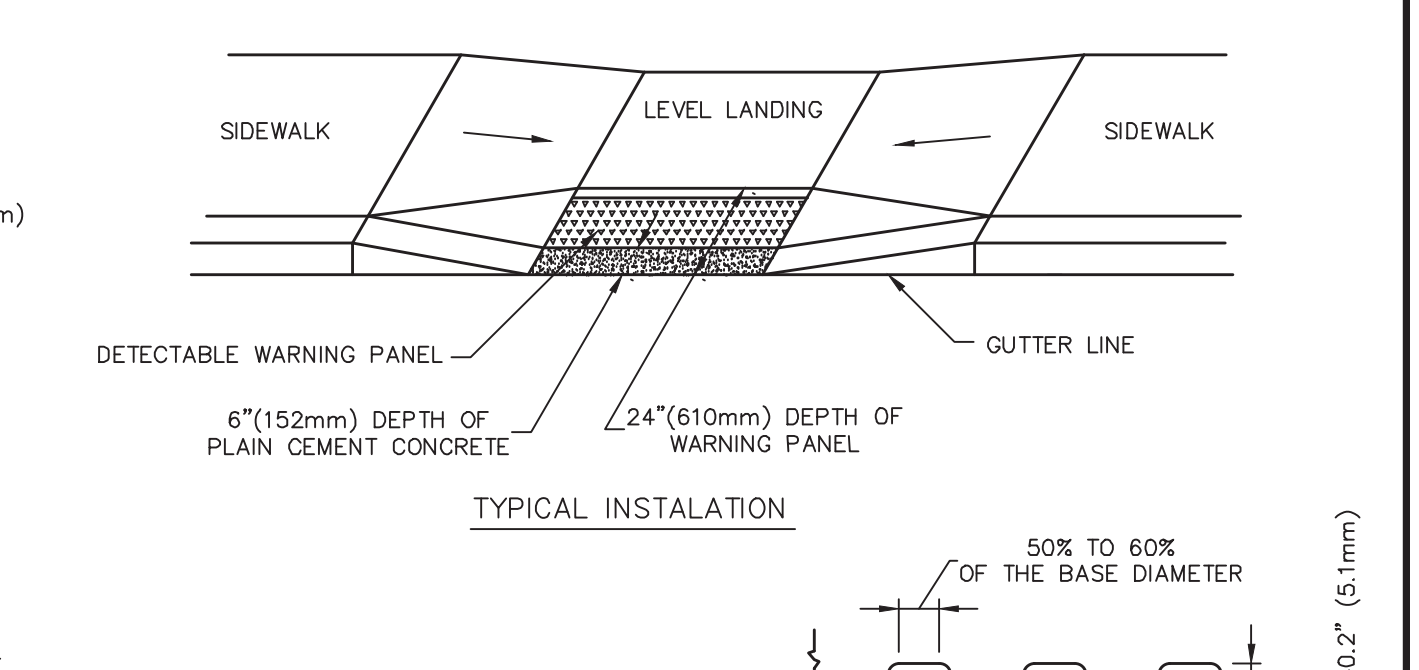
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NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



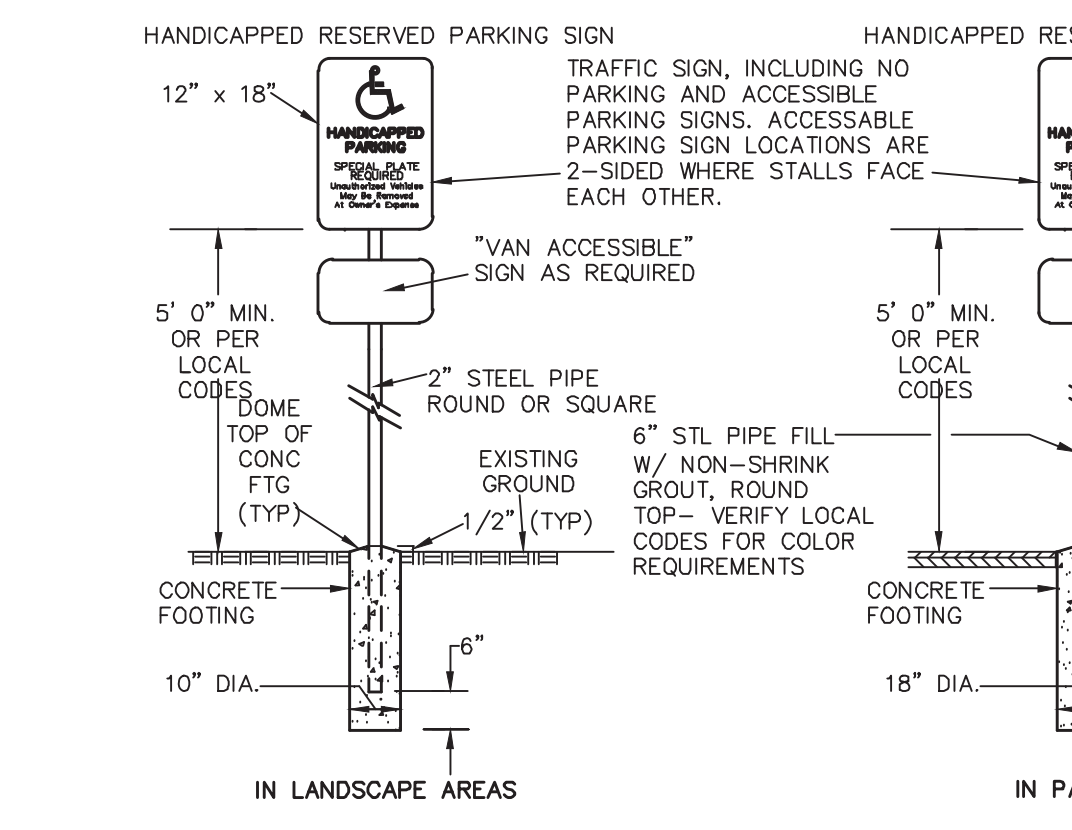
**DETECTABLE WARNING PANEL FOR WHEELCHAIR RAMPS**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



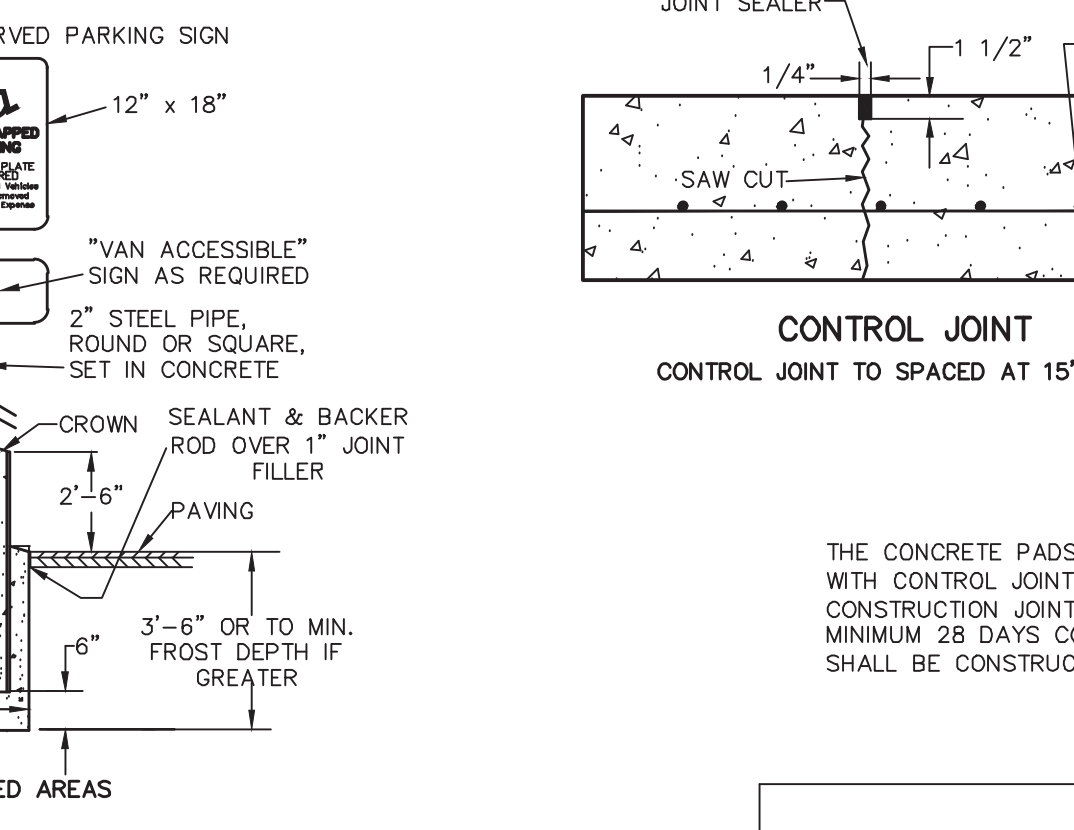
**DETAIL OF DETECTABLE WARNING PANEL**



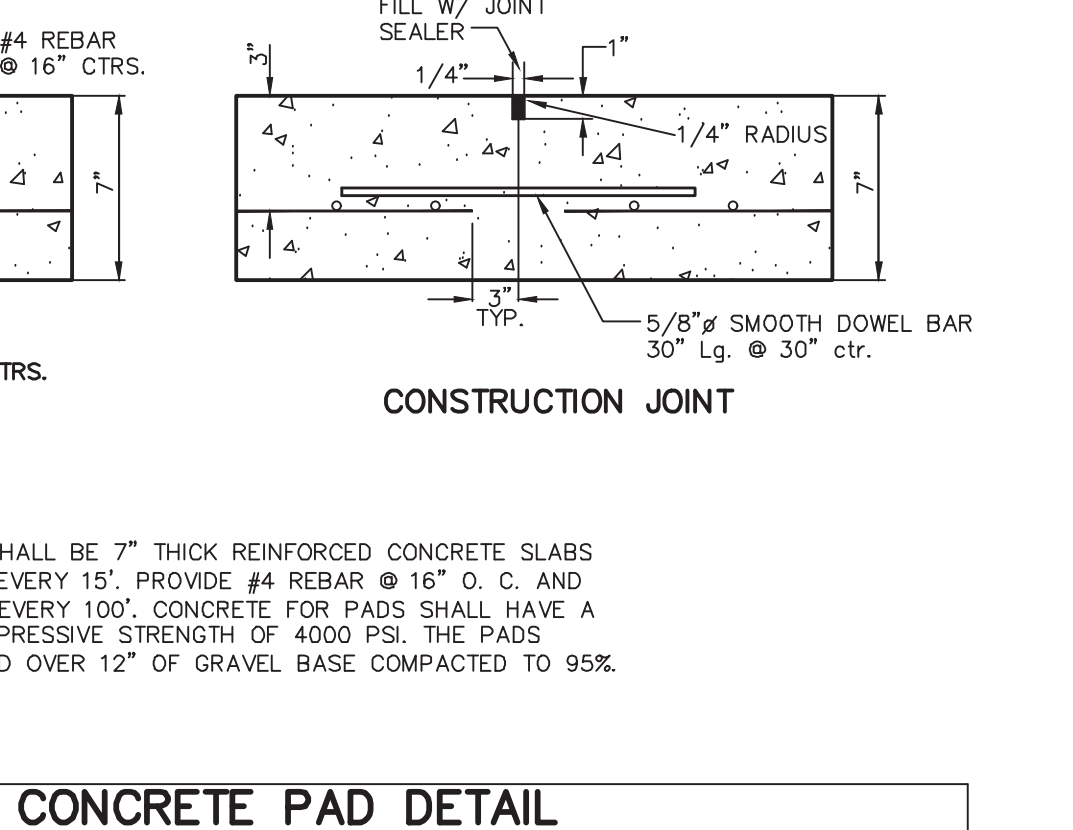
**TYPICAL INSTALLATION**



**HANDICAP SIGN DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



**CONTROL JOINT AND CONSTRUCTION JOINT**



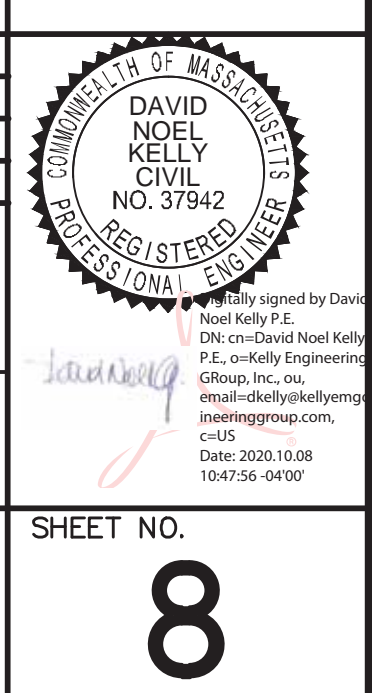
**CONCRETE PAD DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.

SCALE	4.	10/01/20	PER TENANT COORDINATION	
NA	3.	07/28/20	PLANNING BOARD COMMENTS	
DATE	2.	06/02/20	NO CHANGE	
02/14/20	REV	DATE	PER PEER REVIEW	BY
	1.	04/10/20	REVISION	

**MARCUS PARTNERS**  
176- 210 GROVE STREET  
FRANKLIN, MA

**DETAIL SHEET**

**KELLY ENGINEERING GROUP**  
civil engineering consultants  
0 Campanelli Drive, Braintree, MA 02184  
Phone: 781-843-4333 www.kellyengineeringgroup.com



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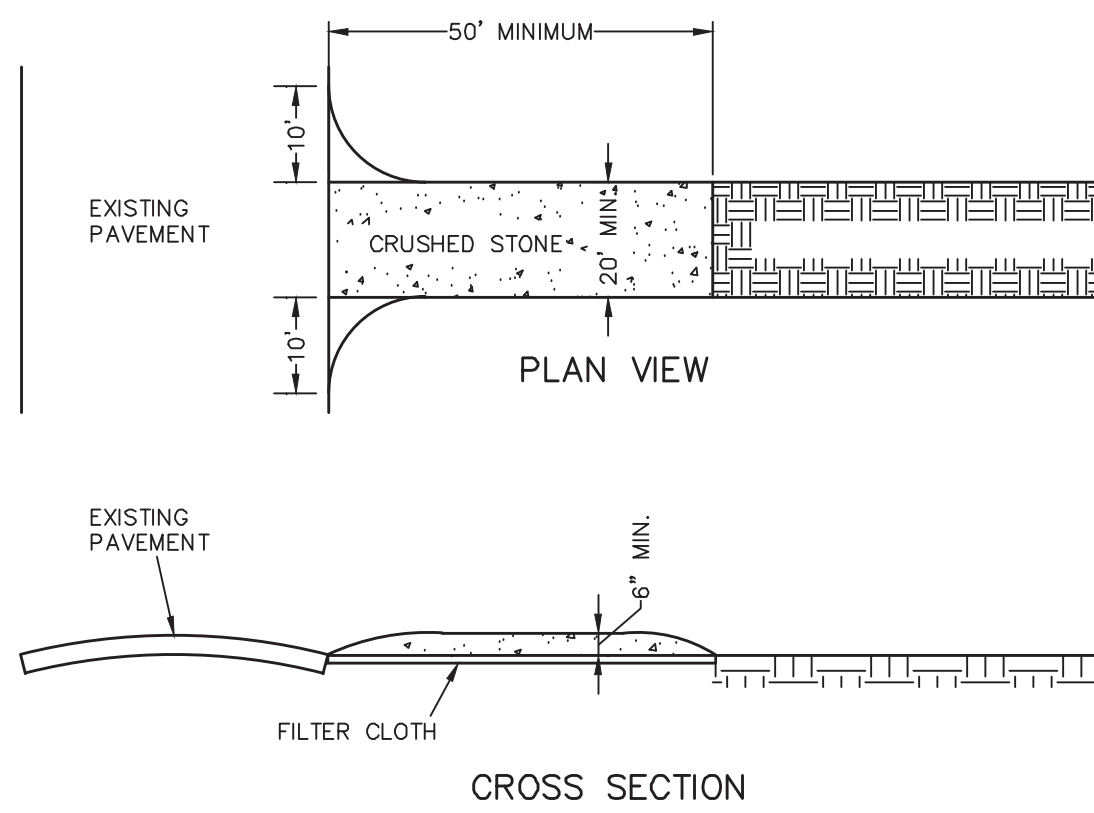
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NOTE: 1. SIGN LAYOUT, COLORS, SYMBOL AND LETTERING SHALL BE STANDARD.  
2. TO BE LOCATED ON SITE AS DIRECTED.  
3. TO BE LOCATED AT APPROPRIATE SPACES.

THE CONCRETE PADS SHALL BE 7\"/>

THE CONCRETE PADS SHALL BE 7\"/>

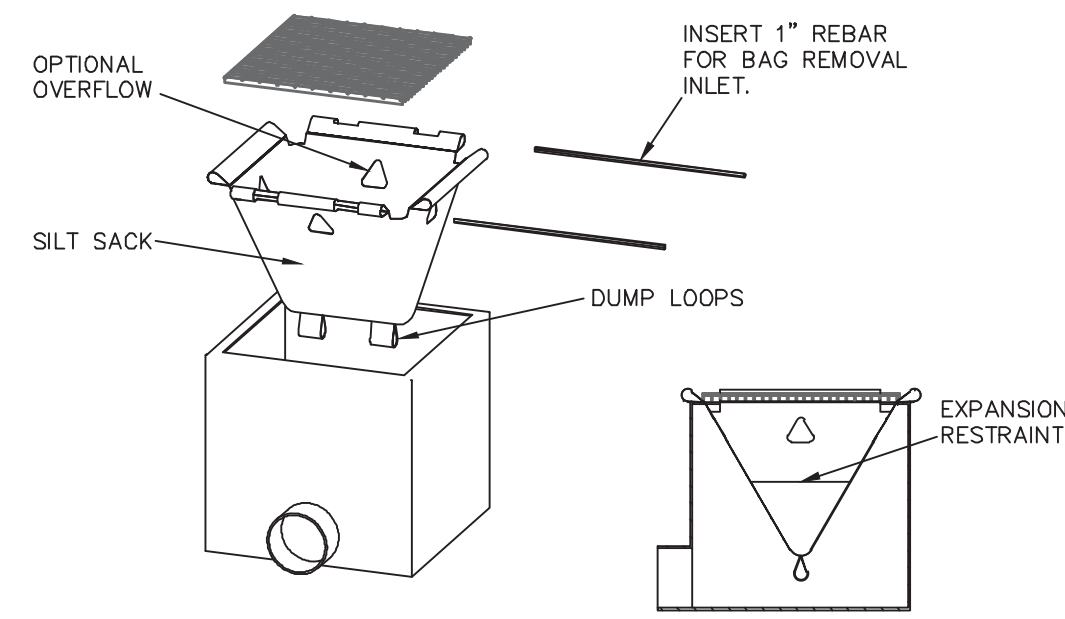




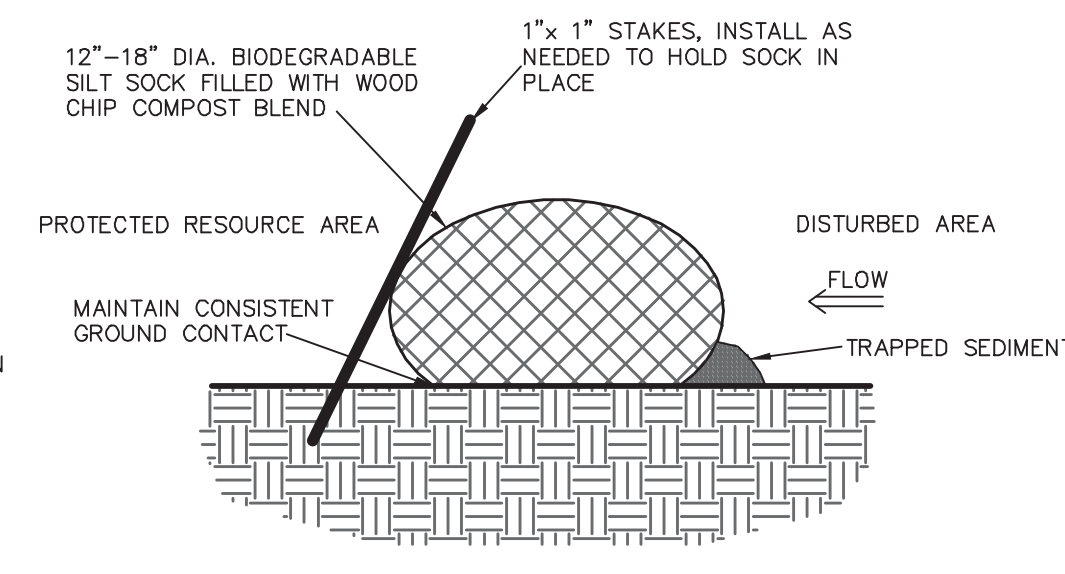
**TRACKING PAD NOTES:**

- STONE SIZE - USE 2" CRUSHED STONE
- FILTER CLOTH - SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
- SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHOULD BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM SHOULD BE PERMITTED.
- MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH PREVENTS TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANING OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

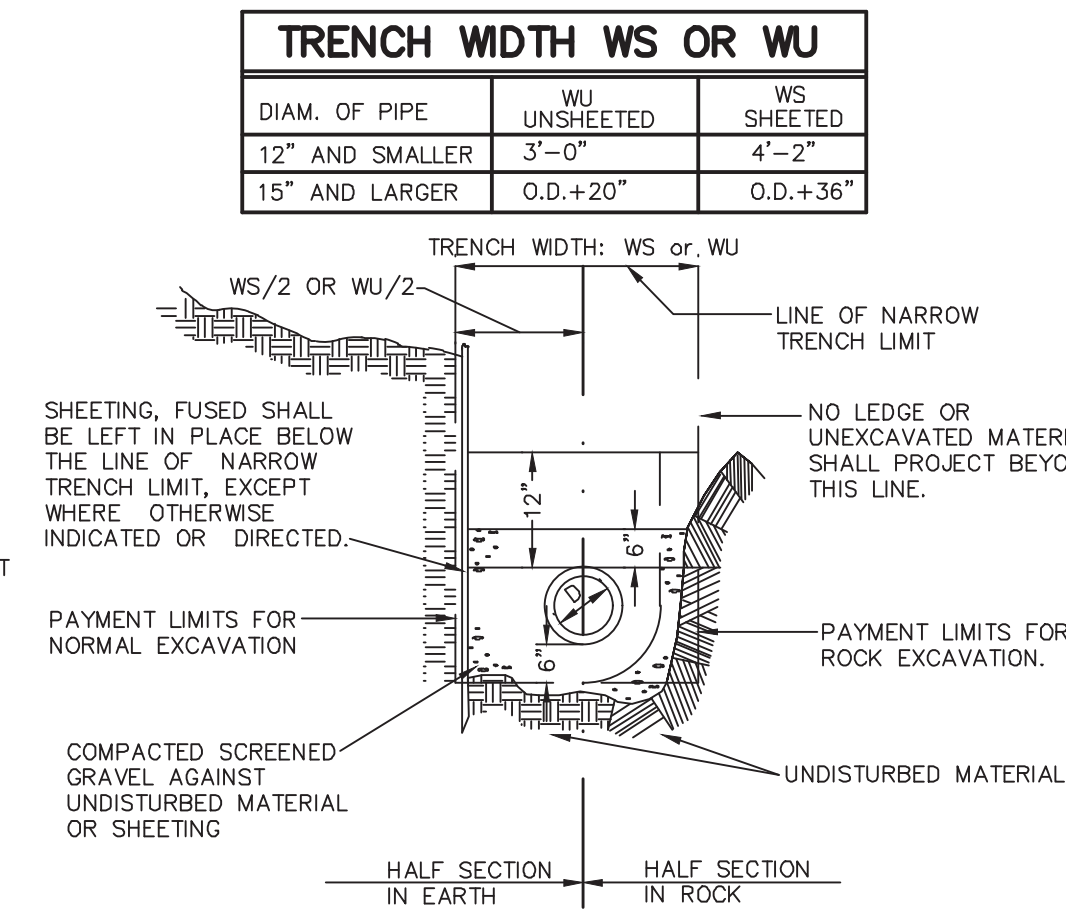
**CONSTRUCTION TRACKING PAD**  
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KELLY ENGINEERING GROUP, INC.



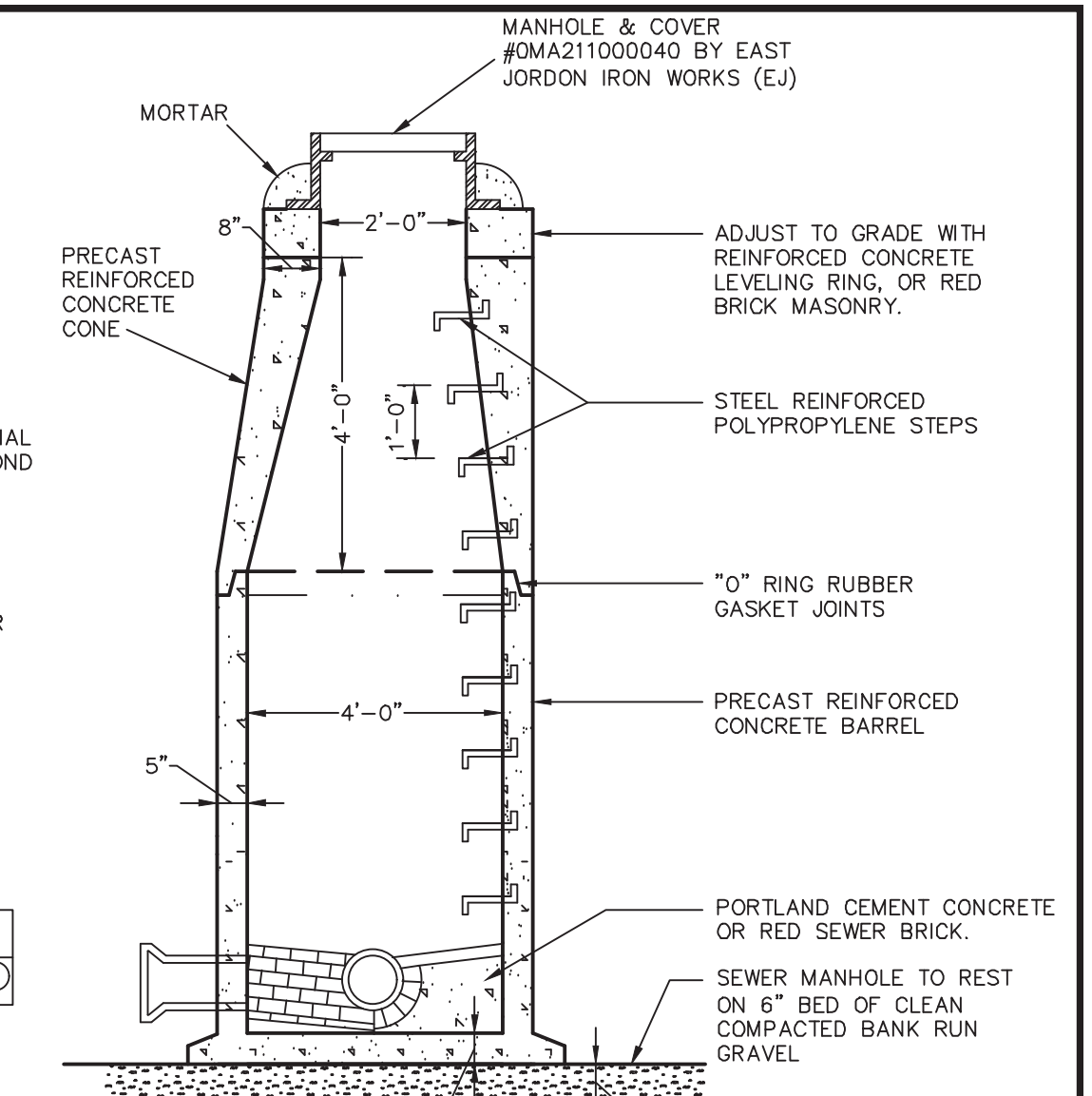
**SILT SACK- TYPE A DETAIL**  
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KELLY ENGINEERING GROUP, INC.



**SILT SOCK LINE DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.

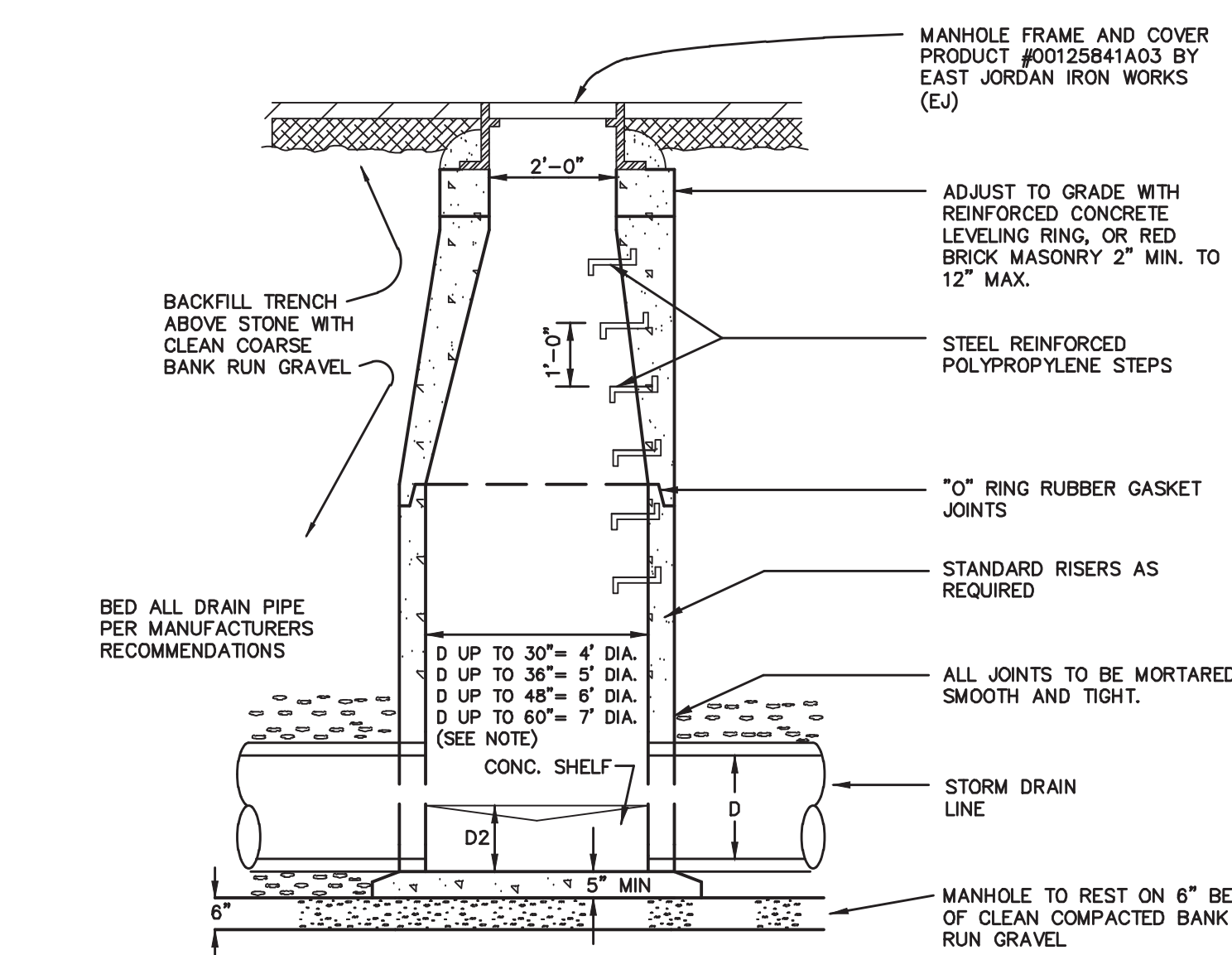


**WATER AND SEWER TRENCH SECTION**  
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KELLY ENGINEERING GROUP, INC.

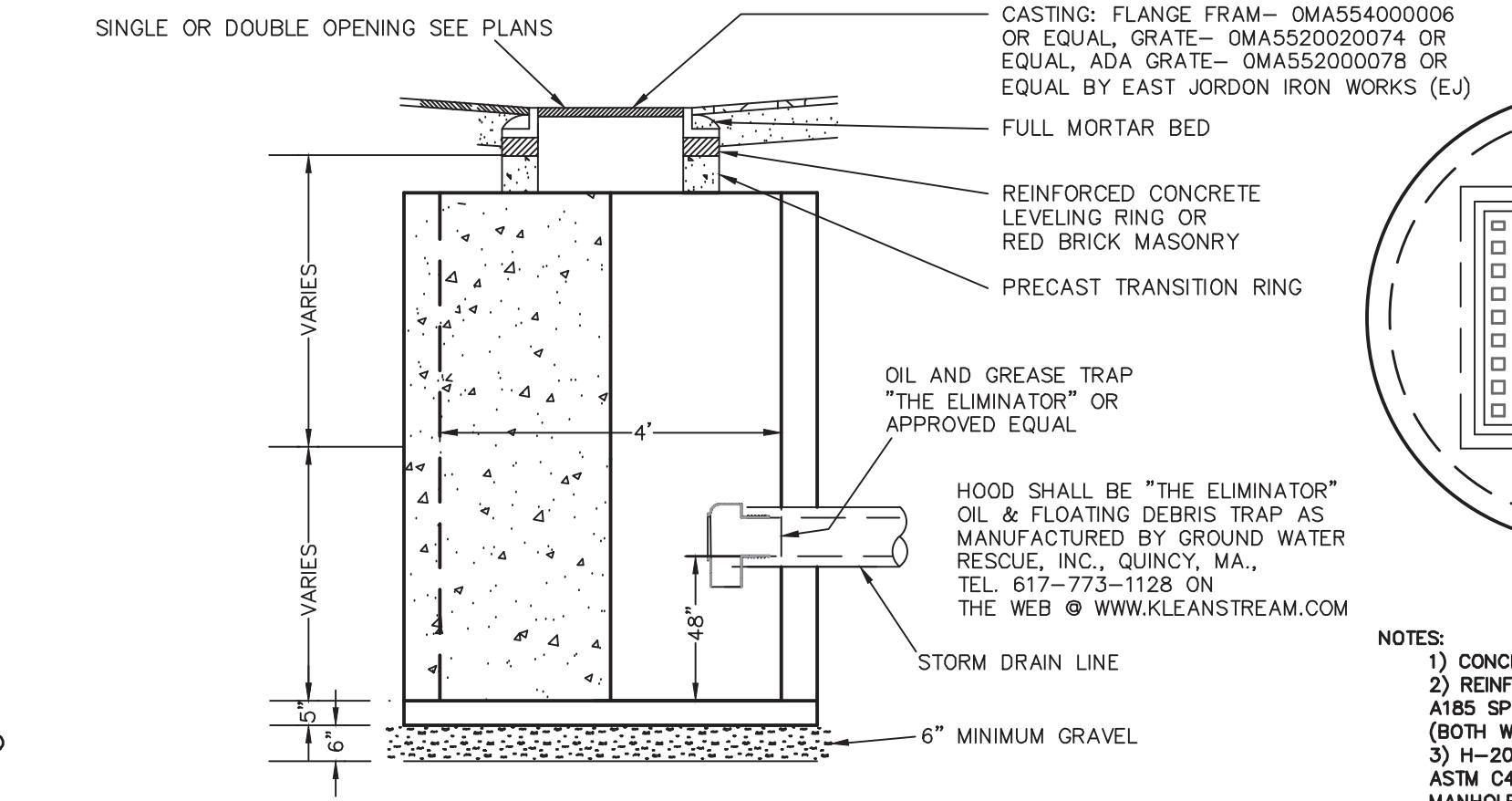


**SEWER MANHOLE DETAIL**  
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KELLY ENGINEERING GROUP, INC.

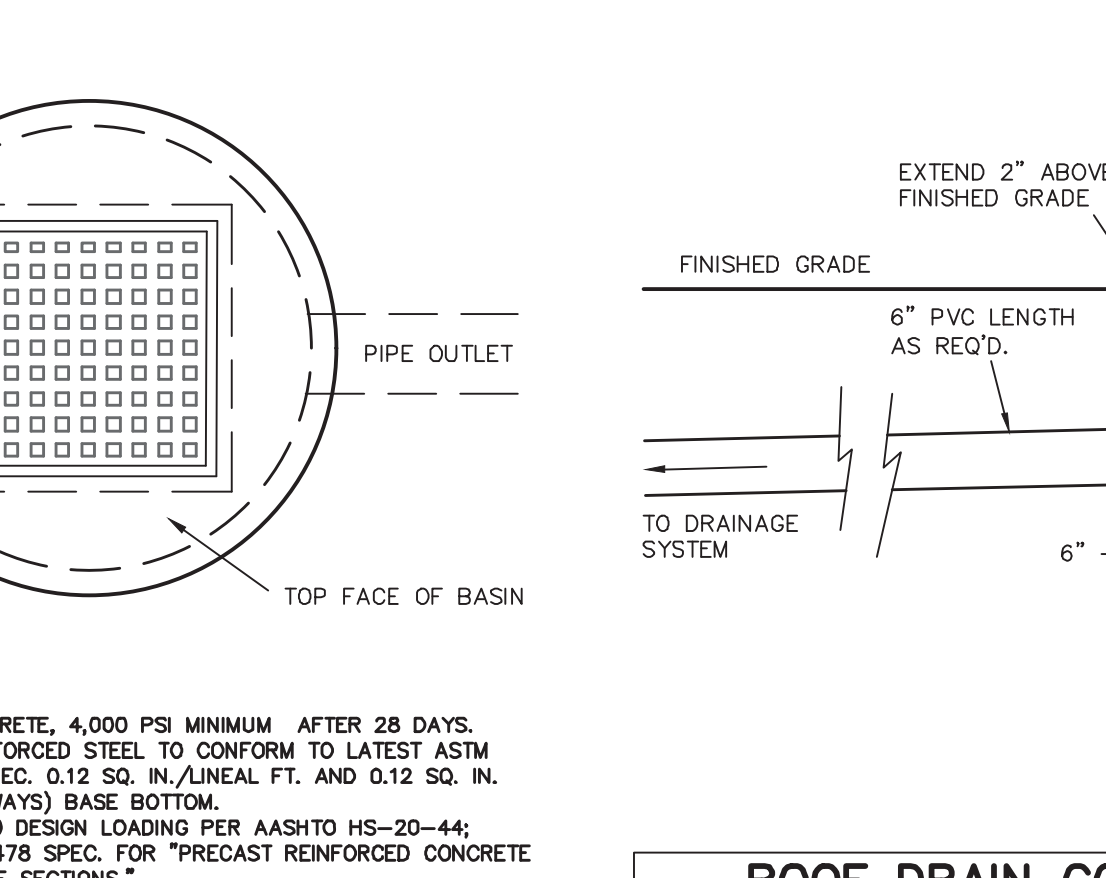
**SEWER MANHOLE DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



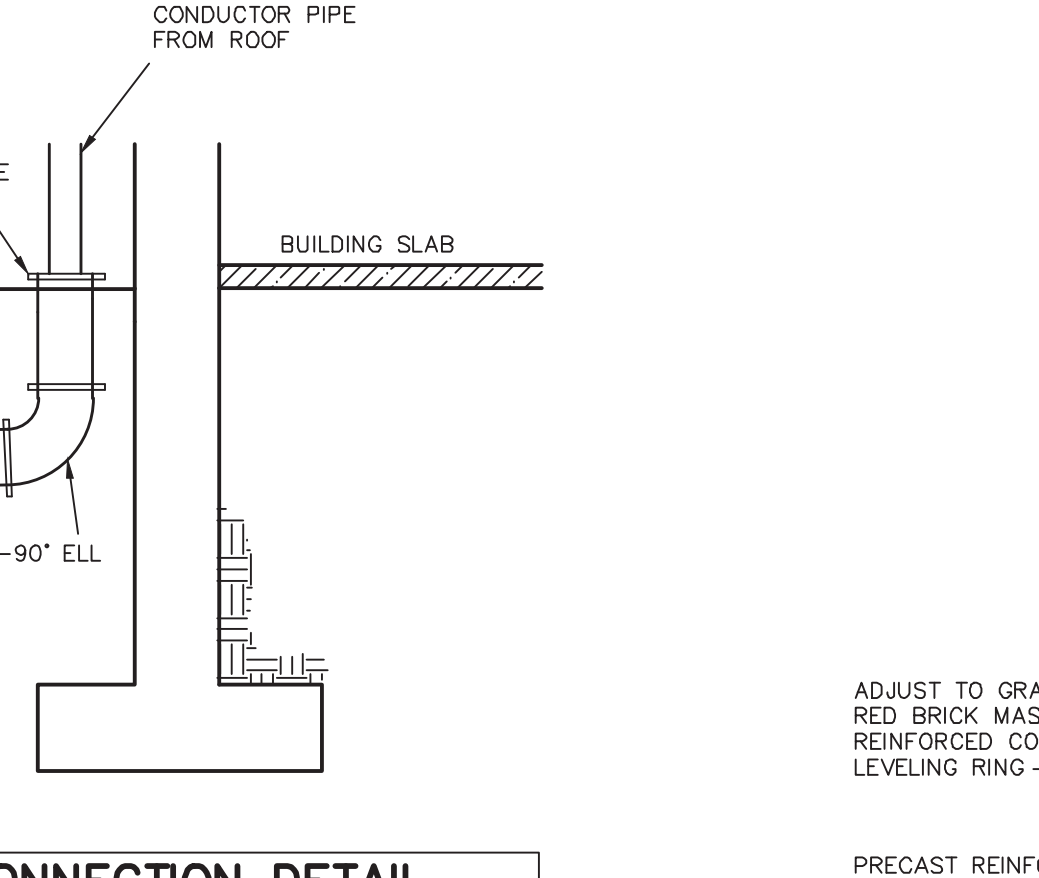
**PRECAST DRAIN MANHOLE DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



**PRECAST CATCH BASIN DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



**ROOF DRAIN CONNECTION DETAIL**  
NOT TO SCALE  
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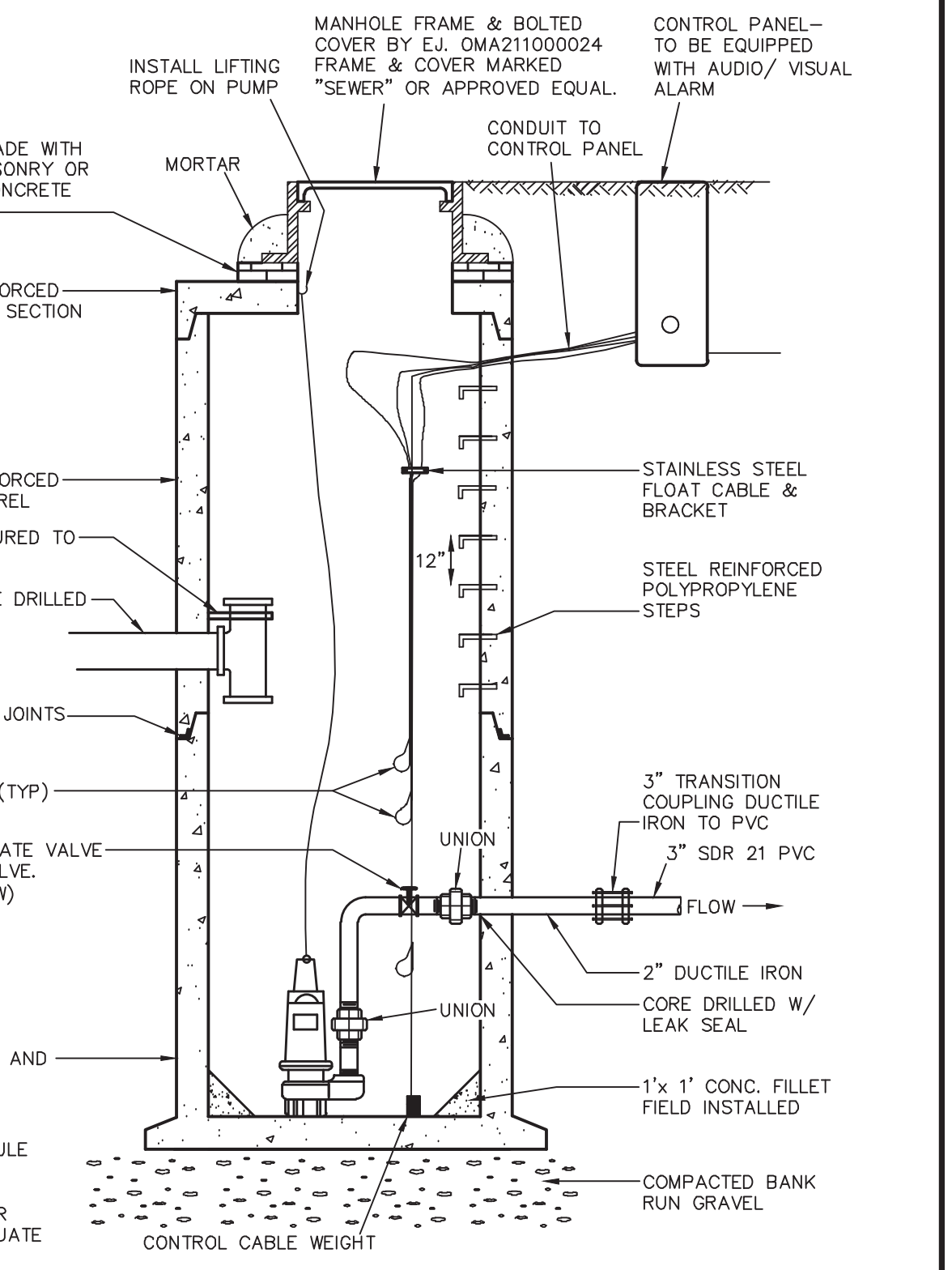
**ROOF DRAIN CONNECTION DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.

**SANITARY PUMP STATION SCHEDULE OF INVERTS**

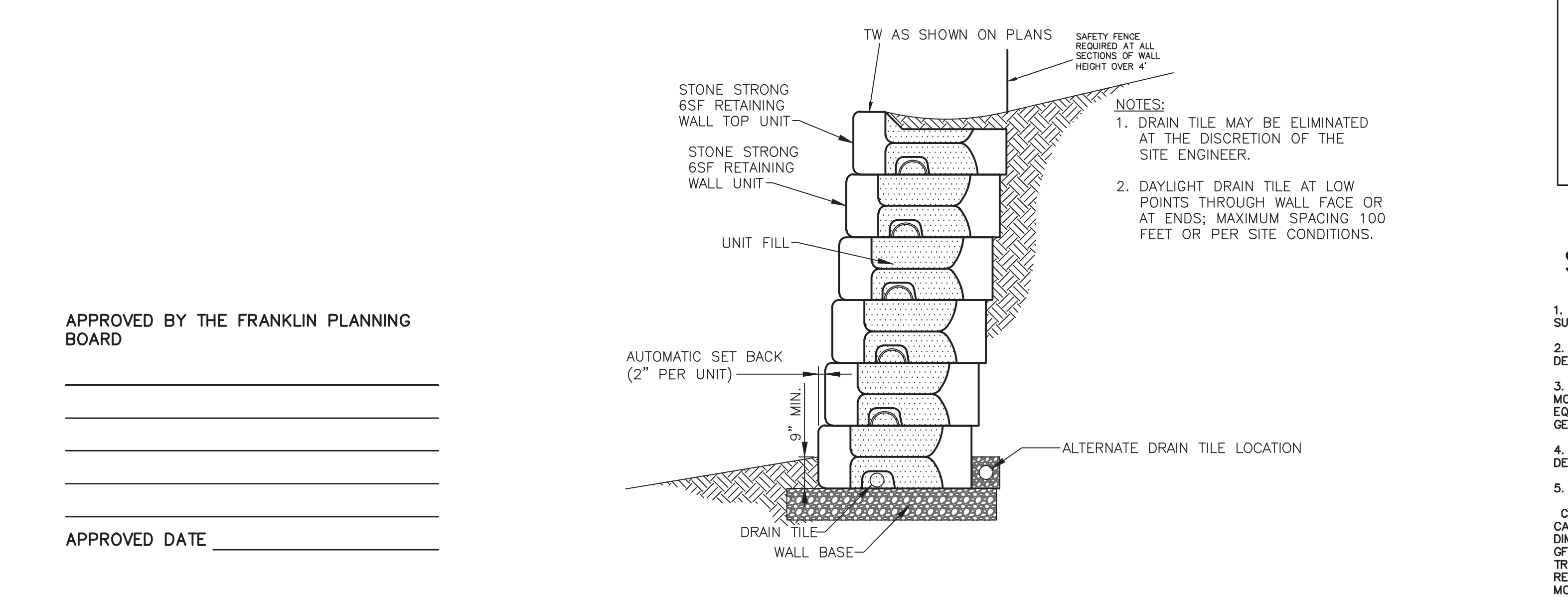
INSIDE BOTTOM OF PUMP STATION	243.8
PUMP OFF	244.8
LEAD PUMP ON	245.8
LAG PUMP ON	246.6
ALARM ON	246.1
INVERT FORCE MAIN	248.6
INVERT 6" IN (LOWEST)	248.8
INSIDE TOP OF PUMP STATION	252.0
RIM	258.0

DESIGN FLOW = 2,250 GPD (150 PEOPLE @ 15 GPD/PERSON)  
 \*USE GOULDS MODEL WS2003 OR EQUAL  
 PUMP SHALL BE 200 VOLT, 3 PHASE  
 MINIMUM OPERATION POINT @ 150 GPM WITH 34.3' TDH

SEE UTILITY PLAN FOR CORRECT ORIENTATION OF INLET, OUTLET, & STEPS



**EJECTOR STATION MANHOLE SECTION**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.



**GRAVITY RETAINING WALL DETAIL**  
NOT TO SCALE  
KELLY ENGINEERING GROUP, INC.

**SEWER PUMP STATION NOTES:**

- HATCH RAIL RISERS AND ELECTRICAL COMPONENTS SHALL BE DETAILED BY THE SUPPLIER. SUPPLIER SHALL PROVIDE SHOP DRAWINGS FOR APPROVAL.
- ALL TANKAGE AND HATCHES SHALL BE DESIGNED FOR H-20 LOADING AND DESIGNED TO ACCOMMODATE DIRECT TRAFFIC.
- BACK UP POWER SHALL BE PROVIDED IF REQUIRED BY OWNER. USE A KOHLER MODEL 30RZ EMERGENCY BACKUP GENERATOR, GAS POWERED OR APPROVED EQUIVALENT. GENERATOR SHALL SUPPLY BACKUP POWER. FINAL LOCATION OF GENERATOR TO BE DETERMINED BY ENGINEER.
- 10KV PAD MOUNT TRANSFORMER TO SUPPLY POWER TO SYSTEM OR AS DETERMINED BY UTILITY COMPANY.
- PROVIDE CONTROL CABINET AS FOLLOWS:  
 CABINET SHALL BE CSI 070405-3 CONTROL CABINET OR APPROVED EQUIVALENT CABINET SHALL BE NEMA 4 STEEL EQUIPPED WITH 4 DOUBLE DOOR, 72 X 72 X 18 DIMENSIONS, 200 AMP METER SOCKET, MAIN DISCONNECT, 200 AMP LOAD CENTER, GF OUTLET, LIGHT, ANTI-CONDENSATION HEATER, CELLULAR DIALER, AUTOMATIC TRANSFER SWITCH, MULTITRODE PUMP CONTROL PANEL, ICL MAX STREAM RADIO RECEIVER PANEL, LIGHTNING ARRESTOR. PANEL SHALL HAVE ELAPSED TIME METERS, MOISTURE AND TEMPERATURE SENSORS
- ALL PUMP STATION HARDWARE SHALL BE 304 STAINLESS STEEL.

APPROVED BY THE FRANKLIN PLANNING BOARD

APPROVED DATE \_\_\_\_\_

SCALE	4.	10/01/20	PER TENANT COORDINATION
NA	3.	07/28/20	PLANNING BOARD COMMENTS
DATE	2.	06/02/20	NO CHANGE
REV	1.	04/10/20	PER PEER REVIEW

DATE: 02/14/20

SHEET 9 of 12

FILE # 2019-127-DT04

JOB # F:\P\2019-127

DRAWN BY C.L.

CHKD BY GSH

APPD BY DNK

**MARCUS PARTNERS**  
176- 210 GROVE STREET  
FRANKLIN, MA

**DETAIL SHEET**

**KELLY ENGINEERING GROUP**  
civil engineering consultants  
0 Campanelli Drive, Braintree, MA 02184  
Phone: 781-843-4333 www.kellyengineeringgroup.com

REGISTERED PROFESSIONAL ENGINEER  
DAVID NOEL KELLY  
CIVIL  
NO. 37942

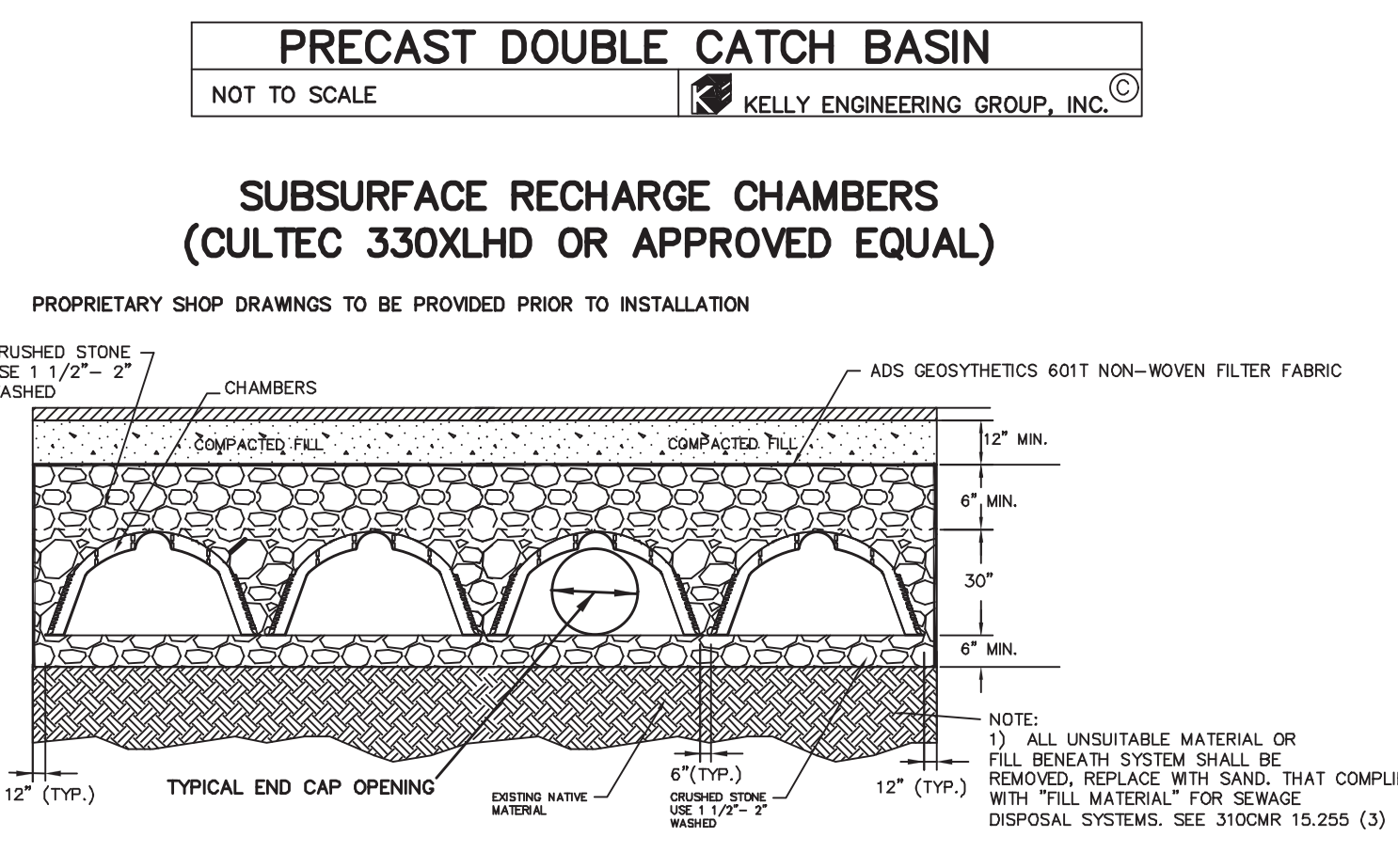
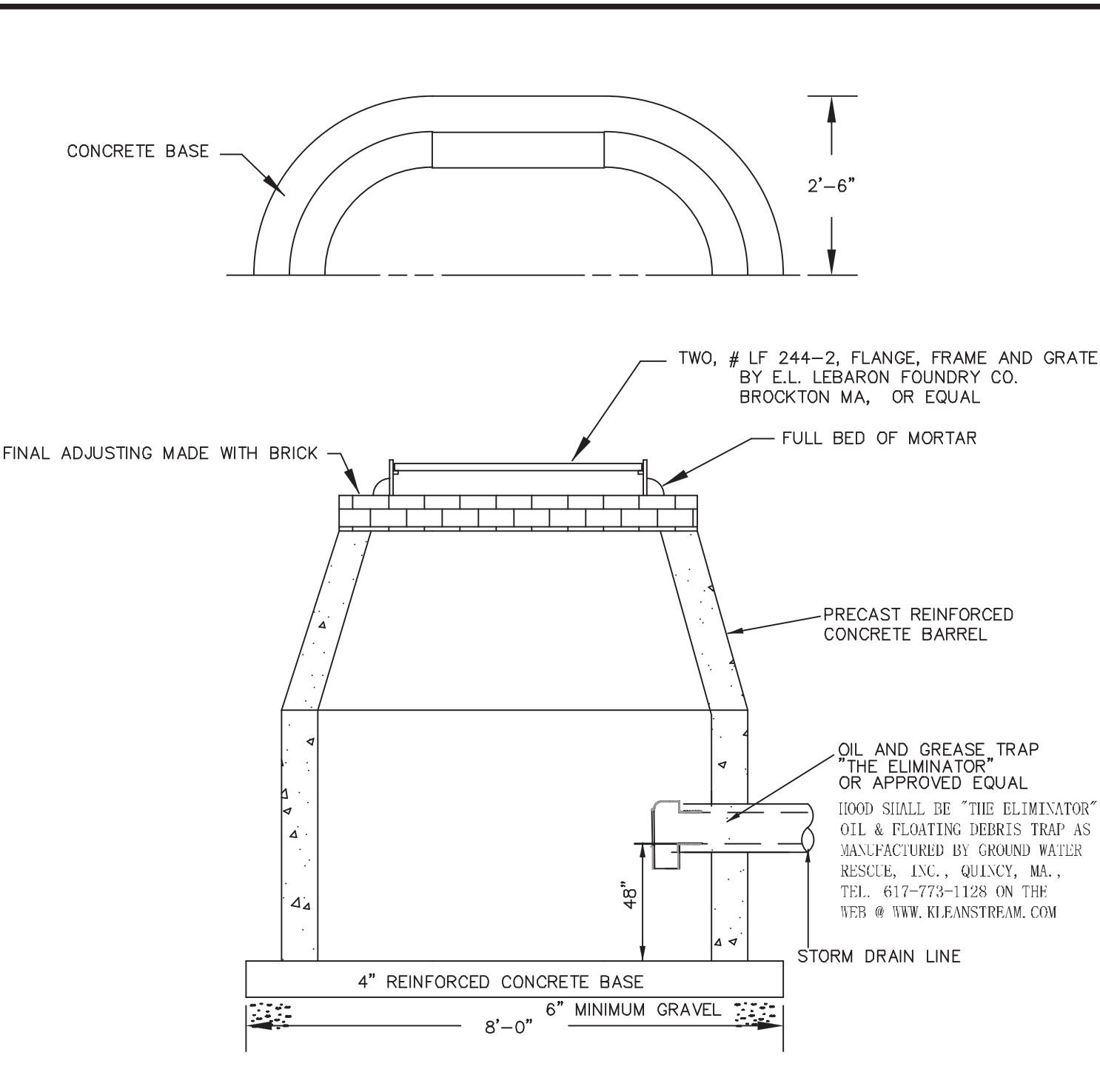
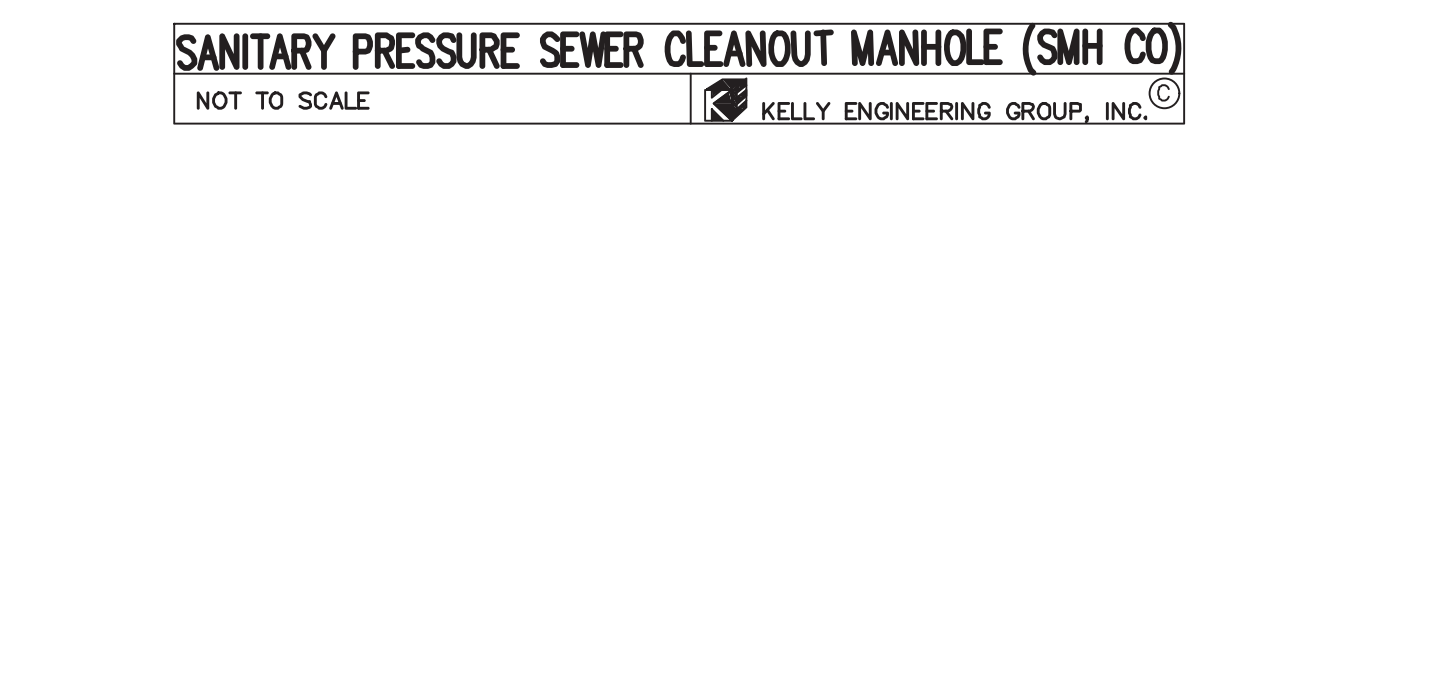
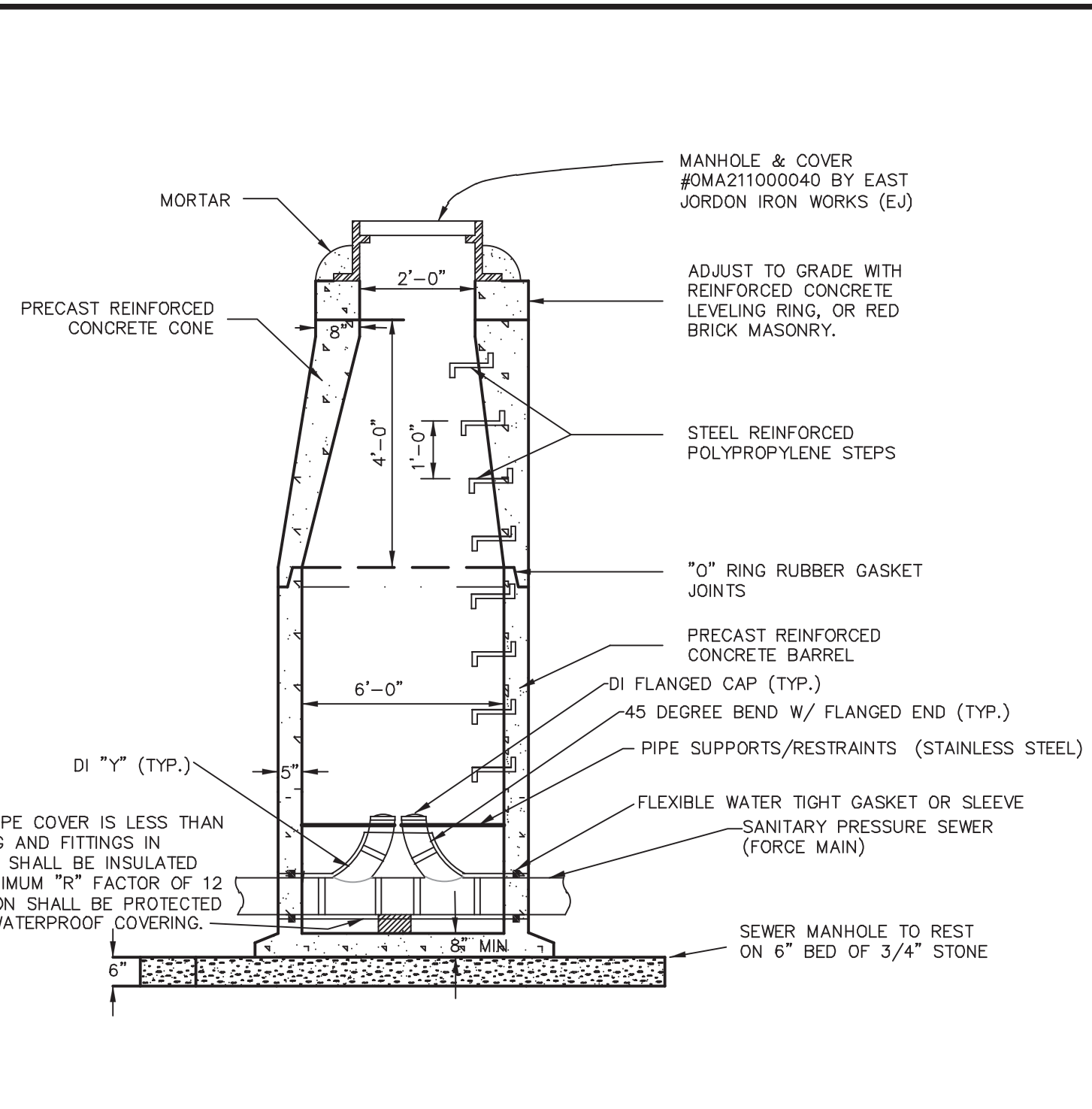
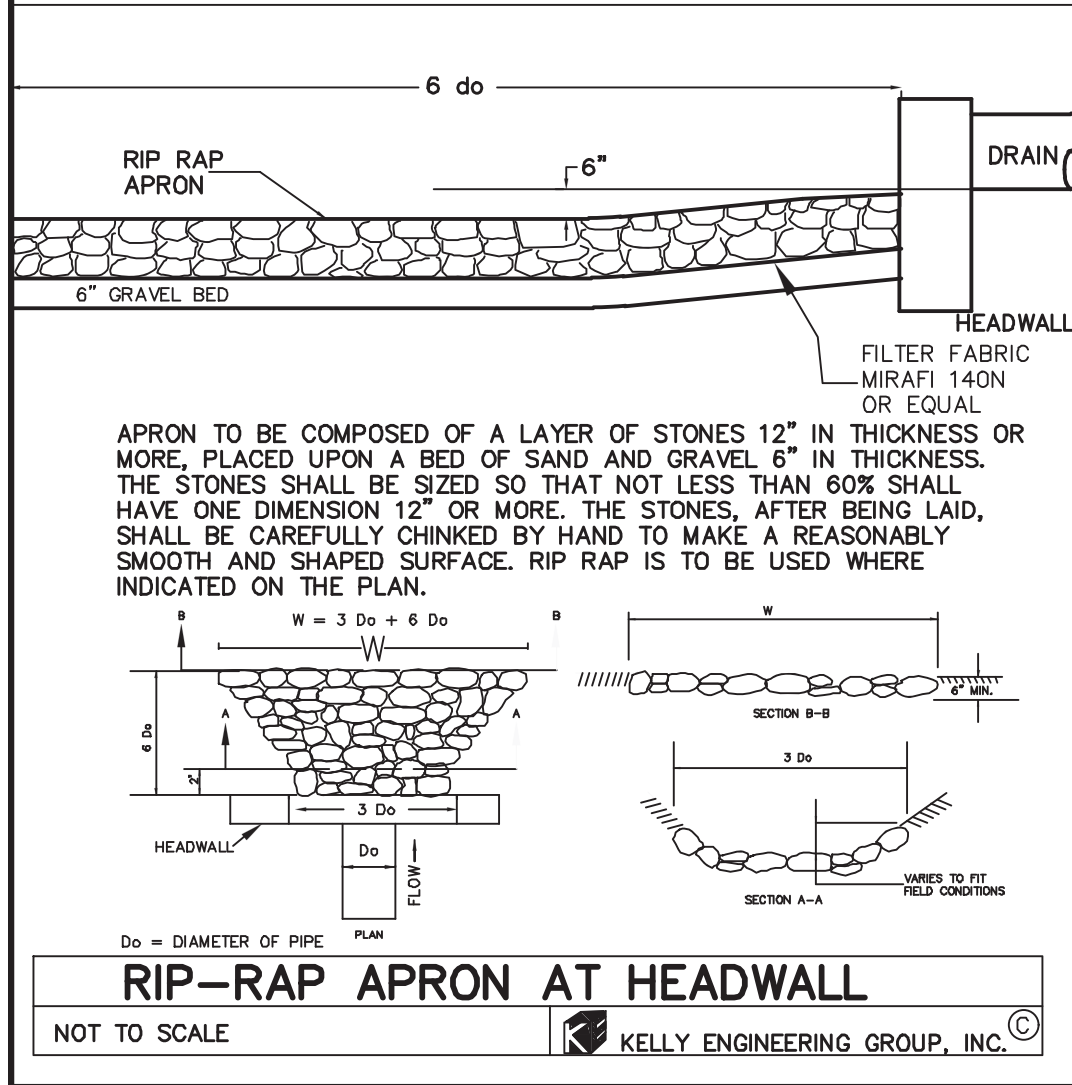
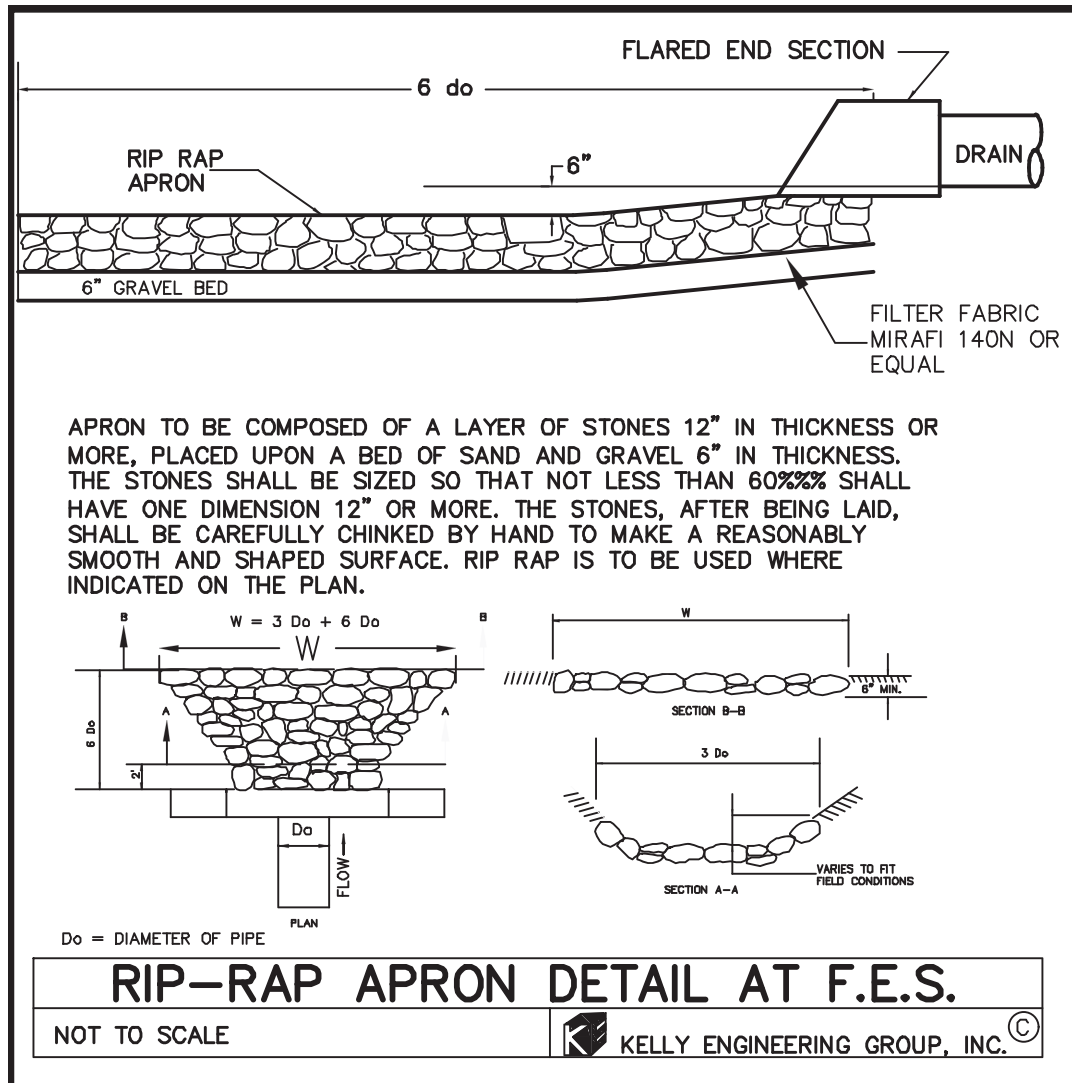
SHEET NO. **9**

KELLY ENGINEERING GROUP SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, OR PROCEDURES UTILIZED BY THE CONTRACTOR NOR FOR THE SAFETY OF PUBLIC OR CONTRACTOR'S EMPLOYEES OR FOR THE FAILURE OF THE CONTRACTOR TO CARRY OUT THE WORKING ACCORDING WITH THE CONTRACT DOCUMENTS.

THE EXTENT OF KELLY ENGINEERING GROUP'S LIABILITY FOR THIS PLAN IS LIMITED TO THE EXTENT OF ITS FEE LESS THIRD PARTY COST

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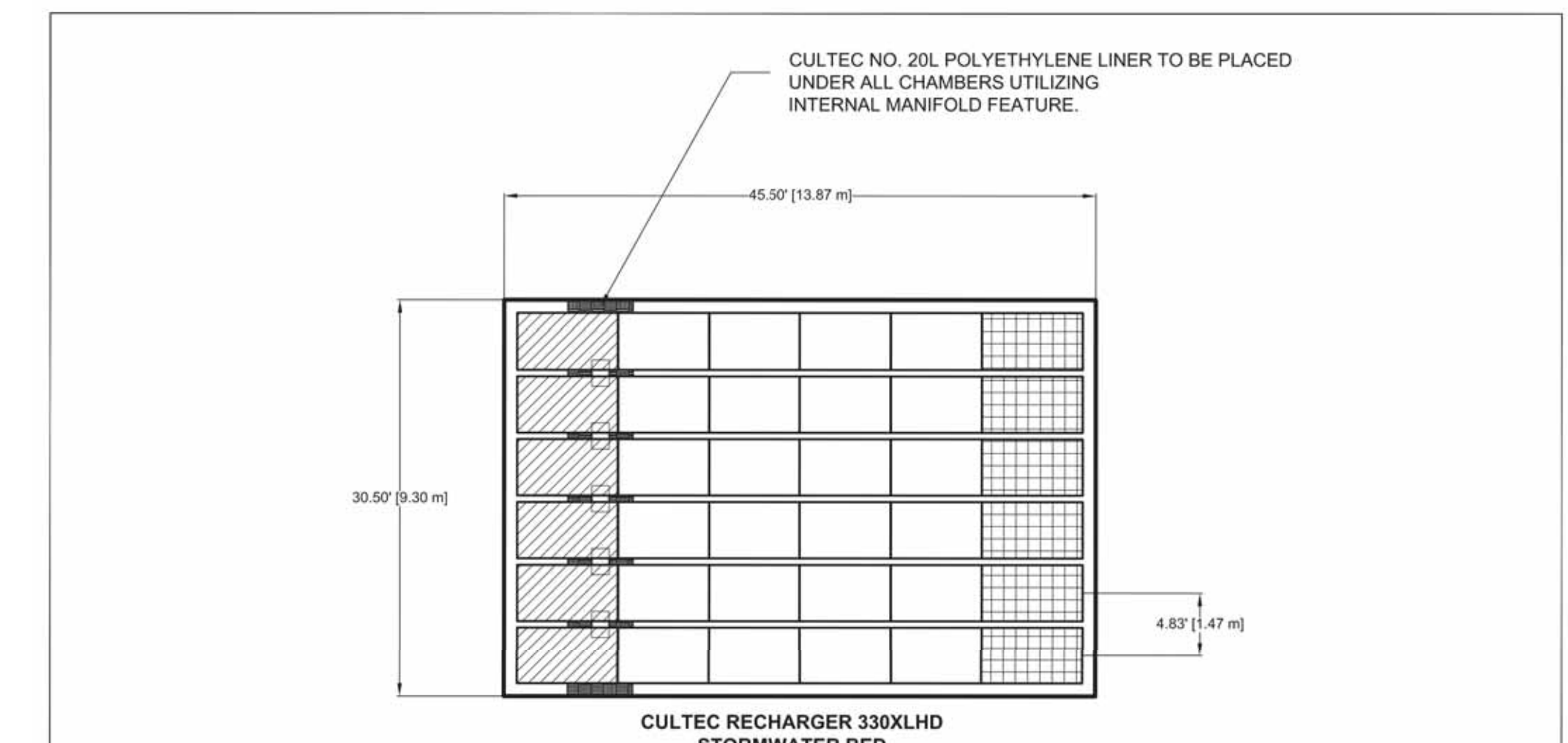
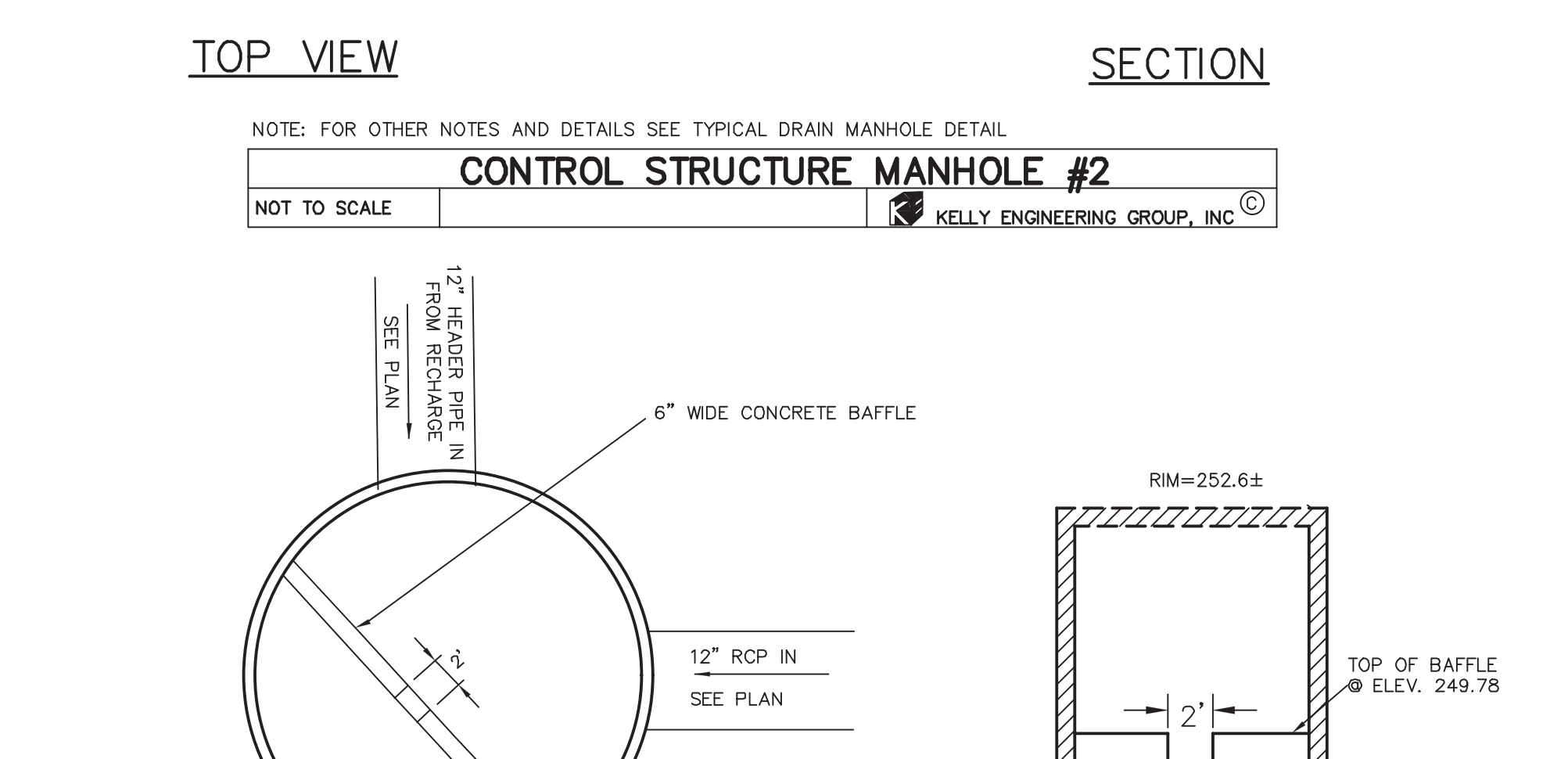
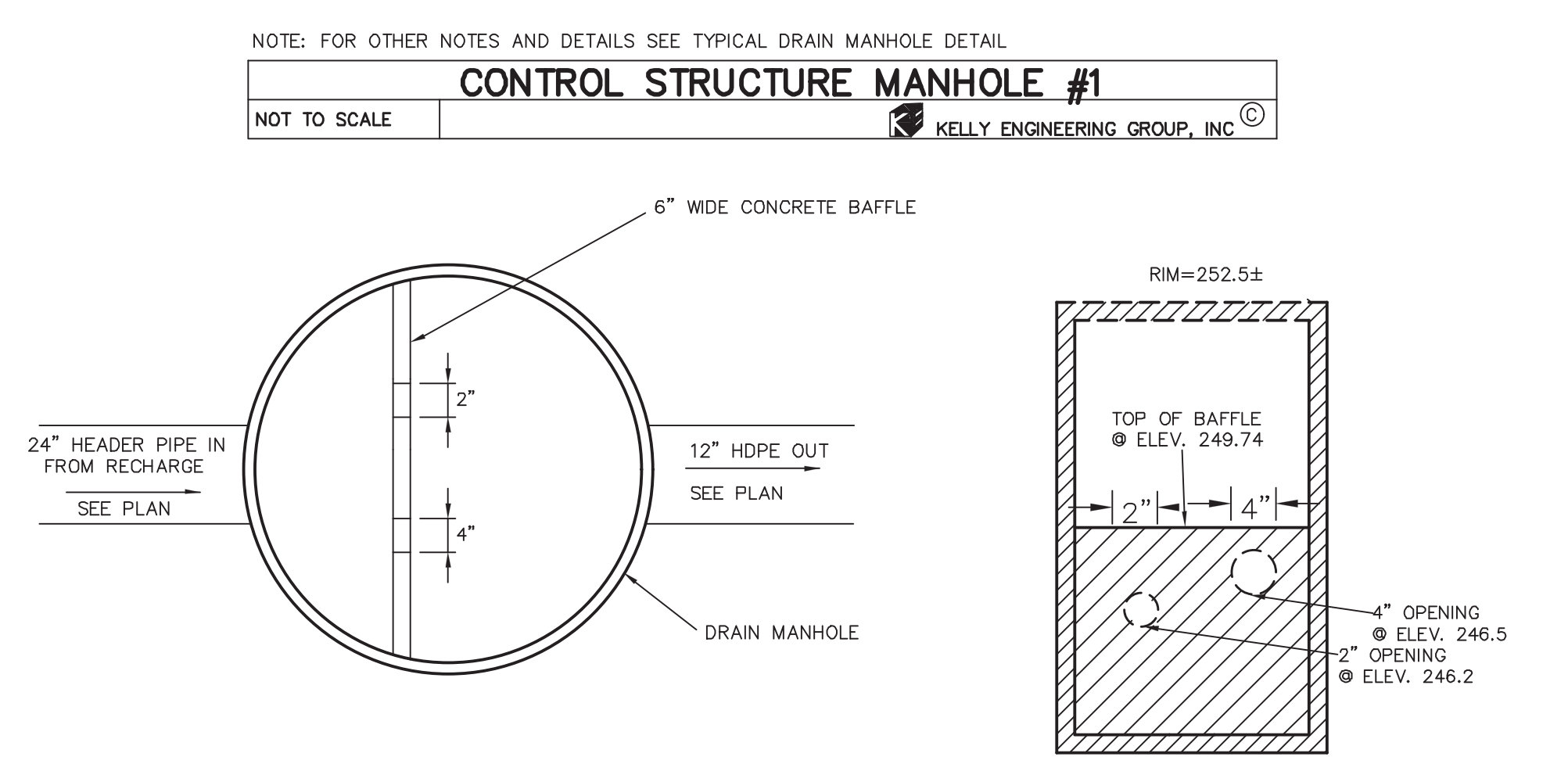
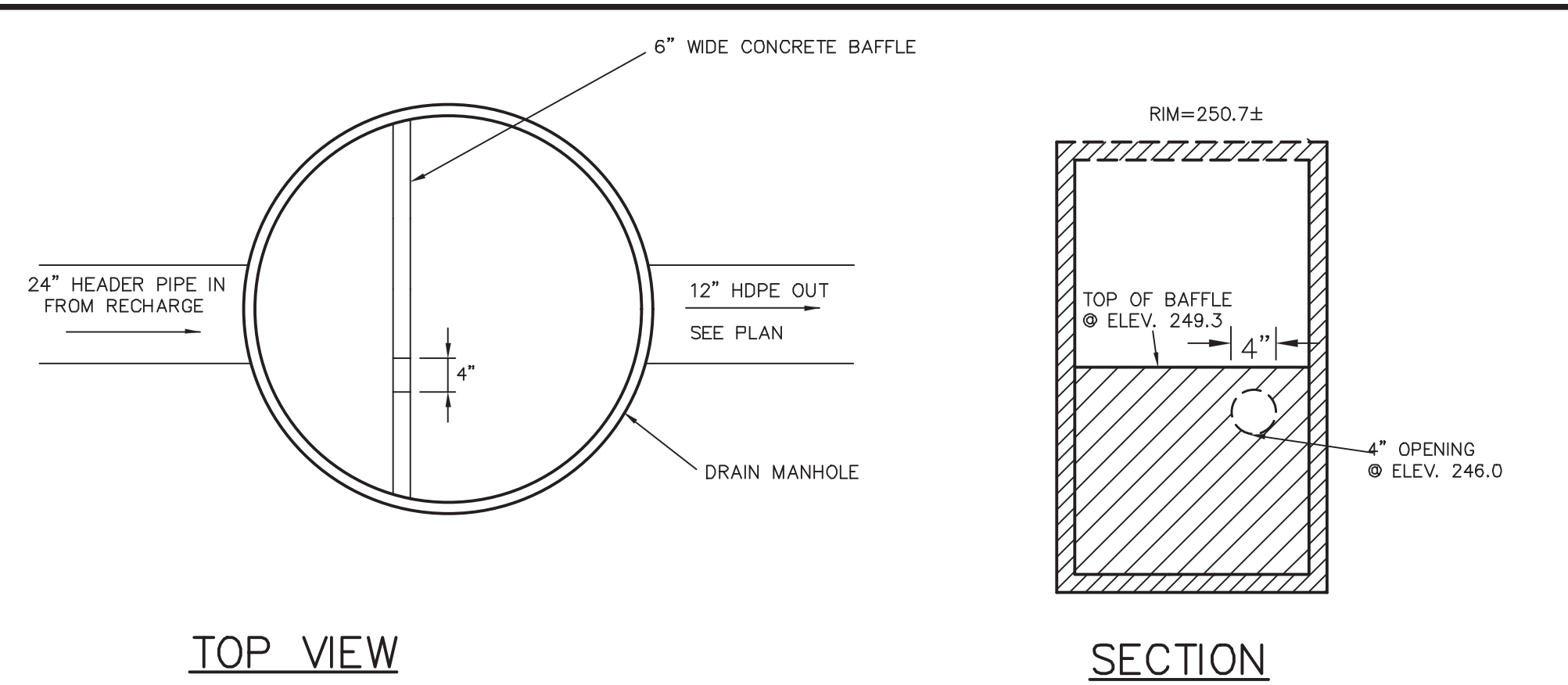
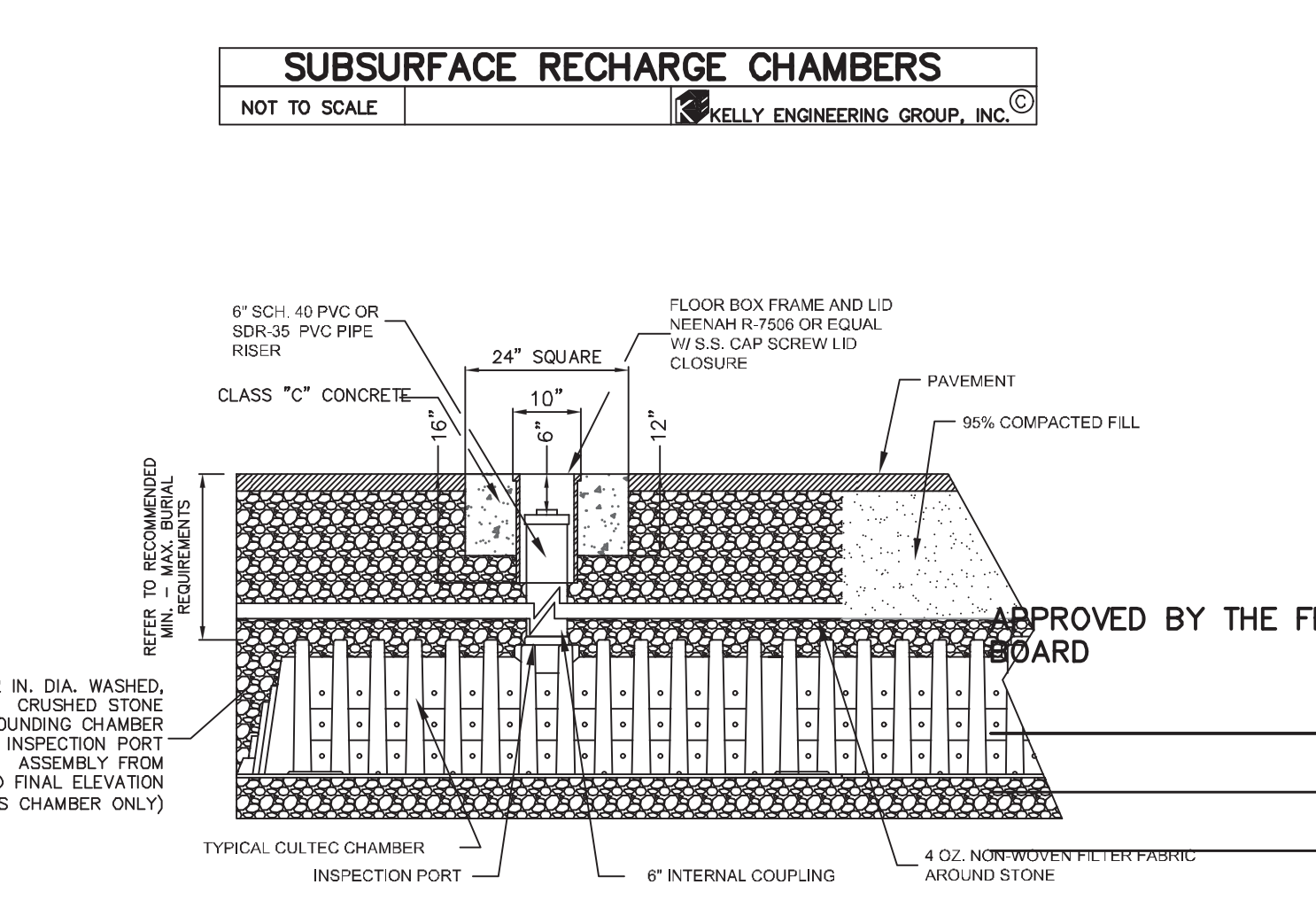


**STORMWATER MANAGEMENT SYSTEM CONSTRUCTION OPERATION + MAINTENANCE NOTES:**

- EXTREME CARE SHALL BE TAKEN DURING CONSTRUCTION TO AVOID SILTATION DURING THE CONSTRUCTION PROCESS.
- EXTREME CARE SHALL BE TAKEN TO PREVENT COMPACTION OF UNDISTURBED SOILS BENEATH RECHARGE SYSTEM.
- THERE SHALL BE NO DISCHARGE OF WATER FOR CONSTRUCTION DEWATERING ACTIVITIES INTO THE STORMWATER MANAGEMENT SYSTEM.
- THERE SHALL BE NO DISCHARGE OF STORMWATER INTO THE RECHARGE SYSTEM UNTIL THE SITE HAS BEEN STABILIZED.

**CONSTRUCTION INSPECTION SCHEDULE**

- SILT SACKS AND SILT SOCKS SHALL BE INSPECTED AND REPLACED AS NECESSARY.
- INSPECTIONS SHALL INCLUDE THE PAVEMENT TO DETERMINE IF ACCUMULATED SEDIMENT IS TO BE REMOVED, OF THE CATCH BASINS TO DETERMINE DEPTH OF SEDIMENTS AND REQUIRED CLEANING, AND INSPECTION OF THE RECHARGE SYSTEM TO DETERMINE IF CLEANING IS NECESSARY.
- AN INSPECTION OF THE EXCAVATION OF THE RECHARGE SYSTEM SHALL BE CONDUCTED BY THE ENGINEER AND A REPRESENTATIVE THE TOWN'S ENGINEERING DEPARTMENT PRIOR TO PLACEMENT OF ANY CHAMBERS.



Recharger 330XLHD Stormwater System by CULTEC, Inc.		CULTEC RECHARGER 330XLHD LEGEND	
STARTER CHAMBERS	6	PIECES	STARTER CHAMBERS
INTERMEDIATE CHAMBERS	24	PIECES	INTERMEDIATE CHAMBERS
END CHAMBERS	6	PIECES	END CHAMBERS
HVLV FC-24 FEED CONNECTOR	5	PIECES	HVLV FC-24 FEED CONNECTOR
CULTEC NO. 410™ FILTER FABRIC	405.02	SQ. YARDS	CULTEC NO. 20L POLYETHYLENE LINER
CULTEC NO. 20L POLYETHYLENE LINER	30.50	FEET	
STONE	109.85	CU. YARDS	
VOLUME OF EXCAVATION	237.72	CU. YARDS	

**CULTEC STORMWATER MANAGEMENT SYSTEM**  
TOTAL STORAGE PROVIDED: 3135.4 cu. feet  
(STORAGE PROVIDED IN STONE: 1188.3 cu. feet)  
(STORAGE PROVIDED IN CONNECTORS 2.3 cu. feet)  
\*SYSTEM INSTALLED REQUIRING STONE AMOUNTS OF 6.0 INCHES BELOW CHAMBERS, 6.0 INCHES ABOVE AND A 12.0 INCHES BORDER SURROUNDING

CULTEC, Inc.		CULTEC STORMWATER SYSTEM	
PROJECT NO.	2019-127-DT04	PROJECT NO.	DATE
PROJECT ADDRESS	176-210 GROVE STREET, FRANKLIN, MA	DESIGNED BY	ENGINEER
PROJECT CITY, STATE	FRANKLIN, MA	SCALE	N.T.S.
		SHEET NO.	1 OF 1

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SCALE	4.	10/01/20	PER TENANT COORDINATION
NA	3.	07/28/20	PLANNING BOARD COMMENTS
DATE	2.	06/02/20	NO CHANGE
02/14/20	1.	04/10/20	PER PEER REVIEW
REV	DATE	REVISION	BY

**MARCUS PARTNERS**  
176-210 GROVE STREET  
FRANKLIN, MA

**DETAIL SHEET**

DRAWN BY  
CHKD BY  
APPD BY  
DNK

**KELLY ENGINEERING GROUP**  
civil engineering consultants  
0 Campanelli Drive, Braintree, MA 02184  
Phone: 781-843-4333 www.kellyengineeringgroup.com

**DAVID NOEL KELLY CIVIL ENGINEER**  
REG. STATE OF MASSACHUSETTS  
No. 37942

**SHEET NO. 10**

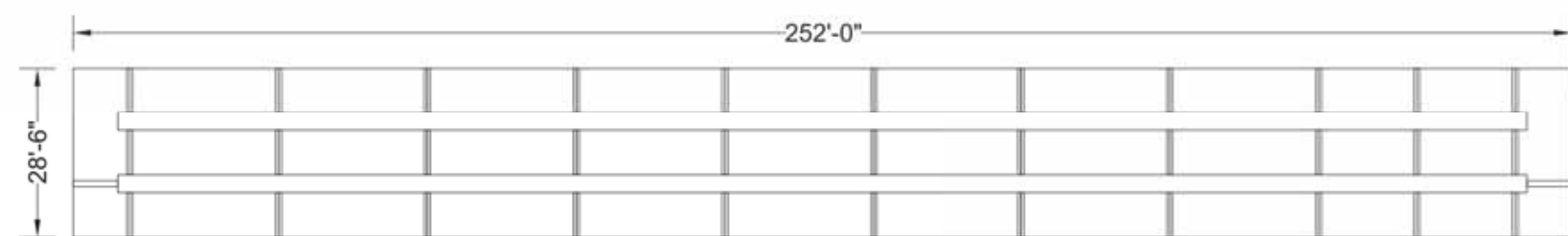
**PROJECT SUMMARY**

**CALCULATION DETAILS**  
 • LOADING = HS20 & HS25  
 • APPROX. LINEAR FOOTAGE = 768 ft.

**STORAGE SUMMARY**  
 • STORAGE VOLUME REQUIRED = 46,600 cf.  
 • PIPE STORAGE VOLUME = 33,929 cf.  
 • BACKFILL STORAGE VOLUME = 12,768 cf.  
 • TOTAL STORAGE PROVIDED = 46,697 cf.

**PIPE DETAILS**  
 • DIAMETER = 90 IN.  
 • CORRUGATION = 5x1  
 • GAGE = 16  
 • COATING = ALT2  
 • WALL TYPE = Perforated  
 • BARRELL SPACING = 36 IN.

**BACKFILL DETAILS**  
 • WIDTH AT ENDS = 12 IN.  
 • ABOVE PIPE = 6 IN.  
 • WIDTH AT SIDES = 12 IN.  
 • BELOW PIPE = 6 IN.



ASSEMBLY  
SCALE: 1" = 30'

DYO1548 206 Grove Street  
 90" CMP Detention - 43604 cf.  
 DETENTION SYSTEM

PROJECT NO.	158	DATE	7/30/2020
DESIGNED	DYO	DRAWN	DYO
CHECKED	DYO	APPROVED	DYO
SHEET NO.	D1		

**NOTES:**  
 THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

- NOTES:**
- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
  - ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
  - ALL RISERS AND STUBS ARE 2 1/2" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
  - RISERS TO BE FIELD TRIMMED TO GRADE.
  - QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
  - BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
  - THE PROJECT SUMMARY IS REFLECTIVE OF THE DYO'S DESIGN. QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.

MARK	DATE	REVISION DESCRIPTION	BY

**CONTECH**  
 ENGINEERED SOLUTIONS LLC  
 www.contechES.com  
 9025 Centre Pointe Dr., Suite 400, West Chester, OH 45399  
 800-338-1122 513-645-7000 513-645-7993 FAX

**CONTECH**  
 CMP DETENTION SYSTEMS  
 CONTECH  
 DYO'S  
 DRAWING

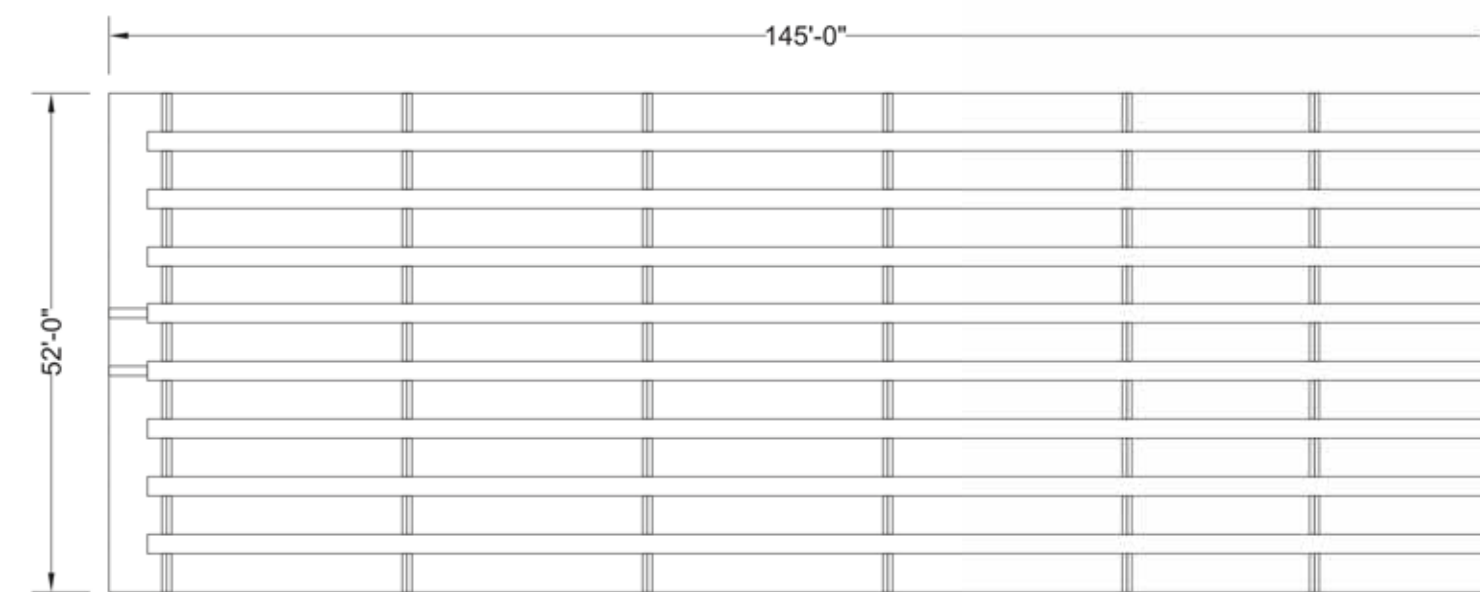
**PROJECT SUMMARY**

**CALCULATION DETAILS**  
 • LOADING = HS20 & HS25  
 • APPROX. LINEAR FOOTAGE = 1,321 ft.

**STORAGE SUMMARY**  
 • STORAGE VOLUME REQUIRED = 25,800 cf.  
 • PIPE STORAGE VOLUME = 16,600 cf.  
 • BACKFILL STORAGE VOLUME = 9,236 cf.  
 • TOTAL STORAGE PROVIDED = 25,836 cf.

**PIPE DETAILS**  
 • DIAMETER = 48 IN.  
 • CORRUGATION = 2 2/3x1/2  
 • GAGE = 16  
 • COATING = ALT2  
 • WALL TYPE = Perforated  
 • BARRELL SPACING = 24 IN.

**BACKFILL DETAILS**  
 • WIDTH AT ENDS = 12 IN.  
 • ABOVE PIPE = 6 IN.  
 • WIDTH AT SIDES = 12 IN.  
 • BELOW PIPE = 6 IN.



ASSEMBLY  
SCALE: 1" = 20'

DYO1584 206 Grove Street  
 48" CMP Detention - 16600 cf.  
 DETENTION SYSTEM

PROJECT NO.	1584	DATE	7/30/2020
DESIGNED	DYO	DRAWN	DYO
CHECKED	DYO	APPROVED	DYO
SHEET NO.	D1		

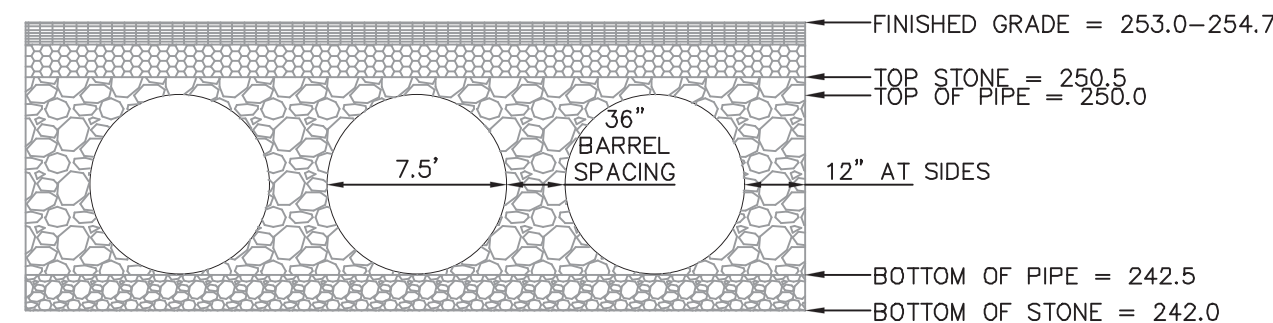
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MARK	DATE	REVISION DESCRIPTION	BY

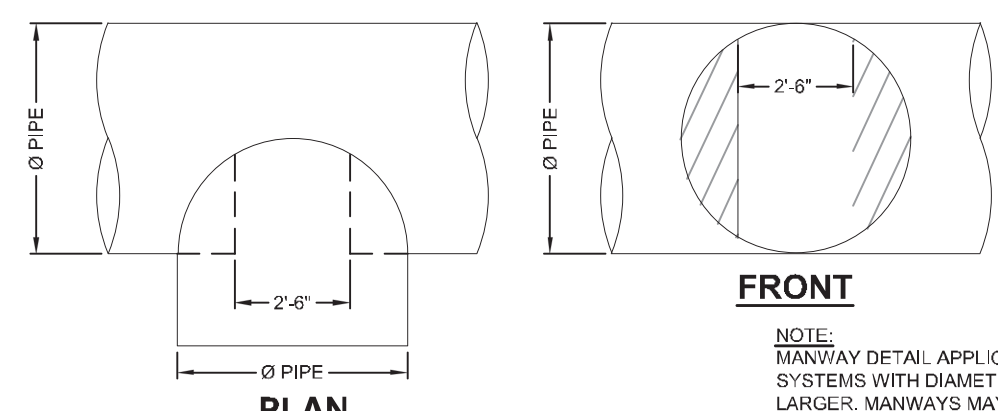
**CONTECH**  
 ENGINEERED SOLUTIONS LLC  
 www.contechES.com  
 9025 Centre Pointe Dr., Suite 400, West Chester, OH 45399  
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**CONTECH**  
 CMP DETENTION SYSTEMS  
 CONTECH  
 DYO'S  
 DRAWING

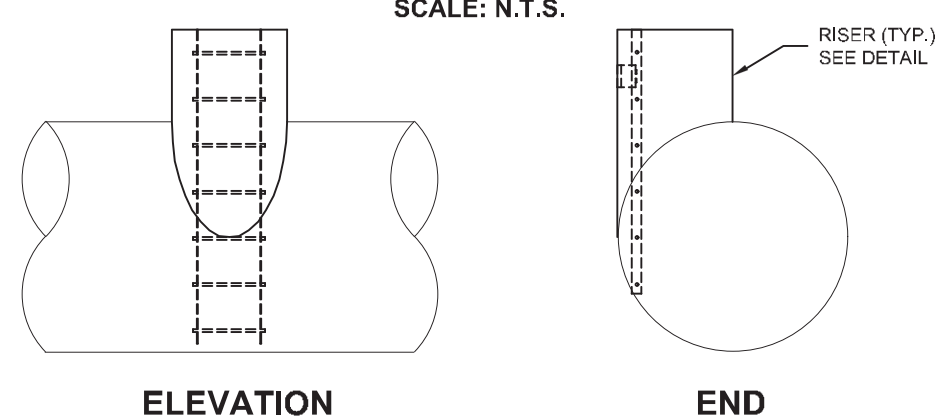


SECTION VIEW SUBSURFACE SYSTEM 1  
 NOT TO SCALE  
 KELLY ENGINEERING GROUP, INC.

NOTE: PRIOR TO CONSTRUCTION FULL SHOP DRAWINGS TO BE PROVIDED BY MANUFACTURER.

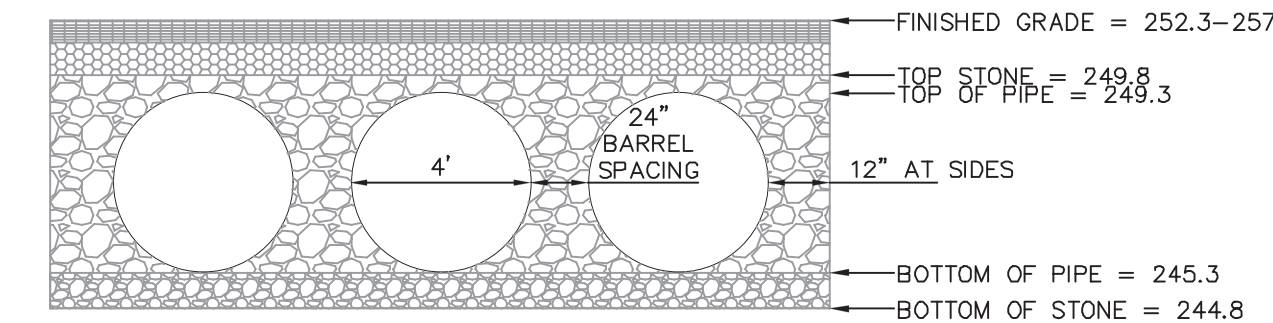


TYPICAL MANWAY DETAIL  
 SCALE: N.T.S.



TYPICAL RISER DETAIL  
 SCALE: N.T.S.

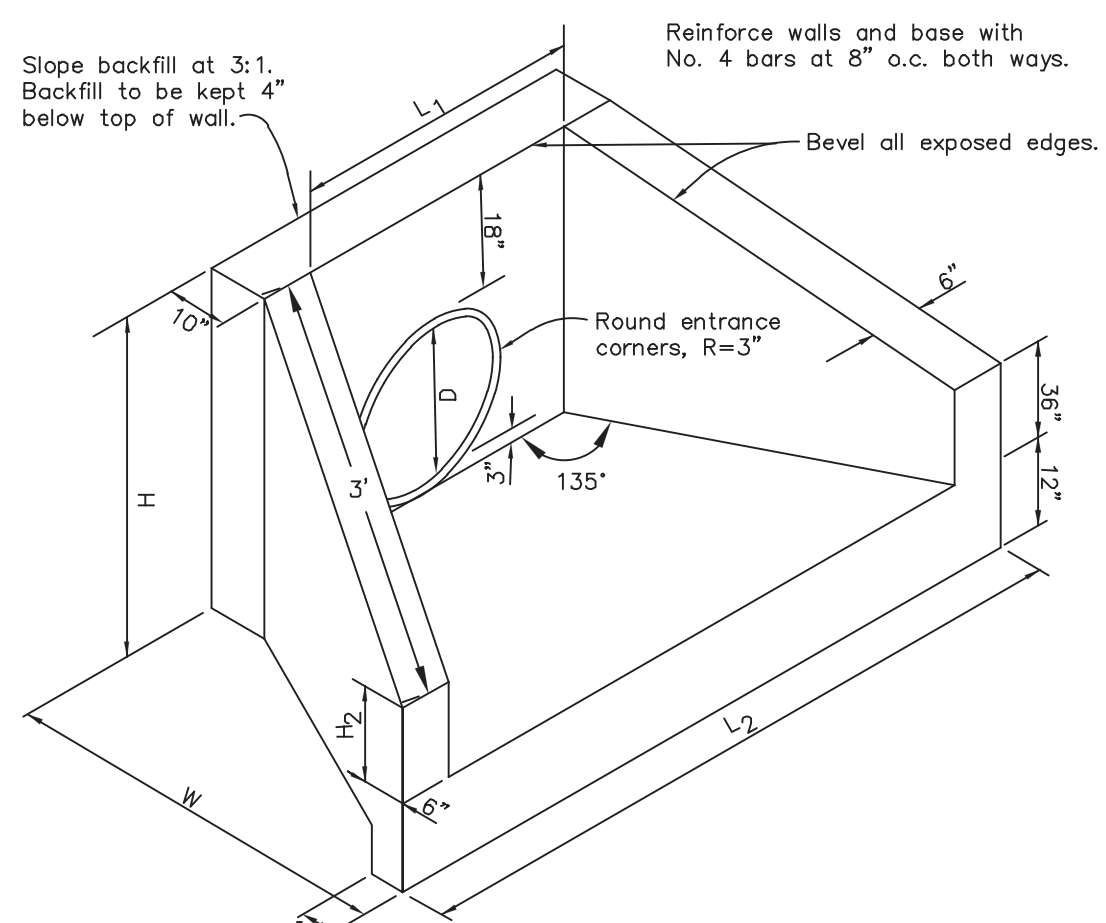
NOTE: PRIOR TO CONSTRUCTION FULL SHOP DRAWINGS TO BE PROVIDED BY MANUFACTURER.



SECTION VIEW SUBSURFACE SYSTEM 2  
 NOT TO SCALE  
 KELLY ENGINEERING GROUP, INC.

NOTE: PRIOR TO CONSTRUCTION FULL SHOP DRAWINGS TO BE PROVIDED BY MANUFACTURER.

HEADWALL #	D	H <sub>1</sub>	H <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	W <sub>1</sub>
1	12"	35'	0.5'	4'	7.5'	2.5'
2	15"	3.7'	0.5'	4'	8.0'	3.0'
3	15"	3.7'	0.5'	4'	8.0'	3.0'
4	12"	3.5'	0.5'	4'	7.5'	3.0'
5	42"	5.7'	0.5'	6.8'	13'	4.0'
6	42"	5.7'	0.5'	6.8'	13'	4.0'



NOTE:  
 Concrete shall be Class B" ( 5 sack mix ) unless otherwise noted.

HEADWALL DETAIL  
 NOT TO SCALE  
 KELLY ENGINEERING GROUP, INC.

APPROVED BY THE FRANKLIN PLANNING BOARD

APPROVED DATE \_\_\_\_\_

SCALE	4.	10/01/20	PER TENANT COORDINATION
NA	3.	07/28/20	PLANNING BOARD COMMENTS
DATE	2.	06/02/20	NO CHANGE
02/14/20	1.	04/10/20	PER PEER REVIEW
REVISION	DATE	REVISION	BY

**MARCUS PARTNERS**  
 176- 210 GROVE STREET  
 FRANKLIN, MA

**DETAIL SHEET**

**KELLY ENGINEERING GROUP**  
 civil engineering consultants  
 0 Campanelli Drive, Braintree, MA 02184  
 Phone: 781-843-4333 www.kellyengineeringgroup.com

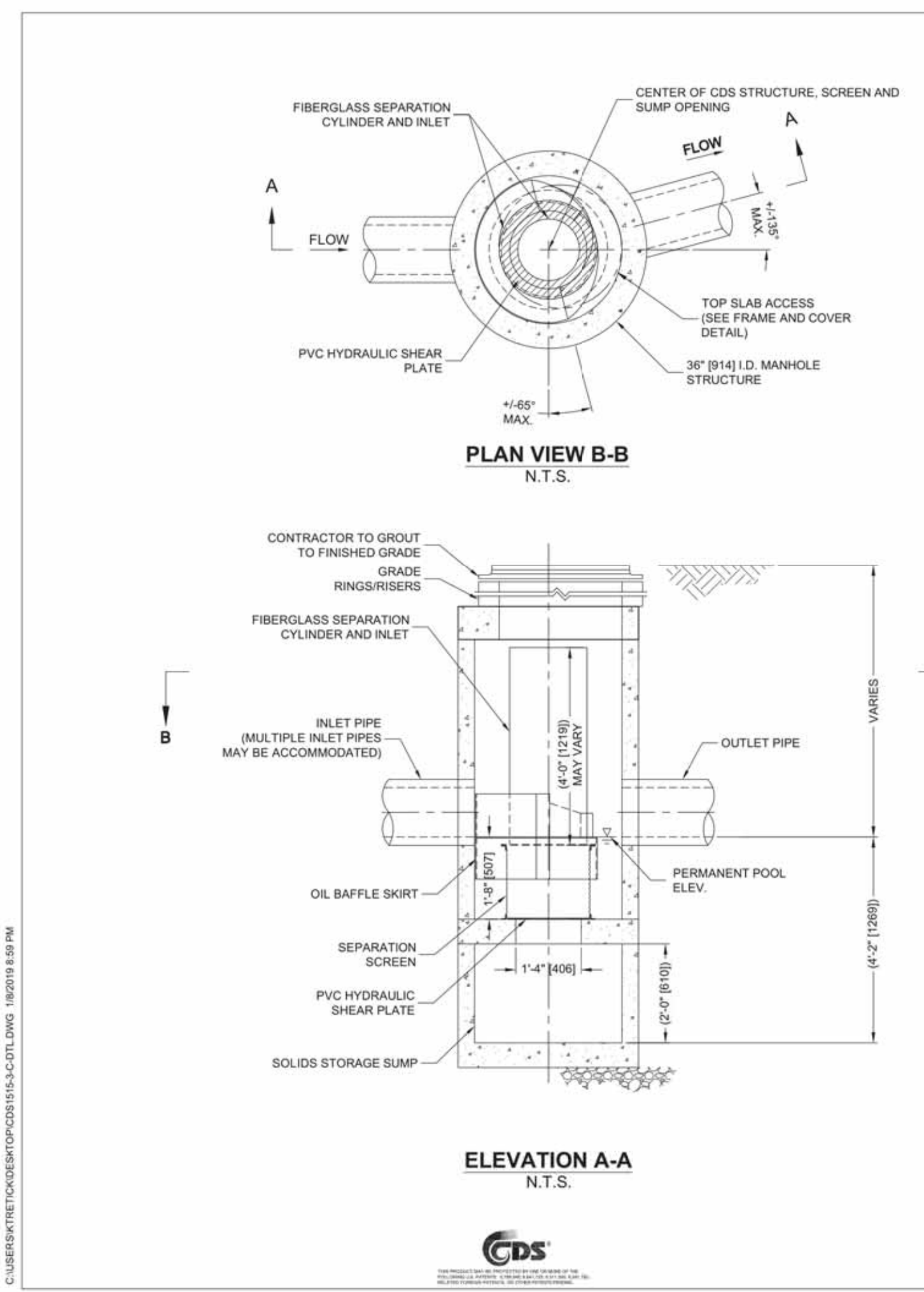
REGISTERED PROFESSIONAL ENGINEER  
 DAVID NOEL KELLY  
 CIVIL ENGINEER  
 NO. 37442  
 State of Massachusetts

DATE: 2020.10.08 10:49:07 AM

SHEET NO. **11**

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**CDS1515-3-C DESIGN NOTES**  
 THE STANDARD CDS1515-3-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

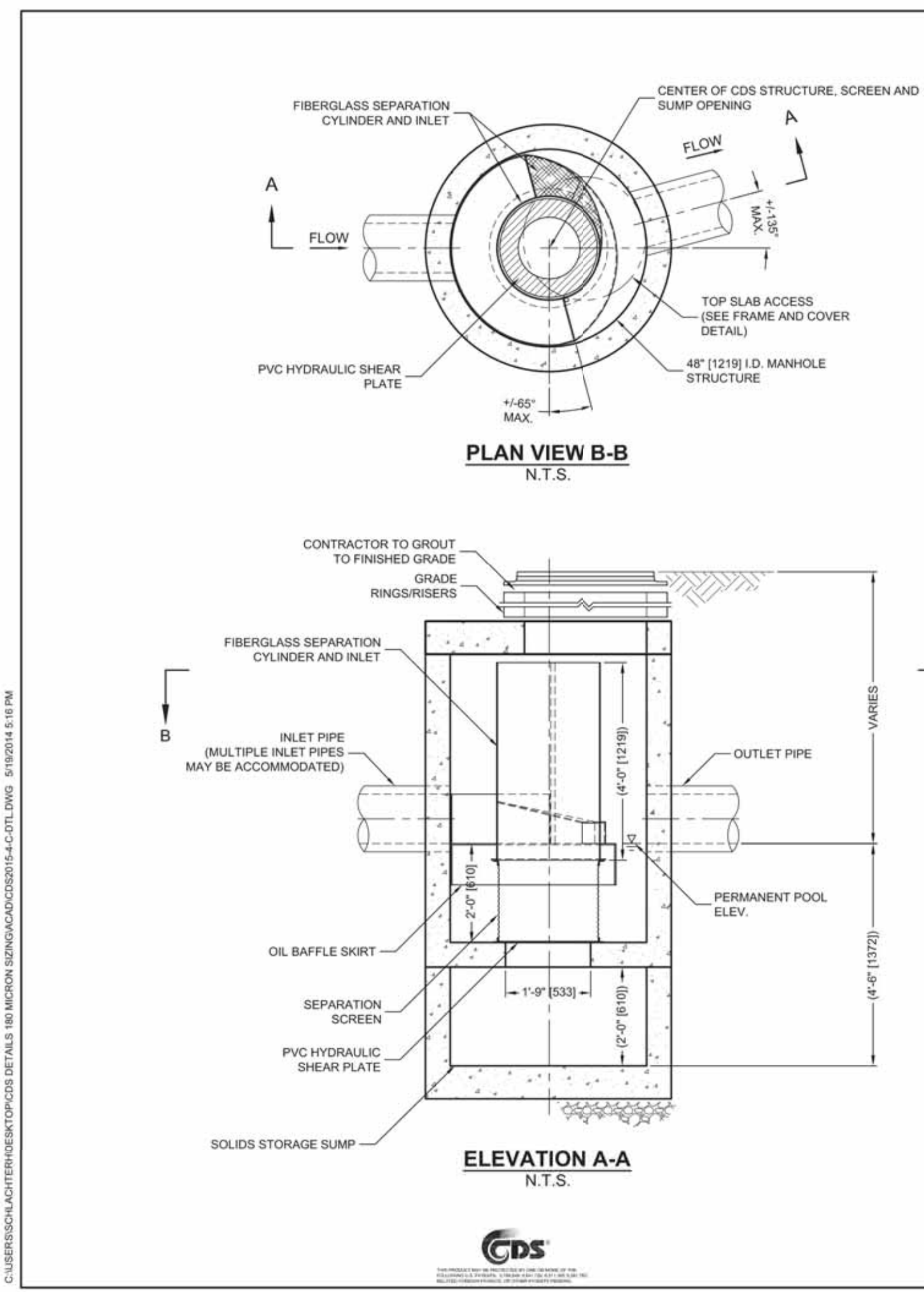
**SITE SPECIFIC DATA REQUIREMENTS**

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			
PEAK FLOW RATE (CFS OR L/s)			
RETURN PERIOD OF PEAK FLOW (YRS)			
SCREEN APERTURE (2400 OR 4700)			
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

- GENERAL NOTES**
- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
  - FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. [www.contechES.com](http://www.contechES.com)
  - CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
  - STRUCTURE SHALL MEET AASHTO H20 AND CASTINGS SHALL MEET AASHTO M308 AND BE CAST WITH THE CONTECH LOGO.
  - IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
  - CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.
- INSTALLATION NOTES**
- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
  - CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
  - CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
  - CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
  - CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

**CONTECH ENGINEERED SOLUTIONS LLC**  
 9025 Centre Pointe Dr., Suite 400, West Chester, OH 45399  
 800-338-1122 513-645-7000 513-645-7993 FAX

**CDS1515-3-C ONLINE CDS STANDARD DETAIL**



**CDS2015-4-C DESIGN NOTES**  
 THE STANDARD CDS2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

**CONFIGURATION DESCRIPTION**

GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS

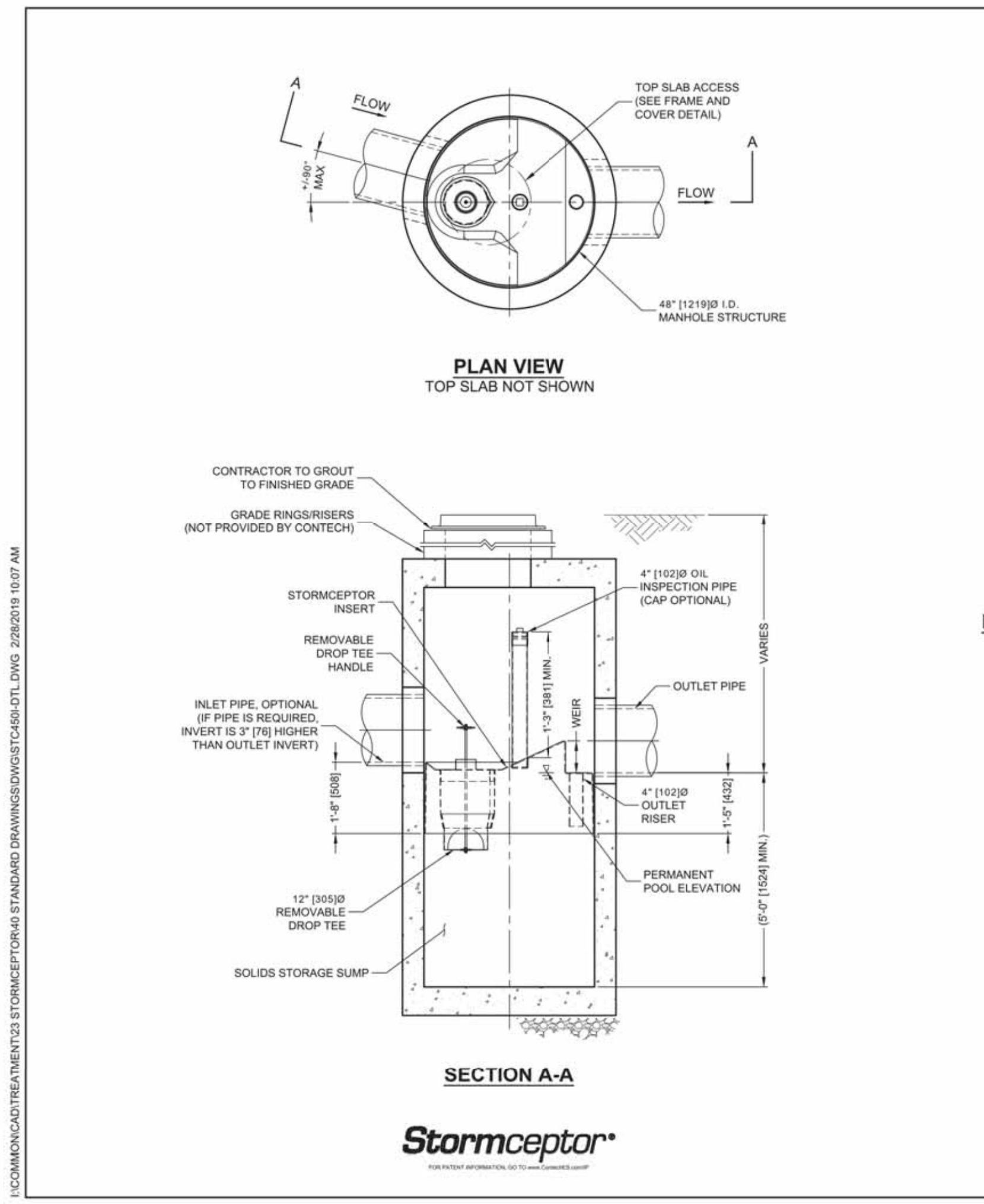
**SITE SPECIFIC DATA REQUIREMENTS**

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			
PEAK FLOW RATE (CFS OR L/s)			
RETURN PERIOD OF PEAK FLOW (YRS)			
SCREEN APERTURE (2400 OR 4700)			
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT	
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

- GENERAL NOTES**
- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
  - DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
  - FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. [www.contechES.com](http://www.contechES.com)
  - CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
  - STRUCTURE SHALL MEET AASHTO H20 AND CASTINGS SHALL MEET AASHTO M308 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
  - PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
- INSTALLATION NOTES**
- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
  - CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
  - CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
  - CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
  - CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

**CONTECH ENGINEERED SOLUTIONS LLC**  
 9025 Centre Pointe Dr., Suite 400, West Chester, OH 45399  
 800-338-1122 513-645-7000 513-645-7993 FAX

**CDS2015-4-C INLINE CDS STANDARD DETAIL**



**STORMCEPTOR DESIGN NOTES**  
 THE STANDARD STC450I CONFIGURATION WITH ROUND, SOLID FRAME AND COVER, AND INLET PIPE IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

**CONFIGURATION DESCRIPTION**

GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES

**SITE SPECIFIC DATA REQUIREMENTS**

STRUCTURE ID			
WATER QUALITY FLOW RATE (cfs [L/s])			
PEAK FLOW RATE (cfs [L/s])			
RETURN PERIOD OF PEAK FLOW (yrs)			
RIM ELEVATION			
PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
NOTES/SPECIAL REQUIREMENTS:			

- GENERAL NOTES**
- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
  - FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. [www.contechES.com](http://www.contechES.com)
  - STORMCEPTOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
  - STORMCEPTOR STRUCTURE SHALL MEET AASHTO H20 AND CASTINGS SHALL MEET AASHTO M308 AND BE CAST WITH THE CONTECH LOGO.
  - STORMCEPTOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
  - ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].
- INSTALLATION NOTES**
- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
  - CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMCEPTOR MANHOLE STRUCTURE.
  - CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
  - CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
  - CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

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**STC450I STORMCEPTOR STANDARD DETAIL**

APPROVED BY THE FRANKLIN PLANNING BOARD

APPROVED DATE \_\_\_\_\_

KELLY ENGINEERING GROUP SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION METHODS, TECHNIQUES, OR PROCEDURES UTILIZED BY THE CONTRACTOR, NOR FOR THE SAFETY OF PUBLIC OR CONTRACTOR'S EMPLOYEES, OR FOR THE FAILURE OF THE CONTRACTOR TO CARRY OUT THE WORKING ACCORDING WITH THE CONTRACT DOCUMENTS. THE EXTENT OF KELLY ENGINEERING GROUP'S LIABILITY FOR THIS PLAN IS LIMITED TO THE EXTENT OF ITS FEE LESS THIRD PARTY COSTS.

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SCALE	4.	10/01/20	NO CHANGE	
NA	3.	07/28/20	PLANNING BOARD COMMENTS	
DATE	2.	06/02/20	NO CHANGE	
02/14/20	REV.	DATE	PER PEER REVIEW	BY
	1.	04/10/20	REVISION	

**MARCUS PARTNERS**  
 176- 210 GROVE STREET  
 FRANKLIN, MA

**DETAIL SHEET**

**KELLY ENGINEERING GROUP**  
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**DAVID NOEL KELLY CIVIL NO. 37942 REGISTERED PROFESSIONAL ENGINEER**

SHEET NO. **12**



Plan View

## SCHEDULE

SYMBOL	LABEL	QUANTITY	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	LAMP	# OF LAMPS	LLF	LUMENS PER LAMP	WATTAGE
	A	4	Lithonia Lighting	RSX1 LED P4 40K R3 MOUNTING HS XX XX	RSX Area Fixture Size 1 P4 Lumen Package 4000K CCT Type R3 Distribution with HS Shield	LED	1	0.9	12480	133.1431
	B-1	4	Lithonia Lighting	RSX1 LED P4 40K R4 MVOLT MOUNTING XX XX	RSX Area Fixture Size 1 P4 Lumen Package 4000K CCT Type R4 Distribution	LED	1	0.9	16573	133.14
	B-2	3	Lithonia Lighting	RSX1 LED P4 40K R4 MVOLT MOUNTING XX XX	RSX Area Fixture Size 1 P4 Lumen Package 3000K CCT Type R4 Distribution	LED	1	0.9	15084	266.28
	B-3	3	Lithonia Lighting	RSX1 LED P4 40K R4 MVOLT MOUNTING XX XX	RSX Area Fixture Size 1 P4 Lumen Package 4000K CCT Type R4 Distribution	LED	1	0.9	16573	399.42
	C	15	Lithonia Lighting	WDGE3 LED P4 70CRI R4 40K MVOLT MOUNTIN XX XX	WDGE3 LED WITH P4 - PERFORMANCE PACKAGE, 4000K, 70CRI, TYPE 4 OPTIC	LED	1	0.9	12537	87.8914
	D	3	Lithonia Lighting	RSXF2 LED P3 40K AWFDMVOLT MOUNTING XX XX	RSXF Flood Fixture Size 2 P3 Lumen Package 4000K CCT Type AWFDM Distribution	LED	1	0.9	20882	149.98
	E	5	Lithonia Lighting	DSX0 LED P4 40K BLC MVOLT MOUNTING XX XX	DSX0 LED P4 40K BLC MVOLT	LED	1	0.9	8656	92

## STATISTICS

DESCRIPTION	SYMBOL	AVG.	MAX	MIN.	MAX/AMIN	AVG/AMIN
Boundary	+	0.2 fc	8.8 fc	0.0 fc	N/A	N/A
Pavement / Parking Lot	+	1.1 fc	7.4 fc	0.0 fc	N/A	N/A
Pavement / Parking Lot	+	2.0 fc	10.1 fc	0.0 fc	N/A	N/A
Residential Side	X	0.0 fc	0.0 fc	0.0 fc	N/A	N/A
Trucks	+	1.7 fc	4.2 fc	0.6 fc	7.0:1	2.8:1

- NOTES:
- REFLECTANCES ASSUMED: WALL : 50 GROUND : 20
  - MOUNTING HEIGHTS: 20'-0" ABOVE GRADE
  - TASK HEIGHT: AT GRADE
  - CALCULATION POINT SPACING: 15'X15' OC

DISCLAIMER:

- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION. VALUES REPRESENTED ARE AN APPROXIMATION GENERATED FROM MANUFACTURERS PHOTOMETRIC IN-HOUSE OR INDEPENDANT LAB TEST WITH DATA SUPPLIED BY LAMP MANUFACTURERS.