Robert Hill Way Senior Apartments

Robert Hill Way, Ashland, Massachusetts

One - Stop Affordable Housing Application
Submitted to Massachusetts Department of Housing & Community Development
Submitted By EA Fish Development & The Planning Office for Urban Affairs



SUBMISSIONS :

October 12, 2012	ONE - STOP APPLICATION
July 31, 2013	ONE - STOP APPLICATION

PROJECT INFORMATION :

DEVELOPER	EA FISH DEVELOPMENT 536 GRANITE STREET 3rd FLOOR BRAINTREE, MA 02184-9107 PHONE # : 781.380.1600 FAX # : 781.380.1650
	PLANNING OFFICE OF URBAN AFFAIRS 84 STATE STREET BOSTON, MA 02190 PHONE # : 617.350.8885 FAX # : 617.350.8889
PROPERTY MANAGER	PEABODY PROPERTIES, INC. 536 GRANITE STREET BRAINTREE, MA 02184-9107 PHONE # : 781.749.1000 FAX # : 781.749.1001
GENERAL CONTRACTOR	DELLBROOK CONSTRUCTION, LLC 536 GRANITE STREET BRAINTREE, MA 02184 PHONE # : 781.380.1675 FAX # : 781.380.1676
ARCHITECT	THE ARCHITECTURAL TEAM, INC. 50 COMMANDANT'S WAY AT ADMIRALS HILL CHELSEA, MA 02150 PHONE # : 617.889.4402 FAX # : 617.884.4329
CIVIL ENGINEER	HORSLEY WITTEN GROUP, INC. 90 ROUTE 6A SANDWICH, MA 02563 PHONE # : 508.833.6600 FAX # : 508.833.3150

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Consultant:

Revision:
1 July 31, 2013

Architect of Record:

DRAFT
NOT FOR CONSTRUCTION

Drawn: Y.Y.
Checked: E.B.
Scale: NOT TO SCALE
Key Plan:

Project Name:
Robert Hill Way
Senior Apartments

ASHLAND, MA

Sheet Name:
TITLE SHEET

Project Number:
09069

Issue Date:
October 10, 2012

Sheet Number:
T1.01

Wednesday, July 31, 2013 1:51:50 PM
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PROJECT SUMMARY :

Project Floor Area Tabulation (Phase 1)

Floor	Units NSF	Common	Mech., Stor, Laundry, & etc.	Shafts, Walls, etc.	Total GSF	Unit Mix 1BR	Average NSF per Unit	Number of Bedrooms	Number of Bathrooms	Number of HP Units
Ground	6,542	2,610	381	997	10,530	11	595	11	11	1
1st	15,088	3,615	1,093	1,434	21,230	25	604	25	25	2
2nd	16,876	2,122	763	1,469	21,230	28	603	28	28	1
Total	38,506	8,347	2,237	3,900	52,990	64	602	64	64	4

Lot Area	341,884 SF	7.8 Acres
Dwelling Units per Acre	8.2	
Building Footprint Area	21,230 SF	
Building Coverage - % of Site	6.2%	
Parking /Paved Areas Coverage - % of Site	17.5%	
Lanscaped Open Areas - % of Site	76.3%	
Building Height (Ft./Stories)	33'-0" / 2 Stories + basement	
Parking Spaces Provided	76 Spaces	1.19 per Unit

Rentable to Gross SF Ratio	73%

Notes:

1. Coverage calculations for building, paved areas, lot disturbance, impervious areas and open space exclude easement and wetlands.
2. **Units NSF Floor Area:** The floor area of residential units is measured from the interior face of unit/unit and unit/corridor demising walls, and interior face of exterior walls.
3. **Common Floor Area:** Common floor area includes resident common amentity space, corridors, lobbies, elevators, stairways, offices, and similar common spaces. Common floor area is measured to the interior face of walls.
4. **Mechanical/Storage Floor Area:** Mechanical/Storage floor area includes all mechanical, storage, trash, electrical, janitor, fire protection, and similar spaces. Mechanical/Storage floor area is measured to the interior face of walls.
5. **Total GSF Floor Area:** Total floor area includes all of the spaces listed above in Items 1, 2, & 3 as well as shafts and interior/exterior walls, measured to the outer face of exterior walls.
6. **Buiding Height:** Building height is measured per the Town of Ashland Zoning ByLaw, Section 4.1: "The height of any building or structure shall not exceed thirty-five (35) feet at any face measured from the average grade for each such face, and shall not exceed three (3) stories above the average grade at the foundation lines." *Average grade* is measured from the proposed average grade. The height of the *face* is measured to the top of the roof's highest ridge.

ZONING SUMMARY :

Project Statistics (Phases 1 and 2):

- Location: Ashland, MA
- Zoning District: Residential A (RA), from Zoning Map, Town of Ashland, MA 2010
- Lot Area: 583,425 SF (13.4 +/- Acres)
- 112 1BR Residential Units
- 146 Surface Parking Spaces

Ordinance Reviewed: Zoning By-laws of the Town of Ashland

Section 3 – Use Regulations:

Table 3-1, Table of Uses:

Multi-family dwellings are not permitted in the RA Zoning District – **Zoning Waiver Required**

Section 4 – Dimensional Requirements

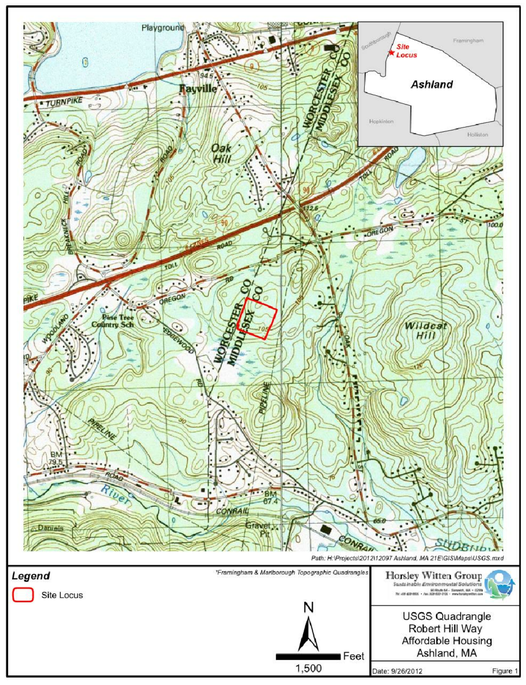
Dimersional Feature	Requirement RA District	Comprehensive Permit April 7, 2008	Proposed Drawings June 6, 2013	Compliance with April 7, 2008 Comprehensive Permit Project Plans	Compliance with Zoning By-law	Zoning Waiver Required
Min.Lot Area	30,000 SF/ 0.69 Acres	583,704 SF/ 13.4 Acres	583,704 SF/ 13.4 Acres	Yes	Yes	No
Min Lot Frontage	150 FT	40 FT	40 FT	Yes	No	**Yes**
Front Yard	40 FT	125 FT	241 FT	Yes	Yes	No
Side Yard	10 FT	30 FT	99 FT	Yes	Yes	No
Rear Yard	30 FT	6 FT	113 FT	Yes	Yes	No
Building Height – Stories/Ft.[i]	N/A Stories/ 35 FT	2 Stories/ FT not listed	2 Stories/ 33 FT	Yes	Yes	No
Parking	2 Spaces per unit	1.14 Spaces per affordable unit	1.3 per spaces per affordable unit	Yes[ii]	No	**Yes**

Notes:

[i] **Building Height** – Per the Section 10 Definitions, Building Height is measured from the grade plane to the average height of the highest roof surface. The Grade Plane is the referenced plane representing the average of finished ground level adjoining the building at all exterior walls.

[ii] **Parking** – The April 7, 2008 Comprehensive Permit granted a zoning waiver allowing 1.14 parking spaces per unit for the Senior Affordable Apartment units. The proposed design includes 1.3 spaces per senior affordable unit (i.e. all proposed 112 units are affordable), in compliance with the April 7, 2008 zoning waiver.

USGS MAP



LOCUS PLAN



DRAWING LIST

DWG #	DRAWING TITLE	ISSUE DATES: OCTOBER 10, 2012 ONE - STOP APPLICATION	JULY 31, 2013 ONE - STOP APPLICATION
TITLE SHEETS			
T0.01	TITLE SHEET	●	●
T1.02	DRAWING LIST AND PROJECT INFORMATION	●	●
CIVIL DRAWINGS			
C-1	COVER SHEET	●	●
C-2	NOTES & LEGEND	●	●
C-3	EXISTING CONDITIONS		●
C-4	PRELIMINARY PHASING PLAN		●
C-5	PROPOSED SITE PLAN		●
C-6	GRADING & EROSION CONTROL		●
C-7	UTILITY PLAN		●
C-8	DETAILS 1		●
C-9	DETAILS 2		●
C-10	DETAILS 3		●
C-11	DETAILS 4		●
C-12	DETAILS 5		●
C-13	LANDSCAPE PLAN		●
C-14	LANDSCAPE DETAILS		●
ARCHITECTURAL DRAWINGS			
FLOOR PLANS			
A1.01	GROUND, FIRST & SECOND FLOOR PLANS	●	●
A2.01	TYPICAL UNIT FLOOR PLANS	●	●
EXTERIOR ELEVATIONS			
A4.01	BUILDING ELEVATIONS	●	●
A4.02	BUILDING ELEVATIONS	●	●
BUILDING SECTIONS			
A5.01	BUILDING SECTIONS & WALL SECTIONS	●	●

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Consultant:

Revision:
1 July 31, 2013

Architect of Record:

DRAFT
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Drawn: Y.Y.
Checked: E.B.
Scale: NOT TO SCALE
Key Plan:

Project Name:
Robert Hill Way
Senior Apartments

ASHLAND, MA

Sheet Name:
DRAWING LIST
& PROJECT INFORMATION

Project Number:
09069

Issue Date:
October 10, 2012

Sheet Number:
T1.02

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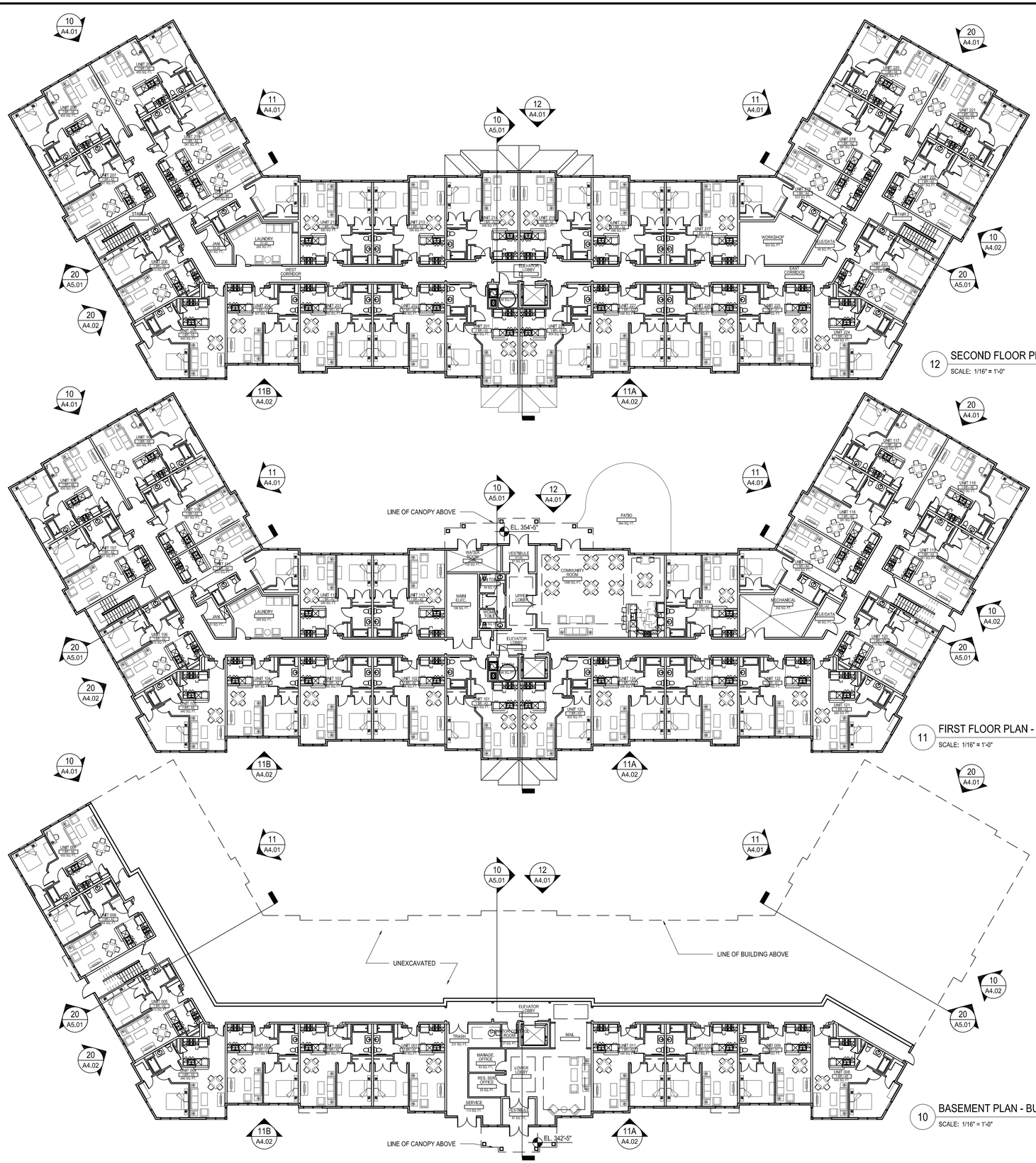

12 SECOND FLOOR PLAN - BUILDING A
SCALE: 1/16" = 1'-0"

11 FIRST FLOOR PLAN - BUILDING A
SCALE: 1/16" = 1'-0"

10 BASEMENT PLAN - BUILDING A
SCALE: 1/16" = 1'-0"

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Project Name:
Robert Hill Way
Senior Apartments

ASHLAND, MA

Sheet Name:
BASEMENT, FIRST
& SECOND FLOOR PLANS

Project Number:
09069

Issue Date:
October 10, 2012

Sheet Number:
A1.01

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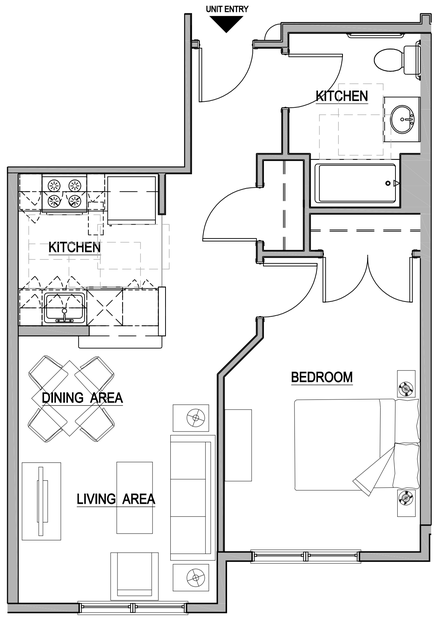

21 1 BR - A3
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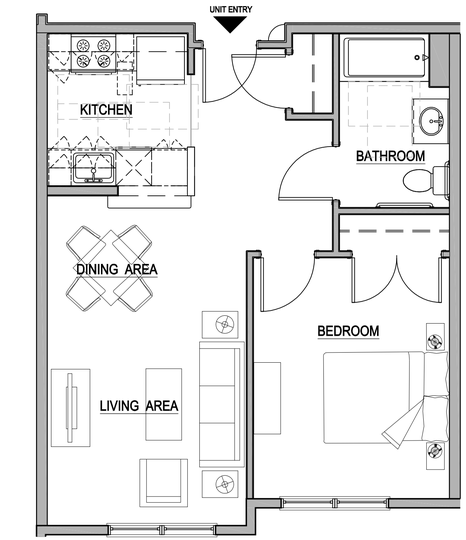

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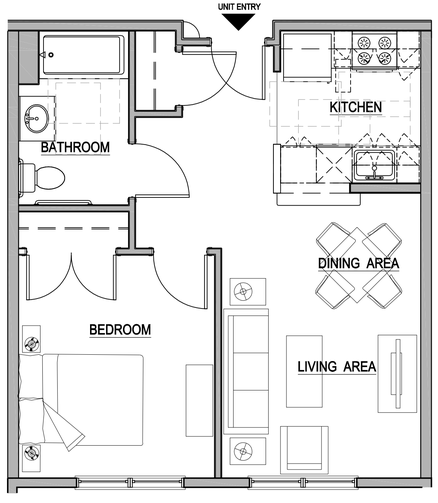

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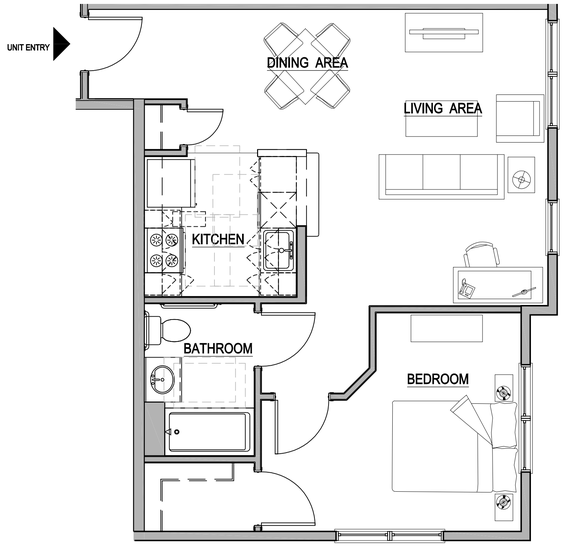

10 1 BR - A6
SCALE: 1/4" = 1'-0" 655 SF

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Consultant:

Revision:

Architect of Record:

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Scale: 1/4" = 1'-0"
Key Plan:

Project Name:
Robert Hill Way
Senior Apartments

ASHLAND, MA

Sheet Name:
TYPICAL UNIT
FLOOR PLANS

Project Number:
09069

Issue Date:
October 10, 2012

Sheet Number:
A2.01

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12 BUILDING ELEVATION
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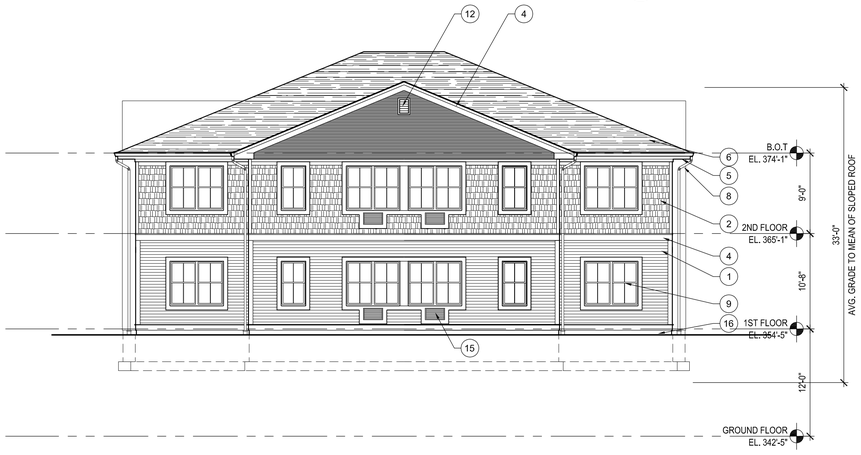


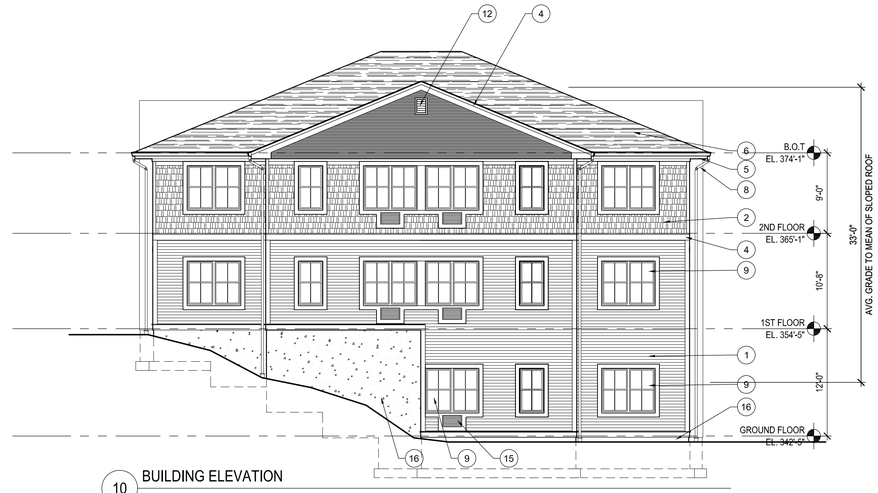
20 BUILDING ELEVATION
SCALE: 1/8" = 1'-0"



11 BUILDING ELEVATION
SCALE: 1/8" = 1'-0"

MATERIAL KEY:

1. VINYL LAP SIDING - HORIZONTAL
2. VINYL LAP SIDING - SHINGLE
3. PVC PANEL - PAINTED
4. PVC TRIM - PAINTED
5. PVC FASCIA AND SOFFIT - PAINTED
6. ASPHALT SHINGLE ROOFING
7. STANDING SEAM METAL ROOF
8. ALUMINUM GUTTER AND DOWNSPOUT
9. VINYL WINDOW ASSEMBLY
10. ALUMINUM DOOR ASSEMBLY
11. ARCHITECTURAL DORMER
12. LOUVER
13. CEDAR POST
14. PVC TRIM WITH WATERTABLE - PAINTED
15. A.C. UNIT
16. CONCRETE FOUNDATION WALL



10 BUILDING ELEVATION
SCALE: 1/8" = 1'-0"

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Project Name:
Robert Hill Way
Senior Apartments

ASHLAND, MA

Sheet Name:
BUILDING ELEVATIONS

Project Number:
09069

Issue Date:
October 10, 2012

Sheet Number:
A4.01

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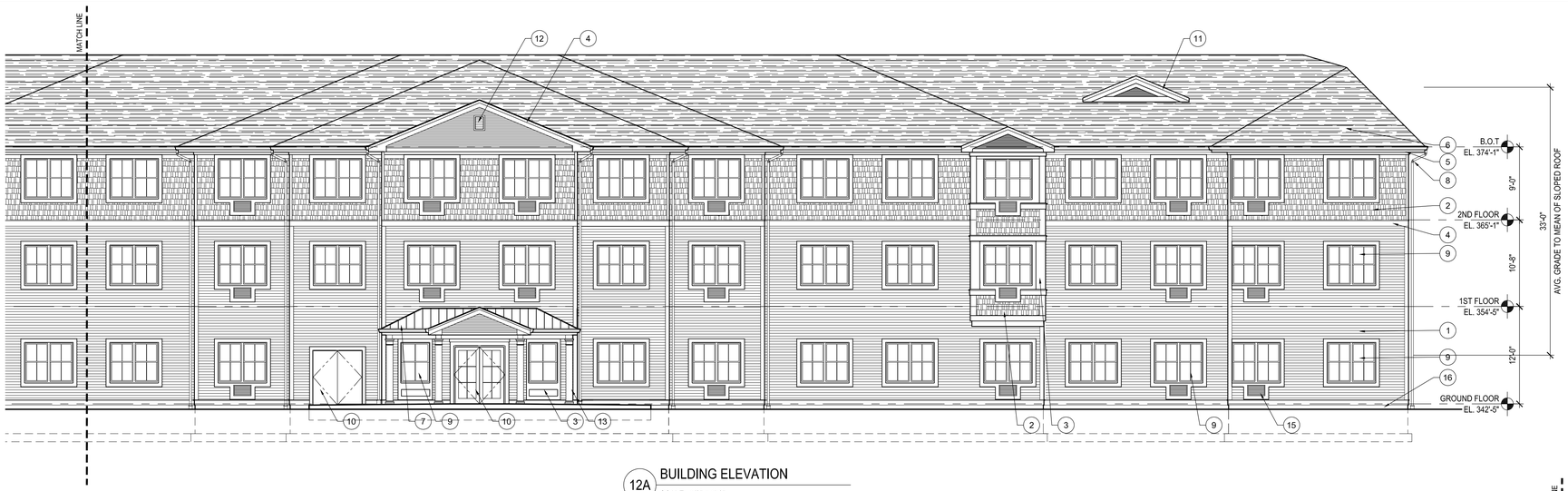

12A BUILDING ELEVATION
SCALE: 1/8" = 1'-0"



20 BUILDING ELEVATION
SCALE: 1/8" = 1'-0"



12B BUILDING ELEVATION
SCALE: 1/8" = 1'-0"

MATERIAL KEY:

1. VINYL LAP SIDING - HORIZONTAL
2. VINYL LAP SIDING - SHINGLE
3. PVC PANEL - PAINTED
4. PVC TRIM - PAINTED
5. PVC FASCIA AND SOFFIT - PAINTED
6. ASPHALT SHINGLE ROOFING
7. STANDING SEAM METAL ROOF
8. ALUMINUM GUTTER AND DOWNSPOUT
9. VINYL WINDOW ASSEMBLY
10. ALUMINUM DOOR ASSEMBLY
11. ARCHITECTURAL DORMER
12. LOUVER
13. CEDAR POST
14. PVC TRIM WITH WATERTABLE - PAINTED
15. A.C. UNIT
16. CONCRETE FOUNDATION WALL



10 BUILDING ELEVATION
SCALE: 1/8" = 1'-0"

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Robert Hill Way
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ASHLAND, MA

Sheet Name:
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Project Number:
09069

Issue Date:
October 10, 2012

Sheet Number:
A4.02

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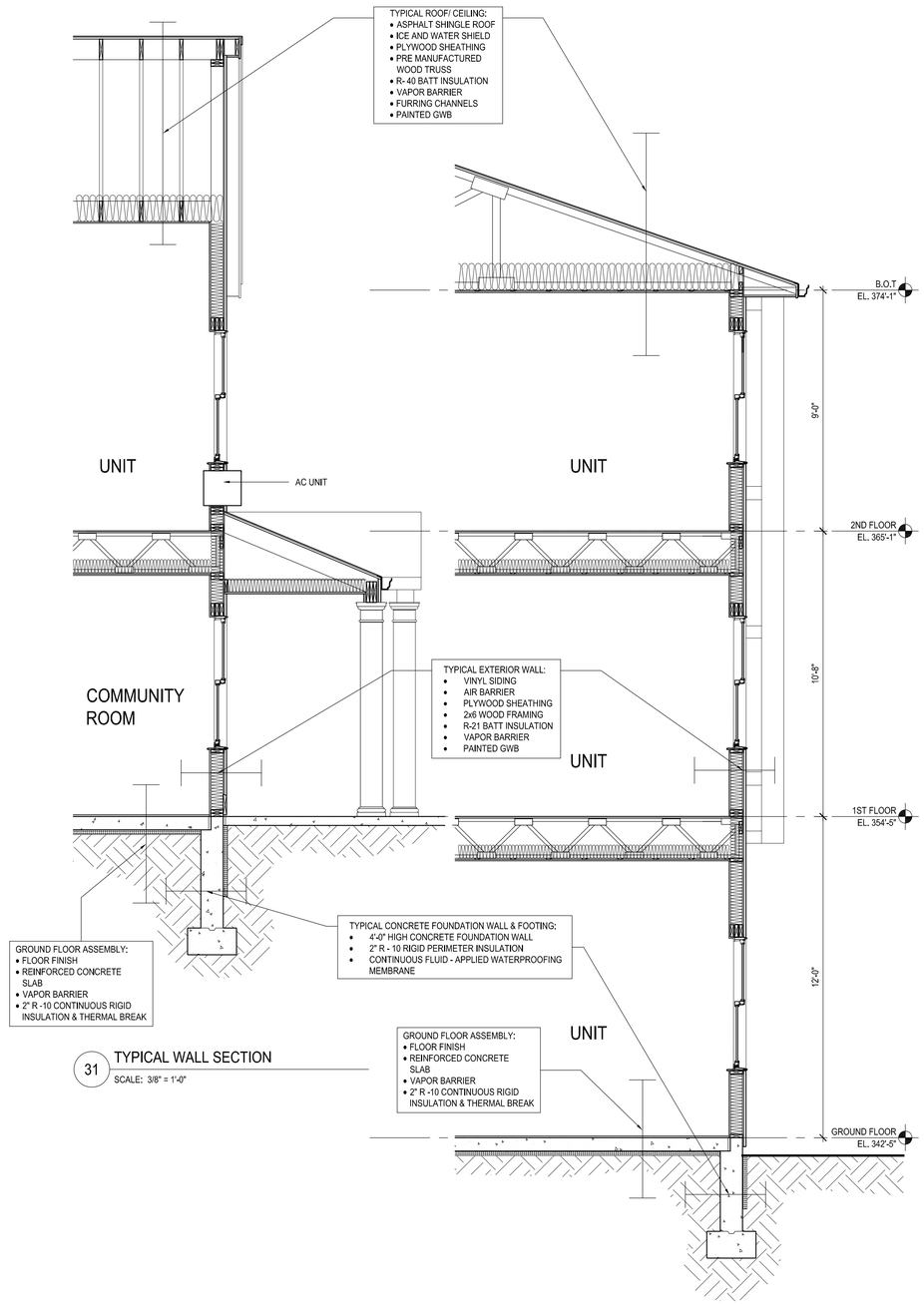

31 TYPICAL WALL SECTION
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30 TYPICAL WALL SECTION
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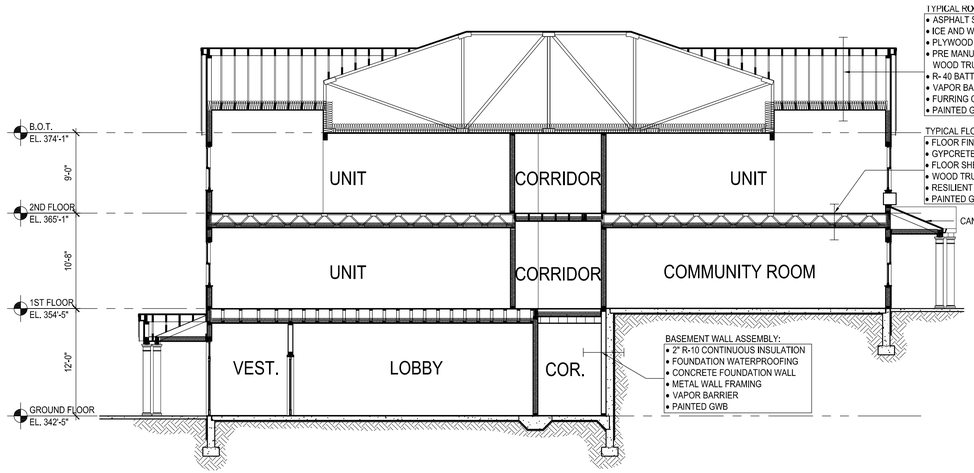

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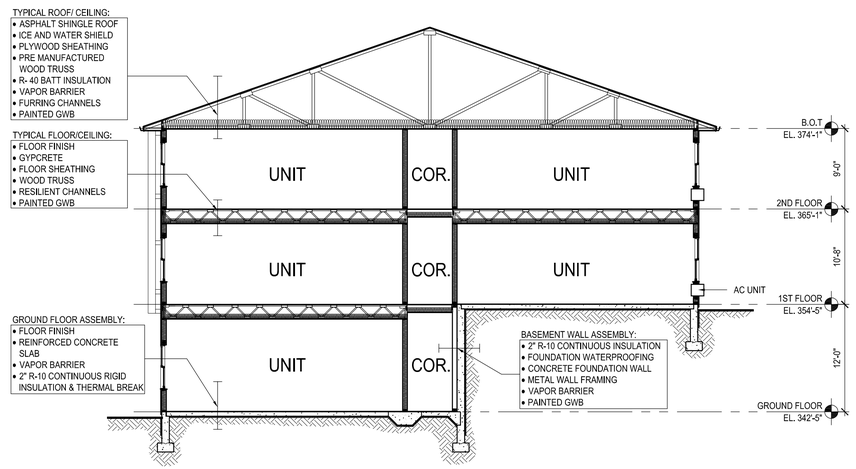

10 TYPICAL CROSS SECTION
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Drawn: E.W.
Checked: E.B.
Scale: AS NOTED
Key Plan:

Project Name:
Robert Hill Way Senior Apartments

ASHLAND, MA

Sheet Name:
BUILDING SECTIONS & WALL SECTIONS

Project Number:
09069

Issue Date:
October 10, 2012

Sheet Number:
A5.01

Wednesday, July 31, 2013 1:54:06 PM
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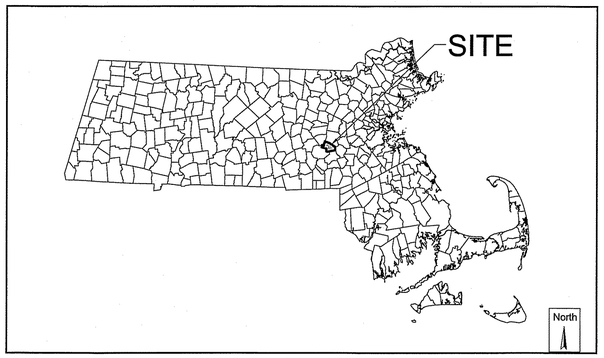
ASHLAND AFFORDABLE HOUSING
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS
JUNE 12, 2013



MASSACHUSETTS

Graphic Scale

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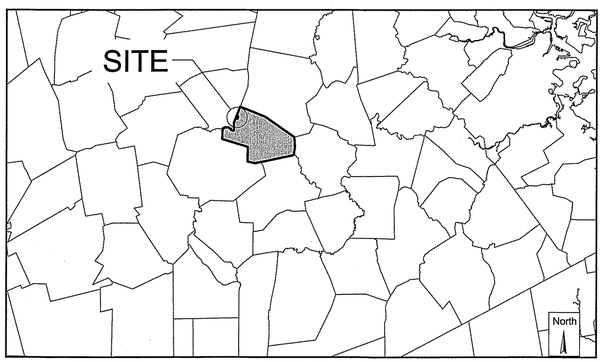

TOWN

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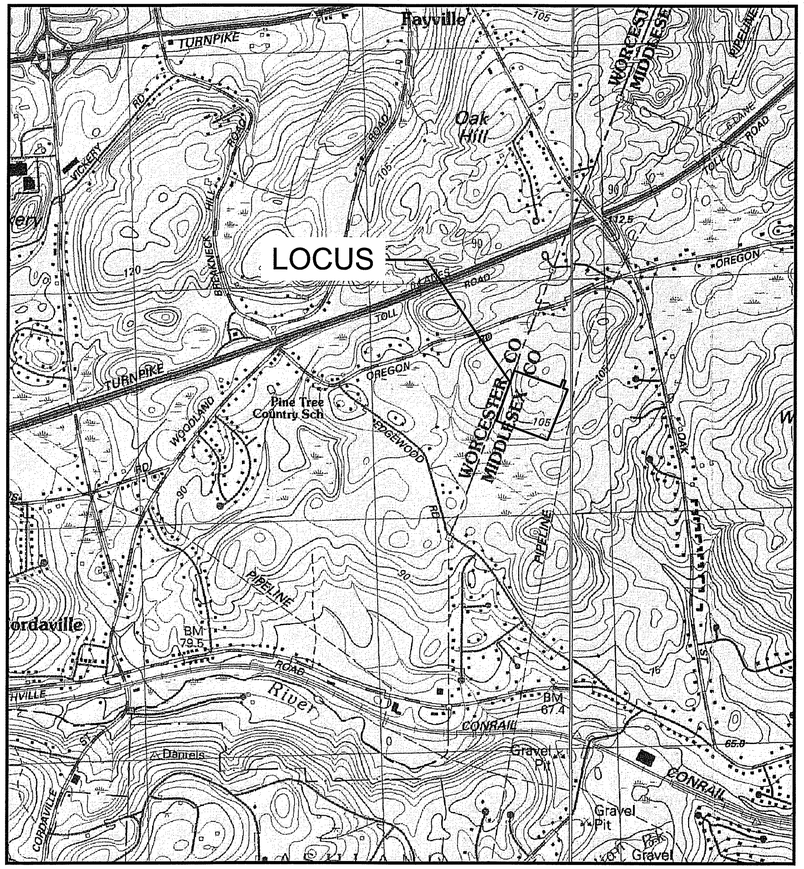

VICINITY MAP

Graphic Scale

1-inch = 1000-feet

SHEET LIST TABLE	
Sheet Number	Sheet Title
1	COVER SHEET
2	NOTES & LEGEND
3	EXISTING CONDITIONS
4	PHASING PLAN
5	PROPOSED SITE PLAN
6	GRADING & EROSION CONTROL
7	PROFILES (1)
8	PROFILES (2)
9	UTILITY PLAN
10	DETAILS 1
11	DETAILS 2
12	DETAILS 3
13	DETAILS 4
14	DETAILS 5
15	DETAILS 6
16	LANDSCAPE PLAN
17	LANDSCAPE DETAILS

Plan Set:

ASHLAND AFFORDABLE HOUSING
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Prepared For:

RHW DEVELOPMENT LLC
C/O EA FISH DEVELOPMENT AND
THE PLANNING OFFICE FOR URBAN AFFAIRS
536 Granite Street
Braintree, MA 02184 (781) 380-1660

Prepared By:

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Date Issued: JUNE 12, 2013

Designed By: MC/JL

Drawn By: MC

Checked By: RAC

Registration:

COMMONWEALTH OF MASSACHUSETTS
FAT PIU LEE
CIVIL
No. 42824
REGISTERED
PROFESSIONAL ENGINEER
8/1/13

Revisions

Rev.	Date	By	Appr.	Description
1	07/31/13	MJC	JEL	PEER REVIEW COMMENTS
2				
3				
4				
5				
6				
7				

Project Number: *12097*

Sheet Number: *1 of 17*

Drawing Number: C-1

last modified: 07/31/13 printed: 07/31/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-CV.dwg

GENERAL CONSTRUCTION NOTES

1. ALL SITE PREPARATION NECESSARY TO COMPLETE THIS PROJECT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
2. ALL NECESSARY POLICE DETAIL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL COORDINATE WITH THE LOCAL POLICE DEPARTMENT.
3. THE CONTRACTOR SHALL MAKE ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY CONSTRUCTION PERMITS, PAY ALL FEES INCLUDING POLICE DETAILS AND POST ALL BONDS, IF NECESSARY, ASSOCIATED WITH THE SAME, AND COORDINATE WITH THE OWNER AND THE ENGINEER.
4. ALL EXISTING CONDITIONS SHOWN SHALL BE CONSIDERED APPROXIMATE AND ARE BASED ON THE BEST INFORMATION AVAILABLE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THAT THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS DO NOT CONFLICT WITH ANY KNOWN EXISTING OR OTHER PROPOSED IMPROVEMENTS. IF ANY CONFLICTS ARE DISCOVERED, THE CONTRACTOR SHALL NOTIFY THE OWNER AND THE ENGINEER PRIOR TO INSTALLING ANY PORTION OF THE SITE WORK WHICH WOULD BE AFFECTED.
5. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS ARE BASED ON RECORDS OF VARIOUS UTILITY COMPANIES, AND WHEREVER POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED UPON AS BEING EXACT OR COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY, ANY GOVERNING PERMITTING AUTHORITY IN THE TOWN, AND "DIGSAFE" (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK IN PREVIOUSLY UNALTERED AREAS TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RESOLVE CONFLICTS BETWEEN THE PROPOSED UTILITIES AND FIELD-LOCATED UTILITIES AND SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER IMMEDIATELY. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED, INCOMPLETELY OR INACCURATELY SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ACCURATE RECORDS OF THE LOCATION AND ELEVATION OF ALL WORK INSTALLED AND EXISTING UTILITIES FOUND DURING CONSTRUCTION FOR THE PREPARATION OF THE AS-BUILT PLAN.
6. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL EXISTING UTILITIES IN WORKING ORDER AND FREE FROM DAMAGE DURING THE ENTIRE DURATION OF THE PROJECT. ALL COST RELATED TO THE REPAIR OF UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. EXCAVATION REQUIRED WITHIN THE PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT NO COST TO THE OWNER.
7. THE CONTRACTOR SHALL UTILIZE ALL PRECAUTIONS AND MEASURES TO ENSURE THE SAFETY OF THE PUBLIC, ALL PERSONNEL AND PROPERTY DURING CONSTRUCTION IN ACCORDANCE WITH OSHA STANDARDS, INCLUDING BARRICADES, SAFETY LIGHTING, CONES, POLICE DETAIL AND/OR FLAGMEN AS DETERMINED NECESSARY BY THE ENGINEER AND/OR TOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF POLICE DETAIL AND FOR COORDINATING WITH THE LOCAL OR STATE POLICE DEPARTMENT FOR ALL REQUIRED POLICE DETAIL.
8. ALL TRENCHING WORK WITHIN A ROADWAY SHALL BE COORDINATED WITH THE PROPER LOCAL & STATE AGENCY. TRENCH SAFETY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR INCLUDING ANY LOCAL AND/OR STATE PERMITS REQUIRED FOR THE TRENCHWORK. THIS WORK MAY BE REQUIRED TO TAKE PLACE OUTSIDE OF NORMAL HOURS OF OPERATION FOR THE FACILITY. THE CONTRACTOR SHALL PLAN ACCORDINGLY.
9. ALL TRENCH WORK WITHIN EXISTING PAVEMENT SHALL BE SAWCUT PER THE APPLICABLE DETAILS. TRENCHWORK BACKFILL AND COMPACTION SHALL HAVE MAX. 8-INCH LIFTS. CONTRACTOR SHALL BE REQUIRED TO REMOVE PATCH AND REPAVE AFTER ONE COMPLETE 12-MONTH CYCLE IF SETTLEMENT OCCURS DUE TO INADEQUATE COMPACTION AS DETERMINED BY THE ENGINEER WITHIN THE WARRANTY PERIOD.
10. THE CONTRACTOR SHALL MAKE ALL CONNECTION ARRANGEMENTS WITH UTILITY COMPANIES, AS REQUIRED.
11. ALL IMPORTED MATERIAL SHALL BE CLEAN. NO MATERIAL WILL BE ACCEPTED FROM AN EXISTING OR FORMER 21E SITE AS DEFINED BY THE MASSACHUSETTS CONTINGENCY PLAN 310 CMR 40.0000.
12. SITE LAYOUT SURVEY REQUIRED FOR CONSTRUCTION WILL BE PROVIDED BY THE CONTRACTOR AND SHALL BE CONDUCTED BY A MASSACHUSETTS' REGISTERED PROFESSIONAL LAND SURVEYOR. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE SURVEYOR FOR ALL SITE SURVEY WORK.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL CONTROL POINTS AND BENCHMARKS DURING CONSTRUCTION INCLUDING BENCHMARK LOCATIONS AND ELEVATIONS AT CRITICAL AREAS. THE LOCATION OF ALL CONTROL POINTS AND BENCHMARKS SHALL BE COORDINATED WITH THE ENGINEER.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL GRADE STAKES SET BY THE SURVEYOR. GRADE STAKES SHALL REMAIN UNTIL A FINAL INSPECTION OF THE ITEM HAS BEEN COMPLETED BY THE ENGINEER. ANY RE-STAKING OF PREVIOUSLY SURVEYED SITE FEATURES SHALL BE THE RESPONSIBILITY (INCLUDING COST) OF THE CONTRACTOR.
15. UNLESS OTHERWISE SPECIFIED ON THE PLANS AND DETAILS/SPECIFICATIONS, ALL SITE CONSTRUCTION MATERIALS AND METHODOLOGIES ARE TO CONFORM TO THE MOST RECENT VERSION OF THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS (THE MASSACHUSETTS HIGHWAY DEPARTMENT 1988 STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, THE 2002 SUPPLEMENTAL SPECIFICATIONS, AND THE 2005 STANDARD SPECIAL PROVISIONS).
16. CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS REGARDING NOISE, VIBRATION, DUST, SEDIMENTATION CONTAINMENT, AND TRENCH WORK.
17. SOLID WASTES SHALL BE COLLECTED AND STORED IN A SECURED DUMPSTER. THE DUMPSTER SHALL MEET ALL LOCAL AND STATE SOLID WASTE MANAGEMENT REGULATIONS.
18. THE CONTRACTOR SHALL RESTORE ALL SURFACES EQUAL TO THEIR ORIGINAL CONDITION AFTER CONSTRUCTION IS COMPLETE. AREAS NOT DISTURBED BY CONSTRUCTION SHALL BE LEFT NATURAL. THE CONTRACTOR SHALL TAKE CARE TO PREVENT DAMAGE TO SHRUBS, TREES, OTHER LANDSCAPING AND/OR NATURAL FEATURES. WHERE AS THE PLANS DO NOT SHOW ALL LANDSCAPE FEATURES, EXISTING CONDITIONS MUST BE VERIFIED BY THE CONTRACTOR IN ADVANCE OF THE WORK.
19. ALL UNPAVED AREAS DISTURBED BY THE WORK SHALL HAVE A MINIMUM OF 4-INCHES OF LOAM INSTALLED AND BE SEEDED WITH GRASS SEED AS SHOWN ON THE PLAN AND/OR DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR WATERING ANY LOAM AND SEEDED AREAS UNTIL LAWN GROWTH IS ESTABLISHED AND APPROVED BY THE ENGINEER AND/OR OWNER.
20. ALL PROPOSED STRUCTURES SHALL BE DESIGNED BY THEIR MANUFACTURERS FOR AASHTO H-20 LOADING. PRECAST CONCRETE SHALL HAVE A MINIMUM 28-DAY STRENGTH OF 4000 PSI UNLESS OTHERWISE NOTED HEREIN.
21. ALL WHEELCHAIR RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS AND CONSTRUCTION AND TRAFFIC STANDARD DETAILS (1996) DRAWING NUMBER 107.1.0 AND 107.2.0. RAMPS SHALL HAVE AN 8% MAX. SLOPE AND 2% CROSS SLOPE.
21. A HIGH WATER TABLE IS ANTICIPATED. IF THE WATER TABLE IS ENCOUNTERED DURING EXCAVATION, THE WATER TABLE SHALL BE TEMPORARILY LOWERED BY PUMPING. THE CONTRACTOR INSTALL A DEWATERING BAG/BASIN AND PROVIDE A DEWATERING PLAN DEPICTING PROPOSED DEWATERING LOCATION TO THE ENGINEER. THE PUMP DISCHARGE SHALL BE DIRECTED TO THIS BASIN TO PREVENT SEDIMENTS FROM LEAVING THE CONSTRUCTION AREA. THE CONTRACTOR SHALL INSTALL ADDITIONAL BASINS IF REQUIRED. INSTALL THE BASIN(S) WITHIN THE LIMIT OF DISTURBANCE AS SHOWN IN THE PLANS.
22. LEDGE OR BOULDER EXCAVATION IS ANTICIPATED FOR THIS SITE. CONTRACTOR IS DIRECTED TO THE SUBSURFACE INVESTIGATIONS FOR AVAILABLE INFORMATION.
23. THE CONTRACTOR SHALL REGULARLY INSPECT THE PERIMETER OF THE PROPERTY TO CLEAN UP AND REMOVE LOOSE CONSTRUCTION DEBRIS BEFORE IT LEAVES THE SITE. ALL DEMOLITION DEBRIS SHALL BE PROMPTLY REMOVED FROM THE SITE TO AN APPROVED DUMP SITE. ALL TRUCKS LEAVING THE SITE SHALL BE COVERED.
24. CONCRETE TRUCKS SHALL NOT BE WASHED ONSITE. ANY CEMENT OR CONCRETE DEBRIS LEFT IN THE DISTURBED AREA SHALL BE REMOVED BY HAND AT THE CONTRACTOR'S EXPENSE.
25. BURIAL OF ANY STUMPS, SOLID DEBRIS, AND/OR STONES/BOULDERS ONSITE IS PROHIBITED. NO ROAD SALT OR OTHER DE-ICING CHEMICALS SHALL BE USED ON THE ACCESS ROADWAY.
26. IF ANY DEVIATION OR ALTERATION OF THE WORK PROPOSED ON THESE DRAWINGS IS REQUIRED, THE CONTRACTOR IS TO IMMEDIATELY CONTACT AND COORDINATE WITH THE ENGINEER AND OWNER.
27. AT THE END OF CONSTRUCTION, THE CONTRACTOR SHALL REMOVE ALL CONSTRUCTION DEBRIS AND SURPLUS MATERIALS FROM THE SITE. A THOROUGH INSPECTION OF THE WORK PERIMETER IS TO BE MADE AND ALL DISCARDED MATERIALS, BLOWN OR WATER CARRIED DEBRIS, SHALL BE COLLECTED, AND REMOVED FROM THE SITE.

GENERAL GRADING AND DRAINAGE NOTES

1. ALL CUT AND FILL SLOPES SHALL BE 3:1 OR FLATTER UNLESS OTHERWISE NOTED. SLOPES GREATER THAN 3:1 WILL BE REINFORCED WITH EROSION CONTROL BLANKET OR STONE SURFACING.
2. EXISTING GRADE CONTOUR INTERVALS SHOWN AT 2 FOOT.
3. PROPOSED GRADE CONTOUR INTERVALS SHOWN AT 2 FOOT.
4. CONTRACTOR SHALL ADJUST AND/OR CUT EXISTING PAVEMENT AS NECESSARY TO ASSURE A SMOOTH FIT AND CONTINUOUS GRADE.
5. CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE AWAY FROM BUILDINGS FOR ALL NATURAL AND PAVED AREAS.
6. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLAN AND SPECIFICATIONS FOR EARTHWORK AND COMPACTION REQUIREMENTS FOR ALL SLABS AND BUILDING FOUNDATIONS.
7. PROPOSED ELEVATIONS ARE SHOWN TO FINISH PAVEMENT OR GRADE UNLESS NOTED OTHERWISE.
8. ALL EARTHWORK AND SITE PREPARATION SHALL BE DONE IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF ANY SUBSURFACE INVESTIGATION OR GEOTECHNICAL REPORTS PREPARED FOR THIS SITE.
9. ROADS AND PARKING AREAS ARE NOT TO BE PAVED UNTIL THE ENTIRE PERMANENT DRAINAGE SYSTEM HAS BEEN INSTALLED AND ALL PIPE CONNECTIONS COMPLETE.
10. DRAINAGE PIPING SHALL BE HIGH DENSITY POLYETHYLENE PIPE AND CONFORM TO AASHTO M294 CORRUGATED POLYETHYLENE PIPE. PIPE SHALL BE INSTALLED AT THE LOCATIONS INDICATED ON THE PLAN. MINIMUM CLEARANCE BETWEEN PROPOSED DRAINAGE PIPING AND OTHER UTILITIES/STRUCTURES SHALL BE 18" VERTICALLY AND 4-FT HORIZONTALLY. CPP SHALL BE CAREFULLY BACKFILLED IN ACCORDANCE WITH THE LATEST MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS. THE MINIMUM COVER FOR HDPE PIPE IS 1'-0" FOR H-20 TRAFFIC LOADS IF INSTALLED IN ACCORDANCE WITH AASHTO SECTION 30. THIS IS BASED ON EMPIRICAL CALCULATION OF LOAD RESPONSE, MANUFACTURER'S TESTING AND FIELD EXPERIENCE WITH THE PIPE. AASHTO SPECIFICATIONS SECTION 18.4.1.5 DEFINES THE MINIMUM COVER AS "ID/8 BUT NOT LESS THAN 12 INCHES." THIS COVER IS MEASURED FROM THE PIPE OD TO THE TOP OF A RIGID (CONCRETE) PAVEMENT OR THE BOTTOM OF A FLEXIBLE (BITUMINOUS) PAVEMENT. BOTH AASHTO AND ASTM, AS WELL AS MOST MANUFACTURERS, REQUIRE ADDITIONAL (TEMPORARY) COVER FOR CONSTRUCTION LOADS GREATER THAN H-20. GENERALLY, AN ADDITIONAL 2' OF TEMPORARY COVER, MOUNDED OVER THE PIPE AND REMOVED FOR FINAL GRADING AND PAVING, IS SUFFICIENT FOR LARGE CONSTRUCTION VEHICLE LOADS.
11. BACKFILL ADJACENT TO PIPES AND STRUCTURES SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE ADJOINING FILL MATERIAL. BACKFILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED SIX INCHES IN THICKNESS AND COMPACTED TO A DENSITY OF 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN +/- 2% OF OPTIMUM. ALL COMPACTION IS TO BE DETERMINED BY AASHTO METHOD T-99. TESTING OF BACKFILL MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

BASIC CONSTRUCTION SEQUENCE

THE FOLLOWING CONSTRUCTION SEQUENCE IS TO BE USED AS A GENERAL GUIDELINE. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER, ENGINEERS, AND LANDSCAPE ARCHITECTS AND SUBMIT A PROPOSED CONSTRUCTION SEQUENCE FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

1. SURVEY AND STAKE THE PROPOSED LIMIT OF DISTURBANCE AND LIMIT OF SEDIMENTATION BARRIERS.
2. PLACE SEDIMENTATION BARRIERS (STRAWBALES, SILT FENCE, ETC.) AS SHOWN ON THE PLANS AND STAKED OUT IN THE FIELD. IN NO CASE IS THE LIMIT OF WORK TO EXTEND BEYOND THE SEDIMENTATION BARRIERS/LIMIT OF DISTURBANCE AS SHOWN ON THE PROJECT PLANS.
3. INSTALL TEMPORARY CONSTRUCTION ENTRANCES IN LOCATIONS SHOWN ON PLANS. NO OTHER ENTRANCES SHALL BE USED TO GAIN ACCESS TO THE SITE BY ANY CONSTRUCTION OR DELIVERY VEHICLES.
4. BEGIN CLEARING THE SITE AND DEMOLITION AS REQUIRED.
5. SURVEY AND STAKE CENTERLINE OF THE PROPOSED ROADS, DRAINAGE BASINS, AND DRAINAGE LINES.
6. EXCAVATE AND ROUGH GRADE THE PROPOSED DRAINAGE BASINS AND ANY ADDITIONAL TEMPORARY BASINS NECESSARY TO CONTROL SITE RUNOFF AND SEDIMENTS. PERMANENT DRAINAGE BASINS SHALL BE TEMPORARILY SEEDED. PERMANENT DRAINAGE BASIN SEEDING AND PLANTING SHALL BE COMPLETED AFTER THE CONTRIBUTING AREA TO THE BASIN HAS REACHED A MINIMUM OF 80% STABILIZATION AND IS NO LONGER REQUIRED TO BE USED AS A CONSTRUCTION SEDIMENTATION BASIN.
7. BEGIN CLEARING AND GRUBBING IN AREA OF ROADWAYS AND DRAINAGE BASINS. TOPSOIL IS TO BE STRIPPED FROM THE AREA OF THE PROPOSED ROADWAYS AND DRAINAGE BASINS AND STOCKPILED IN APPROVED LOCATIONS. TOPSOIL STOCKPILES ARE TO BE PROTECTED BY A SEDIMENT BARRIER.
8. INSTALL TEMPORARY CONVEYANCE DEVICES (SWALES, CHECK DAMS, PIPES, ETC.) AS NECESSARY TO CONVEY RUNOFF TO TREATMENT AREAS.
9. BEGIN ROUGH GRADING AREAS FOR ROADS, PARKING AND BUILDINGS. BRING ROUGH GRADING TO PROPER ELEVATIONS AS SOON AS PRACTICABLE. WORK SHALL PROGRESS DILIGENTLY TO MINIMIZE TIME SOILS ARE UN-STABILIZED.
10. BEGIN UTILITY CONSTRUCTION. CONTRACTOR SHALL BE FREE TO INSTALL UTILITIES IN ANY ORDER HE/SHE CHOOSES. ANY EROSION CONTROL DEVICE DISTURBED DURING THE UNDERGROUND UTILITY CONSTRUCTION SHALL BE IMMEDIATELY REPAIRED OR REPLACED IN KIND AND STABILIZED. MODIFY TEMPORARY CONVEYANCE DEVICES AS NECESSARY TO CONVEY RUNOFF TO TREATMENT AREAS.
11. INSTALL DRAINAGE PIPES, DRAINAGE MANHOLES AND CATCH BASINS, AND UNDERGROUND DRAINAGE STRUCTURES. WORK SHALL BEGIN AT THE DRAINAGE BASINS AND PROGRESS UP-GRADIENT. PROTECT DISCHARGE OUTLETS WITH RIP-RAP APRONS. THE DRAINAGE BASIN(S) AND DRAINAGE NETWORK ARE TO BE PROTECTED FROM SEDIMENTATION WITH SILT FENCE AND STRAWBALES UNTIL ALL UN-STABILIZED AREAS ARE STABILIZED WITH STONE SUB-BASE OR VEGETATION. INSTALL SEDIMENT BARRIERS AT ALL POINTS OF ENTRY INTO THE DRAINAGE NETWORK. PARTICULAR CARE SHALL BE TAKEN TO PROTECT THE UNDERGROUND DRAINAGE BASINS FROM SEDIMENT.
12. PERMANENTLY SEED ALL DISTURBED AREAS OUTSIDE OF THE AREA TO BE PAVED.
13. ONCE ALL UNDERGROUND UTILITIES HAVE BEEN CONSTRUCTED, PLACE COMPACTED GRAVEL FOUNDATION AND ROUGH GRADE THE ROADWAYS/PARKING AREAS IN ACCORDANCE WITH THE SITE PLANS AND IN ACCORDANCE WITH APPLICABLE STATE AND LOCAL REGULATIONS AS SOON AS POSSIBLE.
14. BEGIN ROAD AND PARKING CONSTRUCTION PER SITE PLANS AND IN ACCORDANCE WITH APPLICABLE STATE AND LOCAL REGULATIONS. ROADS AND PARKING AREAS ARE NOT TO BE PAVED UNTIL THE ENTIRE PERMANENT DRAINAGE SYSTEM HAS BEEN INSTALLED AND ALL PIPE CONNECTIONS COMPLETE.
15. FINISH PERMANENT STABILIZATION. SWEEP THE ROADWAY TO REMOVE ALL SEDIMENTS. REPAIR DRAINAGE OUTLETS AND BASINS AS REQUIRED. THE CONTRACTOR SHALL CLEAN AND FLUSH THE DRAINAGE STRUCTURES AND PIPES AT THE END OF CONSTRUCTION AND ALL ACCUMULATED SEDIMENTS IN THE DRAINAGE BASINS SHALL BE REMOVED. CONTRACTOR SHALL INSPECT THE DRAINAGE NETWORK AND REPAIR ANY DAMAGE IMMEDIATELY.
16. COMPLETE ALL REMAINING PLANTING AND SEEDING.
17. REMOVAL OF ALL TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROL MEASURES FOLLOWING VEGETATIVE ESTABLISHMENT OF ALL DISTURBED AREAS SHALL BE APPROVED BY THE ENGINEER AND WHEN THE CONTRIBUTING AREA HAS REACHED A MINIMUM OF 80% STABILIZATION.

EROSION & SEDIMENT CONTROL NOTES

1. PRIOR TO THE START OF CONSTRUCTION A NOTICE OF INTENT (NOI) MUST BE FILED WITH NPDES. THE CONTRACTOR WILL REFER TO THE STORMWATER AND POLLUTION PREVENTION PLAN (SWPPP) REGARDING ALL EROSION CONTROL MATTERS AND SHALL MAINTAIN A WORKING COPY ONSITE AT ALL TIMES. THE CONTRACTOR SHALL FOLLOW THE SWPPP PROTOCOL FOR SITE MAINTENANCE, INSPECTIONS AND PROPER DOCUMENTATION UNTIL THE SITE HAS BEEN ACCEPTED BY THE OWNER. AT THE COMPLETION OF THE PROJECT A NOTICE OF TERMINATION WILL NEED TO BE FILED BY THE CONTRACTOR OR OWNER WITH NPDES. IN ACCORDANCE WITH NPDES REGULATIONS THE COMPLETED SWPPP, WHICH SHALL INCLUDE ALL OF THE SITE EROSION CONTROL DOCUMENTATION, WEEKLY EROSION INSPECTION REPORTS COMPLETED BY THE DESIGNATED SITE PERSONNEL, AND ANY OTHER PERTINENT SITE DOCUMENTATION MUST BE RETAINED FOR A MINIMUM OF 3 YEARS FROM THE DATE OF TERMINATION.
2. THE SITE CONSTRUCTION FOREMAN SHALL BE DESIGNATED AS THE ON-SITE PERSONNEL RESPONSIBLE FOR THE DAILY INSPECTION AND MAINTENANCE OF ALL SEDIMENT AND EROSION CONTROLS AND SHALL IMPLEMENT ALL NECESSARY MEASURES TO CONTROL EROSION AND PREVENT SEDIMENT FROM LEAVING THE SITE.
3. THE CONTRACTOR SHALL INSTALL ALL EROSION AND SEDIMENT CONTROL (ESC) MEASURES AS SHOWN ON THE DESIGN PLANS IN CONSULTATION WITH THE TOWN, AND AS DETERMINED NECESSARY IN THE FIELD BY THE ENGINEER BEFORE ANY CONSTRUCTION ACTIVITIES ARE TO BEGIN. THESE MEASURES SHALL BE CHECKED, MAINTAINED/REPLACED AS NECESSARY DURING THE ENTIRE CONSTRUCTION PERIOD OF THE PROJECT. SUCH MEASURES SHALL REPRESENT THE LIMIT OF WORK. WORKERS SHALL BE INFORMED THAT NO CONSTRUCTION ACTIVITY IS TO OCCUR BEYOND THE LIMIT OF WORK AT ANY TIME THROUGH THE CONSTRUCTION PERIOD.
4. A MINIMUM SURPLUS OF 50 FEET OF EROSION CONTROL BARRIER (SILT FENCE, STRAWBALE, &/OR SILT SOCK) SHALL BE STOCKPILED ONSITE AT ALL TIMES.
5. THE CONTRACTOR SHALL PROTECT THE ADJACENT RESOURCE AREA FROM SEDIMENTATION DURING PROJECT CONSTRUCTION UNTIL ACCEPTANCE BY THE OWNER & IN CONFORMANCE WITH THE ORDER OF CONDITIONS.
6. A CONSTRUCTION EXIT SHALL BE CONSTRUCTED AS SHOWN IN THE DETAILS TO SHED DIRT FROM CONSTRUCTION VEHICLE TIRES. THE CRUSHED STONE PAD WILL BE REPLACED/CLEANED AS NEEDED TO MAINTAIN ITS EFFECTIVENESS.
7. THE LIMIT OF ALL CLEARING, GRADING AND DISTURBANCES SHALL BE KEPT TO A MINIMUM WITHIN THE PROPOSED AREA OF CONSTRUCTION. THE CONTRACTOR SHALL PHASE THE SITE WORK IN A MANNER TO MINIMIZE AREAS OF EXPOSED SOIL. IF TREES ARE TO BE CUT ON THE ENTIRE SITE, ONLY THOSE AREAS WHICH ARE ACTIVELY UNDER CONSTRUCTION SHALL BE GRUBBED. THE REQUIRED SEDIMENTATION CONTROL FACILITIES MUST BE PROPERLY ESTABLISHED, CLEARLY VISIBLE AND IN OPERATION PRIOR TO INITIATING ANY LAND CLEARING ACTIVITY AND/OR OTHER CONSTRUCTION RELATED WORK.
8. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MONITOR LOCAL WEATHER REPORTS DURING CONSTRUCTION AND PRIOR TO SCHEDULING EARTHMOVING OR OTHER CONSTRUCTION ACTIVITIES WHICH WILL LEAVE AREAS DISTURBED AND UN-STABILIZED. IF INCLEMENT WEATHER IS PREDICTED, THE CONTRACTOR SHALL USE THEIR BEST PROFESSIONAL JUDGEMENT WHEN SCHEDULING CONSTRUCTION ACTIVITIES AND SHALL BE RESPONSIBLE FOR ENSURING THE NECESSARY EROSION CONTROL DEVICES ARE INSTALLED AND FUNCTIONING PROPERLY TO MINIMIZE EROSION FROM ANY IMPENDING WEATHER EVENTS.
9. ESC MEASURES SHALL BE INSPECTED AND MAINTAINED ON A WEEKLY BASIS AND AFTER EACH RAINFALL EVENT OF 0.25 INCH OR GREATER DURING CONSTRUCTION TO ENSURE THAT THE EROSION AND SEDIMENTATION CONTROL MEASURES ARE INTACT AND FUNCTIONING PROPERLY. IDENTIFIED DEFICIENCIES SHALL BE CORRECTED IMMEDIATELY NO LATER THAN 24 HOURS AFTER IDENTIFICATION.
10. SOIL STOCKPILES LEFT OVERNIGHT SHALL BE SURROUNDED ON THEIR PERIMETERS WITH SILT SOCK, SILT FENCE, STRAWBALES, OR A COMBINATION OF SILT FENCE WITH STRAWBALE, AS DETERMINED NECESSARY.
11. DISTURBED AREAS AND SLOPES SHALL NOT BE LEFT UNATTENDED OR EXPOSED FOR EXCESSIVE PERIODS OF TIME SUCH AS THE INACTIVE WINTER SEASON. THE CONTRACTOR SHOULD PROVIDE APPROPRIATE STABILIZATION PRACTICES ON ALL DISTURBED AREAS AS SOON AS POSSIBLE BUT NOT MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA HAS TEMPORARILY OR PERMANENTLY CEASED. TEMPORARY AREAS HAVING A SLOPE GREATER THAN 3:1 SHALL BE REINFORCED WITH EROSION BLANKETS OR APPROVED EQUAL UNTIL THE SITE IS PROPERLY STABILIZED. TEMPORARY SWALES MAY ALSO BE REQUIRED IF DETERMINED NECESSARY IN THE FIELD BY THE ENGINEER.
12. THE CONTRACTOR SHALL INSTALL A SILT SACK OR APPROVED EQUIVALENT IN EACH EXISTING CATCHBASIN RECEIVING RUNOFF FROM THE SITE. UPON THE INSTALLATION OF EACH CATCH BASIN, THE CONTRACTOR SHALL INSTALL A SILT SACK OR APPROVED EQUIVALENT. THESE ARE TO BE INSPECTED AFTER EACH SIGNIFICANT STORM EVENT AND REMOVED AND EMPTIED AS NEEDED DURING THE ENTIRE CONSTRUCTION PERIOD.
13. SMALL SEDIMENTATION BASINS MAY BE CONSTRUCTED ON AN AS-NEEDED BASIS DURING CONSTRUCTION TO AID IN THE CAPTURE OF SITE RUNOFF AND SEDIMENT. IT WILL BE THE RESPONSIBILITY OF THE SITE CONTRACTOR, IN CONSULTATION WITH THE ENGINEER, TO SIZE AND CREATE THESE BASINS IN APPROPRIATE LOCATIONS.
14. THE CONTRACTOR SHALL CONTAIN ALL SEDIMENT ONSITE. ALL EXITS FROM THE SITE WILL BE SWEPT AS NECESSARY INCLUDING ANY SEDIMENT TRACKING. PAVED AREAS SHALL BE SWEPT AS NEEDED TO REMOVE SEDIMENT AND POTENTIAL POLLUTANTS WHICH MAY ACCUMULATE DURING SITE WORK.
15. ACCUMULATED SEDIMENT SHALL BE REMOVED FROM ALL TEMPORARY PRACTICES AND DISPOSED OF IN A PRE-APPROVED LOCATION BY THE CONTRACTOR AS DIRECTED BY THE ENGINEER.
16. THE CONTRACTOR SHALL PROVIDE ON SITE OR MAKE READILY AVAILABLE THE NECESSARY EQUIPMENT AND SITE PERSONNEL DURING CONSTRUCTION HOURS FOR THE DURATION OF THE PROJECT TO ENSURE ALL ESC DEVICES ARE PROPERLY MAINTAINED AND REPAIRED IN A TIMELY AND RESPONSIBLE MANNER. IF SITE WORK IS SUSPENDED DURING THE WINTER MONTHS THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE PERSONNEL AND EQUIPMENT EITHER ON SITE OR MAKE READILY AVAILABLE TO ENSURE ALL ESC DEVICES ARE PROPERLY MAINTAINED AND REPAIRED IN A TIMELY AND RESPONSIBLE MANNER
17. PROPER MEASURES SHALL BE IMPLEMENTED BY THE CONTRACTOR IF DEWATERING IS NECESSARY DURING CONSTRUCTION. THESE MEASURES SHALL INCLUDE DEWATERING BAGS, TEMPORARY STRAWBALES, SILT FENCES, SILT SOCKS AND/OR OTHER APPROVED DEVICES. THE DEWATERING SETUP SHALL BE APPROVED BY THE ENGINEER.
18. ALL SEDIMENT COLLECTED IN THE TEMPORARY PARTIALLY CONSTRUCTED BIORETENTION AREAS WILL BE REMOVED AND DISPOSED OF PROPERLY PRIOR TO FILTER FABRIC AND/OR MEDIA INSTALLATION WITHIN THE BIORETENTION AREAS. PARTIALLY CONSTRUCTED BIORETENTION AREAS WILL HAVE A SURFACE ELEVATION AT A MINIMUM 1-FOOT ABOVE THE BOTTOM OF MEDIA ELEVATION AS SHOWN IN THE BIORETENTION SCHEDULE. THIS WILL ALLOW AN OVER-DIG OF THE COLLECTED SEDIMENT FROM WITHIN THE BIORETENTION AREA PRIOR TO MEDIA/FABRIC INSTALLATION.
19. DUST SHALL BE CONTROLLED BY WATERING OR OTHER APPROVED METHODS AS NECESSARY, OR AS DIRECTED BY THE ENGINEER AT NO EXTRA COST TO THE OWNER.
20. THE CONTRACTOR IS RESPONSIBLE FOR THE INSPECTION AND MAINTENANCE DURING CONSTRUCTION OF ALL STORMWATER FACILITIES INSTALLED OR AFFECTED BY THE PROJECT. ANY SEDIMENT OR DEBRIS COLLECTED WITHIN THESE FACILITIES FROM THE PROJECT WORK SHALL BE REMOVED PRIOR TO THE OWNER'S ACCEPTANCE.

STORMWATER FACILITY OPERATION & MAINTENANCE:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER INSPECTION AND MAINTENANCE OF ALL STORMWATER MANAGEMENT FACILITIES UNTIL SUCH TIME THAT THE ROADWAYS AND ASSOCIATED UTILITIES ARE ACCEPTED BY THE OWNER AND THE ENGINEER.
2. THE CONTRACTOR SHALL INSPECT AND RESTORE/CLEAN ALL FACILITIES (INLETS, MANHOLES, INFILTRATION BASINS, ETC.) OF SEDIMENT AND DEBRIS PRIOR TO THE OWNER'S ACCEPTANCE.
3. ALL SEDIMENT AND DEBRIS SHALL BE DISPOSED OF PROPERLY IN A PRE-APPROVED LOCATION AS APPROVED BY THE TOWN.
4. THE CONTRACTOR SHOULD REFER TO THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) FOR ADDITIONAL INFORMATION PERTAINING TO STORMWATER FACILITY OPERATION AND MAINTENANCE REQUIREMENTS AND SHALL MAINTAIN A WORKING COPY ON SITE AT ALL TIMES.
5. ALL STORMWATER FACILITIES SHALL BE INSPECTED BY THE CONTRACTOR AFTER EVERY MAJOR RAINFALL EVENT FOR THE ENTIRE DURATION OF THE CONSTRUCTION PROJECT AND THE FIRST 3 MONTHS AFTER CONSTRUCTION TO ENSURE PROPER STABILIZATION AND CONSTRUCTION.
6. SPECIFIC ANNUAL MAINTENANCE SHALL BE AS FOLLOWS:
   - A. DRAINAGE STRUCTURES (INLETS, MANHOLES & CATCHBASINS) : ALL DRAINAGE STRUCTURES WILL BE INSPECTED ANNUALLY TO MONITOR FOR PROPER OPERATION, COLLECTION OF LITTER OR TRASH, AND STRUCTURAL DETERIORATION. THE BASINS WILL BE CLEANED OF SEDIMENT (INCLUDING SUMPS) AS NECESSARY, AND REPAIRED WHEN REQUIRED.
   - B. RIP

SURVEY NOTES:

1) TOPOGRAPHIC INFORMATION IS BASED ON AERIAL TOPOGRAPHY PROVIDED BY COL–EAST, INC., RECEIVED AUGUST 2003, BASED ON AERIAL PHOTOGRAPHS DATED APRIL 6, 1995 AND PROVIDED BY BEALS AND THOMAS, INC., DATED OCTOBER 27, 2003.

2) WETLAND FLAGS SHOWN WITHIN THE PROPERTY WERE FLAGGED BY HORSLEY WITTEN GROUP, INC. IN MAY 2013 AND LOCATED BY ON GROUND SURVEY BY HORSLEY WITTEN GROUP, INC., IN MAY 2013. WETLAND FLAGS SOUTH OF THE PROPERTY BY BEALS AND THOMAS, INC. AUGUST–OCTOBER 2003.

3) ZONING CLASSIFICATION – RESIDENTIAL A

4) PROPERTY LINE PROVIDED BY MISTRY ASSOCIATES, INC., DATED JULY 30. 2007.

5) ALL ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

6) NO PART OF THE SITE IS LOCATED WITHIN A FLOODWAY – BASED ON FEMA FLOODWAY MAP COMMUNITY PANEL NUMBER 250179 0001B, EFFECTIVE DATE JULY 16, 1981.

7) TEST PITS: GS–GROUND SURFACE, GW–GROUNDWATER ENCOUNTERED, R–REFUSAL, B–BOTTOM. TEST PIT #1–6 CONDUCTED ON JUNE 4, 2013. TEST PIT #7–17 CONDUCTED ON JULY 25, 2013.

8) PROJECT IS NOT WITHIN THE WELLHEAD PROTECTION ZONE.

(WORCESTER COUNTY)
TOWN OF SOUTHBOROUGH
TOWN OF ASHLAND
(MIDDLESEX COUNTY)

SOUTHBOROUGH
ASHLAND

TOWN OF ASHLAND
13.4± AC.
583,425± S.F.

INDEPENDENCE LANE
(PUBLIC–50' WIDTH)

GRAPHIC SCALE
40 0 20 40 80 160
(in feet)
1 INCH = 40 FEET

last modified: 07/31/13 printed: 07/31/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-EX.dwg

Revisions					
Rev.	Date	By	Appr	Description
1	07/31/13	MJC	JEL	PEER REVIEW COMMENTS

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com
90 Route 64
Sandwich, MA 02563
508-833-6600 voice
508-833-3150 fax

Checked By: RAC
Drawn By: MJC
Designed By: MDZL
Date: JUNE 12, 2013

Plan Set: ASHLAND AFFORDABLE HOUSING
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

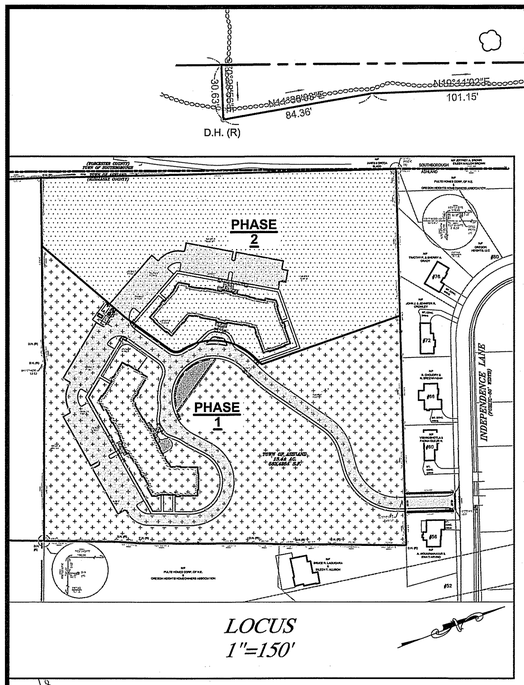
Plan Title: EXISTING CONDITIONS

Prepared For: RHW DEVELOPMENT LLC
536 Granite Street
Braintree, MA 02184
Phone: (781) 380-1660
Fax: (781) 380-1650

Survey Provided By: Beals and Thomas, Inc.
144 Turnpike Road, Southborough, MA 01772
Phone: (508) 366-0560, Fax: (508) 366-4391
Dated: October 27, 2003
Property Information Provided By: Mistry Associates, Inc.
315 Main St., Reading MA 01867
Phone: (781) 944-6940, Fax: (781) 944-0180
Dated: July 30, 2007

Registration:
COMMONWEALTH OF MASSACHUSETTS
PAT PIU LEE
CIVIL
No. 42824
REGISTERED PROFESSIONAL ENGINEER
7/31/13

Project Number: 12097
Sheet: 3 of 17
Sheet Number: C - 3



(WORCESTER COUNTY)
TOWN OF SOUTHBOROUGH
TOWN OF ASHLAND
(MIDDLESEX COUNTY)

N/F JAMES & ONEIDA BLAGG

DRILL PRICK (R)

SOUTHBOROUGH
ASHLAND

N/F JEFFREY A. BROWN
EILEEN MALLON BROWN

N/F PULTE HOMES CORP. OF N.E.
&
OREGON HEIGHTS HOMEOWNERS ASSOCIATION

N/F OREGON HEIGHTS, LLC

DETAIL N.T.S.

N/F TIMOTHY P. & SHERRY A. GRADY

N/F JOHN J. & JENNIFER R. CROWLEY

N/F S. CHOUDRY & N. SREENIVASAN

N/F VISHNUBHOTLA & PADMA GULUR N.

N/F A. AKKAMMANAVAR & SWATI ARVIND

N/F BRUCE R. LAQUIDARA & EILEEN T. ALLISON

N/F PULTE HOMES CORP. OF N.E.
&
OREGON HEIGHTS HOMEOWNERS ASSOCIATION

#80 #76 #72 #66 #60 #56 #52

BIT. CONC. DRIVE

INDEPENDENCE LANE
(PUBLIC–50' WIDTH)

PHASE 2
241,541 SF
5.54 AC

PHASE 2 BUILDING

PHASE 1
341,884 SF
7.85 AC

PHASE 1 BUILDING

TOWN OF ASHLAND
13.4± AC.
583,425± S.F.

DRIVEWAY
4,200 SF
0.10 AC

WF 1 … WF 114, WF113R, WF112R

TP 1 … TP 6

GS:345.0' B:337.5'
GS:346.5' B:336.5'
GS:347.0' B:337.0'
GS:349.5' R:344.5'
GS:362.0' R:355.0'
GS:346.5' B:336.2'
GS:342.0' R:335.5'
GS:357.0' R:348.0'
GS:365.5' R:358.5'
GS:332.0' R:325.5'
GS:337.0' R:327.0'
GS:335.0' B:325.0'
GS:328.5' R:319.5'
GS:339.0' R:333.0'

N61°39'26"E 230.80'
N58°37'16"E 116.49'
L=163.25' R=120.00'
L=26.57' R=22.00'
N01°37'49"E 306.99'
N65°21'35"E 23.35'
25.4'
19.5'
20.0'
28.5'
99.4'
113.5'

S74°50'14"E 42.37'
S61°37'46"E 12.62'
S22°14'54"W 366.60'
N22°14'54"E 168.08'
N22°14'54"E 156.08'
N68°08'49"W 224.21'
0.03'
0.01'
D.H. (R)

N20°04'55"E 743.93'
N70°02'14"W 47.32'
N70°02'14"W 31.50'
N70°02'14"W 144.52'
N70°02'14"W 95.41'
N70°02'14"W 173.60'
N70°02'14"W 143.00'
N70°02'14"W 143.00'
N70°02'14"W 68.72'
N70°02'14"W 82.88'
N70°02'14"W 782.55'
N21°01'30"E 116.96'
N21°21'54"E 235.58'
N21°21'54"E 235.58'
0.89'
3.63'
0.23'
TOTAL
S70°02'14"E 40.00'
S70°02'14"E 40.00'
S70°02'14"E 68.72'
S70°02'14"E 40.00'
105.00' N19°57'46"E
105.00' S19°57'46"W
40.00'
40.00'
S69°39'34"E 142.87'
S69°39'34"E 319.25'
S69°39'34"E 206.38'
S69°39'34"E 359.23'
D.H. (R) 84.36' N44°39'09"E
D.H. (R) 101.15' N44°40'02"E
D.H. (R) 53.30' N35°56'55"E
D.H. (R) 45.89' N25°15'43"E
D.H. (R) 89.51' N21°49'34"E
D.H. (R) 141.12' N21°23'09"E
D.H. (R) 60.00' N23°12'11"E
D.H. (R) 44.20' N23°12'11"E
D.H. (R) 66.59' N21°00'07"E
D.H. (R) 83.39' N22°34'14"E
D.H. (R) 72.16' N21°54'06"E

WF 601 … WF 610
ABBEVW

GRAPHIC SCALE
40 0 20 40 80 160
(in feet)
1 INCH = 40 FEET

last modified: 07/31/13 printed: 07/31/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-LOTTING.dwg

Revisions

Rev.	Date	By	Appr	Description
1	07/01/13	MJC	JEL	PEER REVIEW COMMENTS

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com
90 Route 64
Sandwich, MA 02563
508-833-6600 office
508-833-3150 fax

Designed By: MCL
Drawn By: MC
Checked By: PAC
Date: JUNE 12, 2013

Plan Set: ASHLAND AFFORDABLE HOUSING
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Plan Title: PHASING PLAN

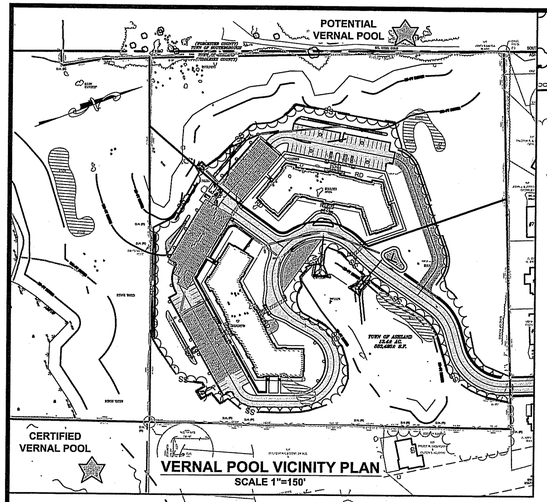
Prepared For:
RHW DEVELOPMENT LLC
536 Granite Street
Braintree, MA 02184
Phone: (781) 380-1660
Fax: (781) 380-1650

Survey Provided By:
Beals and Thomas, Inc.
144 Turnpike Road, Southborough, MA 01772
Phone: (508) 366-0560, Fax: (508) 366-4391
Date: October 27, 2003

Property Information Provided By:
Mistry Associates, Inc.
315 Main St., Reading MA 01867
Phone: (781) 944-0400, Fax: (781) 944-0180
Date: July 30, 2007

Registration:
COMMONWEALTH OF MASSACHUSETTS
FAT PIU LEE
CIVIL
No. 42824
REGISTERED PROFESSIONAL ENGINEER
7/31/13

Project Number: 12097
Sheet : 4 of 17
Sheet Number: C - 4



(WORCESTER COUNTY)
TOWN OF SOUTHBOROUGH
TOWN OF ASHLAND
(MIDDLESEX COUNTY)

BIT. CONC. DRIVE

EDGE OF WOODS

N/F JAMES & ONEIDA BLAGG

SOUTHBOROUGH

ASHLAND

N/F JEFFREY A. BROWN
EILEEN MALLON BROWN

N/F PULTE HOMES CORP. OF N.E. & OREGON HEIGHTS HOMEOWNERS ASSOCIATION

N/F OREGON HEIGHTS, LLC

N/F TIMOTHY P. & SHERRY A. GRADY

N/F JOHN J. & JENNIFER R. CROWLEY

N/F S. CHOUDRY & N. SREENIVASAN

N/F VISHNUBHOTLA & PADMA GULUR N.

N/F A. AKKAMMANAVAR & SWATI ARVIND

N/F BRUCE R. LAQUIDARA & EILEEN T. ALLISON

#80 #76 #72 #66 #60 #56 #52

BIT. CONC. DRIVE

BOULDERS

ROCK

DENSE TREES

25-FT BUFFER

100-FT BUFFER

BIORETENTION #5
NO SNOW STORAGE IN BASIN SIGN
SURFACE STORMWATER MANAGEMENT AREA (TYP.)
SNOW STORAGE AREA
UNDERGROUND RECHARGE FIELD (TYP.)
WOOD PARKING BARRIER
BIORETENTION #4
WOOD FENCE
SEWAGE LIFT STATION W/ BACKUP GENERATOR (SEE UTILITY PLAN)
DUMPSTER PAD (DOUBLE)
GATES W/ BOLLARDS
CROSS WALK
6' CHAINLINK FENCE
BIORETENTION #3
SNOW STORAGE AREA
RETAINING WALL
PICKET FENCE
PATIO PAVERS
BIT. ASPHALT SIDEWALK
STEPS (TYP.)
WOOD BARRIER
LIMIT OF WORK/ CLEARING
BIORETENTION #2
PHASE 1 BUILDING
PHASE 2 BUILDING
SNOW STORAGE AREAS
GRASSPAVE FIRE ACCESS LANE (24' WIDE)
BIT. ASPHALT SIDEWALK
PROPOSED PROPERTY LINE
CONCRETE SIDEWALK RAMP
BIORETENTION #1
LIMIT OF WORK/CLEARING
VEGETATED SWALE ALONG OPEN SECTION ROADWAY
NO SNOW STORAGE IN WETLAND SIGN
DRY-LAID STONE GRAVITY WALL
CONCRETE SIDEWALK RAMP
LIMIT OF WORK
STOP SIGN
SMH 01 RIM: 364.87' INV.: 360.67'
SMH 02 RIM: 364.44' INV.: 358.27'

TOWN OF ASHLAND
13.4± AC.
583,425± S.F.

INDEPENDENCE LANE
(PUBLIC–50' WIDTH)

BUILDING NOTES:

PHASE 1: 64 1-BEDROOM UNITS
PHASE 2: 48 1-BEDROOM UNITS
TOTAL BUILDOUT: 112 1-BEDROOM UNITS

PARKING NOTES:

PHASE 1:
71 - 9'x18' PARKING SPACES PROVIDED
5 - 8x18 HANDICAP SURFACE SPACES (2 VAN SPACES)
TOTAL PHASE 1 PARKING PROVIDED = 76 SPACES
PHASE 2:
65 - 9'x18' PARKING SPACES PROVIDED
5 - 8x18 HANDICAP SURFACE SPACES (2 VAN SPACES)
TOTAL PHASE 2 PARKING PROVIDED = 70 SPACES
TOTAL PROPOSED SPACES (PHASE 1 & 2): 146
PARKING RATIO PER UNIT = 1.30 (1.14 REQUIRED)

HARDSCAPE NOTES:

- ACCESS DRIVE (PRIVATE ROADWAY EXTENSION): 24 FOOT WIDE BITUMINOUS ASPHALT
- PARKING LOT: 24' WIDE BITUMINOUS ASPHALT DRIVE AISLES
- PEDESTRIAN SIDEWALKS: 5 FOOT WIDE ASPHALT

GRAPHIC SCALE
40 0 20 40 80 160
(in feet)
1 INCH = 40 FEET

last modified: 08/20/13 printed: 08/20/13 by mc H:\projects\2012\12097 ea fish ashland\drawings - 12097\12097-ST.dwg

Revisions

Rev.	Date	By	Appr.	Description
1	07/31/13	MJC	JEL	PEER REVIEW COMMENTS
2	08/20/13	MJC	JEL	THIRD PEER REVIEW

Horsley Witten Group, Inc.
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90 Route 6A
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508-833-6600 voice
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Checked By: RAC
Drawn By: MC
Designed By: MCI/JL
Date: JUNE 12, 2013

Plan Set: ASHLAND AFFORDABLE HOUSING
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Plan Title: PROPOSED SITE PLAN

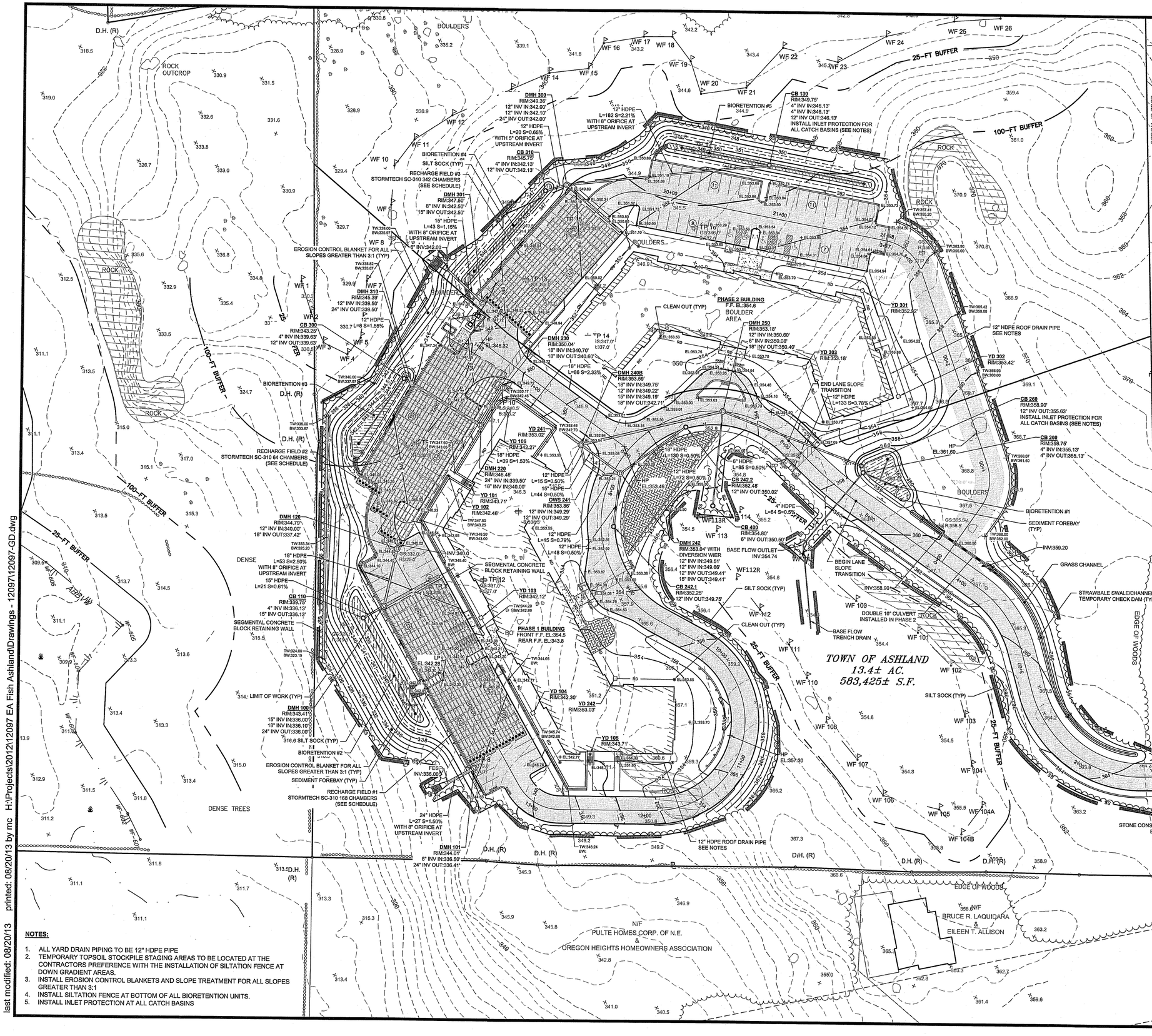
Prepared For: RHW DEVELOPMENT LLC
536 Granite Street
Braintree, MA 02184
Phone: (781) 380-1650
Fax: (781) 380-1650

Survey Provided By:
Beals and Thomas, Inc.
144 Turnpike Road, Southborough, MA 01772
Phone: (508) 366-0560, Fax: (508) 366-4391
Dated: October 27, 2003
Property Information Provided By:
Mistry Associates, Inc.
315 Main St., Reading MA 01867
Phone: (781) 944-6400, Fax: (781) 944-0180
Dated: July 30, 2007

Registration:
COMMONWEALTH OF MASSACHUSETTS
RICHARD A. CLAYTOR
CIVIL
NO. 45118
REGISTERED PROFESSIONAL ENGINEER
8-28-13

Project Number: 12097
Sheet: 5 of 17

Sheet Number: C - 5



NOTES:

1. ALL YARD DRAIN PIPING TO BE 12" HDPE PIPE
2. TEMPORARY TOPSOIL STOCKPILE STAGING AREAS TO BE LOCATED AT THE CONTRACTORS PREFERENCE WITH THE INSTALLATION OF SILTATION FENCE AT DOWN GRADIENT AREAS.
3. INSTALL EROSION CONTROL BLANKETS AND SLOPE TREATMENT FOR ALL SLOPES GREATER THAN 3:1
4. INSTALL SILTATION FENCE AT BOTTOM OF ALL BIORETENTION UNITS.
5. INSTALL INLET PROTECTION AT ALL CATCH BASINS

Revisions			
Rev.	Date	By	Appr. Description
1	07/31/13	MJC	JEL PEER REVIEW COMMENTS
2	8/09/13	MJC	JEL SECOND PEER REVIEW
3	8/20/13	MJC	JEL THIRD PEER REVIEW

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
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90 Route 64
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508-833-6600 voice
508-833-3150 fax

Checked By: RAC
Drawn By: MC
Designed By: MCJ/JL
Date: JUNE 12, 2013

Plan Set:
Plan Title: GRADING & EROSION CONTROL

Prepared For:
RHW DEVELOPMENT LLC
336 Granite Street
Braintree, MA 02184
Phone: (781) 380-1660
Fax: (781) 380-1600

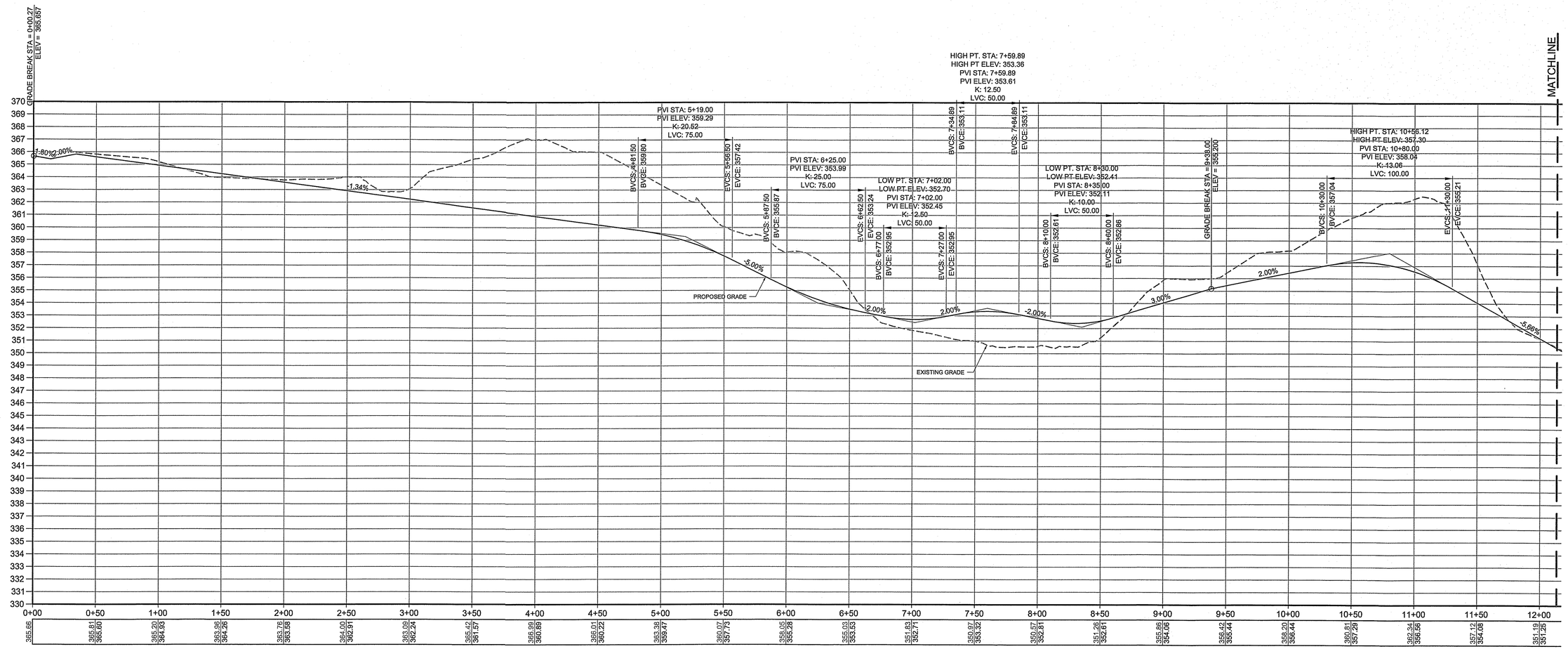
Survey Provided By:
Beals and Thomas, Inc.
144 Turnpike Road
Southborough, MA 01772
Phone: (508) 366-0560
Fax: (508) 366-4391
Date(s): October 27, 2003

Registration:
COMMONWEALTH OF MASSACHUSETTS
RICHARD A. CLAYTOR
CIVIL
NO. 45116
REGISTERED PROFESSIONAL ENGINEER
8-20-13

Project Number: 12097
Sheet: 6 of 17

Sheet Number: C - 6

last modified: 08/20/13 printed: 08/20/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-GD.dwg



ENTRANCE DRIVE PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

last modified: 07/31/13 printed: 07/31/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-GD.dwg

Revisions

Rev.	Date	By	Appr.	Description
1				
2				
3				
4				
5				
6				

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com
90 Route 6A
Sandwich, MA 02563
508-833-3000 office
508-833-3150 fax

Date: JUNE 12, 2013 | Designed By: MCOLL | Drawn By: MC | Checked By: FAC

Plan Set: *ASHLAND AFFORDABLE HOUSING*
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Plan Title: *PROFILES (1)*

Prepared For:
RHW DEVELOPMENT LLC
536 Granite Street
Braintree, MA 02184
Phone: (781) 380-1600
Fax: (781) 380-1600

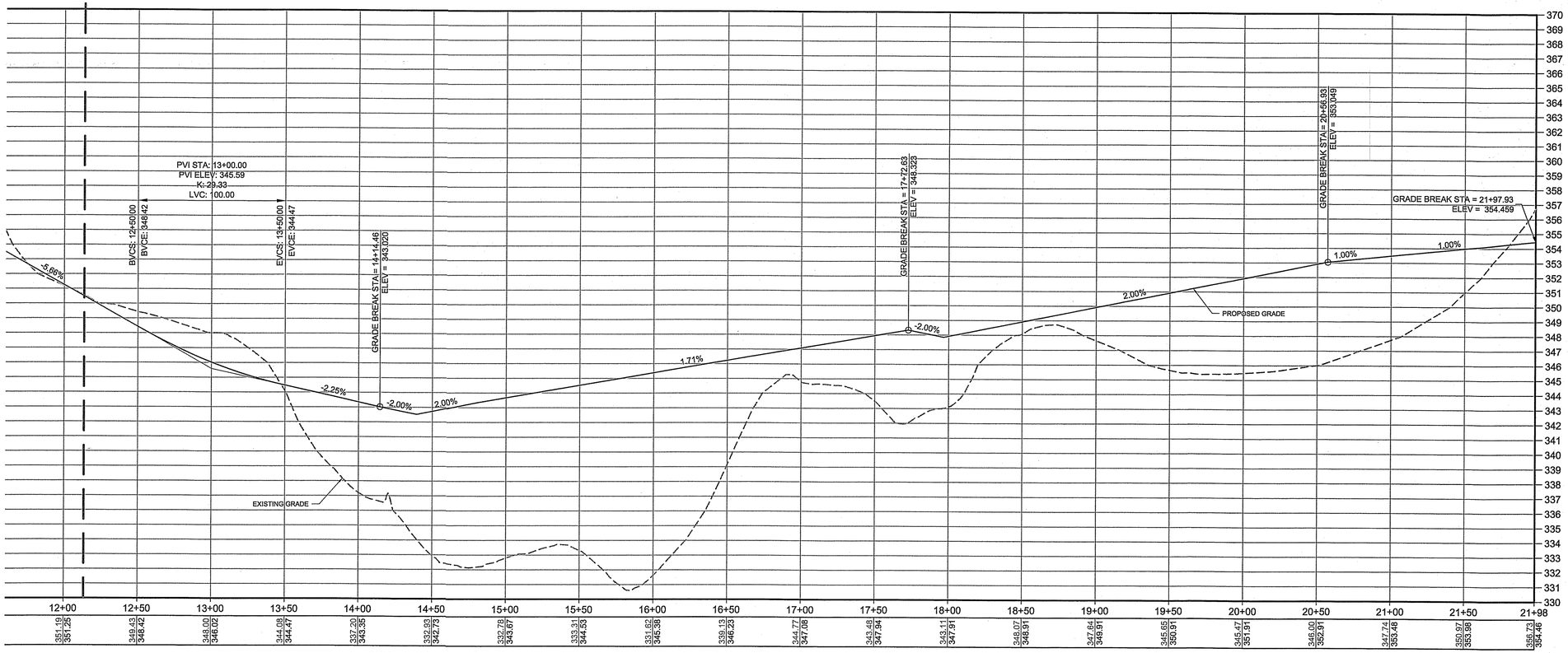
Survey Provided By:
Beals and Thomas, Inc.
144 Turnpike Road
Southborough, MA 01772
Phone: (508) 366-0560
Fax: (508) 366-4391
Dated: October 27, 2003

Registration:

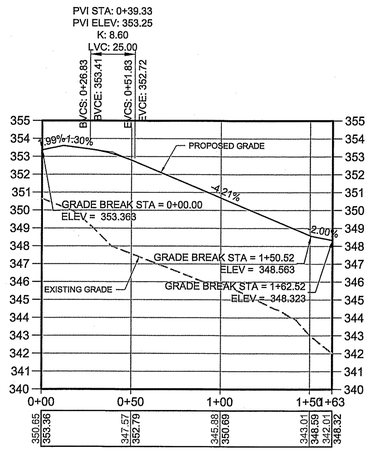
COMMONWEALTH OF MASSACHUSETTS
FAT PIU LEE
CIVIL
No. 42834
REGISTERED PROFESSIONAL ENGINEER
8/1/13

Project Number: 12097 | Sheet: 7 of 17

Sheet Number: C - 7



ENTRANCE DRIVE PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



CONNECTOR DRIVE PROFILE
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

Revisions

No.	Date	By	Appr.	Description
1				
2				
3				
4				
5				
6				

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com
90 Route 6A
Sandwich, MA 02563
508-833-6600 voice
508-833-3150 fax

Drawn By: MC | Checked By: RAC
Designed By: MCJ/L | Date: JUNE 12, 2013

Plan Set: *ASHLAND AFFORDABLE HOUSING*
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Plan Title: *PROFILES (2)*

Prepared For:
RHW DEVELOPMENT LLC
536 Granite Street
Braintree, MA 02184
Phone: (781) 380-1660
Fax: (781) 380-1650

Survey Provided By:
Beals and Thomas, Inc.
144 Turnpike Road
Southborough, MA 01772
Phone: (508) 366-0560
Fax: (508) 366-4391
Dated: October 27, 2003

Registration:
COMMONWEALTH OF MASSACHUSETTS
FAT PIU
LEI
CIVIL
No. 42824
Registered
PROFESSIONAL ENGINEER
8/1/13

Project Number: 12097
Sheet: 8 of 17

Sheet Number: C - 8

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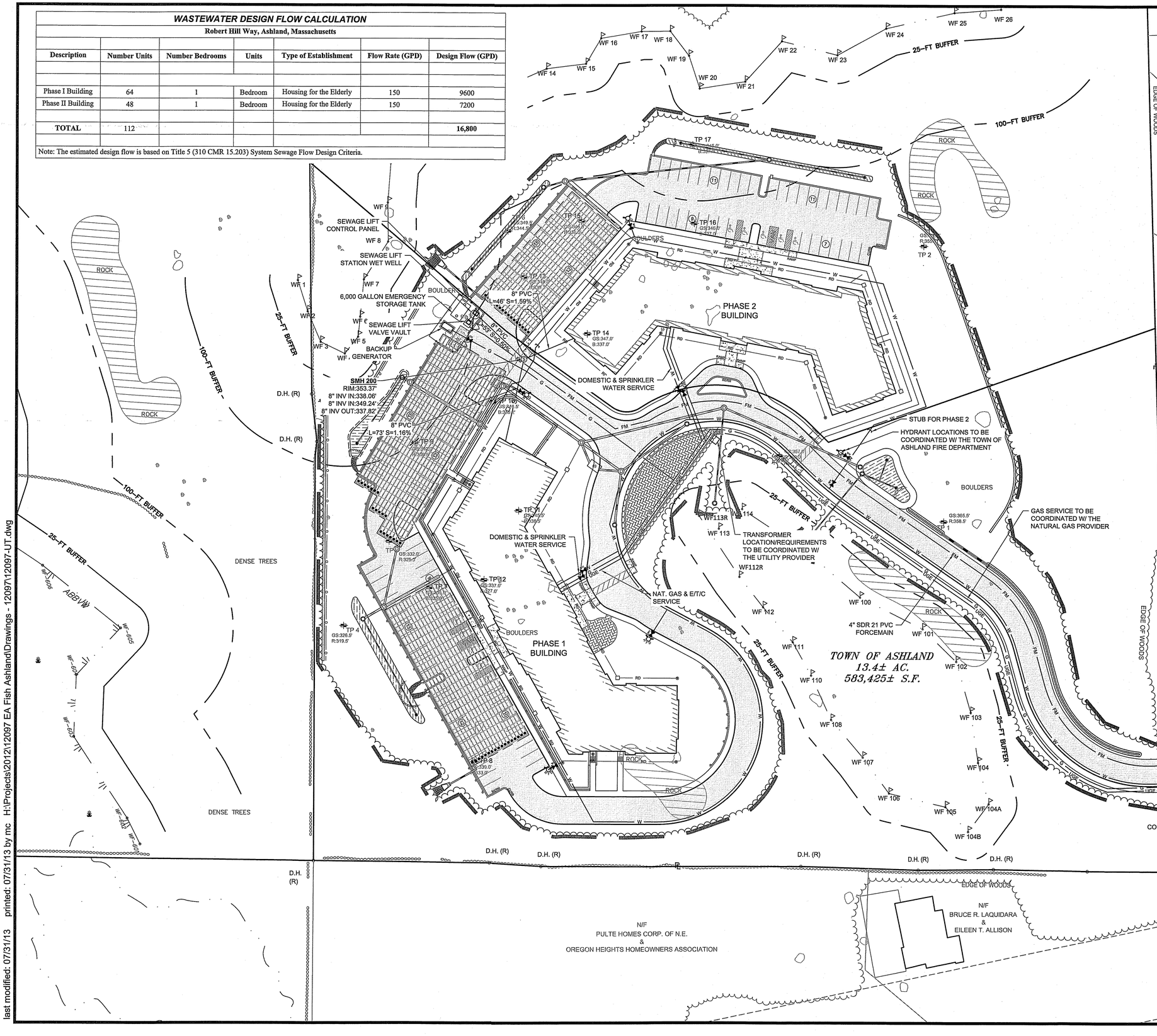
WASTEWATER DESIGN FLOW CALCULATION

Robert Hill Way, Ashland, Massachusetts

Description	Number Units	Number Bedrooms	Units	Type of Establishment	Flow Rate (GPD)	Design Flow (GPD)
Phase I Building	64	1	Bedroom	Housing for the Elderly	150	9600
Phase II Building	48	1	Bedroom	Housing for the Elderly	150	7200
TOTAL	112					**16,800**

Note: The estimated design flow is based on Title 5 (310 CMR 15.203) System Sewage Flow Design Criteria.



GRAPHIC SCALE

40 0 20 40 80 160

(in feet)

1 INCH = 40 FEET

Revisions				
Rev.	Date	By	App'd	Description
1	07/31/13	MJC	JEL	PEER REVIEW COMMENTS

Horsley Witten Group, Inc.
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Designed By: MCGJL
Drawn By: MJC
Checked By: PAC
Date: JUNE 12, 2013

Survey Provided By:
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144 Turnpike Road
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Phone: (508) 366-0560
Fax: (508) 366-4391
Dated: October 27, 2003

Registration:
COMMONWEALTH OF MASSACHUSETTS
FAT PIU LEE
CIVIL
No. 42824
REGISTERED PROFESSIONAL ENGINEER
7/31/13

Prepared For:
RHW DEVELOPMENT LLC
536 Granite Street
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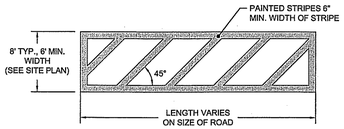
Phone: (781) 380-1600
Fax: (781) 380-1650

Plan Set: *ASHLAND AFFORDABLE HOUSING*
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Plan Title: *UTILITY PLAN*

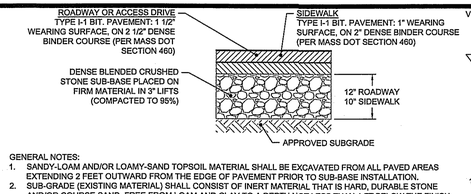
Project Number: 12097
Sheet: 9 of 17
Sheet Number: C - 9

last modified: 07/31/13 printed: 07/31/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-UT.dwg



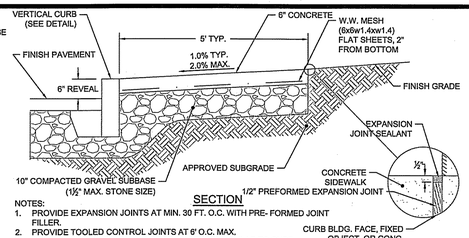
NOTE:
1. ALL PARKING LOT STRIPING SHALL BE 6" SOLID WHITE PAINTED LINES.
2. ALL PAINT SHALL BE NON-SKID.
3. PAINT LINES SHALL BE WHITE

TYPICAL PAINTED CROSSWALK STRIPING
NOT TO SCALE



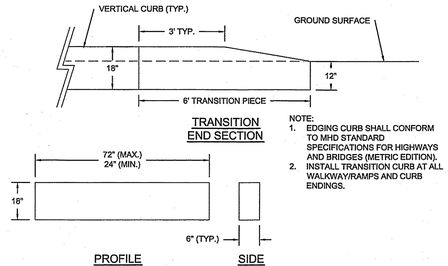
GENERAL NOTES:
1. SANDY-LOAM AND/OR LOAMY-SAND TOPSOIL MATERIAL SHALL BE EXCAVATED FROM ALL PAVED AREAS EXTENDING 2 FEET OUTWARD FROM THE EDGE OF PAVEMENT PRIOR TO SUB-BASE INSTALLATION.
2. SUB-GRADE (EXISTING MATERIAL) SHALL CONSIST OF INERT MATERIAL THAT IS HARD, DURABLE STONE AND/OR COURSE SAND, FREE FROM LOAM AND CLAY TO A DEPTH NOT LESS THAN 4-FT BELOW THE FINISH PAVEMENT SURFACE.
3. SUBGRADE FILL SHALL BE COMPACTED TO 95% COMPACTION.
4. SEE SITE LAYOUT PLAN FOR PAVEMENT WIDTH AND LOCATION
5. SEE GRADING PLANS FOR PAVMENT SLOPE AND CROSS SLOPE
6. PRIOR TO INSTALLING THE WEARING COURSE THE EXISTING BINDER COURSE SURFACE SHALL BE SWEPT COMPLETELY CLEAN BY A STREET SWEEPING MACHINE AND A TACK COAT SHALL BE INSTALLED TO A LEVEL APPROVED BY THE ENGINEER.

TYPICAL BITUMINOUS PAVEMENT
NOT TO SCALE



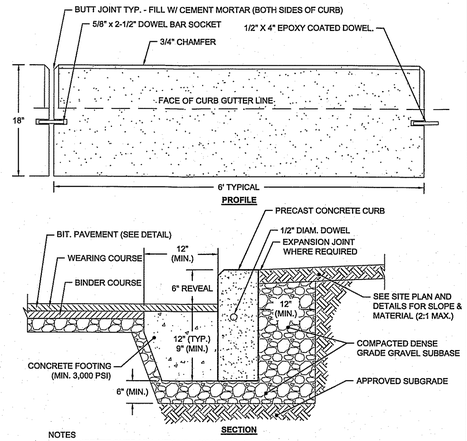
NOTES:
1. PROVIDE EXPANSION JOINTS AT MIN. 30 FT. O.C. WITH PRE- FORMED JOINT FILLER.
2. PROVIDE TOOLED CONTROL JOINTS AT 6' O.C. MAX.
3. PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO CURB.
4. CEMENT CONCRETE SHALL BE 4,000 PSI-TYPE II
5. MATCH ALL EXISTING SIDEWALK WIDTH WHERE APPLICABLE.
6. SUBBASE SHALL BE COMPACTED TO 95%.

CONCRETE SIDEWALK DETAIL
NOT TO SCALE



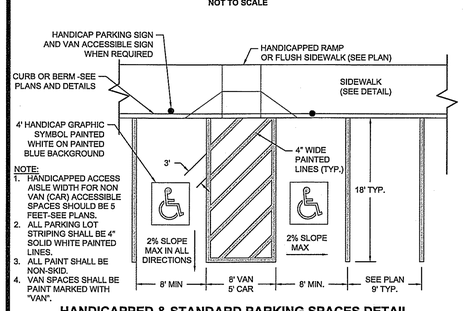
NOTE:
1. EDGING CURB SHALL CONFORM TO MHD STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES (METRIC EDITION).
2. INSTALL TRANSITION CURB AT ALL WALKWAYRAMPS AND CURB ENDINGS.

VERTICAL CURBING END SECTIONS
NOT TO SCALE



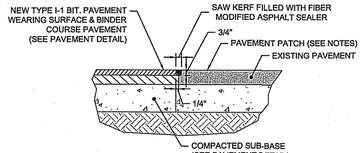
NOTES
1. CONCRETE CURB MIN. HEIGHT = 18" MIN. WIDTH = 6".
2. EXPOSED EDGES TO HAVE 3/4" CHAMFER.
3. EXPOSED SURFACES TO HAVE SPONGE FLOAT FINISH.
4. MINIMUM LENGTH OF STRAIGHT OR CIRCULAR FILLER PIECES TO BE 3'-0".
5. SHALL HAVE A MINIMUM CONCRETE STRENGTH OF 4,000 PSI.
6. SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 501 OF THE 1995 MHD STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
7. JOINTS BETWEEN CURB SECTIONS SHALL BE POINTED (FRONT & BACK).
8. CURB TO BE INSTALLED TO THE REVEAL AND SLOPE SHOWN IN THE DETAILS.
9. INSTALL IN LOCATIONS SHOWN ON THE SITE PLAN.
10. INSTALL TRANSITION CURB AT ALL WALKWAYRAMPS AND CURB ENDINGS.
11. PROVIDE CURB EXPANSION JOINTS AT 5'-0" TO 6'-0" O.C.
12. FOR CURB REPLACEMENT IN EXISTING PAVEMENT - SAWCUT EDGE MIN. 12" FROM CURB.
13. SUBBASE FILL SHALL BE COMPACTED TO 95% COMPACTION.

TYPICAL VERTICAL CONCRETE CURB
NOT TO SCALE



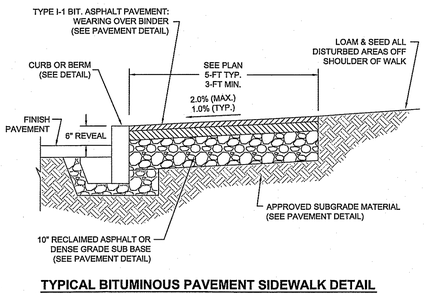
NOTE:
1. HANDICAPPED ACCESS AISLE WIDTH FOR NON VAN (CAR) ACCESSIBLE SPACES SHOULD BE 5 FEET-SEE PLANS.
2. ALL PARKING LOT STRIPING SHALL BE 4" SOLID WHITE PAINTED LINES.
3. ALL PAINT SHALL BE NON-SKID.
4. VAN SPACES SHALL BE PAINT MARKED WITH "VAN".

HANDICAPPED & STANDARD PARKING SPACES DETAIL
NOT TO SCALE

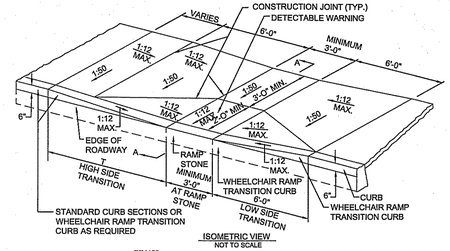


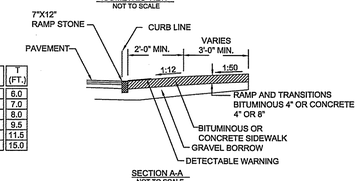
NOTES:
1. EXISTING BITUMINOUS PAVEMENT SHALL BE REMOVED TO A CLEAN STRAIGHT EDGE VIA SAW CUTTING. THE SAW CUT SHALL BE COMPLETED PERPENDICULAR TO THE ROADWAY/SIDEWALK.
2. PRIOR TO INSTALLING THE WEARING COURSE THE EXISTING VERTICAL PAVEMENT SURFACE SHALL BE SWEPT COMPLETELY CLEAN.
3. AFTER PROPER COMPACTION (SEE PAVEMENT DETAIL) SAW CUT NEW PAVEMENT ABUTMENT 3/4" DEEP AND FILL WITH FIBER MODIFIED ASPHALT SEALER AS SHOWN.

TYPICAL PAVEMENT PATCH DETAIL
NOT TO SCALE



TYPICAL BITUMINOUS PAVEMENT SIDEWALK DETAIL
NOT TO SCALE

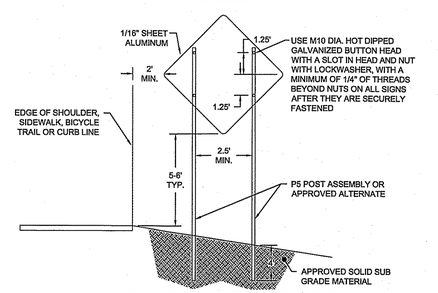




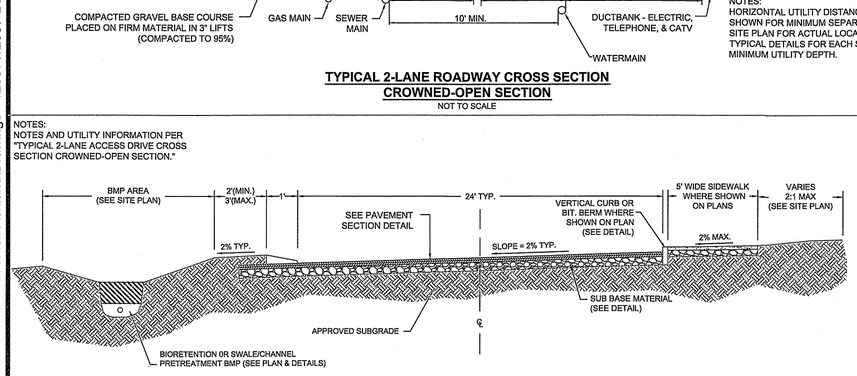
ROADWAY PROFILE GRADE	T (FT.)
0.00	6.0
0.01	7.0
0.02	8.0
0.03	9.5
0.04	11.5
0.05	15.0

1. NOTES:
2. SLOPES SHOWN ARE MAX ALLOWED PER RAMP TYPE. REDUCE SLOPES WHERE AVAILABLE.
3. BROOM FINISH CONCRETE PERPENDICULAR TO SLOPE
4. FORM GROOVES 1/4" X 1/4" 6" O.C. AT 45 DEGREES TO CURB ON CONCRETE SLOPES.
5. ALL CONCRETE SHALL BE 4000 PSI TYPE II & HAVE A MIN. DEPTH OF 6" WITH W.W. MESH (6x6w1.4xw1.4) FLAT SHEETS INSTALLED 2" FROM THE BOTTOM OF THE CONCRETE LAYER.
6. TRANSITION CURB BOTH SIDES OF RAMP (SEE DETAIL).

HANDICAPPED ACCESS RAMP
NOT TO SCALE

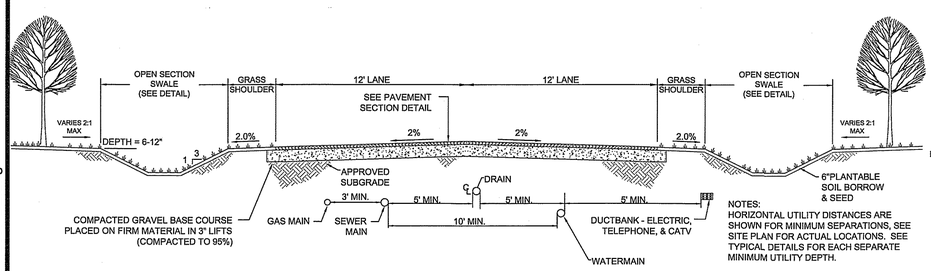


TYPICAL INSTALLATION FOR SIGNS
NOT TO SCALE



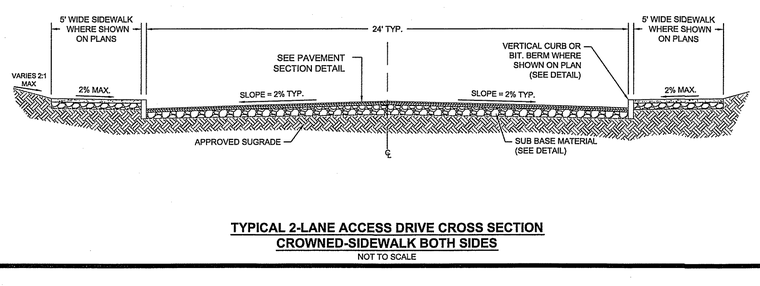
NOTES:
NOTES AND UTILITY INFORMATION PER "TYPICAL 2-LANE ACCESS DRIVE CROSS SECTION CROWNED-OPEN SECTION."

TYPICAL 2-LANE SUPER-ELEVATED ACCESS DRIVE SECTION WITH OPEN SECTION
NOT TO SCALE

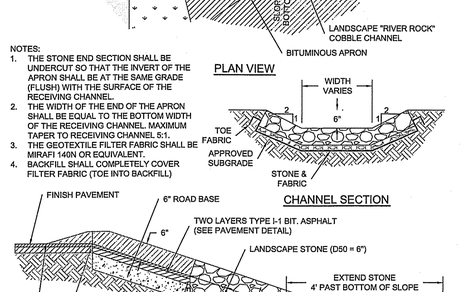


NOTES:
HORIZONTAL UTILITY DISTANCES ARE SHOWN FOR MINIMUM SEPARATIONS, SEE SITE PLAN FOR ACTUAL LOCATIONS. SEE TYPICAL DETAILS FOR EACH SEPARATE MINIMUM UTILITY DEPTH.

TYPICAL 2-LANE ROADWAY CROSS SECTION CROWNED-OPEN SECTION
NOT TO SCALE

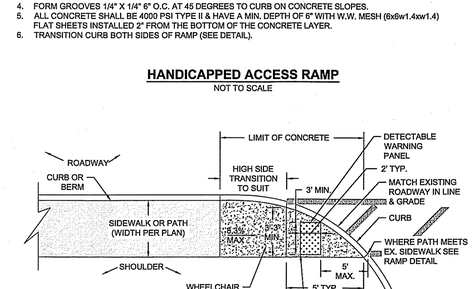


TYPICAL 2-LANE ACCESS DRIVE CROSS SECTION CROWNED-SIDEWALK BOTH SIDES
NOT TO SCALE



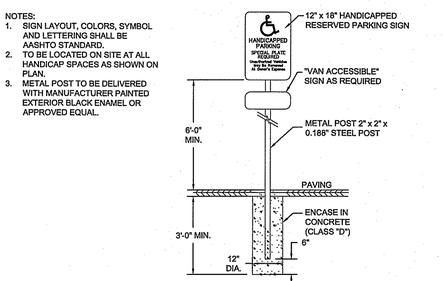
NOTES:
1. THE STONE END SECTION SHALL BE UNDERCUT SO THAT THE INVERT OF THE APRON SHALL BE AT THE SAME GRADE (FLUSH) WITH THE SURFACE OF THE RECEIVING CHANNEL.
2. THE WIDTH OF THE END OF THE APRON SHALL BE EQUAL TO THE BOTTOM WIDTH OF THE RECEIVING CHANNEL. MAXIMUM TAPER TO RECEIVING CHANNEL 5:1.
3. THE GEOTEXTILE FILTER FABRIC SHALL BE MIRAFI 140N OR EQUIVALENT.
4. BACKFILL SHALL COMPLETELY COVER FILTER FABRIC (TOE INTO BACKFILL)

PAVED DRAINAGE FLUME DETAIL
NOT TO SCALE



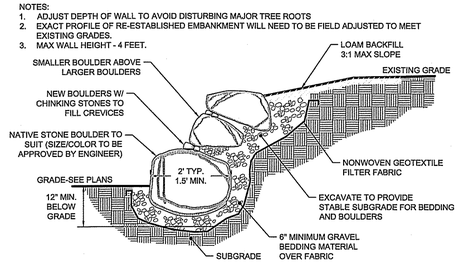
NOTES:
1. WHEELCHAIR RAMP SHALL BE CONSTRUCTED OF PORTLAND CEMENT CONCRETE PER MADOT & ADA SPECIFICATIONS.
2. CONTRACTOR SHALL REPLACE/RESET EX. CURB/BERM AS NECESSARY.
3. CURB END SECTIONS SHALL BE INSTALLED AT ALL RAMPS WHEN APPLICABLE.
4. DETECTABLE WARNING PANEL SHALL BE NON SLIP SURFACE FULLY EMBEDDED AND MEETING ADA REQUIREMENTS INSTALLED AT ALL ROADWAY CROSSING. PANEL SHALL BE 3' MIN. IN WIDTH IN DIRECTION OF TRAVEL AND 5' MAX. FROM FACE OF CURB.

HANDICAP ACCESS FOR CONTINUOUS DIRECTION OF TRAVEL AT ROADWAY INTERSECTION
NOT TO SCALE



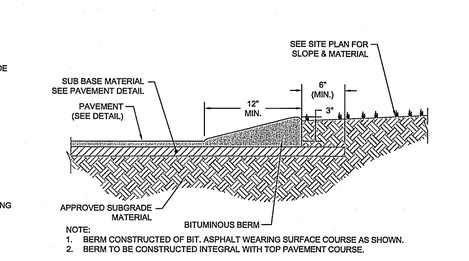
NOTES:
1. SIGN LAYOUT, COLORS, SYMBOL AND LETTERING SHALL BE AASHTO STANDARD.
2. TO BE LOCATED ON SITE AT ALL HANDICAP SPACES AS SHOWN ON PLAN.
3. METAL POST TO BE DELIVERED WITH MANUFACTURER PAINTED EXTERIOR BLACK ENAMEL OR APPROVED EQUAL.

TYPICAL HANDICAP SIGN DETAIL
NOT TO SCALE



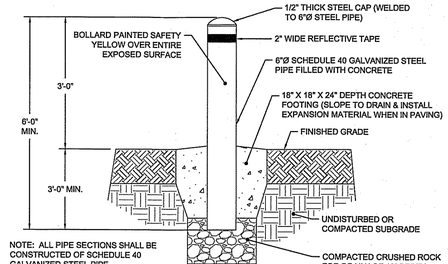
NOTES:
1. ADJUST DEPTH OF WALL TO AVOID DISTURBING MAJOR TREE ROOTS
2. EXACT PROFILE OF RE-ESTABLISHED EMBANKMENT WILL NEED TO BE FIELD ADJUSTED TO MEET EXISTING GRADES.
3. MAX WALL HEIGHT - 4 FEET.

STONE BOULDER RETAINING EMBANKMENT WALL
NOT TO SCALE



NOTE:
1. BERM CONSTRUCTED OF BIT. ASPHALT WEARING SURFACE COURSE AS SHOWN.
2. BERM TO BE CONSTRUCTED INTEGRAL WITH TOP PAVEMENT COURSE.

TYPICAL BITUMINOUS BERM DETAIL
NOT TO SCALE



NOTE: ALL PIPE SECTIONS SHALL BE CONSTRUCTED OF SCHEDULE 40 GALVANIZED STEEL PIPE.

CONCRETE FIXED STEEL BOLLARD DETAIL
NOT TO SCALE

Revisions

Rev.	Date	By	Appr	Description
1	07/31/13	MJC	JEL	PEER REVIEW COMMENTS

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com
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Sandwich, MA 02563
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Drawn By: MJC
Checked By: PAC
Designed By: MCL/JL
Date: JUNE 12, 2013

Plan Set: ASHLAND AFFORDABLE HOUSING
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Plan Title: DETAILS 1

Prepared For: RHW DEVELOPMENT LLC
556 Granite Street
Braintree, MA 02184
Phone: (781) 380-1650
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Survey Provided By: Beals and Thomas, Inc.
144 Turnpike Road
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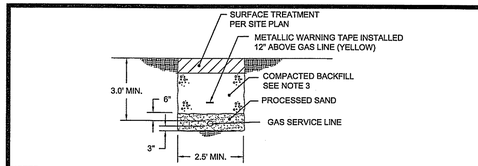
Fax: (508) 366-4391
Dated: October 27, 2003

Registration:
COMMONWEALTH OF MASSACHUSETTS
FAT PIU LEE
CIVIL
No. 42824
REGISTERED PROFESSIONAL ENGINEER
8/1/13

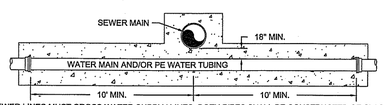
Project Number: 12097
Sheet : 10 of 17
Sheet Number: C - 10

last modified: 07/31/13 printed: 07/31/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-DE.dwg

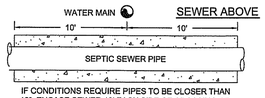


NOTES:
1. SITE WORK SUBCONTRACTOR SHALL PERFORM EXCAVATION, AND BACKFILL FOR ALL GAS LINE INSTALLATIONS. GAS SERVICE PROVIDER SHALL FURNISH AND INSTALL GAS LINES AND WARNING TAPE AS REQUIRED.
2. GAS SERVICE LINE SHALL BE SIZED BY GAS PROVIDER.
4. TRENCH BACKFILL:
   BENEATH PAVEMENT: BACKFILL SHALL BE ROADBASE AND COMPACTED TO PAVEMENT SUBBASE REQUIREMENTS-SEE DETAIL.
   OUTSIDE PAVEMENT: GRAVEL BORROW TYPE B (3" MINUS) COMPACTED IN MAXIMUM 8 INCH LIFTS TO TO 95% COMPACTION.
5. GAS LINES SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL GAS PROVIDER STANDARDS THAT MAY BE MORE STRINGENT THAN THIS DETAIL.

TYPICAL GAS SERVICE TRENCH DETAIL
NOT TO SCALE

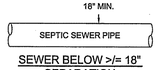


IF SEWER LINES MUST CROSS WATER SUPPLY LINES, BOTH PIPES SHALL BE CONSTRUCTED OF CLASS 150 PRESSURE PIPE OR BETTER AND SHALL BE PRESSURE TESTED AT 150 PSI TO ASSURE WATER TIGHTNESS. IF CROSSING IS WITHIN 18" MINIMUM, BOTH MAINS MUST BE CONSTRUCTED OF MECHANICAL JOINT CEMENT-LINED DUCTILE IRON PIPE FOR A DISTANCE OF 10' EITHER SIDE OF CROSSSING OR INCASED IN CONCRETE 10' EITHER SIDE OF CROSSING



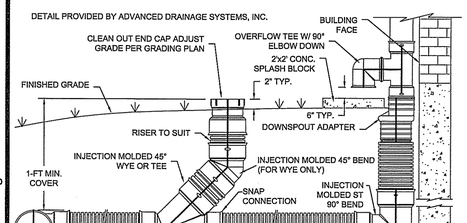
IF CONDITIONS REQUIRE PIPES TO BE CLOSER THAN 18", ENCASE SEWER 10' EACH SIDE OF CROSSING OR USE D.I. FOR SEWER

SEWER BELOW < 18" SEPARATION

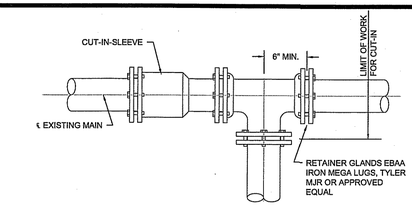


SEWER BELOW >/= 18" SEPARATION

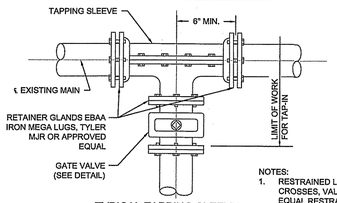
WATER SERVICE / SEWER CROSSING DETAIL
NOT TO SCALE



TYPICAL ROOF DRAIN DETAIL
NOT TO SCALE



TYPICAL CUT - IN SLEEVE AND FITTING DETAIL

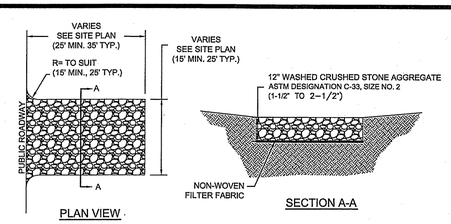


TYPICAL TAPPING SLEEVE AND VALVE DETAIL

NOTES:
1. RESTRAINED LENGTH FOR TEES, CROSSES, VALVES AND PLUGS SHALL EQUAL RESTRAINED LENGTH FOR 90° BENDS.
2. THE SCHEDULE SHOWN IS FOR THE FOLLOWING SERVICE CONDITIONS 150 psig INTERNAL PRESSURE; SOIL TYPE: SAND-SILT; 36 INCHES OF COVER AND TYPE 2 LAYING CONDITIONS.
3. RESTRAINED LENGTHS SHOWN IN TABLE ARE MINIMUM LENGTHS (IN FEET) AND ARE REQUIRED IN EACH DIRECTION FROM FITTINGS OR VALVES.

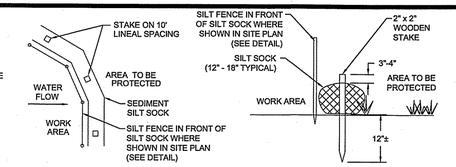
RESTRAINED JOINT SCHEDULE

PIPE SIZE	90° D. I.	45° D. I.	22 1/2° D. I.	11 1/4° D. I.
12"	92'	38'	18'	9'
10"	78'	32'	16'	8'
8"	66'	27'	13'	7'
6"	51'	21'	10'	5'
4"	38'	16'	8'	4'



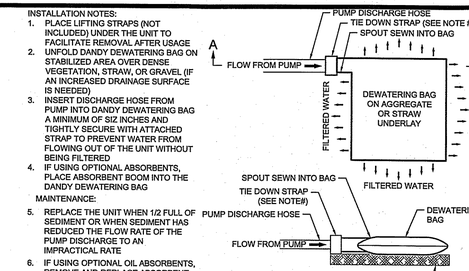
NOTE:
1. STONE CONSTRUCTION ENTRANCE(S) TO REMAIN UNTIL INSTALLATION OF PAVEMENT SUB-BASE IS TO BEGIN.
2. SEE SITE PLAN FOR LOCATION & ACTUAL DIMENSIONS

STONE CONSTRUCTION ENTRANCE DETAIL
NOT TO SCALE

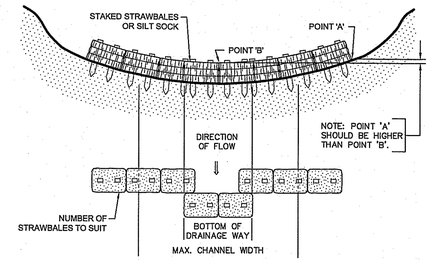


NOTES:
1. SILT SOCK MANUFACTURER SHALL BE SILT SOXX OR ENGINEER APPROVED EQUAL.
2. ALL MATERIAL TO MEET MANUFACTURER'S SPECIFICATIONS.
3. SEDIMENT SILT SOCK TO BE FILLED WITH LEAF COMPOST AND/OR WOODY MULCH PER MANUFACTURER'S REQUIREMENTS.
4. FOLLOWING CONSTRUCTION AND SITE STABILIZATION, COMPOST MATERIAL SHALL BE REMOVED OR DISPERSED ON SITE, AS APPROVED BY THE ENGINEER.

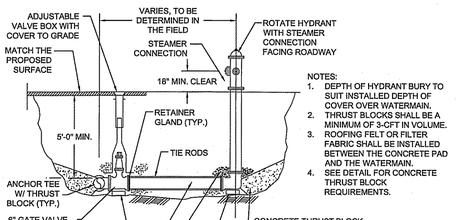
SEDIMENT SILT SOCK DETAIL
NOT TO SCALE



DEWATERING BAG DETAIL
NOT TO SCALE



SWALE/CHANNEL TEMPORARY CHECK DAM
NOT TO SCALE



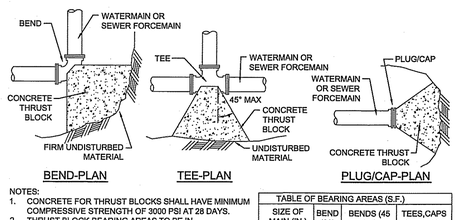
NOTES:
1. 12-IN MIN. SIDE CLEARANCE FROM MAIN TO ALL STRUCTURES
2. 10-FT. MIN. HORIZONTAL AND 18-IN. VERTICAL SEPARATION TO SANITARY SEWER.

WATERMAIN CONNECTIONS
NOT TO SCALE

WATER TRENCH DETAIL
NOT TO SCALE

NOTES:
1. DEPTH OF HYDRANT BURY TO SUIT INSTALLED DEPTH OF COVER OVER WATERMAIN.
2. THRUST BLOCKS SHALL BE A MINIMUM OF 3-CFT IN VOLUME.
3. ROOFING FELT OR FILTER FABRIC SHALL BE INSTALLED BETWEEN THE CONCRETE PAD AND THE WATERMAIN.
4. SEE DETAIL FOR CONCRETE THRUST BLOCK REQUIREMENTS.

HYDRANT ASSEMBLY DETAIL
NOT TO SCALE



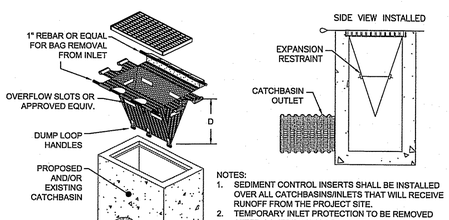
NOTES:
1. CONCRETE FOR THRUST BLOCKS SHALL HAVE MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
2. THRUST BLOCK BEARING AREAS TO BE IN ACCORDANCE WITH TABLE, UNLESS DETERMINED OTHERWISE BY THE ENGINEER BECAUSE OF SOIL CONDITIONS.
3. THRUST BLOCK SHALL BE PRECAST OR CAST-IN PLACE W/ SIDES FORMED WITH PLYWOOD.

TABLE OF BEARING AREAS (S.F.)

SIZE OF MAIN (IN.)	BEND (90)	BENDS (45 & <)	TEES,CAPS OR PLUGS
8 & <	6	3	4
10 & 12	12	7	9
16 & >	18	10	14

THRUST BLOCK DETAIL
NOT TO SCALE

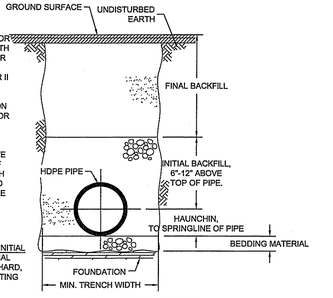
SILTATION CONTROL FENCE
NOT TO SCALE



NOTES:
1. SEDIMENT CONTROL INSERTS SHALL BE INSTALLED OVER ALL CATCHBASINS/INLETS THAT WILL RECEIVE RUNOFF FROM THE PROJECT SITE.
2. TEMPORARY INLET PROTECTION TO BE REMOVED AFTER CONTRIBUTING DRAINAGE AREA HAS BEEN PERMANENTLY STABILIZED.
3. DEPTH (D) SHALL BE A MINIMUM OF 16-INCHES.
4. MANUFACTURER SHALL BE SILT SACK OR APPROVED EQUIVALENT.

TEMPORARY CATCHBASIN INSERT
NOT TO SCALE

NOTES:
1. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH A FOUNDATION OF CLASS I OR II MATERIAL AS DEFINED IN ASTM D2321, "STANDARD PRACTICE FOR INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS," LATEST EDITION; AS AN ALTERNATIVE AND AT THE DISCRETION OF THE ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A WOVEN GEOTEXTILE FABRIC.



DETAIL PROVIDED BY ADVANCED DRAINAGE SYSTEMS, INC.

2. BEDDING, HAUNCHING AND INITIAL BACKFILL: SUITABLE MATERIAL SHALL CONSIST OF CLEAN, HARD, PARTICLES OF GRAVEL MEETING THE FOLLOWING:
   SIEVE SIZE% PASSING
   3/8" 85-95
   NO. 4 5-15
   NO. 8 0-2
   MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

   MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100-600mm) AND 42"-48"(1050-1200mm) CORRUGATED POLYETHYLENE PIPE (CPEP); 6" (150mm) FOR 30"-36" (750-900mm) CPEP.

3. MINIMUM TRENCH WIDTHS SHALL BE AS FOLLOWS:

NOMINAL Ø In (mm)	MIN. RECOMMENDED TRENCH WIDTH, In (mm)
8 (200) 10	25 (630)
(250) 12	28 (710)
(300) 15	31 (790)
(375) 18	34 (860)
(450)	39 (990)

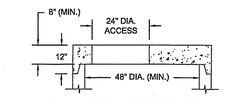
4. MINIMUM COVER: MINIMUM RECOMMENDED DEPTHS OF COVER FOR VARIOUS LIVE LOADING CONDITIONS ARE SUMMARIZED IN THE FOLLOWING TABLE. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE TAKEN FROM THE TOP OF PIPE TO THE GROUND SURFACE.

SURFACE LIVE LOADING CONDITION	MINIMUM RECOMMENDED * COVER, In (mm)
H25 (FLEXIBLE PAVEMENT)	12 (300)
H25 (RIGID PAVEMENT) E60	12 (300)
RAILWAY HEAVY CONSTRUCTION	24 (610) 48 (1220)

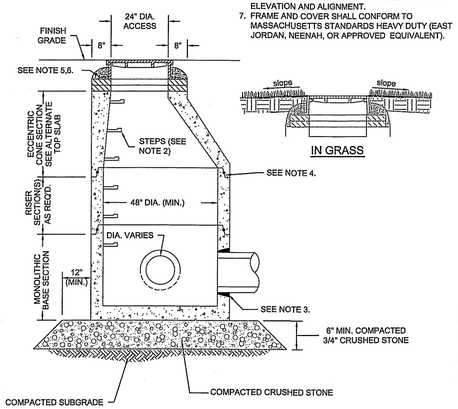
* TOP OF PIPE TO BOTTOM OF BITUMINOUS PAVEMENT THE MINIMUM COVER FOR A HDPE PIPE IS 1'-0" FOR H-20 TRAFFIC LOADS IF INSTALLED IN ACCORDANCE WITH AASHTO SECTION 30. THIS IS BASED ON EMPIRICAL CALCULATION OF LOAD RESPONSE, MANUFACTURER'S TESTING AND FIELD EXPERIENCE WITH THE PIPE. AASHTO SPECIFICATIONS SECTION 18.4.1.5 DEFINES THE MINIMUM COVER AS "ID/8 BUT NOT LESS THAN 12 INCHES". THIS COVER IS MEASURED FROM THE PIPE OD TO THE TOP OF A RIGID (CONCRETE) PAVEMENT OR THE BOTTOM OF A FLEXIBLE (BITUMINOUS) PAVEMENT. BOTH AASHTO AND ASTM, AS WELL AS MOST MANUFACTURERS, REQUIRE ADDITIONAL (TEMPORARY COVER, INCLUDED OVER THE PIPE AND REMOVED FOR FINAL GRADING AND PAVING, IS SUFFICIENT FOR LARGE CONSTRUCTION VEHICLE LOADS.

TYPICAL DRAINAGE PIPE TRENCH DETAIL
NOT TO SCALE

NOTES:
1. ALL SECTIONS SHALL BE DESIGNED FOR H-20 LOADING.
2. COPOLYMER MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.
3. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
5. DRAIN MANHOLE FRAME AND COVER SHALL BE SET IN FULL 12" MORTAR BED. ADJUST TO GRADE WITH PRECAST CONCRETE RISER OR BRICK.
6. DO NOT PLACE MORTAR BED AROUND STRUCTURE UNTIL IT IS AT THE REQUIRED FINISH ELEVATION AND ALIGNMENT.
7. FRAME AND COVER SHALL CONFORM TO MASSACHUSETTS STANDARDS HEAVY DUTY (EAST JORDAN, NEENAH, OR APPROVED EQUIVALENT).

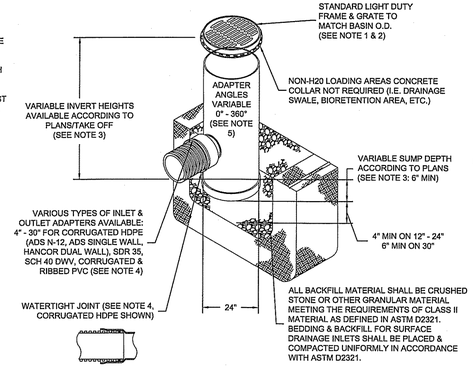


ALTERNATE TOP SLAB



IN GRASS

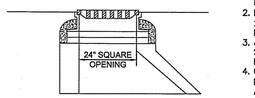
PRECAST DRAIN MANHOLE (DMH)
NOT TO SCALE



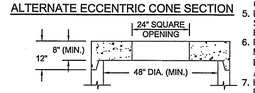
NOTES:
1. GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05,
2. FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS SEE DRAWING NO. 7001-110-055
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012, 7001-110-013, & 7001-110-014

YARD INLET DETAIL
NOT TO SCALE
BY "NYLOPLAST" OR APPROVED EQUIVALENT

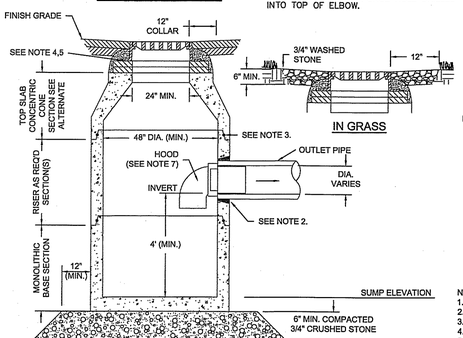




ALTERNATE ECCENTRIC CONE SECTION



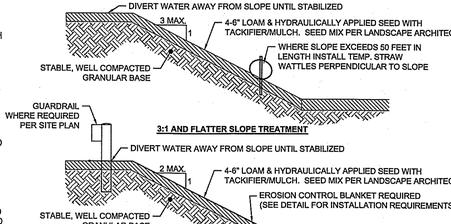
ALTERNATE TOP SLAB



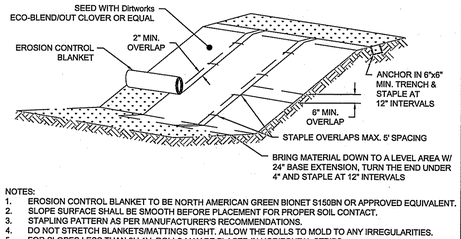
IN GRASS

PRECAST CONCRETE CATCH BASIN (CB) WITH HOOD
NOT TO SCALE

NOTES:
1. ALL SECTIONS SHALL BE DESIGNED FOR H-20 LOADING.
2. PROVIDE "V" KNOCKOUTS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
4. CATCH BASIN FRAME AND GRATE SHALL BE SET IN FULL 12" WIDE MORTAR BED. ADJUST TO GRADE WITH PRECAST CONCRETE RISER OR BRICK.
5. DO NOT PLACE MORTAR BED AROUND STRUCTURE UNTIL IT IS AT THE REQUIRED FINISH ELEVATION AND ALIGNMENT.
6. FRAME AND COVER SHALL CONFORM TO MASSACHUSETTS STANDARDS HEAVY DUTY (EAST JORDAN, NEENAH, OR APPROVED EQUIVALENT)
7. HDPE PIPE HOOD SHALL BE 90° BEND FASTENED TO PIPE WITH SEALANT. BEND SHALL HAVE 1 INCH PURGE HOLE DRILLED INTO TOP OF ELBOW.



EROSION CONTROL SLOPE TREATMENT DETAIL
NOT TO SCALE



NOTES:
1. EROSION CONTROL BLANKET TO BE NORTH AMERICAN GREEN BIONET S150BN OR APPROVED EQUIVALENT.
2. SLOPE SURFACE SHALL BE SMOOTH BEFORE PLACEMENT FOR PROPER SOIL CONTACT.
3. STAPLING PATTERN AS PER MANUFACTURER'S RECOMMENDATIONS.
4. DO NOT STRETCH BLANKETS/MATTINGS TIGHT. ALLOW THE ROLLS TO MOLD TO ANY IRREGULARITIES.
5. FOR SLOPES LESS THAN 3H:1V, ROLLS MAY BE PLACED IN HORIZONTAL STRIPS.
6. LIME, FERTILIZE AND SEED BEFORE INSTALLATION. PLANTING OF SHRUBS, TREES, ETC. SHOULD OCCUR AFTER INSTALLATION.

EROSION CONTROL BLANKET DETAIL
NOT TO SCALE

Revisions

Rev.	Date	By	Appr.	Description
1	07/31/13	MJC	JEL	PEER REVIEW COMMENTS

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Sustainable Environmental Solutions
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Checked By: RAC
Drawn By: MC
Designed By: MCJ/L
Date: JUNE 12, 2013

Plan Set: ASHLAND AFFORDABLE HOUSING
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Plan Title: DETAILS 2

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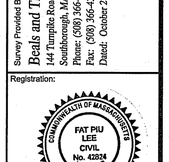
Dated: October 27, 2003

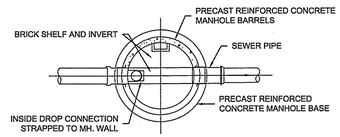
Registration:



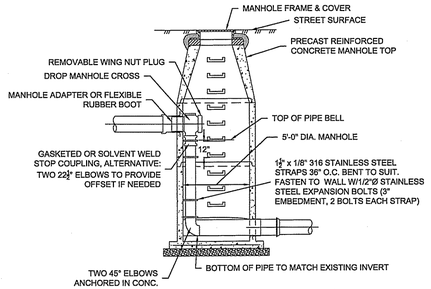
Project Number: 12097
Sheet: 11 of 17
Sheet Number: C - 11

last modified: 07/31/13 printed: 07/31/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-DE.dwg

NOTE:
SEE STANDARD SEWER MANHOLE DETAIL FOR ADDITIONAL INFORMATION.



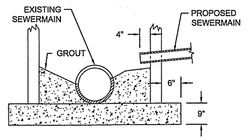
SECTIONAL PLAN



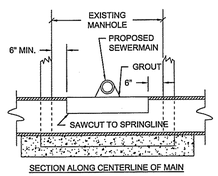
ILLUSTRATIVE SECTION

DROP SEWER MANHOLE (DSMH) CONNECTION

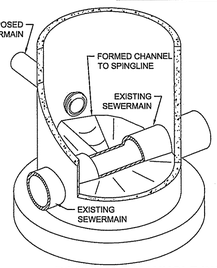
NOT TO SCALE



CROSS SECTION AT EXISTING MAIN



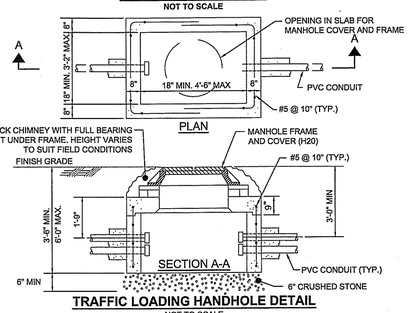
SECTION ALONG CENTERLINE OF MAIN



NOTES:
1. FLOW SHALL BE MAINTAINED DURING CONSTRUCTION AND UNTIL NEW LIFT STATION HAS PAST STARTUP TESTING.
2. MANHOLE PAD TO REST UPON A MINIMUM 6" COMPACTED ¾"-1 ½" STONE BASE.

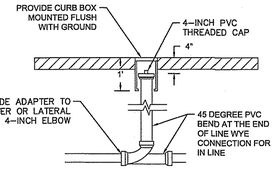
DOGHOUSE MANHOLE INSTALLATION OVER EXISTING SEWER MAIN

NOT TO SCALE



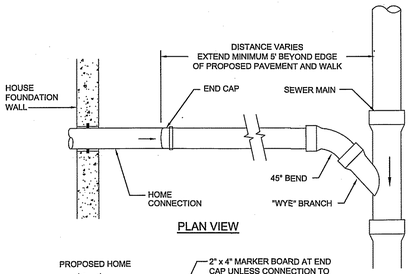
TRAFFIC LOADING HANDHOLE DETAIL

NOT TO SCALE

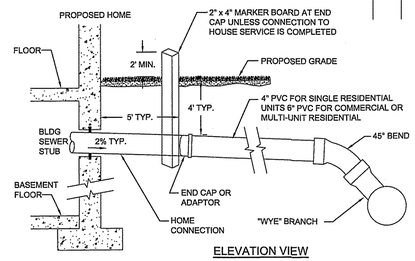


TYPICAL CLEANOUT DETAIL

NOT TO SCALE



PLAN VIEW



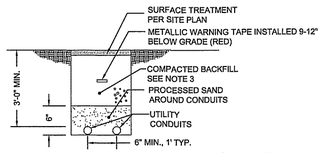
ELEVATION VIEW

NOTES:
1. PIPE AND FITTING MATERIALS TO BE PVC SCH. 40 OR SDR 35.
2. ADAPTOR TO BE PREMANUFACTURED UNIT FOR CONNECTION OF PIPE TYPES.

TYPICAL SEWER WYE CONNECTION DETAIL

NOT TO SCALE

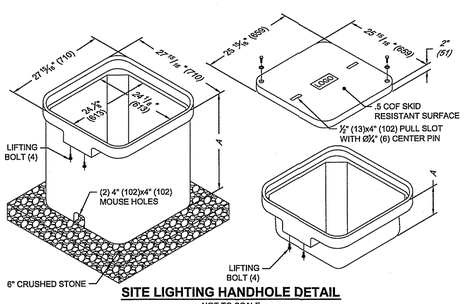
NOTE:
DETAIL IS FOR SECONDARY ELECTRICAL SERVICE. PRIMARY SERVICE SHALL BE INSTALLED PER ELECTRICAL COMPANY STANDARDS.



NOTES:
1. SITE WORK SUBCONTRACTOR SHALL PERFORM EXCAVATION, AND BACKFILL FOR ALL CONDUIT INSTALLATIONS. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL CONDUITS, PULLWIRES, HANDHOLES, AND WARNING TAPE AS REQUIRED FOR ELECTRICAL WORK.
2. UTILITY CONDUITS SHALL INCLUDE A COMBINATION OF ONE, TWO, OR ALL OF (1) FOR TELEPHONE, (1) FOR ELECTRICAL, AND (1) FOR CABLE TELEVISION, (1) COMMUNICATION, (1) FOR OTHER AS SHOWN IN THE SITE PLAN.
3. TRENCH COMPACTED BACKFILL:
   BENEATH PAVEMENT: BACKFILL SHALL BE ROADBASE AND COMPACTED TO PAVEMENT SUBBASE REQUIREMENTS-SEE DETAIL.
   OUTSIDE PAVEMENT: GRAVEL BORROW TYPE B (3" MINUS) COMPACTED IN MAXIMUM 8 INCH LIFTS TO TO 95% COMPACTION.
4. UTILITY SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE UTILITY COMPANY STANDARDS THAT MAY BE MORE STRINGENT THAN THIS DETAIL.

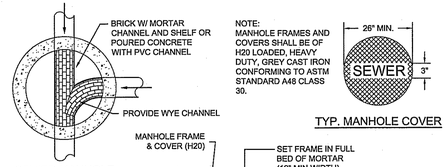
TYPICAL UTILITY TRENCH DETAIL

NOT TO SCALE



SITE LIGHTING HANDHOLE DETAIL

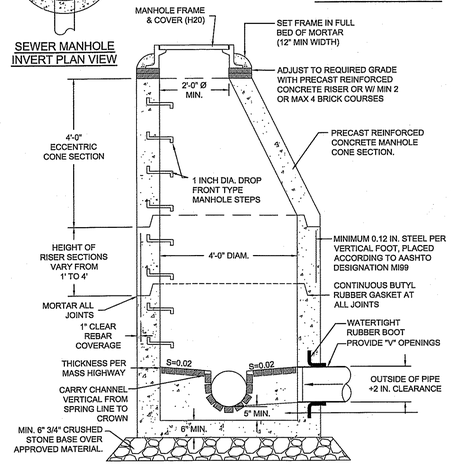
NOT TO SCALE



SEWER MANHOLE INVERT PLAN VIEW

NOTE:
MANHOLE FRAMES AND COVERS SHALL BE OF H20 LOADED, HEAVY DUTY, GREY CAST IRON CONFORMING TO ASTM STANDARD A48 CLASS 30.

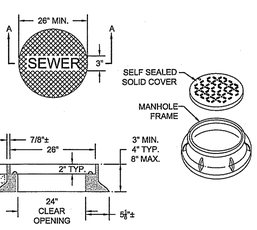
TYP. MANHOLE COVER



PRECAST CONCRETE SEWER MANHOLE (SMH)

NOT TO SCALE

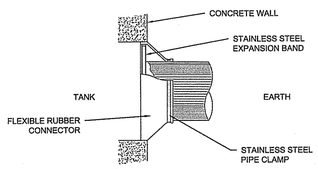
NOTE:
1. MANHOLE FRAMES AND COVERS SHALL BE OF H20 LOADED, HEAVY DUTY, GREY CAST IRON, WATER TIGHT, CONFORMING TO ASTM STANDARD A48 CLASS 30.
2. SAWCUT BINDER 12" FROM FRAME AND POUR 3,000 PSI CONCRETE TO TOP ELEVATION OF BINDER.



SECTION A-A

TYPICAL SELF SEALING MANHOLE COVER DETAIL

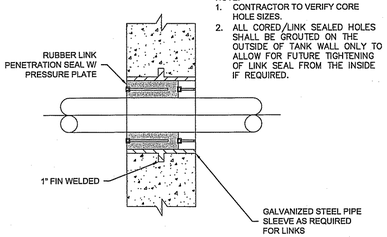
NOT TO SCALE



NOTES:
1. OPENING IN CONCRETE WALL SHALL BE CORED USING HIGH SPEED DIAMOND DRILL.
2. ALL METAL FIXTURES SHALL BE OF STAINLESS STEEL.
3. SERVICE LINE SHALL BE FLUSH WITH THE INSIDE OF THE CONCRETE PIPE OR WALL.

PIPE BOOT DETAIL

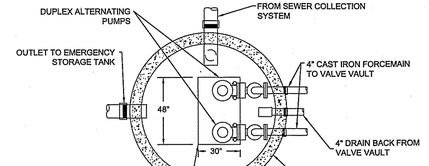
NOT TO SCALE

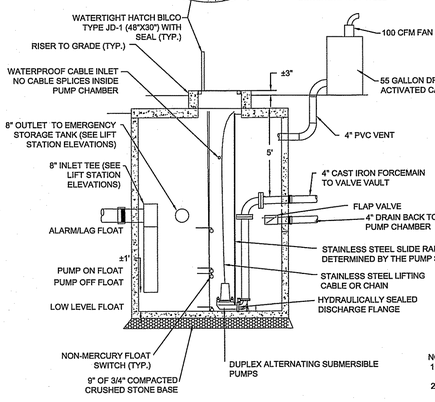


NOTE:
1. CONTRACTOR TO VERIFY CORE HOLE SIZES.
2. ALL CORED/LINK SEALED HOLES SHALL BE GROUTED ON THE OUTSIDE OF TANK WALL ONLY TO ALLOW FOR FUTURE TIGHTENING OF LINK SEAL FROM THE INSIDE IF REQUIRED.

RUBBER LINK SEAL & SLEEVE DETAIL

NOT TO SCALE





SEWAGE LIFT STATION

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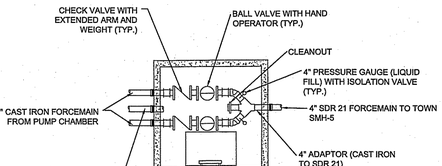
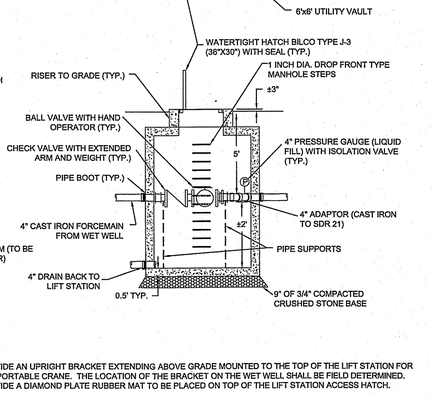


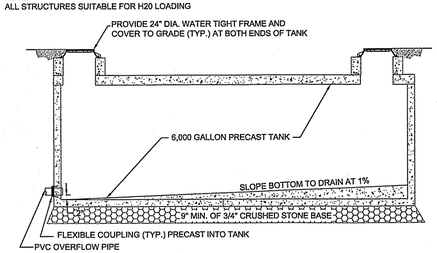


NOTE:
1. PROVIDE AN UPRIGHT BRACKET EXTENDING ABOVE GRADE MOUNTED TO THE TOP OF THE LIFT STATION FOR THE PORTABLE CRANE. THE LOCATION OF THE BRACKET ON THE WET WELL SHALL BE FIELD DETERMINED.
2. PROVIDE A DIAMOND PLATE RUBBER MAT TO BE PLACED ON TOP OF THE LIFT STATION ACCESS HATCH.

VALVE VAULT

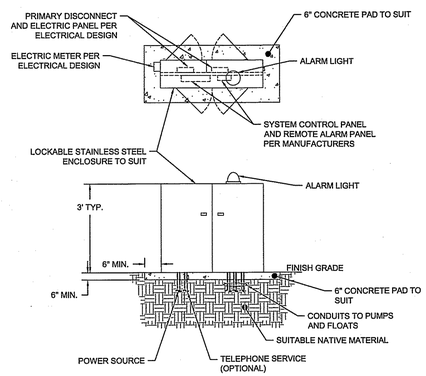
NOT TO SCALE
ROTONDO PRECAST MODEL MH6X6 OR APPROVED EQUAL

NOTE:
ALL STRUCTURES SUITABLE FOR H20 LOADING



SEWER EMERGENCY STORAGE TANK

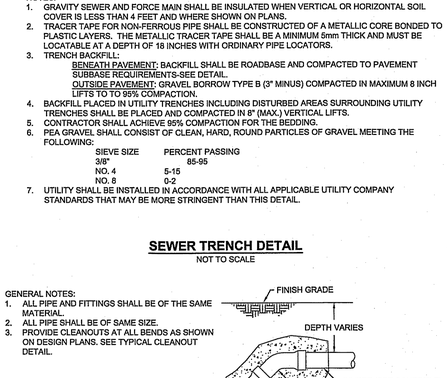
NOT TO SCALE



NOTES:
1. ALL POWER AND CONTROL LINES SHALL BE CONTINUOUS (NO SPLICES).
2. ALL HARDWARE INSTALLED ABOVE GROUND SHALL BE STAINLESS STEEL.
3. A CLEAR WORK AREA OF 3-FT IS REQUIRED IN ALL DIRECTIONS OF THE PEDESTAL.
4. ALL ELECTRICAL PER MA. ELECTRICAL CODE.
5. SERVICE DISCONNECT SHALL BE INSTALLED IF REQUIRED.
6. TELEPHONE SERVICE IS OPTIONAL AND MAY BE REQUIRED DEPENDING ON THE REMOTE ALARM MONITORING SYSTEM SELECTED.

LIFT STATION CONTROL PANEL DETAIL

NOT SCALE



NOTES:
1. GRAVITY SEWER AND FORCE MAIN SHALL BE INSULATED WHEN VERTICAL OR HORIZONTAL SOIL COVER IS LESS THAN 4 FEET AND WHERE SHOWN ON PLANS.
2. TRACER TAPE FOR NON-FERROUS PIPE SHALL BE CONSTRUCTED OF A METALLIC CORE BONDED TO PLASTIC LAYERS. THE METALLIC TRACER TAPE SHALL BE A MINIMUM 5mm THICK AND MUST BE LOCATABLE AT A DEPTH OF 18 INCHES WITH ORDINARY PIPE LOCATORS.
3. TRENCH BACKFILL:
   BENEATH PAVEMENT: BACKFILL SHALL BE ROADBASE AND COMPACTED TO PAVEMENT SUBBASE REQUIREMENTS-SEE DETAIL.
   OUTSIDE PAVEMENT: GRAVEL BORROW TYPE B (3" MINUS) COMPACTED IN MAXIMUM 8 INCH LIFTS TO TO 95% COMPACTION.
4. BACKFILL PLACED IN UTILITY TRENCHES INCLUDING DISTURBED AREAS SURROUNDING UTILITY TRENCHES SHALL BE PLACED AND COMPACTED IN 8" (MAX.) VERTICAL LIFTS.
5. CONTRACTOR SHALL ACHIEVE 95% COMPACTION FOR THE BEDDING.
6. PEA GRAVEL SHALL CONSIST OF CLEAN, HARD, ROUND PARTICLES OF GRAVEL MEETING THE FOLLOWING:

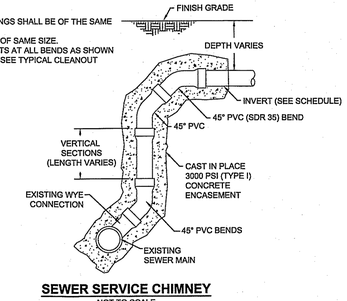
SIEVE SIZE	PERCENT PASSING
3/8"	85-95
NO. 4	5-15
NO. 8	0-2

7. UTILITY SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE UTILITY COMPANY STANDARDS THAT MAY BE MORE STRINGENT THAN THIS DETAIL.

SEWER TRENCH DETAIL

NOT TO SCALE

GENERAL NOTES:
1. ALL PIPE AND FITTINGS SHALL BE OF THE SAME MATERIAL.
2. ALL PIPE SHALL BE OF SAME SIZE.
3. PROVIDE CLEANOUTS AT ALL BENDS AS SHOWN ON DESIGN PLANS. SEE TYPICAL CLEANOUT DETAIL.



SEWER SERVICE CHIMNEY

NOT TO SCALE

Revisions					
Rev.	Date	By	Appr.	Description	
1	07/31/13	MJC	JEL	PEER REVIEW COMMENTS	

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Date: JUNE 12, 2013 | Designed By: MCJ/JEL | Drawn By: MJC | Checked By: RJC

Plan Set: ASHLAND AFFORDABLE HOUSING
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Plan Title: DETAILS 3

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Registration:
COMMONWEALTH OF MASSACHUSETTS
FAT PIU LEE
CIVIL
No. 40824
Registered
PROFESSIONAL ENGINEER
8/1/13

Project Number: 12097 | Sheet: 12 of 17

Sheet Number: C - 12

last modified: 07/31/13 printed: 07/31/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-DE.dwg

BIORETENTION CONSTRUCTION SEQUENCE

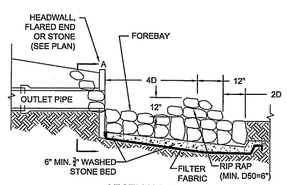
THE FOLLOWING CONSTRUCTION SEQUENCE IS TO BE USED AS A GENERAL GUIDELINE. THE CONTRACTOR TO COORDINATE WITH THE OWNER, ENGINEERS, AND LANDSCAPE ARCHITECTS AND SUBMIT A PROPOSED CONSTRUCTION SEQUENCE FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

1. CONDUCT A PRE-CONSTRUCTION MEETING.
2. CHECK FOR EXISTING UTILITIES PRIOR TO ANY EXCAVATION.
3. CLEAR AND GRUB THE PROPOSED BIORETENTION AREA
4. ROUGH GRADE THE BIORETENTION AREA DURING GENERAL CONSTRUCTION.
5. EXCAVATE PRETREATMENT CELLS AND/OR SEDIMENT FOREBAYS PRIOR TO BIORETENTION CONSTRUCTION.
6. DO NOT CONSTRUCT THE BIORETENTION AREA UNTIL ALL DISTURBED AREAS WITHIN THE CONTRIBUTING DRAINAGE AREAS HAVE BEEN GRADED AND STABILIZED.
7. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS TO DIVERT STORMWATER AWAY FROM THE BIORETENTION AREA.
8. EXCAVATE THE BIORETENTION FACILITY TO THE BOTTOM INVERT OF THE SUBDRAIN SYSTEM.
9. INSTALL THE FILTER FABRIC ALONG THE EXCAVATION SIDE WALLS. ENGINEER FIELD VISIT AND REPORT REQUIRED SEE NOTE (3) BELOW.
10. RIP THE BOTTOM SOILS TO A DEPTH OF SIX INCHES TO PROMOTE GREATER INFILTRATION.
11. INSTALL THE OVERFLOW OUTLET STRUCTURE AS SPECIFIED IN THE DRAWINGS.
12. INSTALL UNDERDRAIN AS INDICATED ON DRAWINGS. ENGINEER FIELD VISIT AND REPORT REQUIRED PRIOR TO COVERING THE UNDERDRAIN. SEE NOTE (3) BELOW.
13. INSTALL PEA GRAVEL LAYER AS INDICATED ON DRAWINGS.
14. DELIVER APPROVED BIORETENTION SOIL AND STORE ON ADJACENT IMPERVIOUS AREA OR PLASTIC SHEETING.
15. BACKFILL WITH APPROVED BIORETENTION SOIL TO THE DESIGN GRADE (UN-COMPACTED) AS INDICATED ON DRAWINGS. THE CONTRACTOR MUST SUBMIT A SOIL SAMPLE (1 GALLON) TO THE ENGINEER PRIOR TO SOIL DELIVERY TO THE SITE.
16. STABILIZE ALL REMAINING DISTURBED AREAS AND SIDE SLOPES WITH SEEDING, HYDROSEEDING, AND/OR EROSION CONTROL BLANKETS AS SPECIFIED IN THE CONSTRUCTION DRAWINGS. ENGINEER FIELD VISIT AND REPORT REQUIRED SEE NOTE (3) BELOW.
17. INSTALL BIORETENTION PLANTINGS AS INDICATED ON DRAWINGS. DO NOT PLANT BEFORE THE REMAINING DISTURBED AREAS SURROUNDING THE FACILITY ARE STABILIZED.
18. INSTALL MULCH LAYER AS INDICATED ON DRAWINGS. THE CONTRACTOR MUST SUBMIT A MULCH SAMPLE (1 GALLON) TO THE ENGINEER PRIOR TO DELIVERY TO THE SITE.
19. CONDUCT FINAL CONSTRUCTION INSPECTION WITH ENGINEER. ENGINEER FIELD VISIT AND REPORT REQUIRED SEE NOTE (3) BELOW.
20. REMOVE REMAINING EROSION AND SEDIMENT CONTROLS ONLY AFTER SURROUNDING DISTURBED AREAS HAVE BEEN PROPERLY STABILIZED.

NOTES:
(1.) SEE GENERAL CONSTRUCTION NOTES FOR OVERALL CONSTRUCTION SEQUENCE.
(2.) SEE GENERAL NOTES/SPECIFICATIONS/CONSTRUCTION DETAILS FOR DETAILED CONSTRUCTION REQUIREMENTS.
(3.) MANDATORY NOTIFICATION/APPROVAL OF THE PROJECT ENGINEER IS REQUIRED PRIOR TO PROCEEDING WITH NEXT STAGE. CALL THE ENGINEER (HORSLEY WITTEN GROUP, INC.) AT 508-833-6600 PRIOR TO 12:00 NOON THE PROCEEDING DAY TO ARRANGE FOR ANY REQUESTED FIELD VISITS.

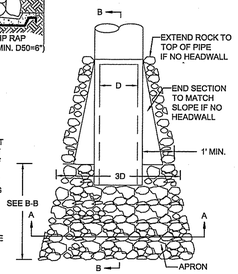
CONSTRUCTION NOTES

1. **EXAMINATION**
   A. VERIFY LAYOUT AND ORIENTATION OF BIORETENTION AREA AND CONNECTIONS.
   B. VERIFY EXCAVATION BASE IS READY TO RECEIVE WORK AND EXCAVATIONS, DIMENSIONS, AND ELEVATIONS ARE AS INDICATED ON DRAWINGS.
2. **PREPARATION**
   A. CALL **DIGSAFE** AT NOT LESS THAN **THREE** WORKING DAYS BEFORE PERFORMING WORK.
   B. REQUEST UNDERGROUND UTILITIES TO BE LOCATED AND MARKED WITHIN AND SURROUNDING CONSTRUCTION AREAS.
   C. IDENTIFY REQUIRED LINES, LEVELS, CONTOURS, AND DATUM.
   D. CLEAR AND GRUB THE PROPOSED BIORETENTION AREA.
3. **EXCAVATION**
   A. EXCAVATE BIORETENTION AREA IN ACCORDANCE WITH GENERAL NOTES AND SPECIFICATIONS.
   B. EXCAVATORS OR BACKHOES SHALL WORK FROM THE SIDES TO EXCAVATE THE BIORETENTION AREA TO ITS APPROPRIATE DESIGN DEPTH AND DIMENSIONS. EXCAVATING EQUIPMENT SHALL HAVE ARMS WITH ADEQUATE REACH SO THEY DO NOT WORK IN THE FOOTPRINT OF THE BIORETENTION AREA. IF APPLICABLE AND PER THE ENGINEERS DIRECTION THE CONTRACTORS SHALL UTILIZE A CELL CONSTRUCTION APPROACH IN LARGER BIORETENTION BASINS, WHEREBY THE BASIN IS SPLIT INTO 500 TO 1000 SQUARE FOOT TEMPORARY CELLS WITH A 10 TO 15 FOOT EARTH BRIDGE IN BETWEEN, SO THAT CELLS CAN BE EXCAVATED FROM THE SIDE.
   C. ANY PRETREATMENT CELLS AND/OR SEDIMENT FOREBAYS SHALL BE EXCAVATED FIRST AND SEALED TO TRAP SEDIMENTS PER THE DRAWINGS.
   D. ROUGH GRADE THE BIORETENTION AREA DURING GENERAL CONSTRUCTION. EXCAVATE THE BIORETENTION FACILITIES TO WITHIN 1 FOOT OF UNDERDRAIN BOTTOM.
   E. IF THE BIORETENTION AREA IS TO BE USED AS A TEMPORARY DRAINAGE STORAGE BASIN DURING THE EARLY STAGES OF PROJECT CONSTRUCTION, THE SIDE SLOPES SHOULD BE TEMPORARILY STABILIZED AND SILT FENCE INSTALLED ALONG THE TOE OF THE ROUGH GRADED BIORETENTION SLOPES TO MINIMIZE EXCESSIVE SEDIMENTATION OF THE BIORETENTION FLOOR.
4. **COMPACTION**
   A. MINIMIZE COMPACTION OF BOTH THE BASE OF THE BIORETENTION AREA AND THE REQUIRED BACKFILL. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.
   B. USE EXCAVATOR OR BACKHOES TO EXCAVATE THE BIORETENTION AREA
   C. EXCAVATORS OR BACKHOES SHALL WORK FROM THE SIDES TO EXCAVATE THE BIORETENTION AREA TO ITS APPROPRIATE DESIGN DEPTH AND DIMENSIONS. EXCAVATING EQUIPMENT SHALL HAVE ARMS WITH ADEQUATE REACH SO THEY DO NOT WORK IN THE FOOTPRINT OF THE BIORETENTION AREA. FOR LARGER BIORETENTION AREAS USE A CELL CONSTRUCTION APPROACH, WHEREBY THE BASIN IS SPLIT INTO 500 TO 1000 SQUARE FOOT TEMPORARY CELLS WITH A 10 TO 15 FOOT EARTH BRIDGE IN BETWEEN, SO THAT CELLS CAN BE EXCAVATED FROM THE SIDE.
   D. IF THE BIORETENTION AREA IS EXCAVATED USING A LOADER, THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TYPE TIRES.
   E. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LUGS, OR HIGH PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND STORAGE VOLUMES AND IS NOT ACCEPTABLE.
   F. COMPACTION CAN BE ALLEVIATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS A CHISEL PLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE PERFORMED TO REFRACTURE THE SOIL PROFILE THROUGH THE 12-IN COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.
   G. DO NOT COMPACT BIORETENTION SOIL WITH MECHANICAL EQUIPMENT.
5. **EMBANKMENT/BERM FILL**
   A. CONSTRUCT EMBANKMENT/BERM IN ACCORDANCE WITH SPECIFICATIONS AND AS INDICATED ON DRAWINGS.
6. **INSTALLATION**
   A. DO NOT CONSTRUCT THE BIORETENTION AREA UNTIL ALL DISTURBED AREAS WITHIN THE CONTRIBUTING DRAINAGE AREAS HAVE BEEN GRADED AND STABILIZED.
   B. REMOVE SEDIMENT ACCUMULATED ALONG THE EXCAVATION FLOOR DURING SITE CONSTRUCTION PRIOR TO CONTINUING WITH THE BIORETENTION FACILITY CONSTRUCTION.
   C. FORM BOTTOM OF EXCAVATION TO CORRECT ELEVATION.
   D. IF INFILTRATION IS PROMOTED THEN THE CONTRACTOR SHALL RIP THE BOTTOM SOILS TO A DEPTH OF SIX INCHES TO PROMOTE GREATER INFILTRATION.
   E. INSTALL THE FILTER FABRIC ALONG THE EXCAVATION SIDE WALLS AS SPECIFIED IN THE DRAWINGS. IF FILTER FABRIC IS TO BE INSTALLED PLACE THE FILTER FABRIC ON THE SIDES OF THE BIORETENTION AREA WITH A MINIMUM SIX INCH OVERLAP AT ALL JOINTS.
   F. INSTALL ANY TEMPORARY EROSION AND SEDIMENT CONTROLS TO DIVERT STORMWATER AWAY FROM THE BIORETENTION AREA DURING FINAL CONSTRUCTION AND UNTIL IT IS COMPLETED. SPECIAL PROTECTION MEASURES SUCH AS EROSION CONTROL FABRICS MAY BE NEEDED TO PROTECT VULNERABLE SIDE SLOPES FROM EROSION DURING THE CONSTRUCTION PROCESS.
   G. ESTABLISH ELEVATIONS AND PIPE INVERTS FOR INLETS AND OUTLETS AS INDICATED ON DRAWINGS
   H. INSTALL THE OVERFLOW OUTLET STRUCTURE AS INDICATED ON DRAWINGS.
   I. INSTALL UNDERDRAIN, INCLUDING 4 INCH PERFORATED PIPE, GRAVEL AND FILTER FABRIC ON TOP OF THE UNDERDRAIN GRAVEL AS INDICATED ON DRAWINGS. GRAVEL SHALL BE PLACED AROUND THE UNDERDRAIN PIPE AS SHOWN IN THE DETAILS. OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (SEE PLANS FOR LOCATION).
   J. INSTALL PEA GRAVEL LAYER AS INDICTED ON DRAWINGS.
   K. DELIVER APPROVED BIORETENTION SOIL AND STORE ON ADJACENT IMPERVIOUS AREA OR PLASTIC SHEETING.
7. **BACKFILLING**
   A. BACKFILL WITH APPROVED BIORETENTION SOIL TO THE DESIGN GRADE AS SPECIFIED IN THE DRAWINGS.
   B. PLACE SOIL IN LIFTS 12 INCH LIFTS UNTIL DESIRED TOP ELEVATION OF BIORETENTION IS ACHIEVED. DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN TO SUPPLY SOILS AND SAND. WAIT 3 DAYS TO CHECK FOR SETTLEMENT, AND ADD ADDITIONAL MEDIA AS NEEDED
   C. DO NOT COMPACT BIORETENTION SOIL WITH MECHANICAL EQUIPMENT.
   D. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.
   E. STABILIZE ALL REMAINING DISTURBED AREAS AND SIDE SLOPES WITH SEEDING, HYDROSEEDING, AND/OR EROSION CONTROL BLANKETS AS INDICATED ON DRAWINGS.
8. **PLANTING**
   A. PLANT BIORETENTION AREA IN ACCORDANCE WITH APPLICABLE DETAIL.
   B. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. DO NOT ADD FERTILIZERS OR OTHER SOIL AMENDMENTS TO THE BIORETENTION SOILS UNLESS INSTRUCTED BY THE ENGINEER. THE PLANTING SOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING.
   C. INSTALL BIORETENTION PLANTINGS AS INDICATED ON DRAWINGS. WATER DURING WEEKS OF NO RAIN FOR THE FIRST TWO MONTHS.
   D. NO PLANTING SHALL OCCUR BEFORE THE REMAINING DISTURBED AREAS SURROUNDING THE FACILITY ARE STABILIZED.
   E. REMOVE SEDIMENT ACCUMULATED IN THE BIORETENTION AREA DURING THE PLANTING PHASE.
   F. IF SUITABLE VEGETATIVE COVER HAS NOT BEEN ESTABLISHED ALONG THE BIORETENTION SIDE SLOPES PRIOR TO PLANTING, INSTALL A SILT FENCE PERIMETER AT THE TOE OF THE BIORETENTION SLOPES AND REMAIN IN PLACE UNTIL AN APPROVED VEGETATIVE COVER HAS BEEN ESTABLISHED.
   G. INSTALL MULCH LAYER AS INDICATED ON DRAWINGS. MIX APPROXIMATELY HALF OF THE SPECIFIED MULCH LAYER INTO THE BIORETENTION SOIL TO A DEPTH OF APPROXIMATELY 4 INCHES TO HELP FOSTER A HIGHLY ORGANIC SURFACE LAYER.
   H. REMOVE REMAINING EROSION AND SEDIMENT CONTROLS ONLY AFTER SURROUNDING DISTURBED AREAS HAVE BEEN PROPERLY STABILIZED.
   I. CONDUCT FINAL CONSTRUCTION INSPECTION WITH ENGINEER.
9. **CLEAN UP**
   A. AFTER COMPLETION OF THE WORK, REMOVE AND PROPERLY DISPOSE ALL DEBRIS, CONSTRUCTION MATERIALS, RUBBISH, EXCESS SOIL, ETC., FROM THE PROJECT SITE. REPAIR PROMPTLY ANY IDENTIFIED DEFICIENCIES AND LEAVE THE PROJECT SITE IN A CLEAN AND SATISFACTORY CONDITION.

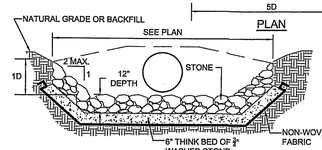


SECTION B-B

NOTES:
1. RIPRAP SHOULD EXTEND UP BOTH SIDES OF THE APRON AND AROUND THE END OF THE PIPE OR CULVERT AT THE DISCHARGE OUTLET AT A MAXIMUM SLOPE OF 2:1 AND A HEIGHT NOT LESS THAN TWO THIRDS THE PIPE DIAMETER OR CULVERT HEIGHT.
2. THE AREA TO BE RIPRAPPED SHALL BE UNDERCUT SO THAT THE INVERT OF THE APRON SHALL BE AT THE SAME GRADE (FLUSH) WITH THE SURFACE OF THE RECEIVING CHANNEL.
3. THE WIDTH OF THE END OF THE APRON SHALL BE EQUAL TO THE BOTTOM WIDTH OF THE RECEIVING CHANNEL. MAXIMUM TAPER TO RECEIVING CHANNEL 5:1
4. ALL SUBGRADE FOR STRUCTURE TO BE COMPACTED TO 90% OR GREATER.
5. HORIZONTAL ALIGNMENT OF THE APRON SHALL BE PER THE SITE PLAN.
6. ANY DISTURBED AREA FROM END OF APRON TO RECEIVING CHANNEL MUST BE STABILIZED.



PLAN



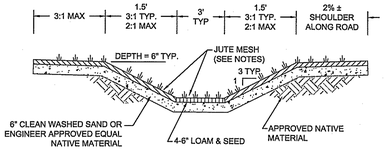
SECTION A-A

TYPICAL RIP RAP OUTFALL DETAIL
NOT TO SCALE

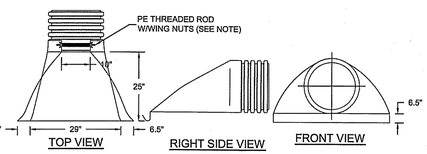
BIORETENTION MATERIAL SPECIFICATIONS

1. **BIORETENTION SOIL**
   A. USDA UNIFIED SOIL CLASSIFICATION: LOAMY SAND CONSISTING OF A UNIFORM MIX, FREE OF NOXIOUS WEEDS AND FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN 1 INCH. A TEXTURAL ANALYSIS IS REQUIRED FOR CONFORMANCE TO THE SOIL COMPOSITION CRITERIA LISTED BELOW.
      85-88% MEDIUM SAND.
      8-12% SOIL FINES (< 2% CLAY).
      3% ORGANIC MATTER (WELL AGED (6-12 MONTHS), WELL AERATED, LEAF COMPOST OR APPROVED EQUIVALENT).
   B. PROVIDE A SOIL TEST OF THE BIORETENTION SOIL FOR CONFORMANCE TO THE FOLLOWING CRITERIA:
      PH RANGE: 5.2-7.0.
      MAGNESIUM: MINIMUM 32 PPM.
      PHOSPHOROUS (P2O5): NOT TO EXCEED 69 PPM.
      POTASSIUM (K2O): MINIMUM 78 PPM.
      SOLUBLE SALTS: NOT TO EXCEED 500 PPM.
      IF THE SOIL PH IS NOT WITHIN THE ACCEPTABLE RANGE, AMEND WITH LIME TO RAISE THE PH OR WITH IRON SULFATE TO LOWER THE PH, AS NECESSARY. ALL TESTING SHOULD BE PERFORMED BY THE SAME TESTING FACILITY TO MAINTAIN CONSISTENT RESULTS. SUBMIT THE SOIL SAMPLE RESULTS TO THE ENGINEER REVIEW AND APPROVAL PRIOR TO DELIVERY TO THE PROJECT SITE.
   C. VOLUME OF FILTER MEDIA BASED ON 110% OF PLAN VOLUME TO ACCOUNT FOR SETTLING OR COMPACTION.
   D. DO NOT MIX, DUMP OR STORE ANY OTHER MATERIALS OR SUBSTANCES THAT MAY B E HARMFUL TO PLANT GROWTH OR PROVE A HINDRANCE TO THE PLANTING MAINTENANCE OR OPERATIONS WITHIN THE BIORETENTION AREA.
2. **MULCH**
   A. FINE SHREDDED WELL AGED (6 MONTH MINIMUM) HARDWOOD MULCH.
      HARDWOOD MULCH IS PREFERRED TO PREVENT FLOATING. IF HARDWOOD MULCH IS NOT AVAILABLE A FINELY DOUBLE SHREDDED, WELL AGED, ORGANIC DARK PINE MULCH MAY BE ACCEPTABLE ON A CASE BY CASE BASIS PER SAMPLE SUBMITTAL AND ENGINEER REVIEW.
   B. A MULCH SAMPLE MUST BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO DELIVERY TO THE PROJECT SITE.
3. **FILTER FABRIC**
   A. NON-WOVEN GEOTEXTILE FABRIC WITH FLOW RATE OF > 110 GALLON/MINUTES/SQUARE FOOT.
   B. CLASS "C" APPARENT OPENING SIZE (ASTM-D-4751).
   C. GRAB TENSILE STRENGTH (ATSM-D-4632) BURST STRENGTH (ASTM-D-4833).
4. **PEA STONE (GRAVEL)**
   A. 3/8" DOUBLE WASHED STONE
5. **UNDERDRAIN GRAVEL**
   A. 3/4" DOUBLE WASHED STONE, CLEAN AND FREE OF ALL FINES AND MEETING AASHTO M-43.
6. **PIPE**
   A. UNDERDRAIN
      4" RIGID SCHEDULE 40 PVC PIPE, WITH 3/8" PERFORATIONS @ 6" O.C. MEETING ASTMD 1785 OR AASHTO M-278.
      T'S AND Y'S FITTINGS AS REQUIRED FOR THE UNDERDRAIN CONFIGURATION INDICATED ON DRAWING.
   B. CONNECTIONS TO STORM DRAIN SYSTEM.
   C. NON-PERFORATED PIPE IN ACCORDANCE WITH APPLICABLE DETAILS AND AS INDICATED ON DRAWINGS.
   D. UNDERDRAIN CLEANOUTS
      NON PERFORATED SCHEDULE 40 PVC PIPE, PVC ELBOW, CAP, AND ALL ASSOCIATED FITTINGS.
7. **EROSION CONTROL BLANKET (3:1 SIDE SLOPES ONLY)**
   A. WOVEN, 100% BIODEGRADABLE JUTE FIBER 7.70 LBS/1000 SQFT.
      BIONET S150BN OR APPROVED EQUIVALENT.
8. **PLANTS**
   A. AS INDICATED ON DRAWINGS.
9. **SEED (SIDE SLOPES ONLY)**
   A. NEW ENGLAND CONSERVATION/WILDLIFE/MIX OR APPROVED EQUIVALENT.
   B. APPLICATION RATE 25 LBS/ ACRES OR PER SEED MANUFACTURER'S REQUIREMENTS.
10. **OUTLET STRUCTURE**
   A. SIZE AS INDICATED ON DRAWINGS.
   B. FIBERGLASS REINFORCED PLASTIC MANHOLES OF SIZE INDICATED ON DRAWINGS.

NOTES:
1. BOTTOM AND SIDESLOPES WITHIN THE GRASS CHANNEL SHALL BE STABILIZED WITH JUTE MESH MATTING OR ENGINEER APPROVED EQUAL.
2. RUNNING SLOPE OF CHANNEL SHALL SUIT PLAN.
3. BOTTOM SHAPE SHALL BE PARABOLIC.

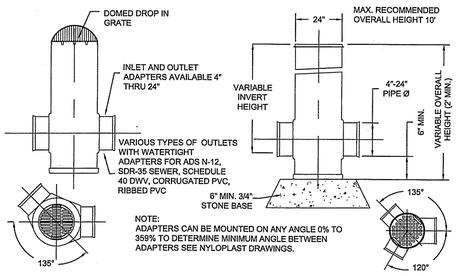


TYPICAL GRASS CHANNEL DETAIL
NOT TO SCALE



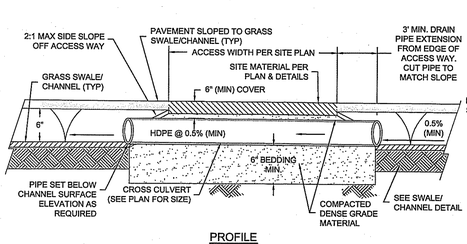
NOTES:
1. PE THREADED ROD W/WING NUTS PROVIDED FOR END SECTIONS 12"-24", 30" & 36" END SECTIONS TO BE WELDED TO PIPE PER MANUFACTURER'S RECOMMENDATIONS.
2. ALL DIMENSIONS ARE NOMINAL
3. DETAIL PROVIDED BY ADVANCED DRAINAGE SYSTEMS, INC.

HDPE FLARED END SECTION
NOT TO SCALE

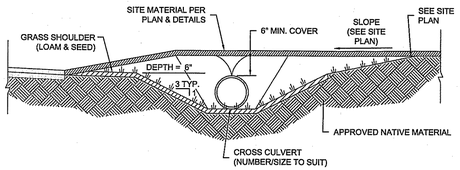


NOTE:
ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0% TO 359% TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE NYLOPLAST DRAWINGS.

OVERFLOW OUTLET DETAIL
NOT TO SCALE
BY "NYLOPLAST" OR APPROVED EQUIVALENT



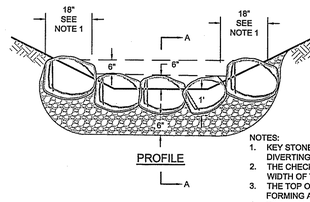
PROFILE



TYP. SECTION

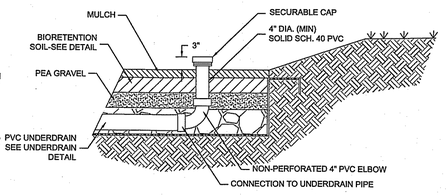
NOTES:
1. SEE SITE PLAN FOR LOCATIONS.
2. CONTRACTOR TO CONSTRUCT THE GRASS SWALES/CHANNELS TO PROVIDE A CONTINUOUS SLOPE TO THE RECEIVING AREAS WITHOUT PONDING DEPRESSIONS.
3. FOR MULTIPLE CULVERTS SPACING BETWEEN CULVERTS SHALL BE 2-INCHES MINIMUM.

ACCESS WAY CROSSING CULVERT DETAIL
NOT TO SCALE



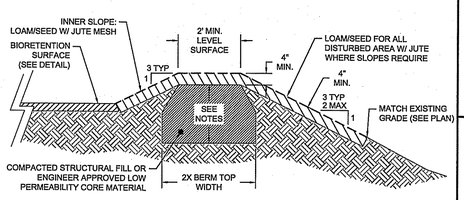
NOTES:
1. KEY STONE INTO THE BIORETENTION BANKS AND EXTEND INTO THE ABUTMENTS A MINIMUM OF 18" TO PREVENT FLOW FROM DIVERTING THE CHECK DAM.
2. THE CHECK DAM SHALL BE CONSTRUCTED OF 18"-24" STONE. THE STONE SHALL BE PLACED SO THAT IT COMPLETELY COVERS THE WIDTH OF THE BIORETENTION AND KEYED IN THE BIORETENTION BANKS.
3. THE TOP OF THE CHECK DAM SHALL BE CONSTRUCTED SO THE CENTER IS APPROXIMATELY 6" LOWER THAN THE OUTER EDGES, FORMING A WEIR THAT WATER CAN FLOW ACROSS.
4. THE MAXIMUM HEIGHT OF THE CHECK DAM AT THE CENTER SHALL NOT EXCEED 6".

STONE CHECK FOR BIORETENTION TYPICAL DETAIL
NOT TO SCALE

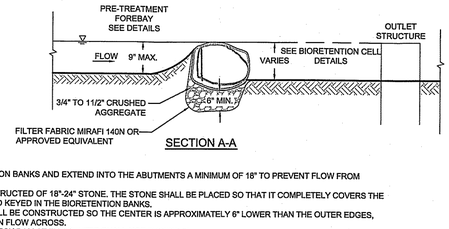


TYPICAL BIORETENTION CLEANOUT DETAIL
NOT TO SCALE

NOTES:
BERM CORE BOTTOM TO EXTEND A MINIMUM 6 INCHES BELOW THE UNDERDRAIN OF THE BIORETENTION AREA.



BIORETENTION BERM DETAIL
NOT TO SCALE



SECTION A-A

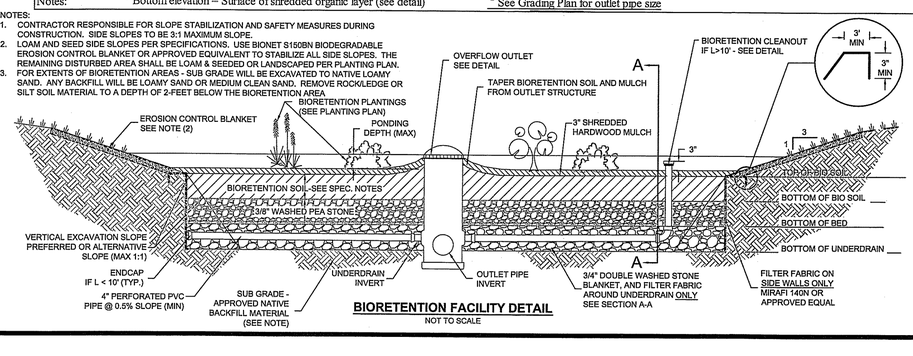
BIORETENTION SCHEDULE:

No.	Bottom Surface Area (sf)	Lowest Top Elevation/ Spillway (ft)	Design Freeboard Above OVF (ft)	Lowest OVF Rim (ft)	Ponding Depth (ft)	Bottom Elev. (ft)[1]	OVF Type	Depth Mulch (ft)	Bottom Mulch (ft)	Depth Planting Soil (ft)	Bottom Planting Soil (ft)	Depth Pea Stone (ft)	Bottom Pea Stone (ft)	Min. Underdrain Stone cover (in.)	Underdrain Pipe Size (in)	Underdrain Inv (ft)	Length Underdrain (ft)	Slope Underdrain (ft/ft)	Underdrain Inv In (ft)	Outlet Inv (ft)[2]	Bottom Underdrain Stone (ft)	Distal Underdrain Stone Depth (ft)	Outlet Depth Stone (ft)
1.00	850	360.00	1.25	358.75	0.75	358.00	CB	0.25	357.75	2.00	355.75	0.17	355.58	1.00	4.00	355.13	55.00	0.000	355.13	355.13	354.84	0.75	0.75
2.00	1200	341.00	1.25	339.75	0.75	339.00	CB	0.25	338.75	2.00	336.75	0.17	336.58	1.00	4.00	336.13	100.00	0.000	336.13	336.13	335.84	0.75	0.75
3.00	800	344.50	1.25	343.25	0.75	342.50	CB	0.25	342.25	2.00	340.25	0.17	340.08	1.00	4.00	339.63	70.00	0.000	339.63	339.63	339.34	0.75	0.75
4.00	580	347.00	1.25	345.75	0.75	345.00	CB	0.25	344.75	2.00	342.75	0.17	342.58	1.00	4.00	342.13	110.00	0.000	342.13	342.13	341.84	0.75	0.75
5.00	930	351.00	1.25	349.75	0.75	349.00	CB	0.25	348.75	2.00	346.75	0.17	346.58	1.00	4.00	346.13	120.00	0.000	346.13	346.13	345.84	0.75	0.75

Abbreviations: SA Bottom Surface Area; OVF Overflow; Inv Invert

Notes: [1] Bottom elevation = Surface of shredded organic layer (see detail); [2] See Grading Plan for outlet pipe size

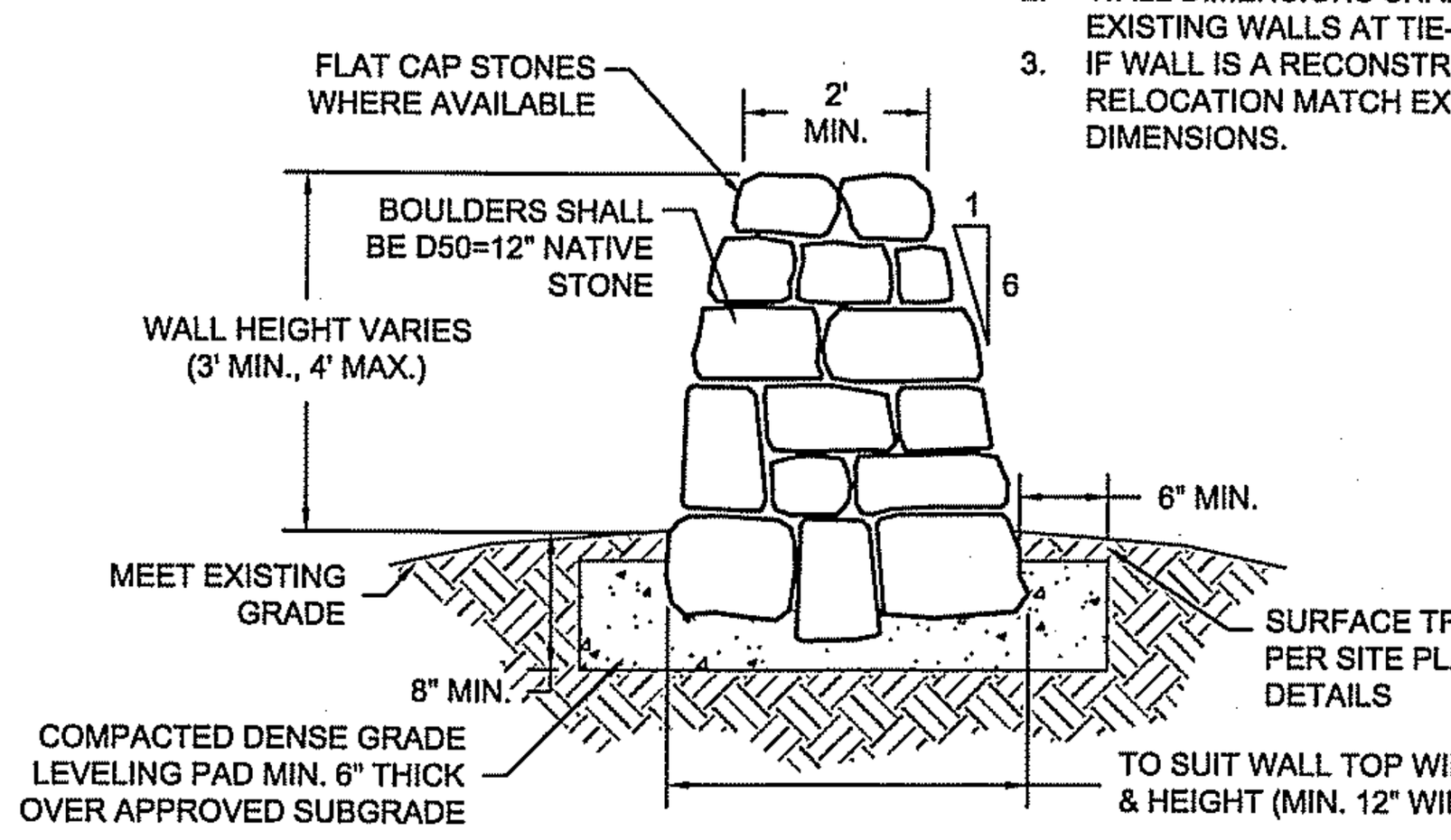
NOTES:
1. CONTRACTOR RESPONSIBLE FOR SLOPE STABILIZATION AND SAFETY MEASURES DURING CONSTRUCTION. SIDE SLOPES TO BE 3:1 MAXIMUM SLOPE.
2. LOAM AND SEED SIDE SLOPES PER SPECIFICATIONS. USE BIONET S150BN BIODEGRADABLE EROSION CONTROL BLANKET OR APPROVED EQUIVALENT TO STABILIZE ALL SIDE SLOPES. THE REMAINING DISTURBED AREA SHALL BE LOAM & SEEDED OR LANDSCAPED PER PLANTING PLAN.
3. FOR EXTENTS OF BIORETENTION AREAS - SUB GRADE WILL BE EXCAVATED TO NATIVE LOAMY SAND. ANY BACKFILL WILL BE LOAMY SAND OR MEDIUM CLEAN SAND. REMOVE ROCK/LEDGE OR SILT SOIL MATERIAL TO A DEPTH OF 2-FEET BELOW THE BIORETENTION AREA



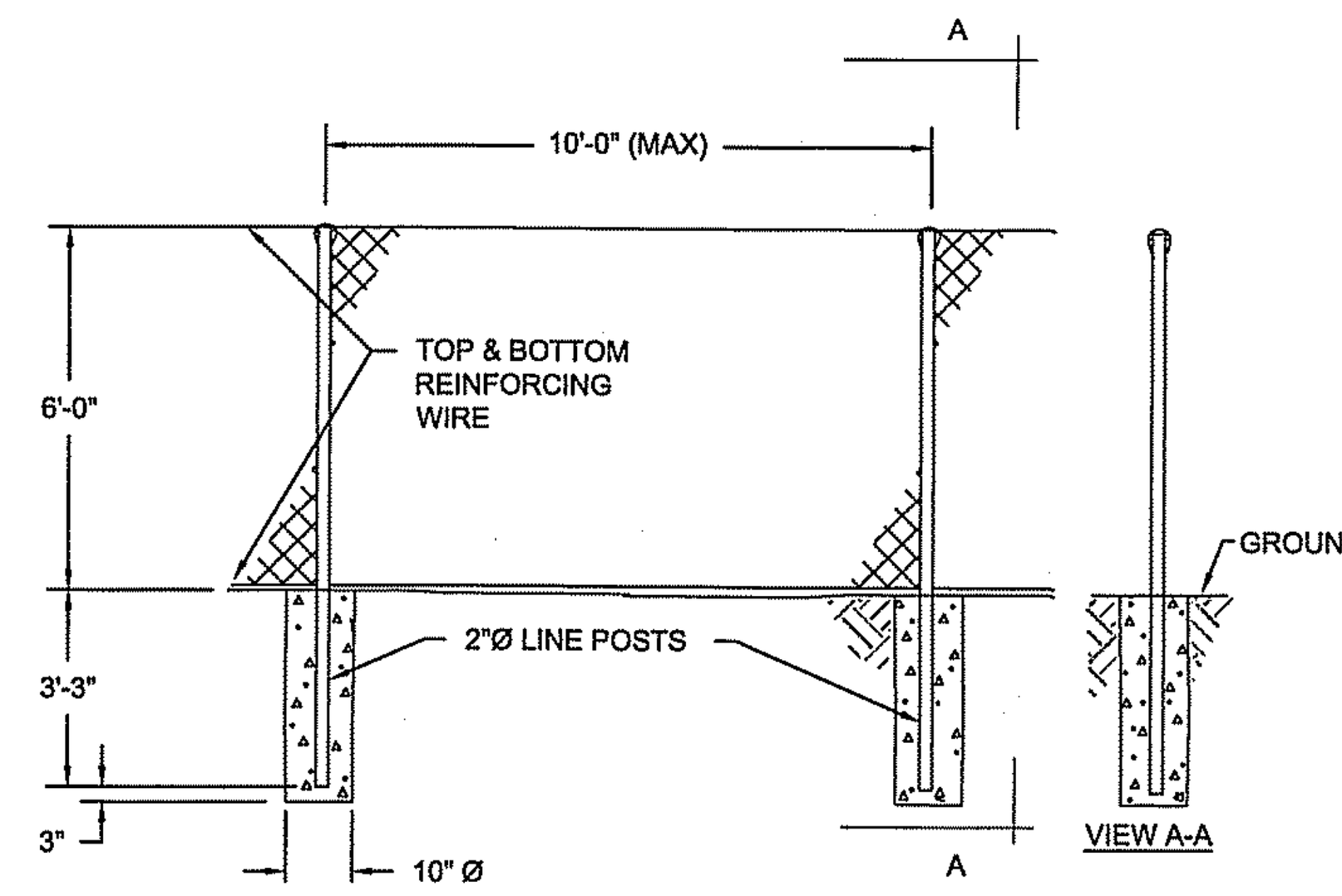
BIORETENTION FACILITY DETAIL
NOT TO SCALE

NOTES:
1. FILTER FABRIC AT BOTTOM OF UNDERDRAIN ONLY.
2. FILTER FABRIC ABOVE UNDERDRAIN SHALL EXTEND VERTICALLY 1-INCH MIN INTO THE PEA GRAVEL LAYER & HORIZONTALLY 1-FO

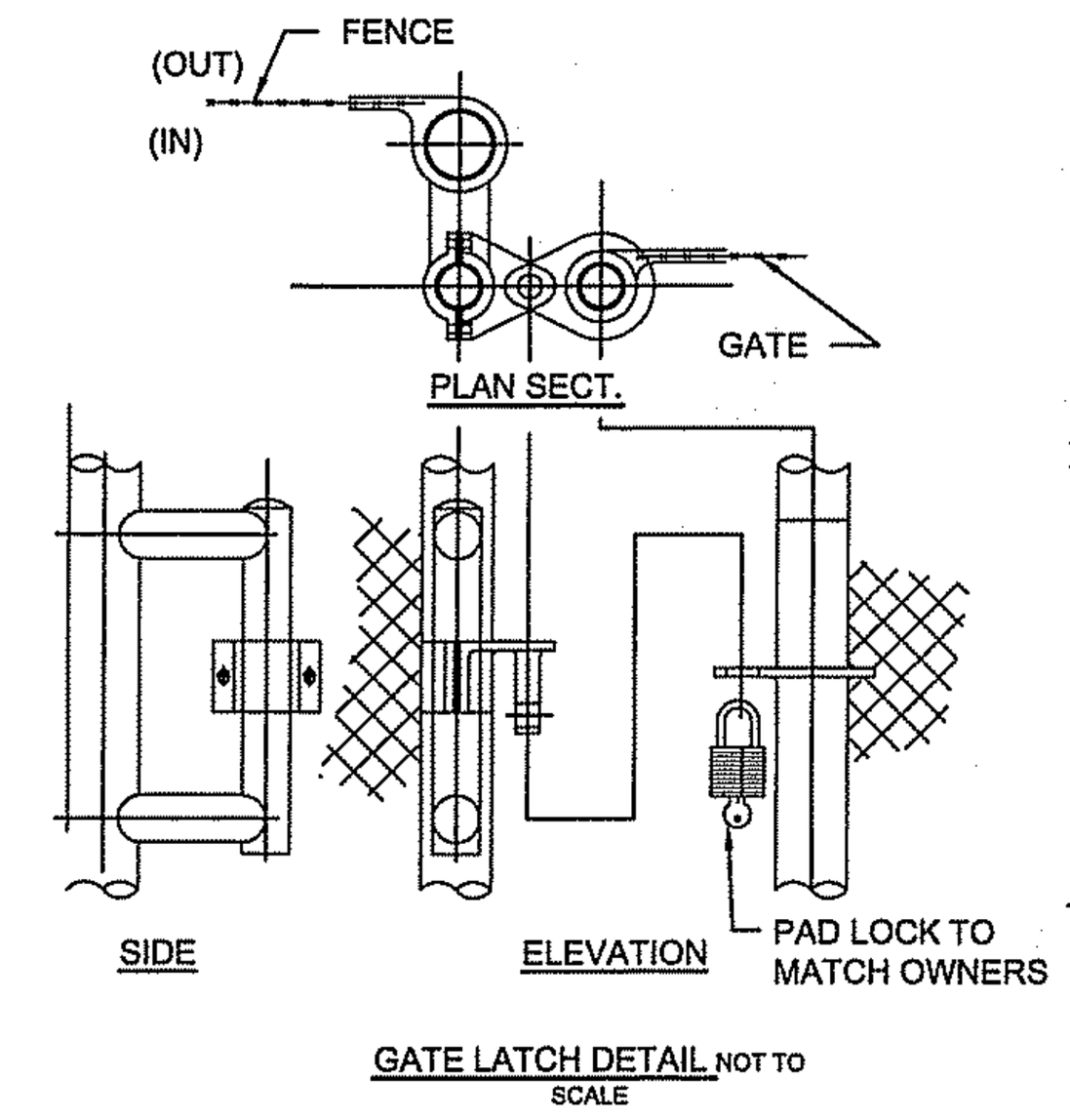
NOTES:
1. RE-USE OF EXISTING BOULDERS/STONES FOUND DURING CONSTRUCTION IS RECOMMENDED.
2. WALL DIMENSIONS SHALL MATCH ANY EXISTING WALLS AT TIE-IN POINTS.
3. IF WALL IS A RECONSTRUCTION OR RELOCATION MATCH EXISTING DIMENSIONS.



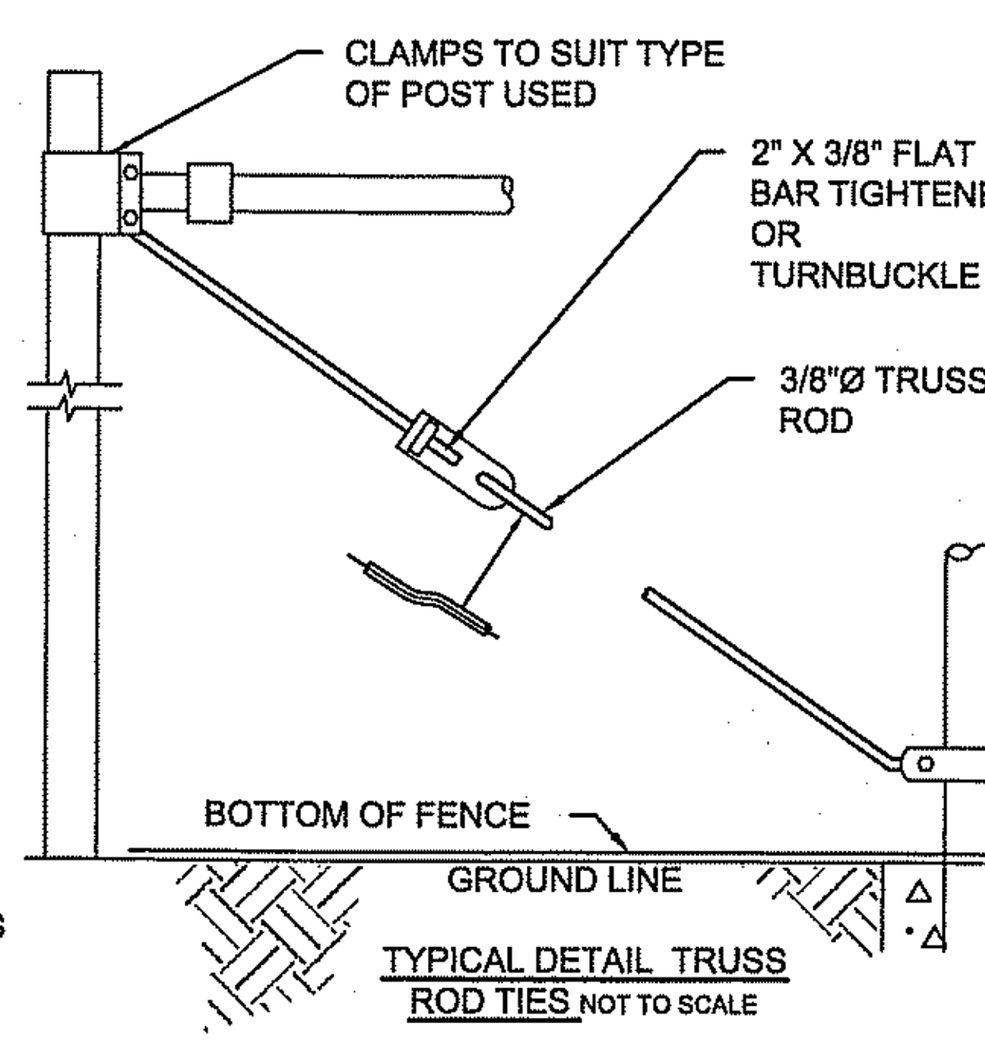
DRY-LAID STONE WALL
NOT TO SCALE



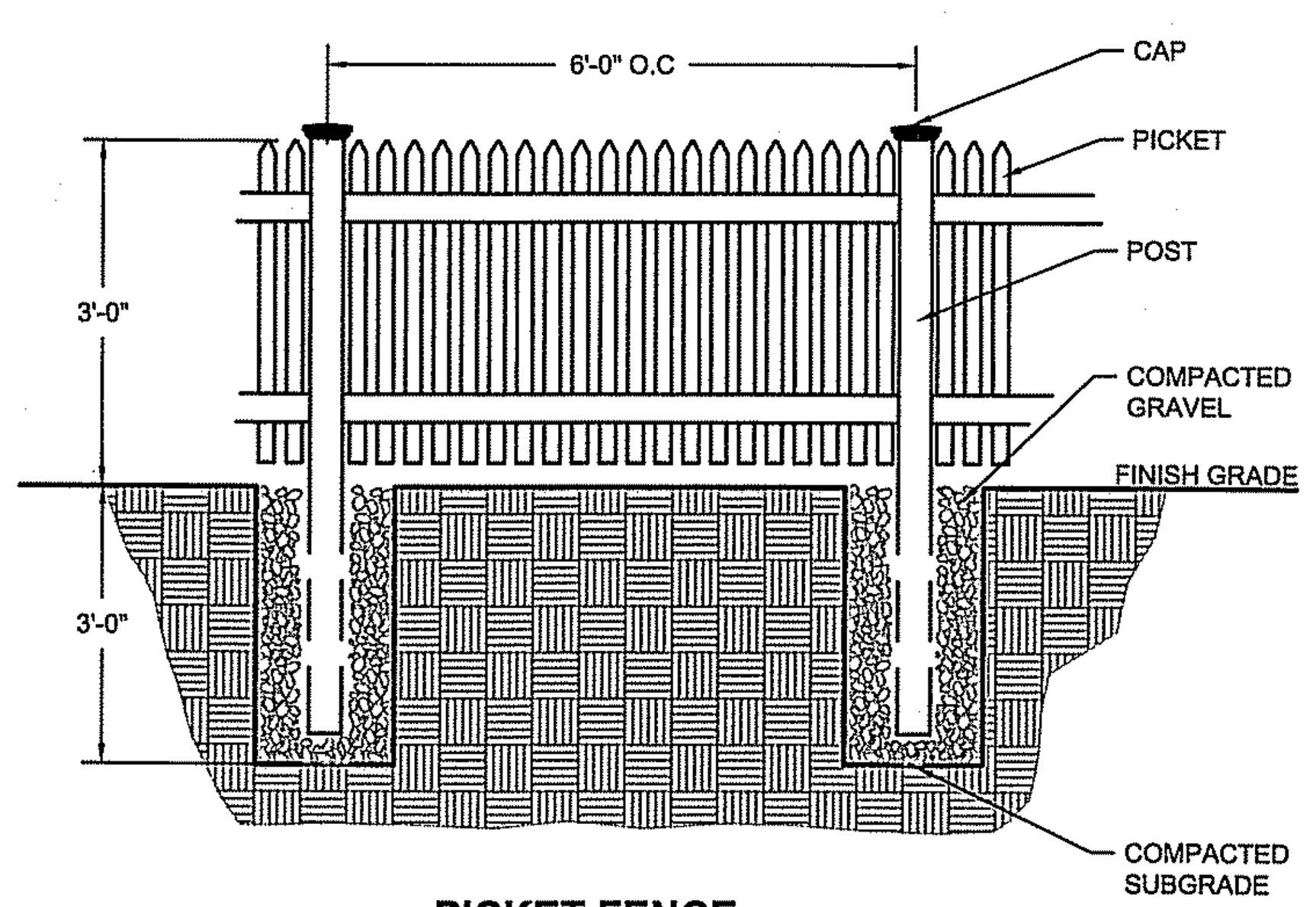
TYPICAL LINE FENCE DETAIL
NOT TO SCALE



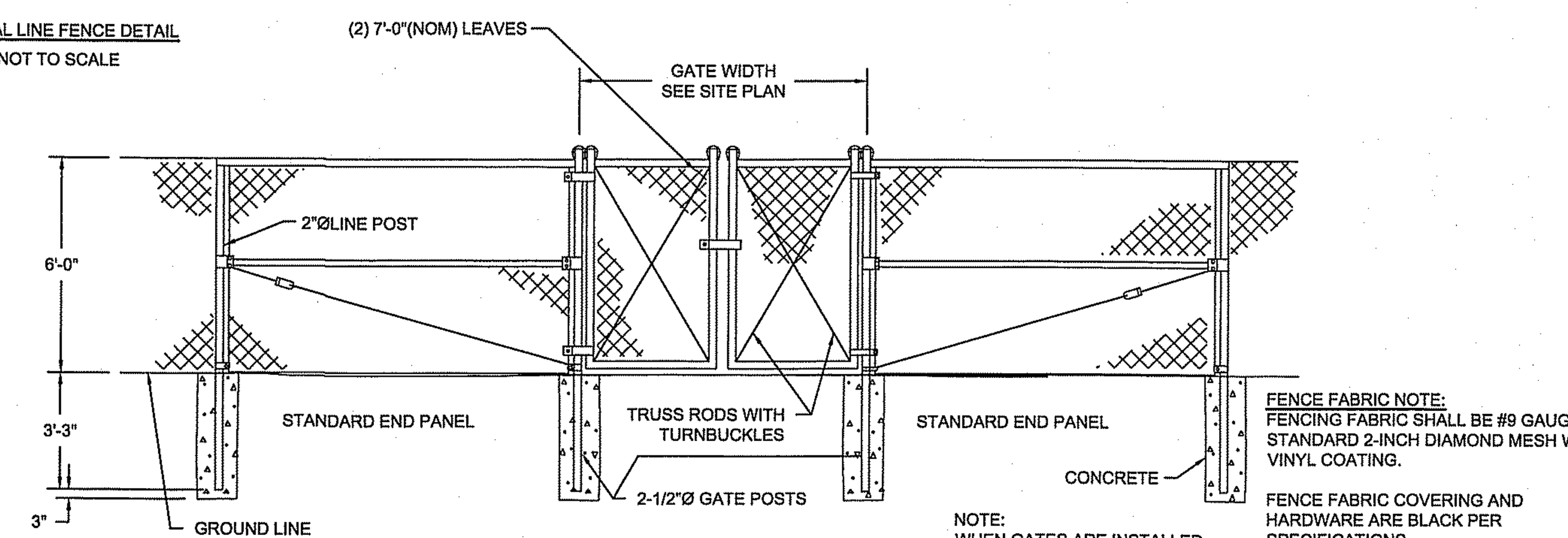
GATE LATCH DETAIL NOT TO SCALE



TYPICAL DETAIL TRUSS ROD TIES NOT TO SCALE



PICKET FENCE
NOT TO SCALE



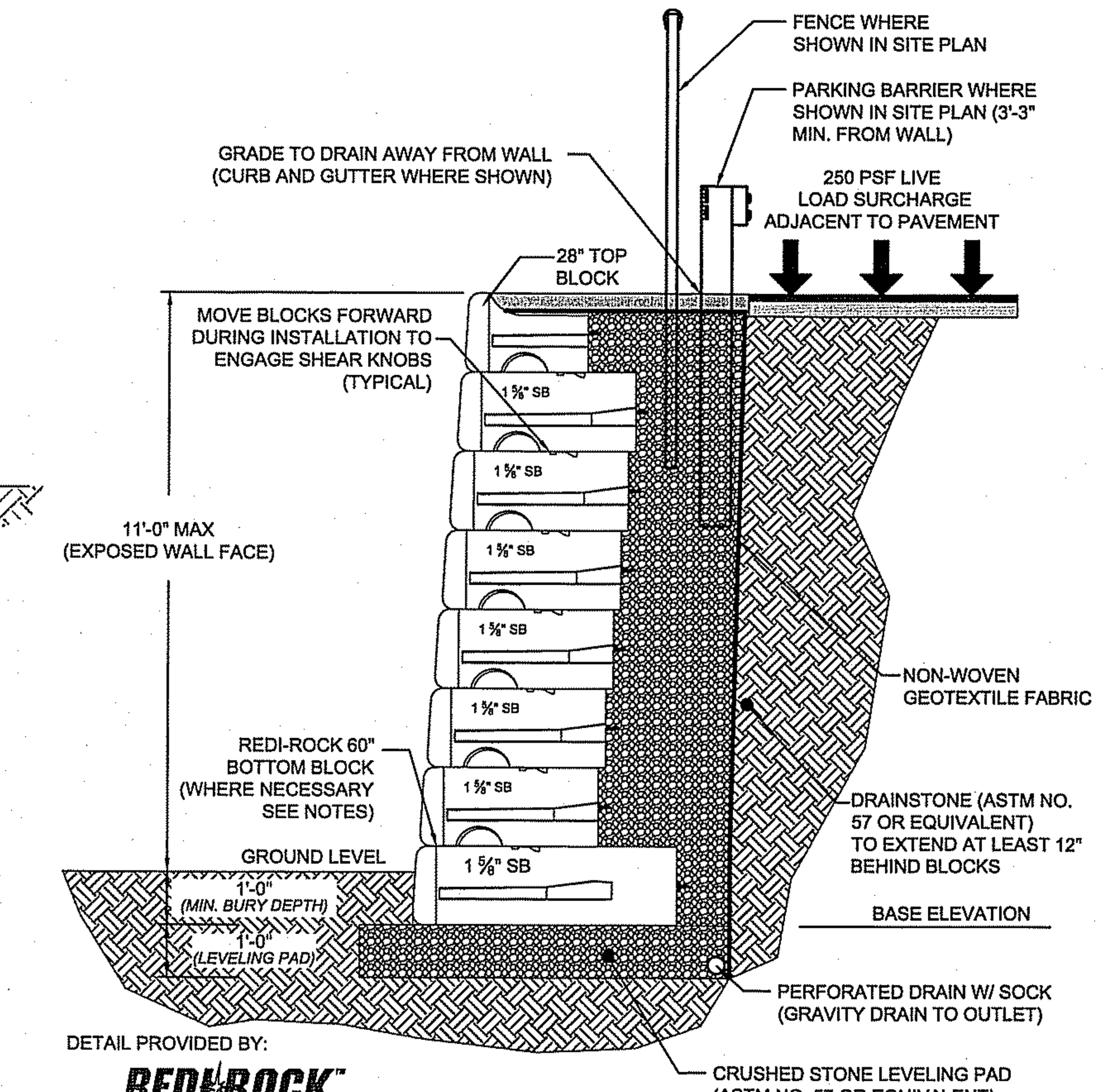
DOUBLE PANEL GATE DETAIL
NOT TO SCALE

NOTE:
WHEN GATES ARE INSTALLED ADJACENT TO CORNER OR END PANELS, INSTALL TRUSS RODS AS IN PULL POST ASSEMBLIES.

FENCE FABRIC NOTE:
FENCING FABRIC SHALL BE #9 GAUGE, STANDARD 2-INCH DIAMOND MESH W/ VINYL COATING.

FENCE FABRIC COVERING AND HARDWARE ARE BLACK PER SPECIFICATIONS

6 FOOT CHAINLINK FENCE DETAIL
NOT TO SCALE

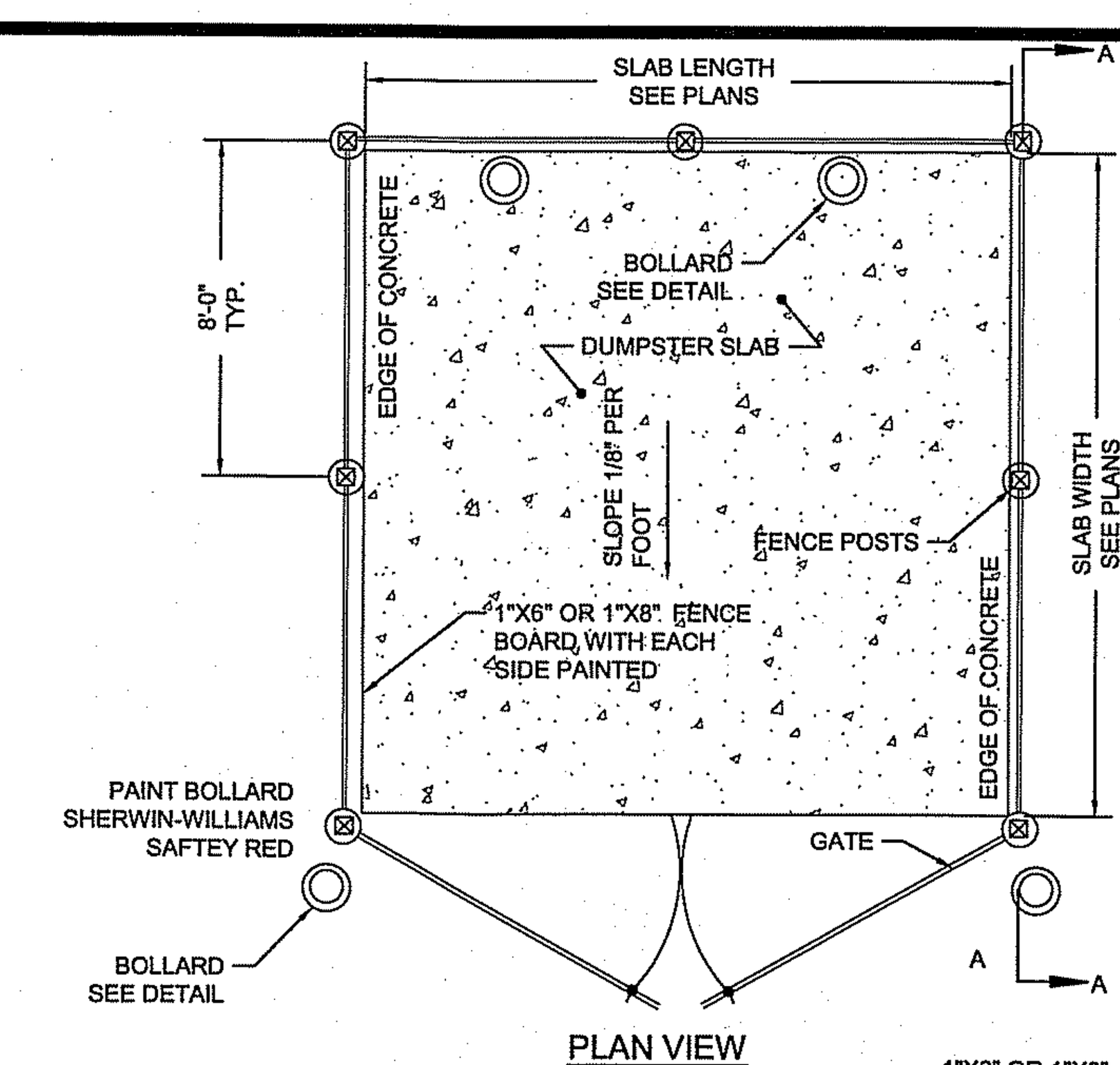


DETAIL PROVIDED BY:
REDI-ROCK INTERNATIONAL LLC
05481 US 31 SOUTH CHARLEVOIX, MI 49720
866-222-8400 • 231-237-9521 Fax • www.redi-rock.com

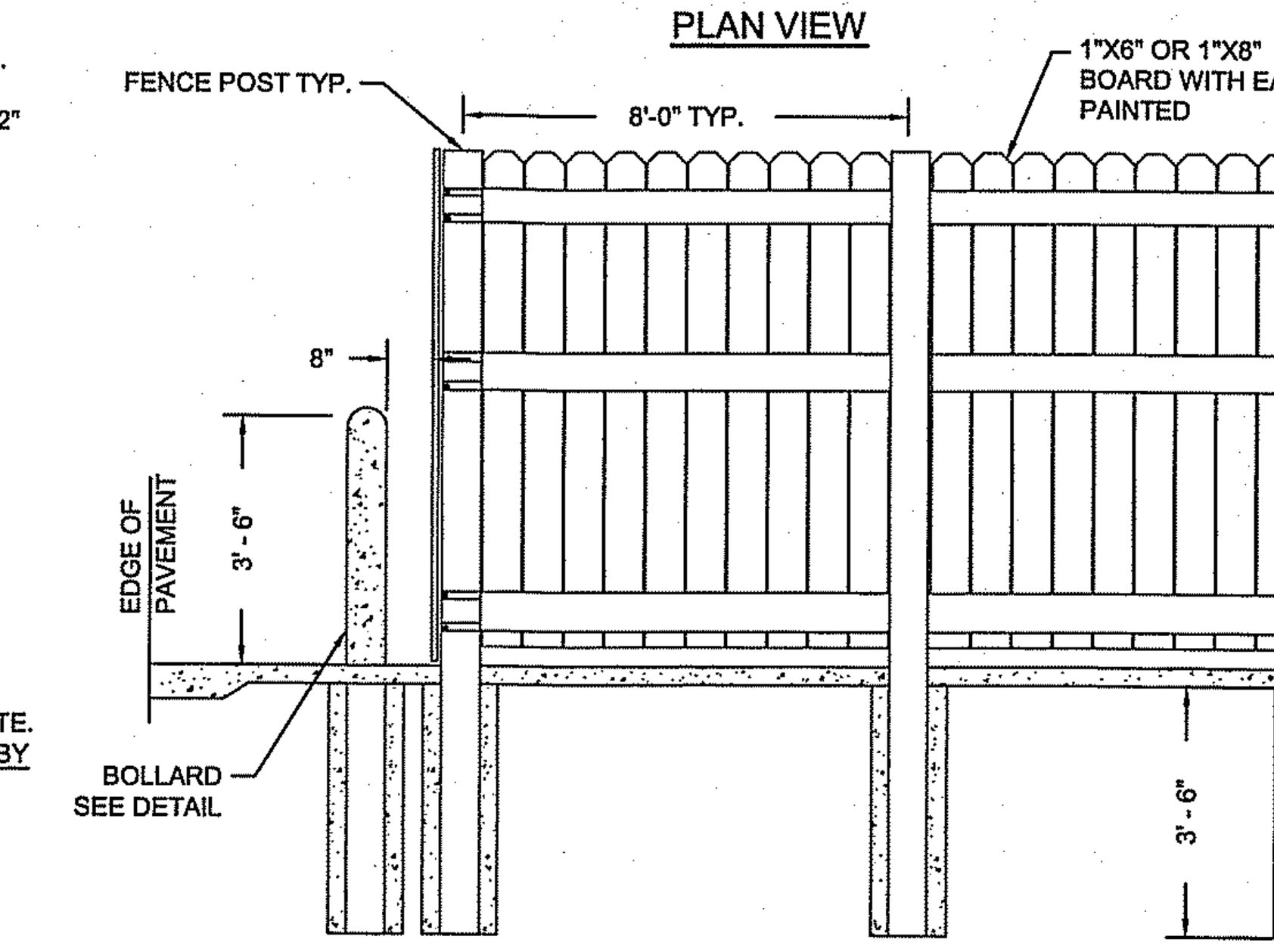
PRELIMINARY SECTION

• THIS DRAWING PROVIDED BY REDIROCK INTERNATIONAL AND IS FOR REFERENCE ONLY. DESIGN PARAMETERS, BLOCK SIZE, BLOCK CONFIGURATION ARE SUBJECT TO THE STRUCTURAL ENGINEER AT NOT ADDITION COST TO THE PROJECT.
• FINAL DESIGNS FOR CONSTRUCTION MUST BE PROVIDED BY THE CONTRACTOR AND PREPARED BY A REGISTERED PROFESSIONAL STRUCTURAL ENGINEER USING THE ACTUAL CONDITIONS OF THE PROPOSED SITE.
• FINAL WALL DESIGN MUST ADDRESS BOTH INTERNAL AND EXTERNAL DRAINAGE AND SHALL BE EVALUATED BY THE PROFESSIONAL ENGINEER WHO IS RESPONSIBLE FOR THE WALL DESIGN.

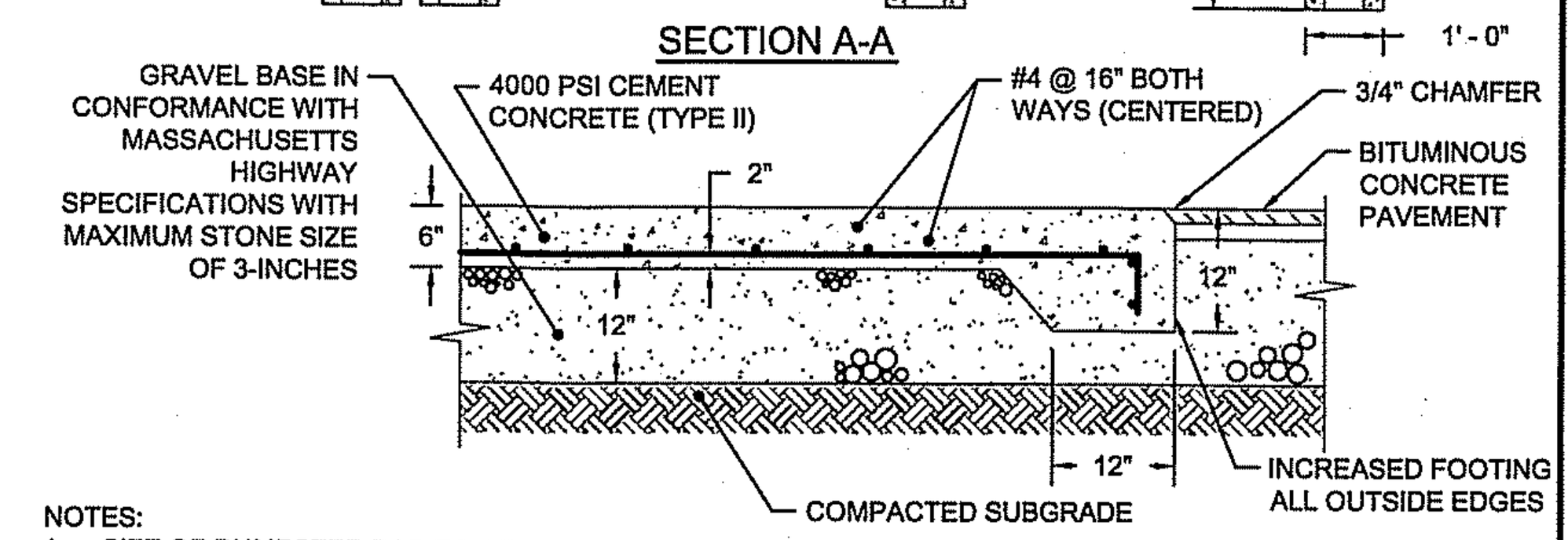
TYPICAL SEGMENTAL CONCRETE BLOCK RETAINING WALL DETAIL
NOT TO SCALE



PLAN VIEW

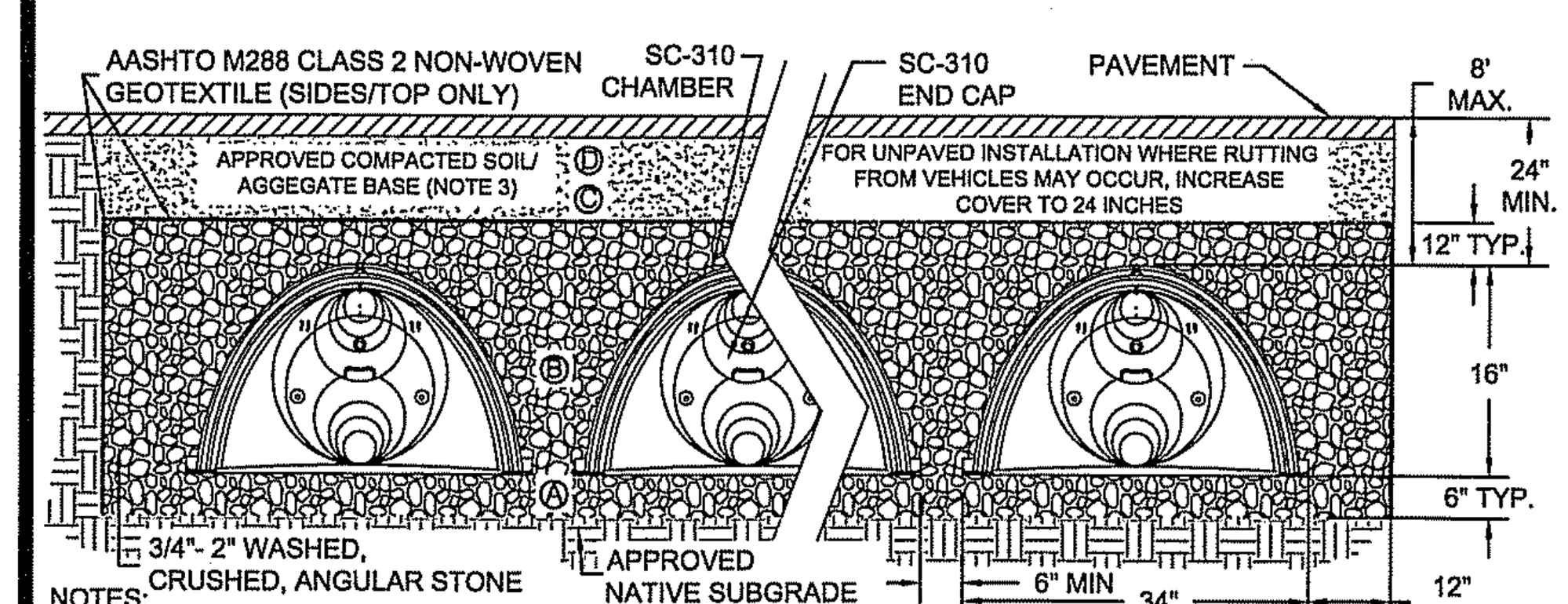


SECTION A-A



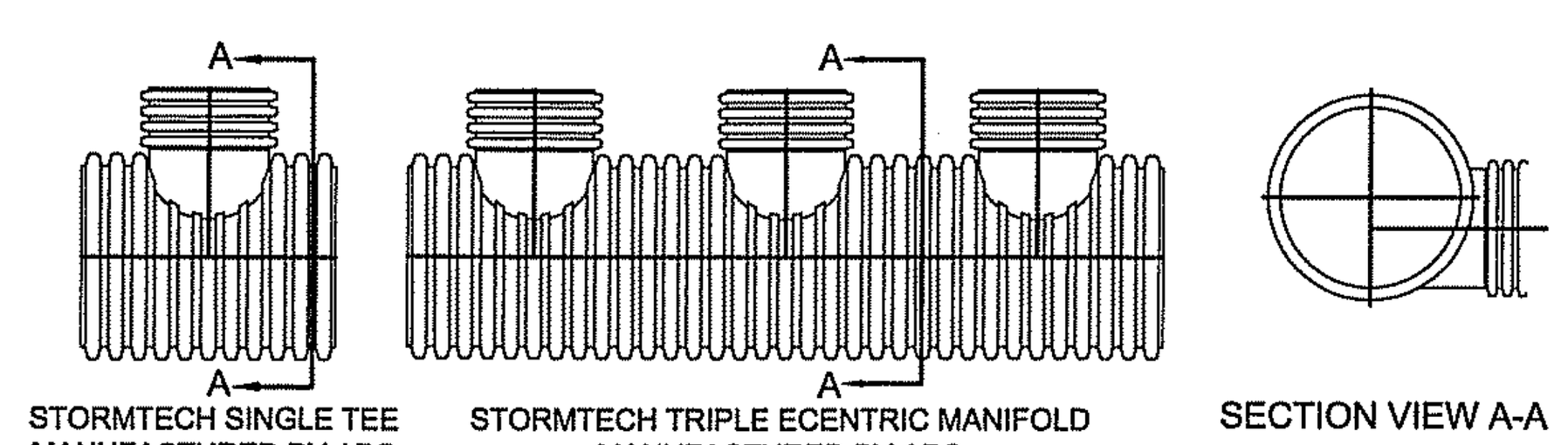
NOTES:
1. SIZE OF DUMPSTER PAD TO BE AS INDICATED ON PLANS. CONSTRUCTION JOINTS TO BE SET AT INTERVALS OF 1/3 OF LENGTH.
2. DUMPSTER PAD SHALL BE SIZED TO SUIT.
3. ENCLOSURE SPECIFICATIONS:
   - THE FENCING SHALL BE AN OPAQUE TYPE MATERIAL OF EITHER CEDAR OR VINYL.
   - THE FENCE HEIGHT SHALL FULLY ENCLOSE THE DUMPSTER AND SHALL NOT EXCEED 8-FT.
   - THE ENCLOSURE SHALL BE CONSTRUCTED IN SUCH A MANNER THAT ALL STRUCTURAL MEMBERS, INCLUDING BRACES, POSTS, POLES AND OTHER PROJECTIONS, SHALL BE ON THE INTERIOR SIDE OF THE FENCE.
   - THE GATES SHALL BE CONSTRUCTED WITH COMMERCIAL GRADE HARDWARE.
   - THE SUPPORTING POLES AT THE GATES SHALL BE METAL WITH THE APPROPRIATE DIAMETER TO SUPPORT THE GATE AT LEAST ONE AND FIVE-EIGHTHS INCHES (1-5/8") IN DIAMETER AND SHALL HAVE A CLOSING LATCH.
   - TWO BOLLARDS SHALL BE INSTALLED IN FRONT OF THE FENCE, BOTH SIDES OF GATE.

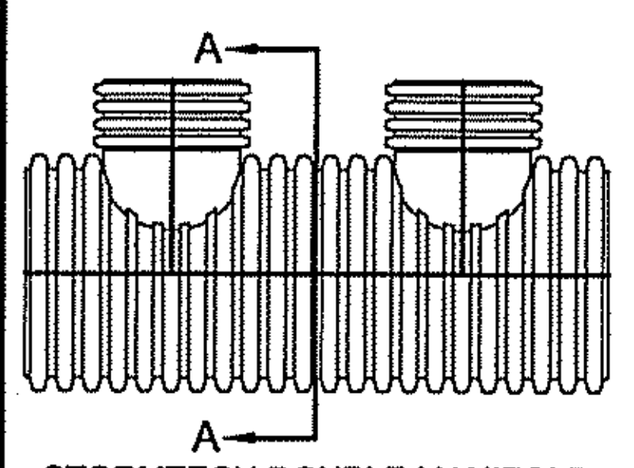
DUMPSTER PAD & ENCLOSURE DETAIL
NOT TO SCALE



NOTES:
1. DEPTH OF STONE TO BE DETERMINED BY DESIGN ENGINEER.
2. CHAMBERS SHALL MEET ASTM F 2418-05 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. APPROVED BASE MATERIAL TO BE GRANULAR WELL GRADED SOIL/AGGREGATE MIXTURES WITH <35% FINES. COMPACT IN 6" LIFTS TO 95% PROCTOR DENSITY. SEE TABLE OF ACCEPTABLE FILL MATERIALS IN STORMTECH'S DESIGN/INSTALLATION MANUAL(S), OR WWW.STORMTECH.COM. ALL LOAM, SANDY LOAM, AND/OR ROCK/LEDGE WILL BE REMOVED AND REPLACED WITH CLEAN MEDIUM SAND TO A DEPTH OF 2-FT BELOW THE BOTTOM OF THE CHAMBER STONE.
4. THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS, WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCE.

STORMTECH SC-310 CHAMBER TYPICAL CROSS SECTION
NOT TO SCALE





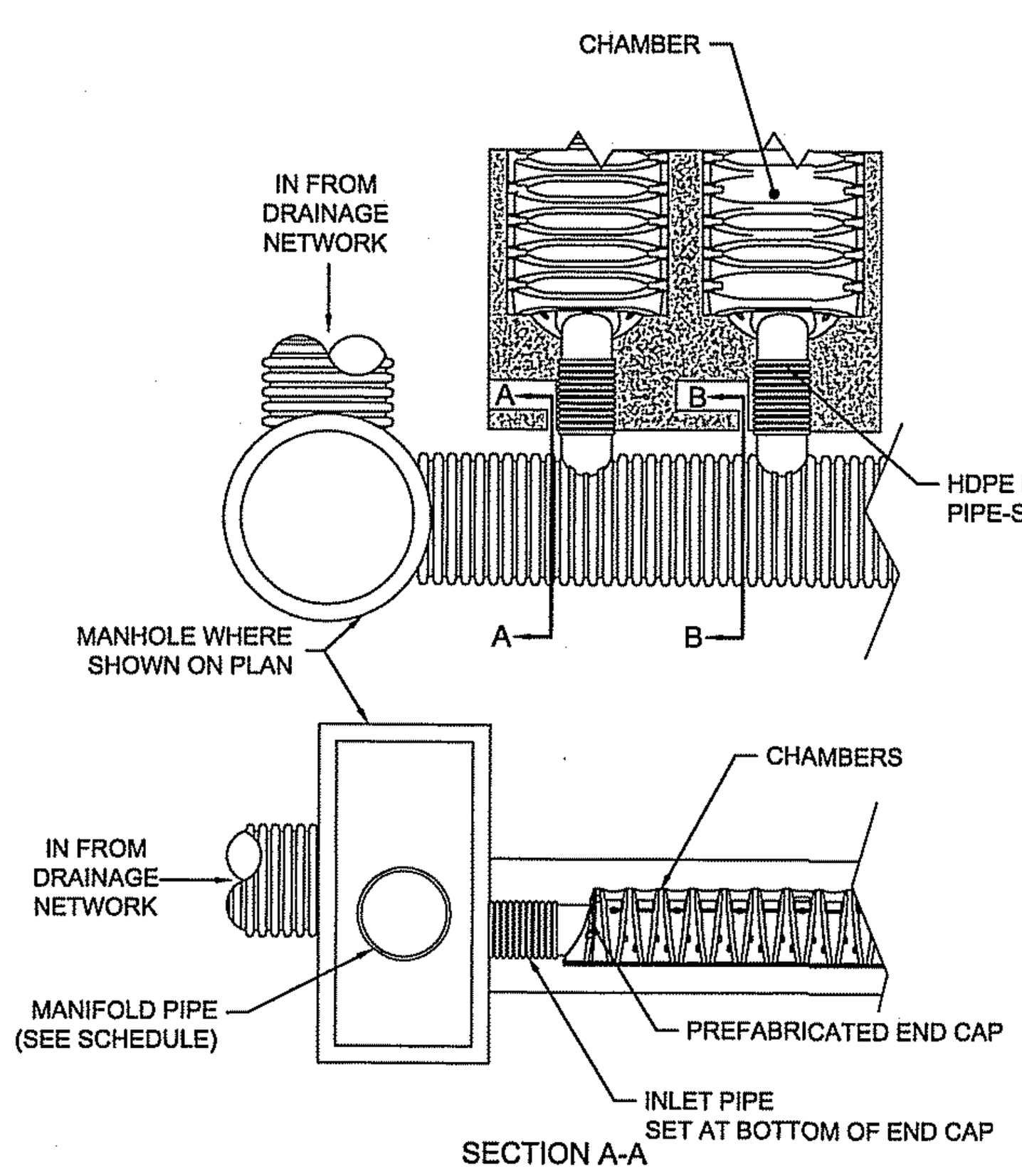
	HEADER PIPE SIZES										
STUB SIZE	48"	42"	36"	30"	24"	18"	15"	12"	10"	8"	6"
12"	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	-	-	-
10"	-	-	-	-	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	-	-
8"	-	-	-	-	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	-
6"	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL	AVAIL

AVAIL - STANDARD HEADERS AVAILABLE

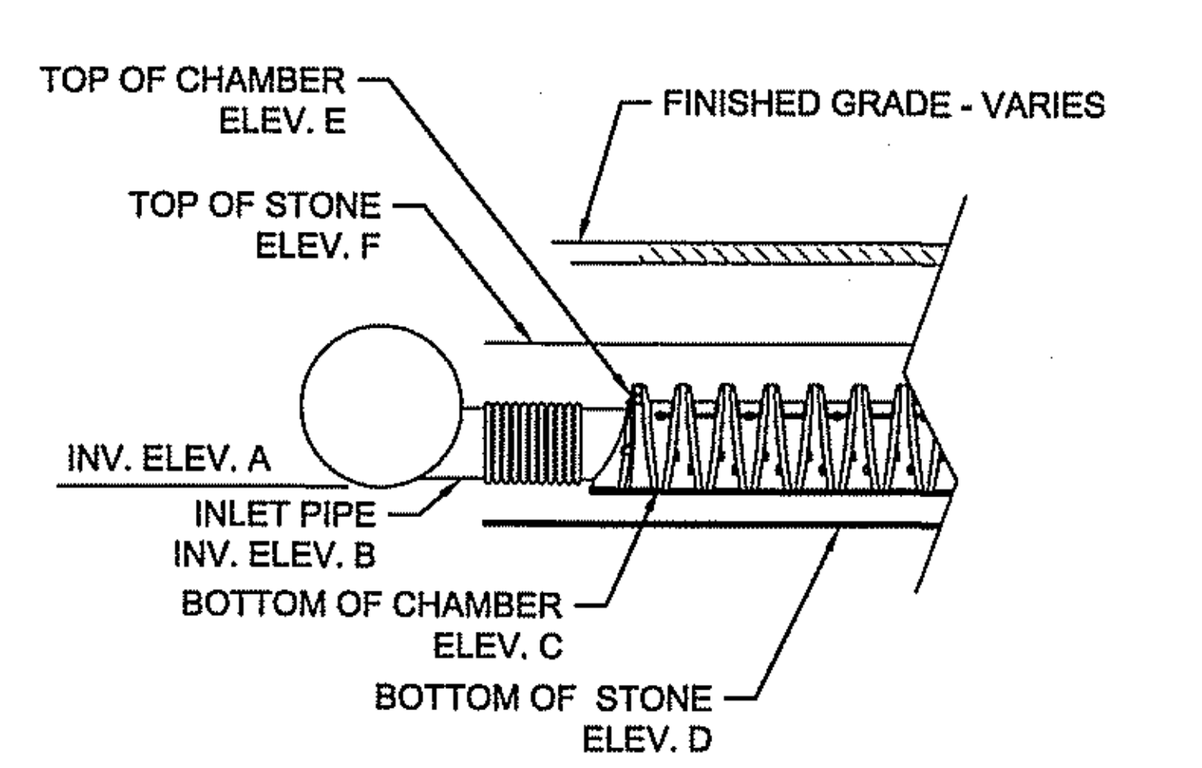
MANIFOLDS ARE DESIGNED TO BE COUPLED TO STORMTECH PREFABRICATED END CAPS. WHEN USING STANDARD END CAPS, CORRUGATE DPIPE UP TO 10 INCHES CAN BE INSERTED DIRECTLY INTO THE END CAP. FOR 12" INLET PIPES, A CORRUGATED TO SMOOTH PIPE ADAPTER IS REQUIRED.

ADS MANIFOLD DETAIL
NOT TO SCALE

FOR INFORMATION CALL 1-888-892-2694

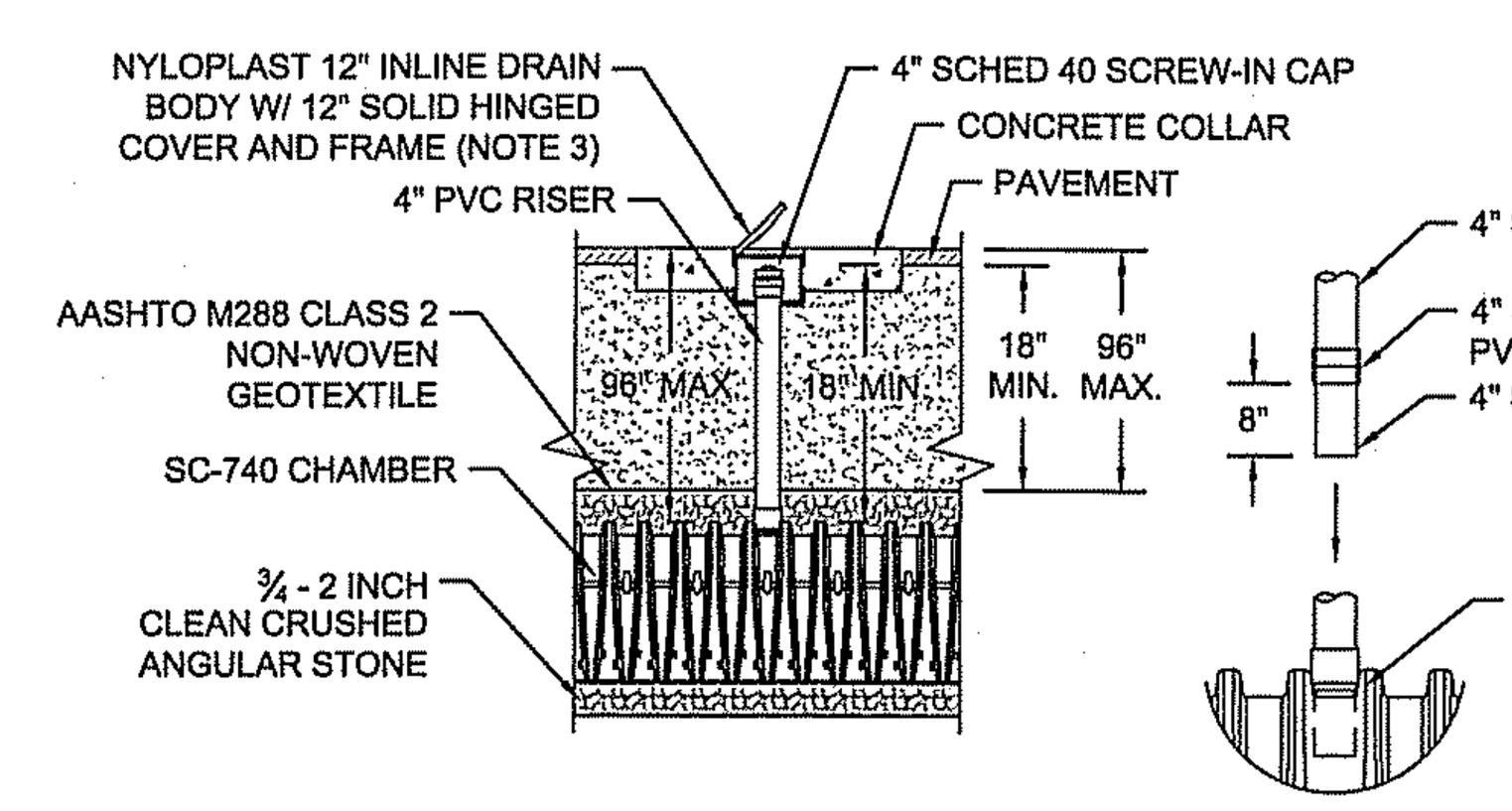


SECTION A-A



SECTION B-B

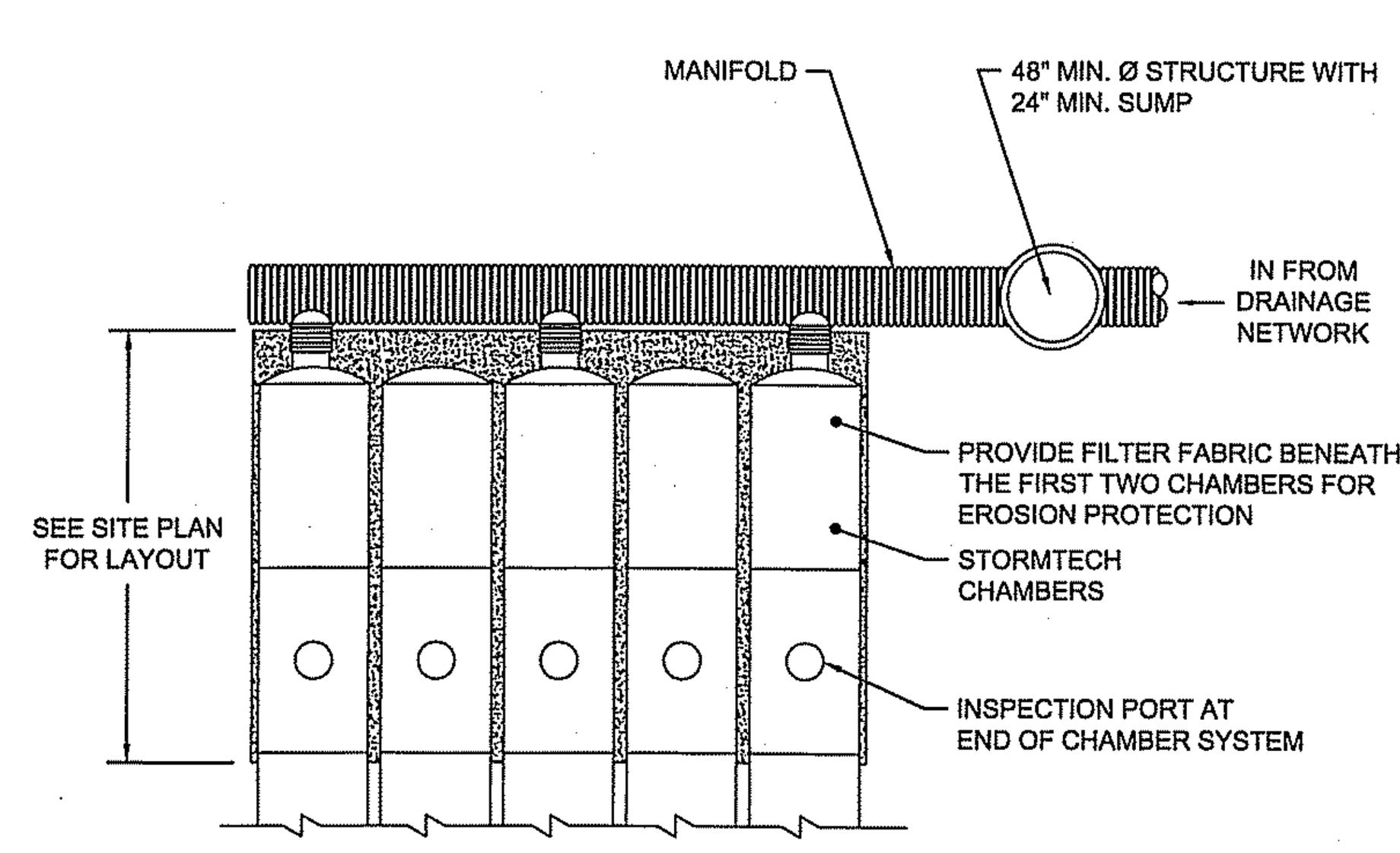
STORMTECH CHAMBER SYSTEM DETAIL
NOT TO SCALE



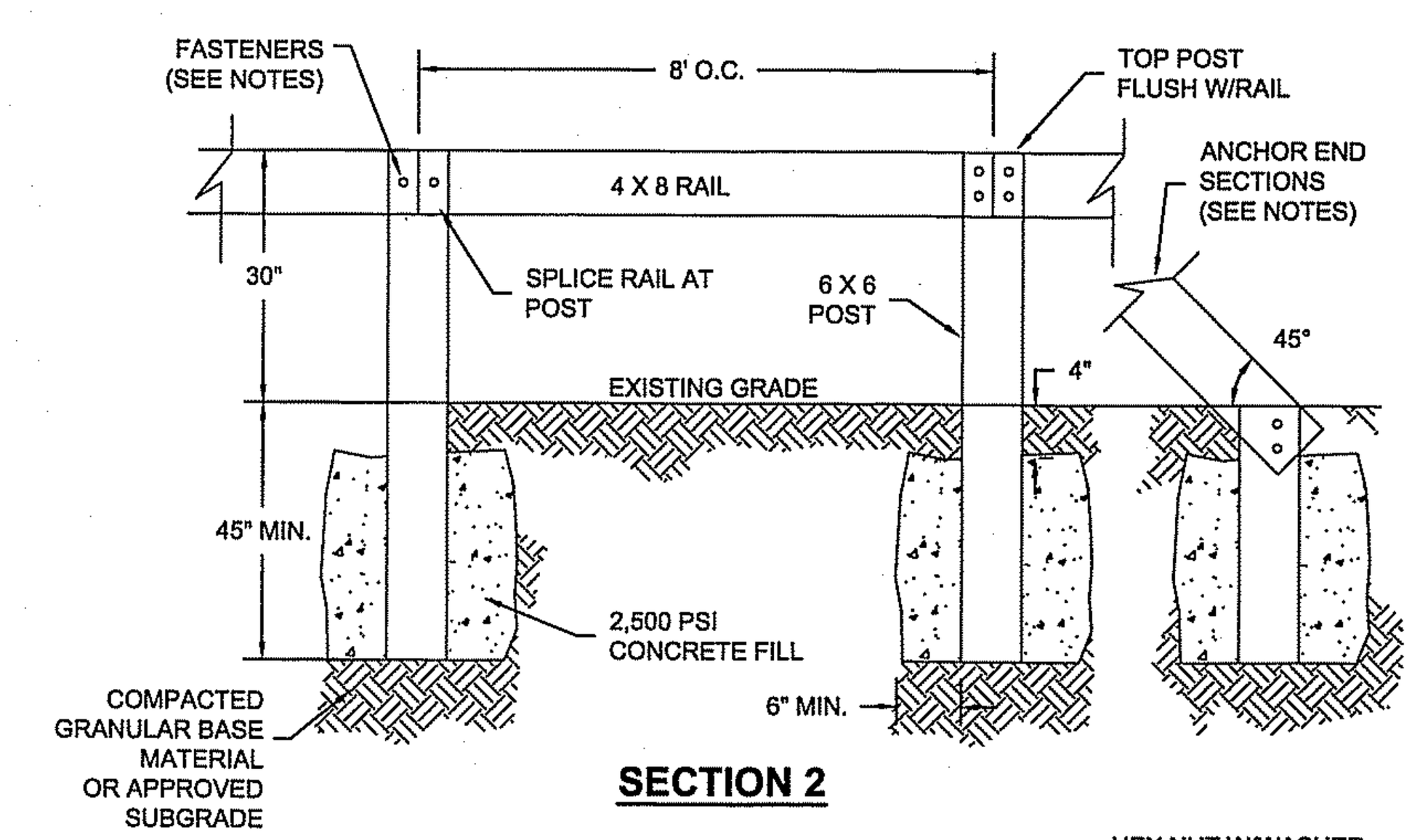
CONNECTION DETAIL

NOTES:
1. INSPECTION PORT MUST BE CONNECTED THROUGH KNOCK-OUT LOCATED AT CENTER OF CHAMBER.
2. ALL SCHEDULE 40 FITTINGS TO BE SOLVENT CEMENTED.
3. INSPECTION PORTS TO BE INSTALLED IN THE MIDDLE CHAMBER OF EACH CHMABER COLUMN.
4. SEE NYLOPLAST DWG# 7003-110-044 FOR PAVED APPLICATIONS / SEE DWG# 7003-110-045 FOR UNPAVED APPLICATIONS.
5. FOR STORMTECH INFORMATION CALL 1-888-892-2694

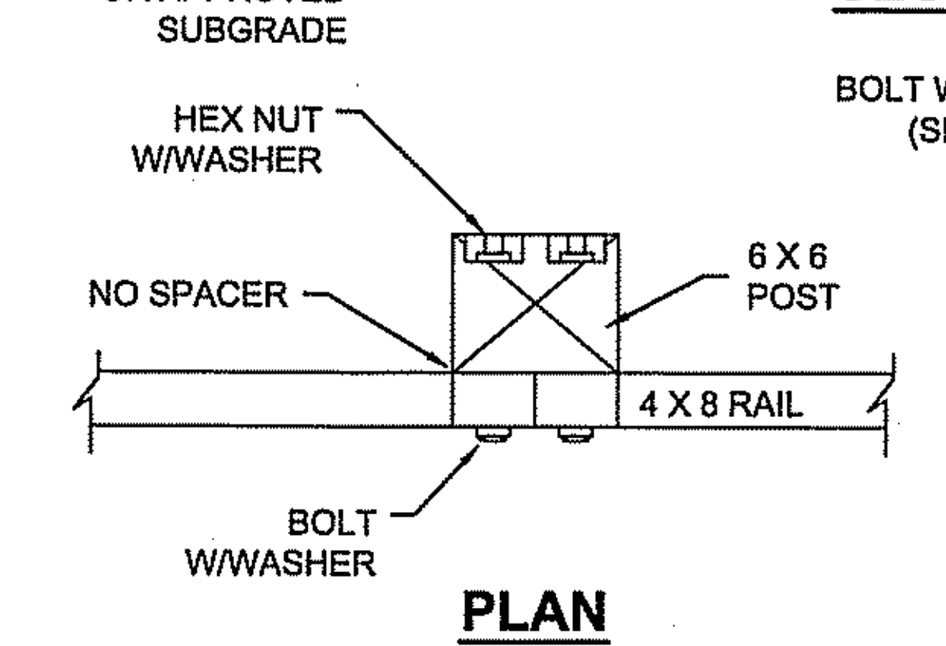
STORMTECH INSPECTION PORT DETAIL
NOT TO SCALE



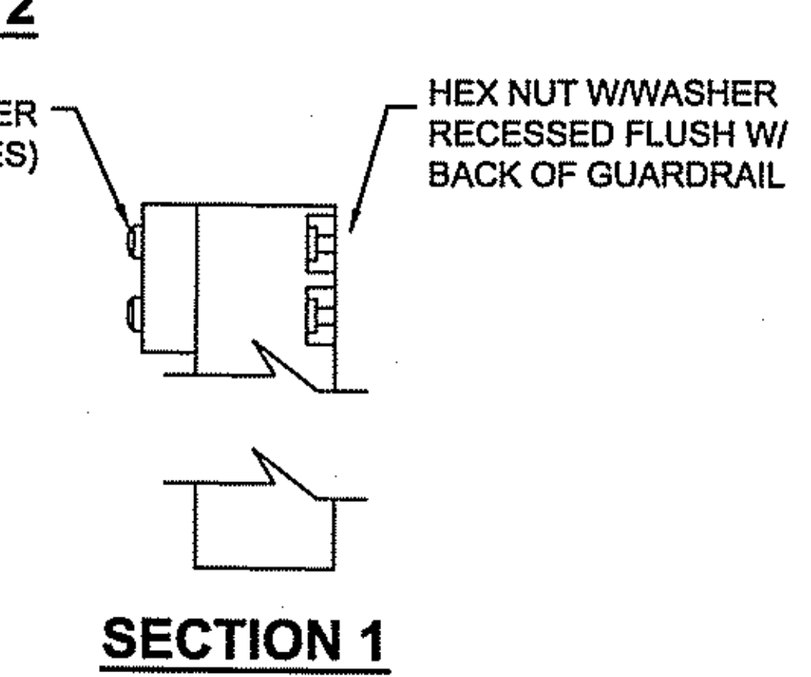
STORMTECH MANIFOLD DETAIL
NOT TO SCALE



SECTION 2



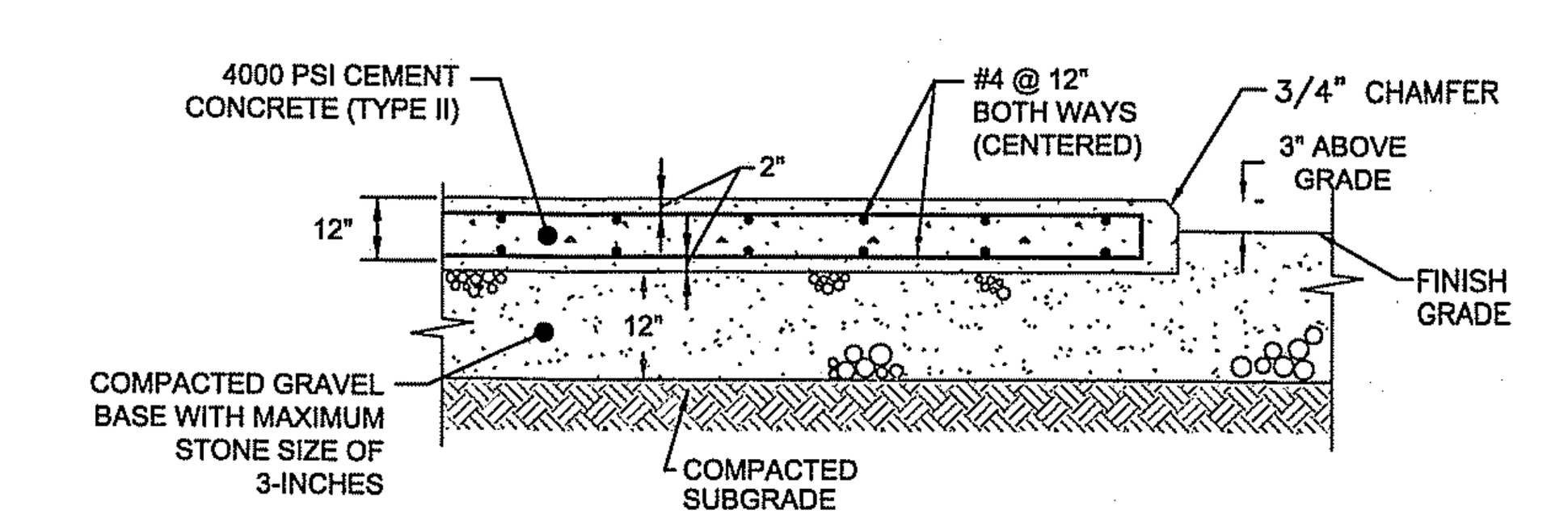
PLAN



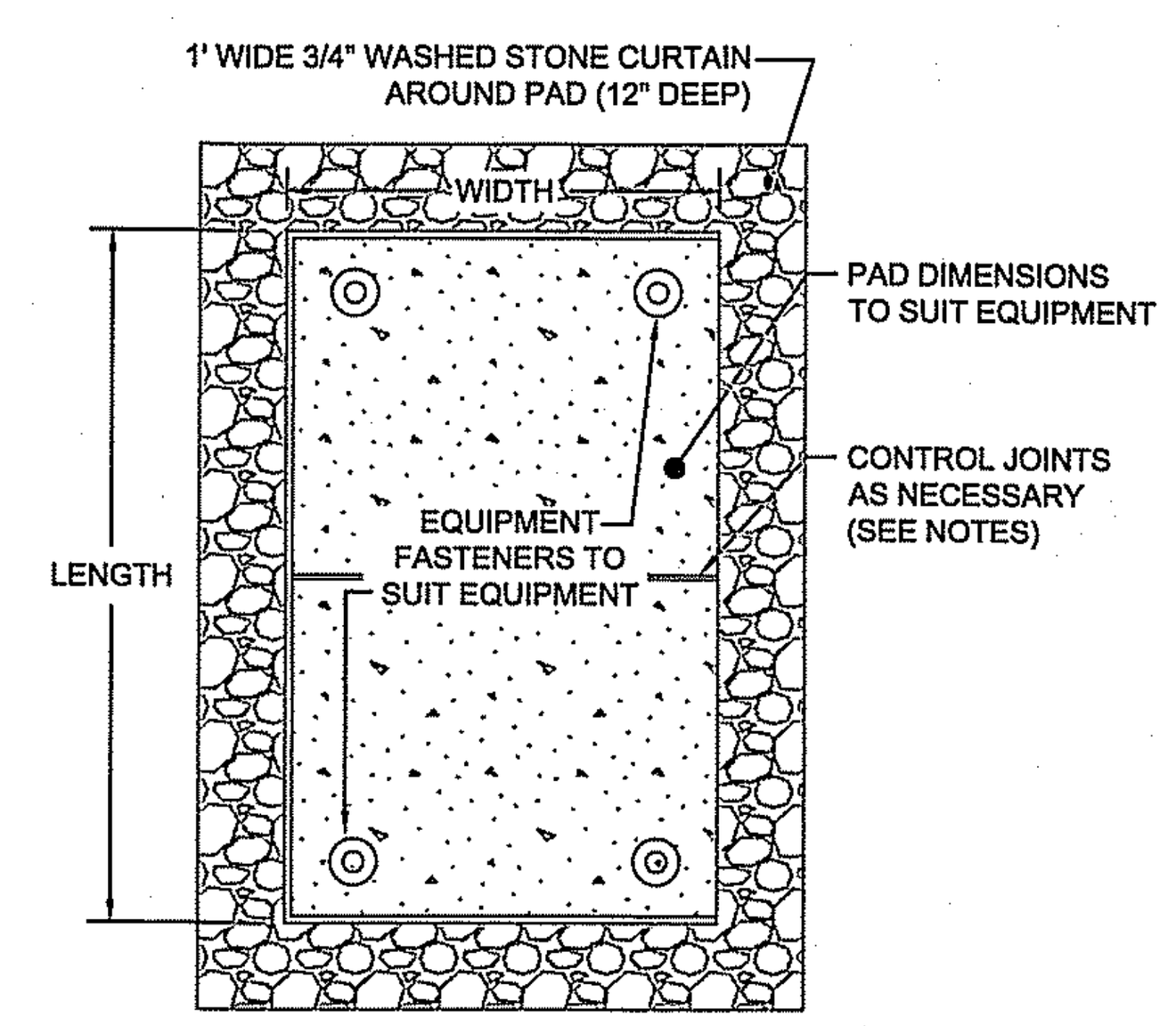
SECTION 1

NOTES:
1. POST AND RAILS TO BE PRESSURE TREATED LUMBER.
2. ALL SPLICES ARE TO BE MADE AT POSTS.
3. BUMPER ANCHORS SHALL BE RAIL BOLTS WITH NUTS AND WASHER CONNECTION. FASTENERS SHALL BE HOT DIPPED GALVANIZED OR STAINLESS STEEL MATCHING ASTM A153 AND ASTM A653.
4. THE CONTRACTOR SHALL INSTALL TWO ¾"Ø BOLTS AT EACH RAIL TO POST CONNECTION.
5. COMPACTED GRAVEL BELOW POST AND EXTEND POST TO THE BASE OF THE GRAVEL FOR DRAINAGE PRIOR TO SETTING IN CONCRETE.
6. WOOD POSTS SHALL BE NOTCHED AS NECESSARY TO FACILITATE CURVES AND CHANGES IN DIRECTION. RAIL SHALL BE CUT TO CREATE A RAIL TO RAIL FLUSH FACE JOINT AS NECESSARY.
7. BEGINNING & END SECTIONS SHALL BE ANCHORED INTO THE GROUND A MINIMUM 1-FOOT BELOW FINISH GRADE AND BOLTED TO A POST SET FLUSH WITH FINISH GRADE.

WOOD PARKING BARRIER
NOT TO SCALE



SECTION



PLAN

NOTES:
1. CONCRETE PAD PROPOSED FOR ALL ABOVE GROUND STORAGE TANKS AND GENERATORS. ALL GENERATORS SHALL BE EQUIPPED WITH FULL ENCLOSURES.
2. LENGTH AND WIDTH SHALL SUIT MANUFACTURER'S EQUIPMENT WITH THE PAD EXTENDING A MINIMUM 1.5' OUTSIDE THE OUTER EDGE OF THE TANK AND/OR GENERATOR ENCLOSURE (SEE SITE PLAN FOR APPOX. SIZE).
3. PROVIDE TOOLED CONTROL JOINTS AT 6-FOOT INTERVALS ACROSS SURFACE.
4. PROVIDE BROOM FINISH TO SURFACE AND 3/4" CHAMFER TO ALL EDGES.
5. FENCE SHALL BE INSTALLED AROUND PAD WHEN SHOWN IN THE PLANS IN CONFORMANCE WITH THE DETAILS.

TYPICAL CONCRETE PAD DETAIL
NOT TO SCALE

UNDERGROUND RECHARGE CHAMBER SCHEDULE

SPECIFICATIONS											INVERTS					
RECHARGE FIELD #	COVER TYPE	NUMBER OF UNITS	CHAMBER TYPE/ MODEL	CHAMBER HEIGHT (IN.)	STONE TOP OF CHAMBER (IN.)	BOTTOM OF CHAMBER TO INVERT IN (IN.)	STONE UNDER CHAMBER (IN.)	DIAMETER HEADER MANIFOLD (IN.)	DIAMETER CHAMBER INLET STUB (IN.)	# OF MANIFOLD INLETS STUBS	ELEV. A INVERT HEADER MANIFOLD (FT)	ELEV. B MANIFOLD STUB INVERT (FT)	ELEV. C BOTTOM OF CHAMBER S (FT)	ELEV. D BOTTOM OF STONE (FT)	ELEV. E TOP OF CHAMBER (FT)	ELEV. F TOP OF STONE (FT)
RF-1	PAVED	374	STORMTECH SC-310	16.00	12	0.00	6	24	12	17	336.00	336.00	336.00	335.50	337.33	338.33
RF-2	PAVED	437	STORMTECH SC-310	16.00	12	0.00	6	24	12	19	339.50	339.50	339.50	339.00	340.83	341.83
RF-3	PAVED	272	STORMTECH SC-310	16.00	12	0.00	6	24	12	16	342.00	342.00	342.00	341.50	343.33	344.33

last modified: 08/09/13 printed: 08/09/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-DE.dwg

Revisions

Rev.	Date	By	Appr.	Description
1	07/31/13	MJC	JEL	PEER REVIEW COMMENTS
2	08/09/13	JJL	JEL	SECOND PEER REVIEW
3				
4				
5				
6				
7				

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Sandwich, MA 02563
508-833-6600 voice
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Date: JUNE 12, 2013 | Designed By: MC/JL | Drawn By: MC | Checked By: RAC

Plan Set: *ASHLAND AFFORDABLE HOUSING ROBERT HILL WAY ASHLAND, MASSACHUSETTS*

Plan Title: *DETAILS 5*

Prepared For:
RHW DEVELOPMENT LLC
536 Granite Street
Braintree, MA 02184
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Survey Provided By:
Beals and Thomas, Inc.
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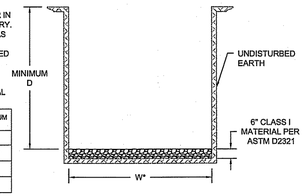
Dated: October 27, 2003

Registration:
COMMONWEALTH OF MASSACHUSETTS
RICHARD A. CLAYTOR
CIVIL
NO. 45116
REGISTERED PROFESSIONAL ENGINEER
8-9-13

Project Number: *12097*
Sheet: *14 of 17*
Sheet Number: C - 14

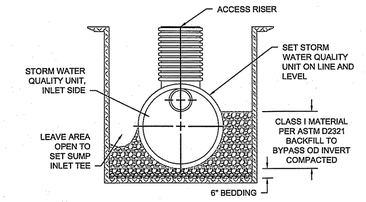
NOTES:
1. AVOID EXCESSIVE GROUND WATER IN THE TRENCH DE-WATER AS NECESSARY.
2. PROVIDE SHEETING OR SHORING AS REQUIRED.
3. MAXIMUM COVER HEIGHT MEASURED FROM THE TOP OF THE UNIT TO FINAL GRADE SHALL NOT EXCEED 8 FEET.
4. MODIFIED TRENCH BOTTOM REQUIRED IF SOFT OR ROCK MATERIAL IS FOUND.

UNIT SIZE	MINIMUM D	MINIMUM W*
36"	4.5'	6.5'
42"	5.0'	7.0'
48"	5.5'	7.5'
60"	7.5'	8.5'



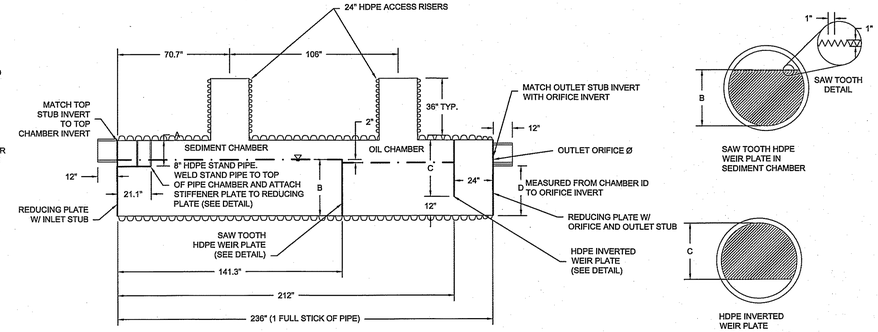
* TRENCH WIDTH DOES NOT ACCOUNT FOR BY-PASS PIPE, THIS ESTIMATE IS FOR THE MAIN UNIT ONLY

TRENCH AND BEDDING PREPARATION FOR UNIT



1. UTILIZE CARE WHEN LOWERING UNIT INTO THE TRENCH. HANDLE USING NYLON SLINGS AND TWO PICK POINTS. DO NOT USE SLINGS AROUND RISERS.
2. PLACE BACKFILL AROUND THE UNIT IN UNIFORM 8"-12" LIFTS, COMPACTED.
3. WHEN THE UNIT CONSISTS OF 2 SECTIONS, PLACE THE DOWNSTREAM SECTION FIRST. PROPERLY LUBE THE BELL AND SPIGOT. CONNECT AND HOME THE REMAINING SECTIONS.

PLACING UNIT AND INITIAL BACKFILL



SAW TOOTH HDPE WEIR PLATE IN SEDIMENT CHAMBER

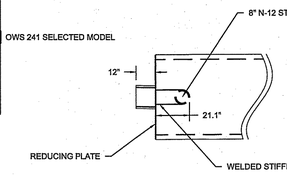
HDPE INVERTED WEIR PLATE FOR OIL CHAMBER

MODEL #	MAIN PIPE DIA.	TREAT. FLOW RATE	SIEVE SIZE	INLET STUB DIA.	OUTLET STUB DIA.	ORIFICE DIA.	A	B	C	D
3620WQAXX	36"	1.50 CFS	140	10"	10"	7.82"	13.9"	26"	24"	24"
3620WQBXX	36"	0.7 CFS	200	10"	10"	5.35"	13.9"	26"	24"	24"
4220WQAXX	42"	1.75 CFS	140	12"	12"	8.13"	16.1"	30"	30"	28"
4220WQBXX	42"	0.86 CFS	200	12"	12"	5.70"	16.1"	30"	30"	28"
4820WQAXX	48"	2.26 CFS	140	12"	12"	9.24"	16.1"	36"	36"	34"
4820WQBXX	48"	1.13 CFS	200	12"	12"	6.53"	16.1"	36"	36"	34"
6020WQAXX	60"	2.95 CFS	140	15"	15"	10.05"	18.9"	45"	48"	43"
6020WQBXX	60"	1.47 CFS	200	15"	15"	7.1"	18.9"	45"	48"	43"

XX DENOTES A BY-PASS SIZE OF 15", 18", 24", 30", 36", 42", 48", OR 60"
XX=00 DENOTES UNITS W/OUT A BY-PASS.

OWS 241 SELECTED MODEL

NOTES:
1. ALL DIMENSIONS ARE NOMINAL
2. ALL FITTING CONNECTIONS WILL BE MADE USING A STANDARD BELL/BELL OR SPLIT COUPLER

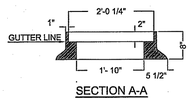


DISPERSION BAFFLE DETAIL (TOP VIEW)

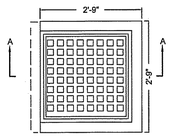
WQ UNIT INSTALLATION TRENCH & PLACEMENT

NOT TO SCALE

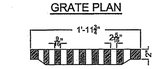
DETAIL PROVIDED BY ADVANCE DRAINAGE SYSTEMS INC. (ADS)



SECTION A-A



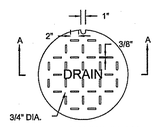
GRATE PLAN



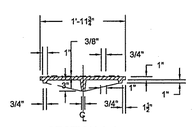
NOTES:
1. BASED ON EAST JORDAN IRON WORKS 24" X 24" ECONOMY GRATE
2. GRATE MATERIAL- DUCTILE IRON

TYPICAL DRAINAGE STRUCTURE FRAME AND GRATE

NOT TO SCALE

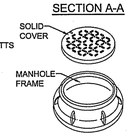


SOLID COVER PLAN



SECTION A-A

NOTES:
1. FRAME AND COVER SHALL CONFORM TO MASSACHUSETTS STANDARDS HEAVY DUTY (EAST JORDAN, NEENAH, OR APPROVED EQUIVALENT)
2. ALL H20 LOADING
3. MIN. FRAME WEIGHT:
   4" FLANGE 295 LBS
   3" FLANGE 265 LBS
4. MATERIAL-CAST IRON
5. MIN. GRATE WEIGHT: 200LBS.
6. SEE CATCHBASIN AND MANHOLE DETAILS FOR INSTALLATION.



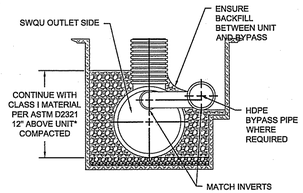
TYPICAL DRAINAGE STRUCTURE FRAME AND COVER

NOT TO SCALE

TYPICAL 20-FOOT LONG WQ UNIT UNIT

NOT TO SCALE

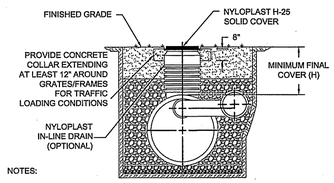
DETAIL PROVIDED BY ADVANCE DRAINAGE SYSTEMS INC. (ADS)



1. CONTINUE BACKFILL WITH CLASS I MATERIAL PER ASTM D2321 TO 12" ABOVE WATER QUALITY UNIT.
2. FILL UNIT WITH WATER TO THE TOP OF THE SEDIMENT WEIR PLATE ONCE BACKFILL IS PLACED AND COMPACTED 12" ABOVE THE UNIT.

* FOR 60" UNITS CONTINUE BACKFILL WITH CLASS I MATERIAL PER ASTM D2321 TO 24" ABOVE WATER QUALITY UNIT..

BACKFILL AROUND THE UNIT AND BY-PASS



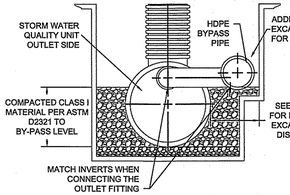
NOTES:

1. PLEASE FOLLOW THE INSTALLATION GUIDELINES FOUND IN THE ADS DRAINAGE HANDBOOK WHEN INSTALLING ADS N-12 PIPE ON THE BY-PASS CONNECTION OR IN OTHER DRAINAGE APPLICATIONS ON THE SITE.
2. ALL RISER EXTENTIONS TO GRADE SHOULD BE COORDINATED THROUGH YOUR ADS REPRESENTATIVE.

FOR NON-TRAFFIC LOADING: H = 12" COVER FOR 36", 42", AND 48" UNITS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF BITUMINOUS PAVEMENT OR TOP OF RIGID PAVEMENT. H = 24" COVER FOR 60" PIPE.

FOR TRAFFIC LOADING H = 24" COVER FOR 36", 42", 48", AND 60" MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF BITUMINOUS PAVEMENT OR TOP OF RIGID PAVEMENT..

FINAL COVER AND RISER EXTENSIONS



NOTES:
1. START ON THE DOWNSTREAM END BY CONNECTING THE OUTLET FITTING; BE SURE TO MATCH INVERTS OF UNIT OUTLET AND BYPASS PIPE.
2. BY-PASS FITTINGS CAN BE CONNECTED USING THE SAME COUPLERS AS THE MAIN STORM SEWER PIPE. COUPLERS MAY BE SPLIT COUPLERS, IN-LINE BELL COUPLERS, SNAP COUPLERS, BELL-BELL COUPLERS OR WELDED COUPLERS

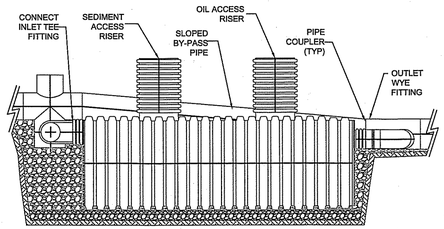
DISTANCE FROM OUTSIDE OF SWQU TO OUTER WALL OF BYPASS PIPE* (IN)

BYPASS PIPE DIAMETER** (IN)							
12	15	18	24	30	36	42	48	60
41	44	49	56	64	71	78	85	100

* ASSUMES 18" MINIMUM SEPARATION BETWEEN SWQU AND HDPE BYPASS PIPE. TRENCH WIDTHS WILL VARY WHEN CONNECTING TO OTHER PIPE/STRUCTURE MATERIALS.

** STANDARD CONFIGURATIONS ARE NOT AVAILALE FOR EVERY SWQU AND BYPASS DIAMETER COMBINATION. CHECK WITH PRODUCT CATALOG FOR LISTING OF STANDARD UNITS.

CONNECTING THE BYPASS (OUTLET END)



NOTES:
1. CONTINUE CONNECTING THE BY-PASS PIPE TO THE UPSTREAM END OF THE UNIT.
2. FINISH THE BY-PASS CONNECTION TO THE UNIT BY CONNECTING THE INLET TEE FITTING

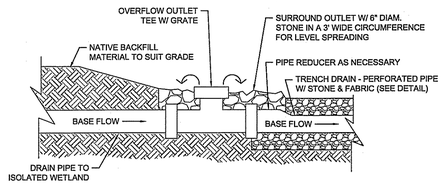
CONNECTING THE BY-PASS (INLET END)

WQ UNIT INSTALLATION BACKFILL & COVER

NOT TO SCALE

DETAIL PROVIDED BY ADVANCE DRAINAGE SYSTEMS INC. (ADS)

NOTE:
1. STONE SURROUNDING OUTLET TEE SHALL BE NATURAL ROUNDED RIVERROCK.
2. GRATE TO BE GREEN HDPE POLYLOK OR EQUAL.



BASE FLOW OUTLET STRUCTURE

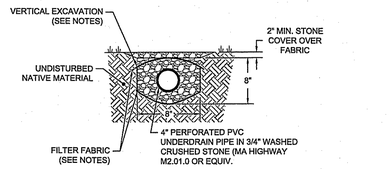
NOT TO SCALE

TYPICAL WQ UNIT UNIT BYPASS

NOT TO SCALE

DETAIL PROVIDED BY ADVANCE DRAINAGE SYSTEMS INC. (ADS)

NOTE:
1. FILTER FABRIC SHALL BE MIRAFI 140N OR APPROVED EQUIVALENT.
2. EXCAVATION WITHIN RESOURCE AREAS WILL BE BY HAND OR HAND HELD TRENCHING MACHINE.- NO TIRE MACHINERY.



TRENCH DRAIN SECTION

NOT TO SCALE

Revisions

Rev.	Date	By	Appr.	Description
1	07/31/13	MJG	JEL	PEER REVIEW COMMENTS
2	08/09/13	JJL	JEL	SECOND PEER REVIEW
3	08/20/13	JJL	JEL	THIRD PEER REVIEW
4				
5				
6				
7				

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
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Sandwich, MA 02563
508-833-6600 voice
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Dates: JUNE 12, 2013 | Designed By: MCJ/JL | Drawn By: MC | Checked By: PAC

Plan Set: ASHLAND AFFORDABLE HOUSING
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Plan Title: DETAILS 6

Prepared For:
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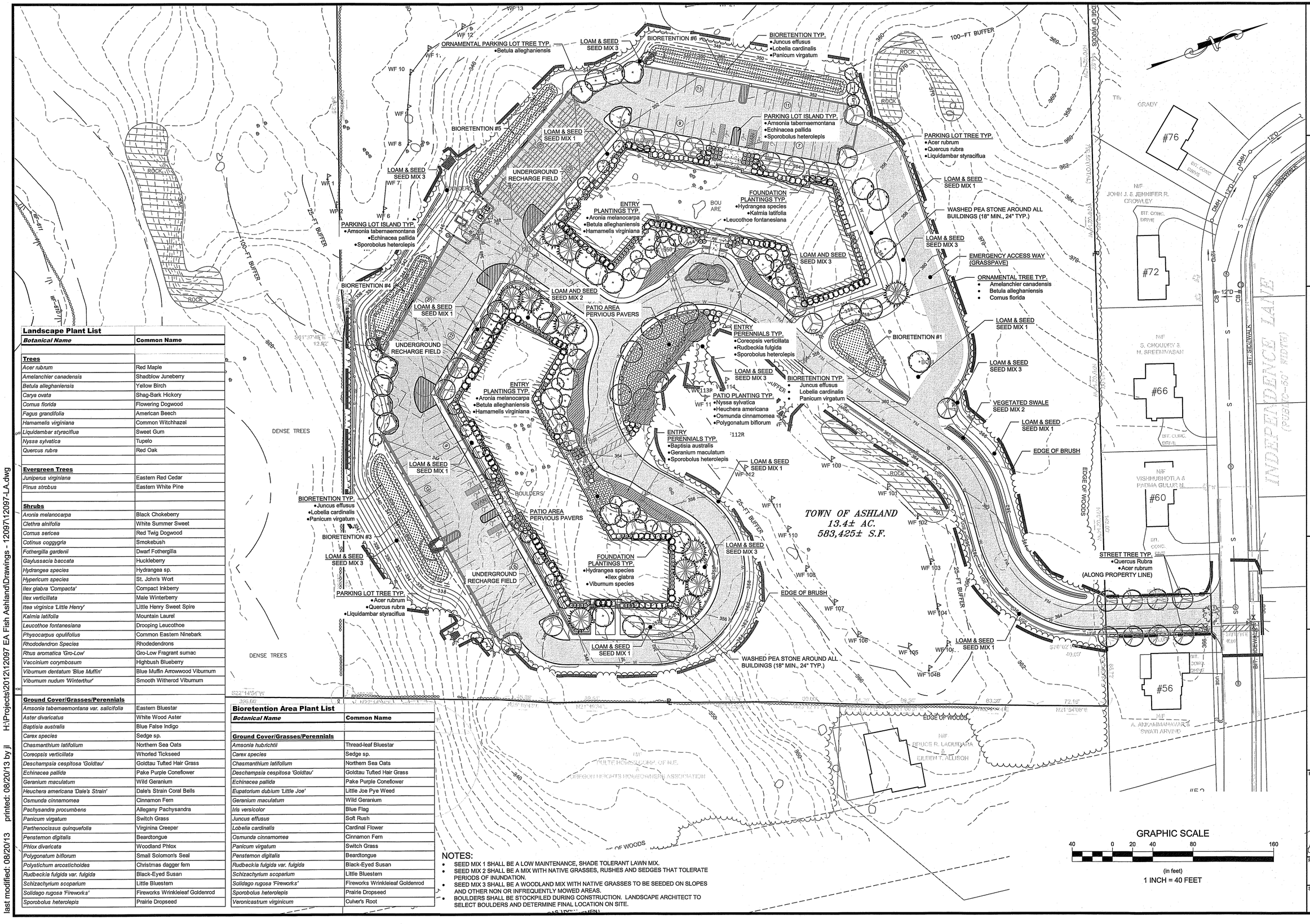
8-20-13

Project Number: 12097 | Sheet: 15 of 17

Sheet Number: C - 15

last modified: 08/20/13 printed: 08/20/13 by jl H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-DE.dwg


ORNAMENTAL PARKING LOT TREE TYP.
•Betula alleghaniensis
LOAM & SEED SEED MIX 3
BIORETENTION #6
BIORETENTION TYP.
•Juncus effusus
•Lobelia cardinalis
•Panicum virgatum
100-FT BUFFER
PARKING LOT ISLAND TYP.
•Amsonia tabernaemontana
•Echinacea pallida
•Sporobolus heterolepis
BIORETENTION #5
LOAM & SEED SEED MIX 1
UNDERGROUND RECHARGE FIELD
PARKING LOT TREE TYP.
•Acer rubrum
•Quercus rubra
•Liquidambar styraciflua
LOAM & SEED SEED MIX 1
WASHED PEA STONE AROUND ALL BUILDINGS (18" MIN., 24" TYP.)
LOAM & SEED SEED MIX 3
EMERGENCY ACCESS WAY (GRASSPAVE)
ORNAMENTAL TREE TYP.
• Amelanchier canadensis
• Betula alleghaniensis
• Cornus florida
ENTRY PLANTINGS TYP.
•Aronia melanocarpa
•Betula alleghaniensis
•Hamamelis virginiana
FOUNDATION PLANTINGS TYP.
•Hydrangea species
•Kalmia latifolia
•Leucothoe fontanesiana
BIORETENTION #4
LOAM AND SEED SEED MIX 2
LOAM & SEED SEED MIX 1
PATIO AREA PERVIOUS PAVERS
UNDERGROUND RECHARGE FIELD
ENTRY PERENNIALS TYP.
•Coreopsis verticillata
•Rudbeckia fulgida
•Sporobolus heterolepis
BIORETENTION #1
LOAM & SEED SEED MIX 3
BIORETENTION TYP.
• Juncus effusus
• Lobelia cardinalis
• Panicum virgatum
PATIO PLANTING TYP.
•Nyssa sylvatica
•Heuchera americana
•Osmunda cinnamomea
•Polygonatum biflorum
VEGETATED SWALE SEED MIX 2
LOAM & SEED SEED MIX 1
EDGE OF BRUSH
ENTRY PERENNIALS TYP.
•Baptisia australis
•Geranium maculatum
•Sporobolus heterolepis
LOAM & SEED SEED MIX 1
BIORETENTION TYP.
•Juncus effusus
•Lobelia cardinalis
•Panicum virgatum
BIORETENTION #3
LOAM & SEED SEED MIX 3
PARKING LOT TREE TYP.
• Acer rubrum
•Quercus rubra
•Liquidambar styraciflua
PATIO AREA PERVIOUS PAVERS
FOUNDATION PLANTINGS TYP.
•Hydrangea species
•Ilex glabra
•Viburnum species
UNDERGROUND RECHARGE FIELD
LOAM & SEED SEED MIX 3
EDGE OF BRUSH
LOAM & SEED SEED MIX 1
WASHED PEA STONE AROUND ALL BUILDINGS (18" MIN., 24" TYP.)
STREET TREE TYP.
•Quercus Rubra
•Acer rubrum
(ALONG PROPERTY LINE)
TOWN OF ASHLAND
13.4± AC.
583,425± S.F.
DENSE TREES
ROCK
BOULDERS
EDGE OF WOODS
EDGE OF WOODS
BIT. SIDEWALK
BIT. CONC. DRIVE
GRADY
N/F JOHN J. & JENNIFER R. CROWLEY
#76
#72
#66
#60
#56
N/F VISHNUBHOTLA & PADMA GULUR N.
N/F S. CHOUDRY & N. SREENIVASAN
N/F A. ARUKAMMAVARS SWATI ARVIND
N/F BRUCE R. LAQUERRA & EILEEN T. ALLISON
N/F PULTE HOMES CORP. OF N.E. & OREGON HEIGHTS HOMEOWNERS ASSOCIATION
S/D ROBERT HILL WAY
S/D ASHLAND HEIGHTS
S/D ASHLAND HEIGHTS
S/D ASHLAND HEIGHTS

GENERAL PLANTING NOTES:

1. THE FOLLOWING NOTES ARE PROVIDED AS GENERAL PLANTING GUIDELINES ONLY. THOROUGHLY REVIEW THE PROJECT SPECIFICATIONS FOR ALL LANDSCAPE REQUIREMENTS PRIOR TO THE COMMENCEMENT OF ANY LANDSCAPE WORK. SUBMIT IN WRITING TO THE LANDSCAPE ARCHITECT ANY QUESTIONS OR CLARIFICATIONS REQUIRED AT A MINIMUM OF 30 DAYS PRIOR TO ORDERING ANY MATERIALS OR BEGINNING ANY LANDSCAPE CONSTRUCTION.
2. SUBMIT TO THE LANDSCAPE ARCHITECT FOR REVIEW AND APPROVAL ALL REQUIRED LANDSCAPE SUBMITTALS AS DESCRIBED IN THE SPECIFICATIONS INCLUDING A PLANT LIST WITH PLANT SIZE AND QUANTITIES TO BE ORDERED PRIOR TO DELIVERY TO THE PROJECT SITE.)
3. FURNISH AND INSTALL ALL PLANTS AS SHOWN ON THE DRAWINGS AND IN THE SIZE AND QUANTITIES SPECIFIED ON THE PLANTING SCHEDULE. PLANT SUBSTITUTION SELECTION MUST BE APPROVED BY BIOLOGIST OR LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
4. ALL PLANTS TO COMPLY WITH APPLICABLE REQUIREMENTS OF ANSI Z60.1 "AMERICAN STANDARD FOR NURSERY STOCK." LATEST EDITION, PUBLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION INC.
5. PLANTS TO BE GROWN UNDER CLIMATIC CONDITIONS SIMILAR TO THOSE IN THE LOCALITY OF THE PROJECT FOR AT LEAST TWO (2) YEARS. USE HEALTHY NURSERY GROWN PLANS, FREE OF DISEASE, INSECTS, AND PESTS. EGGS OR LARVAE, AND HAVE A WELL DEVELOPED ROOT SYSTEM.
6. INSTALL PLANTS WITHIN ONE (1) WEEK OF PURCHASE. IF PLANTS ARE TO BE STORED AT THE SITE PRIOR TO PLANTING, IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THEY ARE PROPERLY MAINTAINED, WATERED, AND REMAIN HEALTHY.
7. PROCEED WITH PLANTING ONLY WHEN EXISTING AND FORECASTED WEATHER CONDITIONS PERMIT. SUBMIT TO THE LANDSCAPE ARCHITECT IN WRITING THE PROPOSED PLANTING SCHEDULE. OBTAIN APPROVAL OF PLANTING SCHEDULE FROM THE LANDSCAPE ARCHITECT PRIOR TO PERFORMING ANY WORK.
8. SEASONS FOR PLANTING:

SPRING:	DECIDUOUS:	APRIL 1 TO JUNE 15
	EVERGREEN:	APRIL 1 TO JUNE 15
	PERENNIALS:	APRIL 15 TO JUNE 1
	GROUNDCOVERS:	APRIL 15 TO JUNE 1
FALL:	DECIDUOUS:	SEPTEMBER 15 TO NOVEMBER 15
	EVERGREEN:	SEPTEMBER 15 TO NOVEMBER 15
	PERENNIALS:	SEPTEMBER 15 TO NOVEMBER 15
	GROUNDCOVERS:	SEPTEMBER 15 TO NOVEMBER 15
LIVE STAKES:	PLANTS WHILE DORMANT FROM DECEMBER 1ST THROUGH MARCH 31ST	

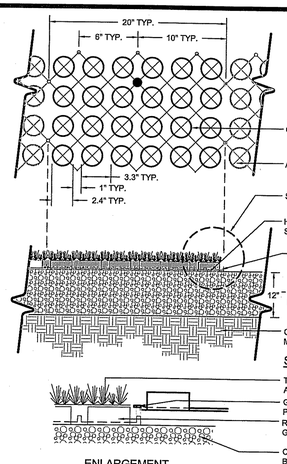
9. PLANTING UNDER FROZEN CONDITIONS IN EITHER THE SPRING OR FALL WILL NOT BE PERMITTED. PLANTING BEFORE OR AFTER THE ABOVE REFERENCED PLANTING DATES WILL INCREASE THE LIKELIHOOD OF PLANT OR GRASS SEED ESTABLISHMENT FAILURE. ANY DEVIATION FROM THE ABOVE REFERENCED PLANTING DATES IS UNDERTAKEN AT SOLE RISK OF THE CONTRACTOR AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ANY ADDITIONAL MAINTENANCE AND WATERING WHICH MAY BE REQUIRED TO ENSURE SATISFACTORY PLANT AND SEED ESTABLISHMENT.
10. FURNISH ONE YEAR MANUFACTURER WARRANTY FOR TREES, PLANTS, AND GROUND COVER AGAINST DEFECTS INCLUDING DEATH AND UNSATISFACTORY GROWTH, EXCEPT FOR DEFECTS RESULTING FROM LACK OF ADEQUATE MAINTENANCE, NEGLECT, OR ABUSE BY OWNER, OR ABNORMAL WEATHER CONDITIONS UNUSUAL FOR WARRANTY PERIOD. THE DATE OF FINAL ACCEPTANCE OF ALL COMPLETED PLANTING WORK ESTABLISHES THE END OF INSTALLATION AND INITIAL MAINTENANCE PERIOD AND THE COMMENCEMENT OF THE GUARANTEE PERIOD.
11. ALL TREES WITHIN 5'-0" OF WALKWAYS AND SIDEWALKS TO HAVE A 6'-8" STANDARD BRANCHING HEIGHT.
12. INSPECT ALL AREAS TO BE PLANTED OR SEEDED PRIOR TO STARTING ANY LANDSCAPE WORK. REPORT ANY DEFECTS SUCH AS INCORRECT GRADING, INCORRECT SUBGRADE ELEVATIONS OR DRAINAGE PROBLEMS, ETC. TO THE LANDSCAPE ARCHITECT AND ENGINEER PRIOR TO BEGINNING WORK. COMMENCEMENT OF WORK INDICATES ACCEPTANCE OF SUBGRADE AREAS TO BE PLANTED, AND THE LANDSCAPE CONTRACTOR ASSUMES RESPONSIBILITY FOR ALL LANDSCAPE WORK.
13. PROVIDE PROPER PREPARATION OF ALL PROPOSED PLANTED AND SEEDED AREAS PER THE NOTES AND SPECIFICATIONS.
14. ALL PLANT LAYOUT AND ACTUAL PLANTING LOCATIONS ARE TO BE FIELD VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO PLANTING. NOTIFY THE LANDSCAPE ARCHITECT AT A MINIMUM OF 48 HOURS IN ADVANCE PRIOR TO SCHEDULING ANY FIELD INSPECTIONS.
15. BALL AND BURLAP: REMOVE BURLAP AND WIRE BASKETS FROM TOPS OF BALLS AND FROM TOP HALF OF ROOTBALL AS INDICATED ON DRAWINGS. REMOVE PALLETS, IF ANY, BEFORE SETTING.
16. POTTED PLANTS: REMOVE THE PLANT FROM THE POT AND LOOSEN OR SCORE THE ROOTS BEFORE PLANTING TO PROMOTE OUTWARDS ROOT GROWTH INTO THE SOIL.
17. PLUGS: PLANT UPRIGHT AND NOT AT AN ANGLE. DIG PLANTING HOLES LARGE ENOUGH AND DEEP ENOUGH TO ACCOMMODATE THE ENTIRE ROOT MASS. PLANT PLUGS WITH NO TWISTED OR BALLED ROOTS AND WITH NO ROOTS EXPOSED ABOVE THE GRADE LINE. HAND PACK THE SOIL AROUND THE ENTIRE PLUG ROOT MASS.
18. DIG THE THE PLANTING HOLE TO THE SAME DEPTH AS THE ROOT BALL AND TWO TO THREE TIMES WIDER. SCORE ALL SIDES OF THE HOLE, PLACE THE PLANT IN THE HOLE SO THE TOP OF ROOT BALL IS EVEN WITH SOIL SURFACE. FILL THE HOLE HALFWAY AND THEN ADD WATER ALLOWING IT TO SEEP INTO BACK FILLED MATERIAL. BE SURE TO REMOVE ALL AIR POCKETS FROM BM BACK FILLED SOIL. DO NOT SPREAD SOIL ON TOP OF THE ROOTBALL. IF SOIL IS EXTREMELY POOR, REPLACE BACK FILL WITH GOOD QUALITY TOP SOIL. AMEND THE SOIL, AS NECESSARY.
19. CREATE A 2" TO 4" BERM AROUND THE EDGE OF PLANTING HOLE WITH REMAINING SOIL TO RETAIN WATER.
20. REMOVE ALL PLANT TAGS AND FLAGS FROM THE PLANTS.
21. MULCH ALL PLANTING BEDS AS INDICATED ON DRAWINGS. UNLESS NOTED OTHERWISE, ALL PLANTS TO RECEIVE 2-3 INCHES OF MULCH. DO NOT PILE OR MOUND MULCH AROUND THE PLANT STEMS OR TRUNK.
22. TRIM BROKEN AND DEAD BRANCHES FROM TREES AND SHRUBS AFTER PLANTING. NEVER CUT A LEADER.

GENERAL SEEDING NOTES:

1. SEND A REPRESENTATIVE SAMPLE OF THE TOPSOIL TO A TESTING LABORATORY FOR STANDARD SOIL ANALYSIS AS DESCRIBED IN THE SPECIFICATIONS. SUBMIT TO THE LANDSCAPE ARCHITECT AND ENGINEER TEST RESULTS WITH RECOMMENDED SOIL TREATMENTS TO PROMOTE PLANT AND GRASS GROWTH. CORRECT DEFICIENCIES IN THE LOAM AND STOCKPILED TOPSOIL AS DIRECTED BY THE TESTING AGENCY.
2. ALL AREAS THAT ARE DISTURBED AND/OR GRADED DURING CONSTRUCTION ARE TO BE BROUGHT TO FINISHED GRADE WITH AT LEAST 4" MINIMUM DEPTH OF GOOD QUALITY LOAM AND SEEDED WITH A QUICK GERMINATING GRASS SEED SUCH AS NEW ENGLAND EROSION CONTROL RESTORATION MIX OR AS SPECIFIED ON THE PLANS.
3. PRIOR TO THE PLACEMENT OF TOP SOIL, LOOSEN THE SUBGRADE OF ALL PROPOSED SEEDED AREAS TO A DEPTH OF 6" AND RAKE TO REMOVE STONES LARGER THAN 1 INCH, STICKS, ROOTS, RUBBISH AND OTHER EXTRANEOUS MATTER AND LEGALLY DISPOSE TO AN OFF SITE LOCATION.
4. DO NOT SPREAD TOPSOIL IF THE SUBGRADE IS FROZEN, EXCESSIVELY WET, COMPACTED OR NOT PROPERLY PREPARED PER THE NOTES AND SPECIFICATIONS.

WATERING NOTES:

1. PROVIDE PROPER PLANT CARE, MAINTENANCE AND WATERING ON SITE UNTIL SUCH TIME AS THE LANDSCAPING IS ACCEPTED BY THE PROPERTY OWNER AS SATISFACTORY PER THE SPECIFICATIONS OR AS DETERMINED BY ANY WRITTEN AGREEMENTS BETWEEN THE CONTRACTOR AND PROPERTY OWNER.
2. ESTABLISH AN APPROPRIATE WATERING SCHEDULE FOR ALL PLANT MATERIAL BASED UPON PLANT SPECIES REQUIREMENTS AND PROVIDE IN WRITING TO THE LANDSCAPE ARCHITECT AND OWNER FOR REVIEW AND APPROVAL. ADHERE TO THE APPROVED SCHEDULE UNTIL PLANTS ARE FULLY ESTABLISHED.
3. AT A MINIMUM THE NEWLY SEEDED AND/OR HYDROSEEDED LAWNS SHOULD BE WATERED 2-3 TIMES A DAY. SPECIAL CARE SHOULD BE TAKEN TO ENSURE THAT THE LAWN IS NOT SATURATED DURING WATERING. IF AN IRRIGATION SYSTEM IS NOT PROVIDED, A TEMPORARY IRRIGATION SYSTEM OR HANDHELD GARDEN HOSE SHALL BE USED FOR WATERING SEEDED AREAS. THE AREA MUST BE MAINTAINED CONSISTENTLY MOIST FOR THE BEST GERMINATION RESULTS. ADDITIONAL WATERING WILL BE REQUIRED IF PLANTING AND SEEDING OCCUR OUTSIDE OF THE RECOMMENDED PLANTING SEASONS.



SPECIFICATIONS
1. UNIT SIZE - 20" x 20" x 1"
2. STRENGTH - 5720 PSI
3. COLOR - BLACK (STANDARD)
4. UNIT WEIGHT - 18 OZ. OR 4.5 POUNDS
5. RESIN - 100% POST-CONSUMER RECYCLED HDPE/LDPE

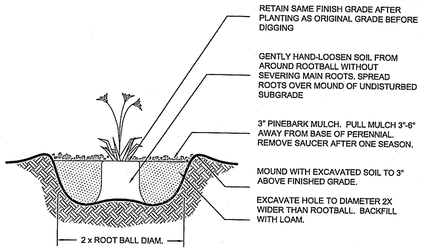
PLAN
GRASSPAVE SQUARES
ADJACENT GRASSPAVE SQUARES

ENLARGEMENT

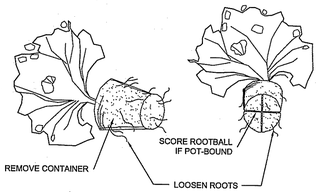
NOTES:
1. GRASS PAVERS SHALL BE MANUFACTURED BY GRASSPAVE OR AN ENGINEER APPROVED EQUAL.
2. GRASS/PLANT TYPES SHALL BE SPECIFIED BY A LANDSCAPE ARCHITECT OR LANDSCAPE DESIGNER
3. SANDY GRAVEL ROAD BASE MATERIAL SHALL PASS THE FOLLOWING SIEVE ANALYSIS:

% PASSING	SIEVE SIZE
100	3/4"
85	3/8"
60	#4
30	#40
<3	#200

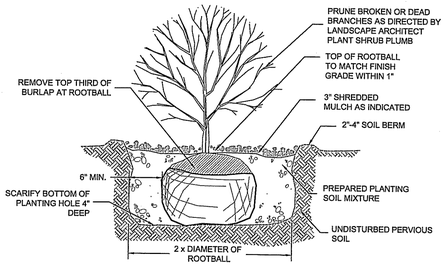
GRASS PAVER ACCESS WAY DETAIL
NOT TO SCALE



PERENNIAL PLANTING DETAIL
NOT TO SCALE



CONTAINER PLANT ROOTBALL TREATMENT
NOT TO SCALE



SHRUB PLANTING DETAIL
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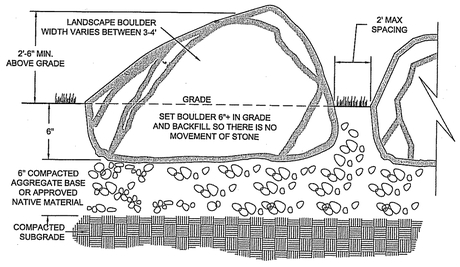
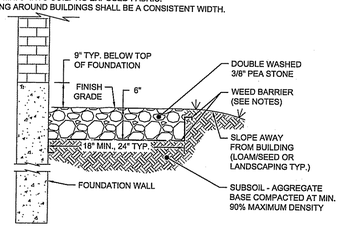
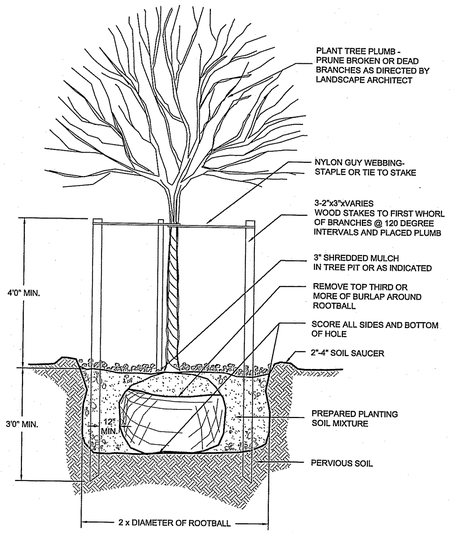


BOULDER BARRIER SET IN GRADE
NOT TO SCALE

NOTES:
1. WEED BARRIER SHALL BE TENCATE NICOLON GROUNDCOVER FABRIC OR EQUAL.
2. ANCHOR FABRIC MN. 6" INTO SOIL. NO EXPOSED FABRIC.
3. STONE SURFACING AROUND BUILDINGS SHALL BE A CONSISTENT WIDTH.

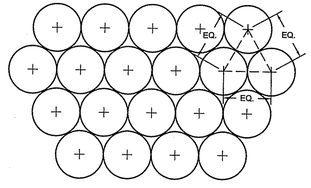


SURFACE TREATMENT SURROUNDING BUILDINGS DETAIL
NOT TO SCALE



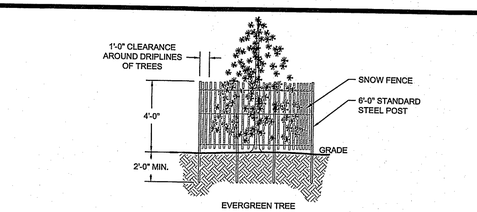
TREE PLANTING DETAIL
NOT TO SCALE

EVERGREEN TREE PLANTING DETAIL
NOT TO SCALE



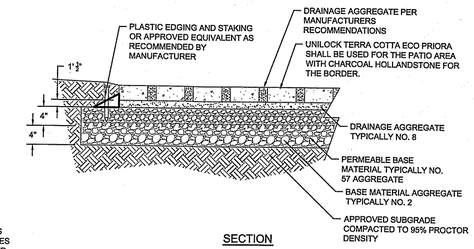
USE EQUIDISTANT TRIANGULAR SPACING FOR PLANTS - FOR ACTUAL SPACING SEE PLANS OR PLANTING SCHEDULE

PLANTING SPACING DETAIL
NOT TO SCALE

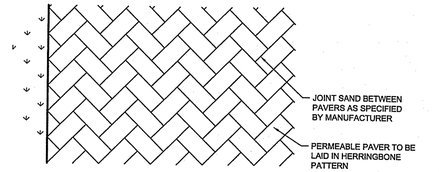


NOTES:
1. FENCING SHALL BE ORANGE RESINET SM60 BARRIER FENCE "SNOW FENCE" OR APPROVED EQUIVALENT.
2. POST SHALL BE HOT ROLLED RAIL STEEL AND FORMED INTO A "T". DIMENSIONS OF "T" POST SECTION, APPROXIMATELY 1 7/16" X 1 5/16" X 1/8" X 6' (SIX FEET) LONG. THE POST SHALL BE PAINTED GREEN OR GALVANIZED.
3. THE FENCING SHALL REMAIN IN PLACE UNTIL ALL EXCAVATION HAS BEEN COMPLETED AND THE SURFACE HAS BEEN RE-ESTABLISHED

TREE PROTECTION DETAIL
NOT TO SCALE



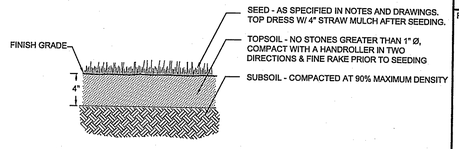
SECTION



PLAN VIEW

NOTES:
1. EXCAVATE ANY UNSUITABLE, UNSTABLE OR UNCONSOLIDATED MATERIAL FROM SUBGRADE.
2. COMPACT BASE TO 95% STANDARD PROCTOR DENSITY.
3. FILL ANY DEPRESSIONS IN BASE WITH BASE MATERIAL.
4. SCREEN BEDDING SAND LEVEL TO AN EVEN THICKNESS OF 1 TO 1½ INCHES.
5. PAVER COLOR AND PATTERN TO BE DETERMINED BY THE OWNER.

PERMEABLE PAVERS DETAIL
NOT TO SCALE



LOAM AND SEED DETAIL
NOT TO SCALE

Revisions

No.	Date	Rev.	By	Description
1	07/31/13		MJC	JEL PEER REVIEW COMMENTS
2				
3				
4				
5				
6				

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Drawn By: MC
Designed By: MCJL
Date: JUNE 12, 2013

Plan Set: ASHLAND AFFORDABLE HOUSING
ROBERT HILL WAY
ASHLAND, MASSACHUSETTS

Plan Title: LANDSCAPE DETAILS

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Date: October 27, 2003

Registration:
COMMONWEALTH OF MASSACHUSETTS
FAT PIU LEE
CIVIL
No. 42824
REGISTERED PROFESSIONAL ENGINEER
8/1/13

Project Number: 12097
Sheet: 17 of 17
Sheet Number: C - 17

last modified: 07/31/13 printed: 07/31/13 by mc H:\Projects\2012\12097 EA Fish Ashland\Drawings - 12097\12097-LA.dwg