TOWN OF COLCHESTER
MOREHOUSE BROOK CULVERT
MALLETTS BAY AVENUE

ISSUED FOR CONSTRUCTION
APRIL 21, 2016

LIST OF DRAWINGS

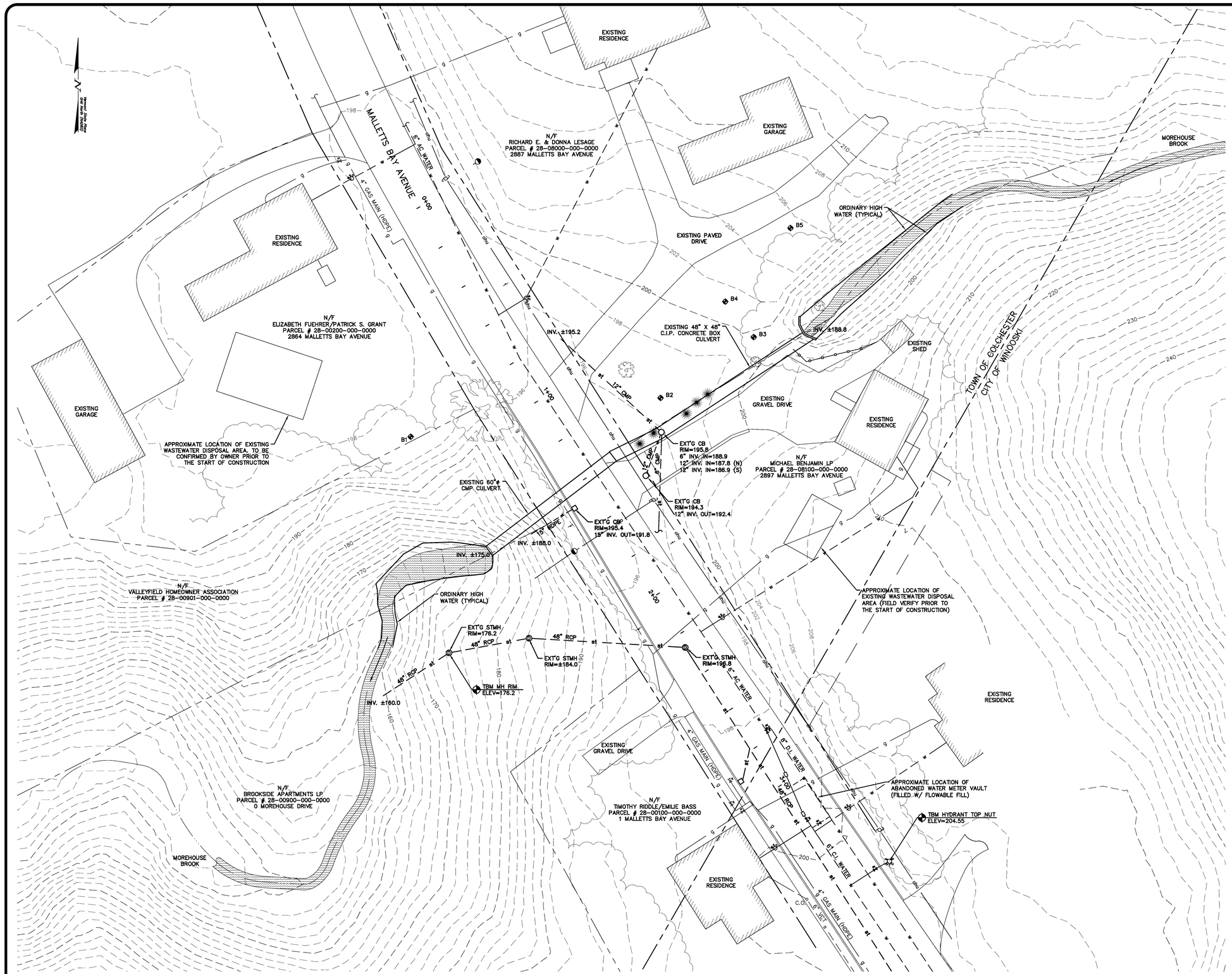
C-1.....EXISTING CONDITIONS PLAN
C-2.....SITE PLAN
C-3.....PROFILE & SECTION
C-4.....GRADING & LAYOUT PLAN
C-5.....SITE DETAILS
C-6.....EPSC DETAILS
C-7.....SOIL BORING LOGS
C-8.....SITE SPECIFICATIONS
C-9.....SITE SPECIFICATIONS
T-1.....TRAFFIC CONTROL NOTES & DETAILS
T-2.....TRAFFIC CONTROL PLAN

OWNER

TOWN OF COLCHESTER
DEPARTMENT OF PUBLIC WORKS
781 BLAKELY ROAD, P.O. BOX 55
COLCHESTER, VERMONT 05446
CONTACT: BRYAN K. OSBORNE, DIRECTOR
(802) 264-5625
CONTACT: KEVIN McALEER, PROJECT MANAGER
(802) 264-5639

CIVIL ENGINEER

CHAMPLAIN CONSULTING ENGINEERS
85 PRIM ROAD
P.O. BOX 453
COLCHESTER, VERMONT 05446
CONTACT: GREGORY J. BOMBARDIER, P.E.
(802) 863-8060



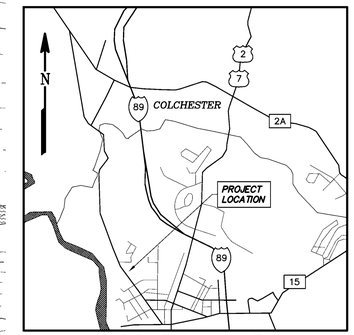
1 C-1 EXISTING CONDITIONS PLAN

SCALE 1" = 20'

Graphic Scale

20 0 20 40 60 80 feet

THIS TOPOGRAPHIC SURVEY WAS CONDUCTED WITHOUT THE BENEFIT OF "DIG SAFE" MARKINGS. UTILITIES SHOWN ARE NOT WARRANTED TO BE EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT "DIG SAFE" AT 1-888-344-7233 BEFORE COMMENCING ANY WORK AND SHALL PRESERVE EXISTING UTILITIES WHICH ARE NOT PART OF THE DEMOLITION PLAN.



LOCATION MAP

N.T.S.

DESIGN SUMMARY:

1. PROJECT DESCRIPTION:

MOREHOUSE BROOK CULVERT REPLACEMENT AT THE MALLETTS BAY AVENUE CROSSING.

2. PROJECT CONTACTS:

OWNER: TOWN OF COLCHESTER
DEPARTMENT OF PUBLIC WORKS
P.O. BOX 55
COLCHESTER, VT 05446
CONTACT: KEVIN McALEER, PROJECT MANAGER
(802) 264-5639

CIVIL ENGINEER: CHAMPLAIN CONSULTING ENGINEERS
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COLCHESTER, VERMONT 05446
CONTACT: GREGORY J. BOMBARDIER, P.E.
(802) 863-8060

GENERAL NOTES:

1. **PRIOR TO COMMENCING SITE WORK, THE GENERAL CONTRACTOR SHALL VERIFY EXISTING FIELD CONDITIONS.** THE PROJECT ENGINEER SHALL BE NOTIFIED IMMEDIATELY WHERE DISCREPANCIES EXIST BETWEEN THE PROJECT DRAWINGS AND ACTUAL FIELD CONDITIONS.

2. THE GENERAL CONTRACTOR SHALL CONTACT DIG SAFE (811 OR 1-888-344-7233), CHAMPLAIN WATER DISTRICT & ALL OTHER POSSIBLE NON-DIG SAFE UTILITY OWNERS, SEVENTY TWO HOURS PRIOR TO ANY EXCAVATION TO ACCURATELY ESTABLISH THE LOCATION OF ALL UNDERGROUND UTILITIES ON THE PROJECT SITE.

3. **ALL PROJECT RELATED COORDINATION & SCHEDULING WITH ALL AFFECTED UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.**

4. WHERE DIMENSIONS ON THE PROJECT DRAWINGS ARE UNCLEAR, CONTACT THE PROJECT ENGINEER IMMEDIATELY FOR CLARIFICATION.

5. IT IS THE GENERAL CONTRACTORS RESPONSIBILITY TO ENSURE THAT THE PROJECT DRAWINGS REFLECT THE LATEST REVISIONS.

PROJECT NOTES:

1. RIGHT-OF-WAY & PROPERTY LINES EXTRACTED FROM TOWN OF COLCHESTER TAX MAPS, THIS IS NOT A BOUNDARY SURVEY.

2. ANY EXISTING BOUNDARY MONUMENTATION DISTURBED BY CONSTRUCTION SHALL BE RESET IN THE SAME LOCATION FOUND.

3. UTILITIES ARE NOT WARRANTED TO BE COMPLETE OR EXACT (SEE GENERAL NOTE 2).

4. THE CONTRACTOR SHALL COORDINATE WITH ALL AFFECTED PROPERTY OWNERS WITH RESPECT TO SCHEDULING ETC.

5. THE CONTRACTOR SHALL ESTABLISH A COORDINATE BASELINE PRIOR TO CONSTRUCTION & MAINTAIN AS REQUIRED.

REFERENCE MAPS:

1. TOPOGRAPHIC SURVEY BY BRADFORD HOLDEN, L.S. DATED JANUARY 17, 2014, VERTICAL DATUM NAVD88 (GEOID12A), HORIZONTAL DATUM VT STATE PLANE, NAD83 (2011).

2. VERMONT DEPARTMENT OF TAXES, VERMONT MAPPING PROGRAM, ORTHOPHOTO #6096222 YEAR TAKEN 2004.

3. TOWN OF COLCHESTER TAX MAP OBTAINED FROM THE VERMONT CENTER FOR GEOGRAPHIC INFORMATION.

4. PLANS PROVIDED BY THE TOWN OF COLCHESTER:

- LANDS OF ALBERT SHEPPARD, SITE PLAN, SHEET 1, BY LAMOUREUX & STONE - DATED 05/25/89;

- WASTEWATER PLAN, SHEET 1, BY EARTHBOUND SERVICES DATED - 05/20/05;

- BROOKSIDE VILLAGE, LANDS OF H.V., 2007, INC. AND JOSEPH OLIO, SUBDIVISION AND BOUNDARY LINE ADJUSTMENT PLAT, SHEET 1, BY BUTTON PROFESSIONAL LAND SURVEYORS, PC - DATED 12/19/08;

- HOUSING VERMONT, BROOKSIDE VILLAGE, FINAL PLAN, SHEET 1, BY O'LEARY-BURKE ASSOCIATES, PLC - DATED 06/02/08;

- HOUSING VERMONT, BROOKSIDE VILLAGE, PLAN & PROFILE, SHEET C2, BY O'LEARY-BURKE ASSOCIATES, PLC - DATED 11/20/09.

5. NATURAL GAS PIPELINE PLANS & NATURAL GAS SERVICE RECORDS PROVIDED BY VERMONT GAS SYSTEMS, INC.

6. PARTIAL WATER INFORMATION PROVIDED BY CWD.

LEGEND

RIGHT OF WAY/TOWN LINE	
PROPERTY LINE	
EXISTING CONTOUR	210
EXISTING WATER	6" AC WATER w
EXISTING STORM SEWER	12" CMP st
EXISTING GAS	g
EXISTING SANITARY SEWER	s
EXISTING UTILITY POLE & OVERHEAD UTILITY LINES	ohu
EXISTING FENCE	
EXISTING ROADWAY/DRIVEWAY	
EXISTING MOREHOUSE BROOK	
EXISTING TREELINE	
EXISTING SIGN	
SOIL BORING LOCATION	BX

REVISION DATE & DESCRIPTION	BY

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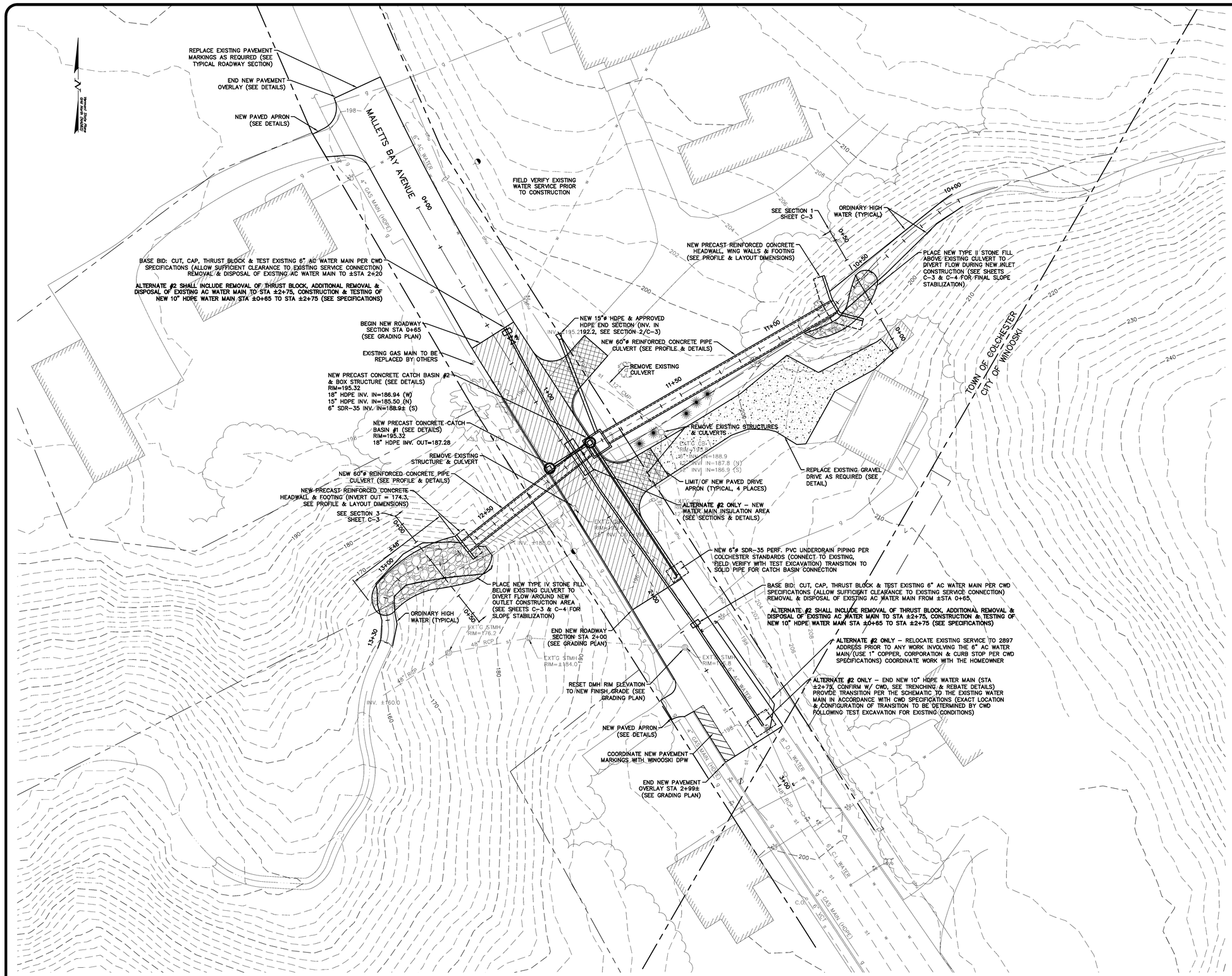
GREGORY J. BOMBARDIER
NO. 4496
REGISTERED PROFESSIONAL ENGINEER

TOWN OF COLCHESTER
MOREHOUSE BROOK CULVERT
MALLETTS BAY AVENUE
EXISTING CONDITIONS PLAN
COLCHESTER VERMONT

DRAWN	CCE
CHECKED	GJB
SCALE	1" = 20'
DATE	04/21/16
JOB NO.	13172
SHEET	C-1

OF 11 SHEETS



1 C-2 SITE PLAN
SCALE 1" = 20'

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CONSTRUCTION NOTES:

1. ALL PROJECT RELATED COORDINATION & SCHEDULING WITH ALL AFFECTED UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

2. THE WATER MAIN PORTION OF THIS PROJECT MAY BE CUT AND CAPPED DURING CULVERT CONSTRUCTION. SERVICES ON THE WINOOSKI SIDE OF THE CULVERT SHALL BE BACK FED FROM THE CITY OF WINOOSKI. ALL WATERLINE WORK SHALL BE COORDINATED DIRECTLY WITH CWD. PROVIDE TEMPORARY WATER MAIN CAPS & THRUST BLOCKS PER CWD & MAINTAIN THROUGHOUT CONSTRUCTION UNTIL NEW WATER MAIN SECTION IS COMPLETED.

3. EXISTING CULVERT SHALL REMAIN IN SERVICE DURING NEW CULVERT CONSTRUCTION AS A BYPASS, THE EXISTING FLOW THROUGH THE CULVERT SHALL NOT BE DIVERTED TO THE EXCAVATION DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE & MAINTAIN STONE LINED INLET & OUTLET CHANNELS WITH SEDIMENT CONTROL MEASURES PRIOR TO EXCAVATION.

4. FOLLOWING NEW CULVERT CONSTRUCTION & ESTABLISHMENT OF FLOW, CONSTRUCT FORMS (SEE SPECIFICATIONS) AS REQUIRED & FILL EXISTING CULVERT WITH FLOWABLE FILL (SEE SPECIFICATIONS). FORMS SHALL BE APPROVED BY THE TOWN PRIOR TO SCHEDULING PLACEMENT OF FILL. FILL PLACEMENT SHALL BE PHASED FROM OUTLET TO INLET IN SECTIONS NOT TO EXCEED 5' IN DEPTH. EACH SECTION SHALL BE ALLOWED TO CURE (48 HRS. MIN.) PRIOR TO PLACEMENT OF THE NEXT UPSTREAM SECTION UNTIL THE CULVERT IS FILLED. **THE CONTRACTOR SHALL CLOSELY MONITOR FORMS FOR DEFLECTION DURING FILL PLACEMENT & CURING. THE EXISTING CULVERT SHALL BE COMPLETELY FILLED, CURED & FORMS REMOVED PRIOR TO COMPLETING THE STONE FILL.**

5. ALL EXISTING OVERHEAD UTILITY POLES SHALL BE PROTECTED & MAINTAINED THROUGHOUT THE PROJECT.

6. ADJACENT PROPERTY OWNER'S ACCESS SHALL BE MAINTAINED TO THE EXTENT PRACTICAL THROUGHOUT THE PROJECT. ALL ACCESS LIMITATIONS SHALL BE COORDINATED WITH THE AFFECTED PROPERTY OWNERS 48 HOURS IN ADVANCE.

7. TREE CLEARING LIMITS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL REFER TO THE SITE CLEARING SPECIFICATION.

8. SEE GENERAL & PROJECT NOTES SHEET C-1.

9. CONTRACTOR SHALL NOT OBSTRUCT IN ANY WAY THE EXISTING RIDDLE DRIVEWAY.

LEGEND

RIGHT OF WAY/TOWN LINE	
PROPERTY LINE	
EXISTING CONTOUR	210
EXISTING WATER	6" AC WATER
EXISTING STORM SEWER	12" CMP
EXISTING GAS	g
EXISTING SANITARY SEWER	s
EXISTING UTILITY POLE & OVERHEAD UTILITY LINES	ohu
EXISTING FENCE	
EXISTING ROADWAY/DRIVEWAY	SEE SHEET C-1
EXISTING MOREHOUSE BROOK	SEE SHEET C-1
EXISTING TREELINE	
EXISTING SIGN	
SOIL BORING LOCATION	BX
NEW FULL SECTION ROADWAY	
NEW FULL SECTION DRIVEWAY APRON	
NEW PAVEMENT OVERLAY	
NEW GRAVEL DRIVEWAY	

REVISION DATE & DESCRIPTION	BY

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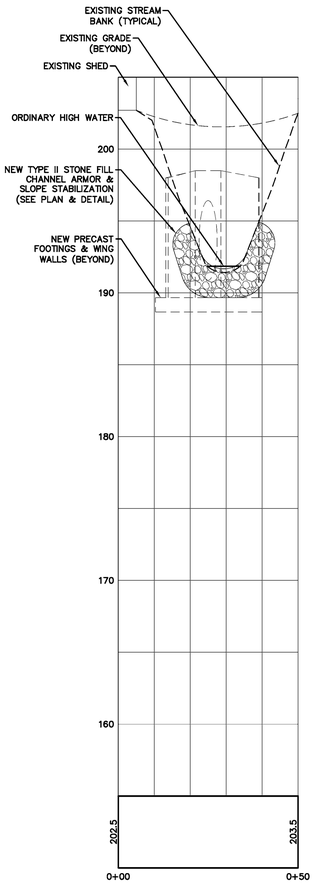
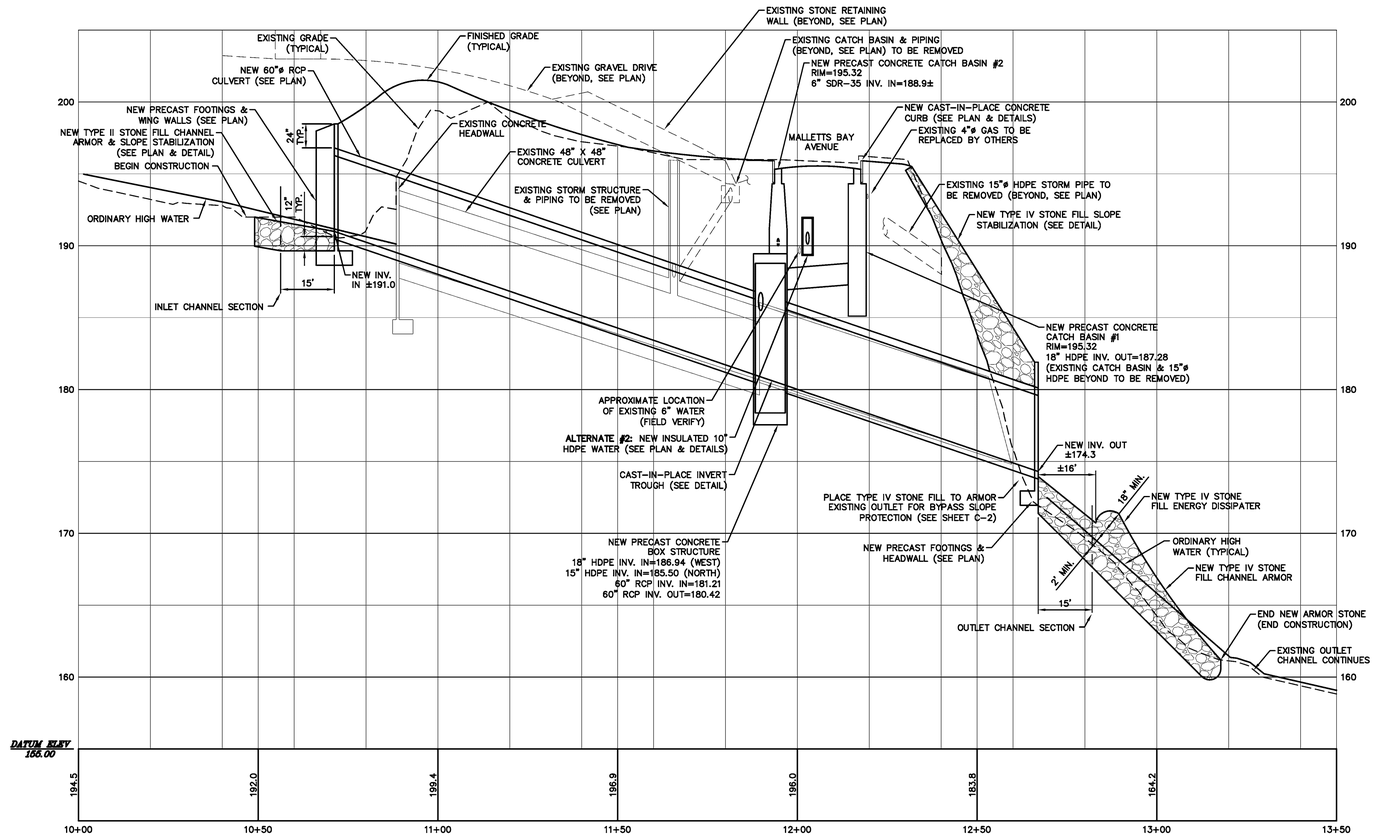
TOWN OF COLCHESTER
MOREHOUSE BROOK CULVERT
MALLETTS BAY AVENUE
SITE PLAN
COLCHESTER VERMONT

DRAWN	CCE
CHECKED	GJB
SCALE	1" = 20'
DATE	04/21/16
JOB NO.	13172
SHEET	C-2

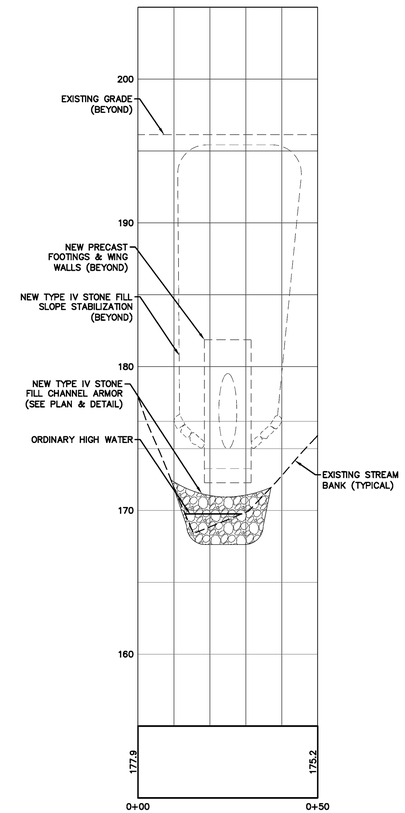
OF 11 SHEETS



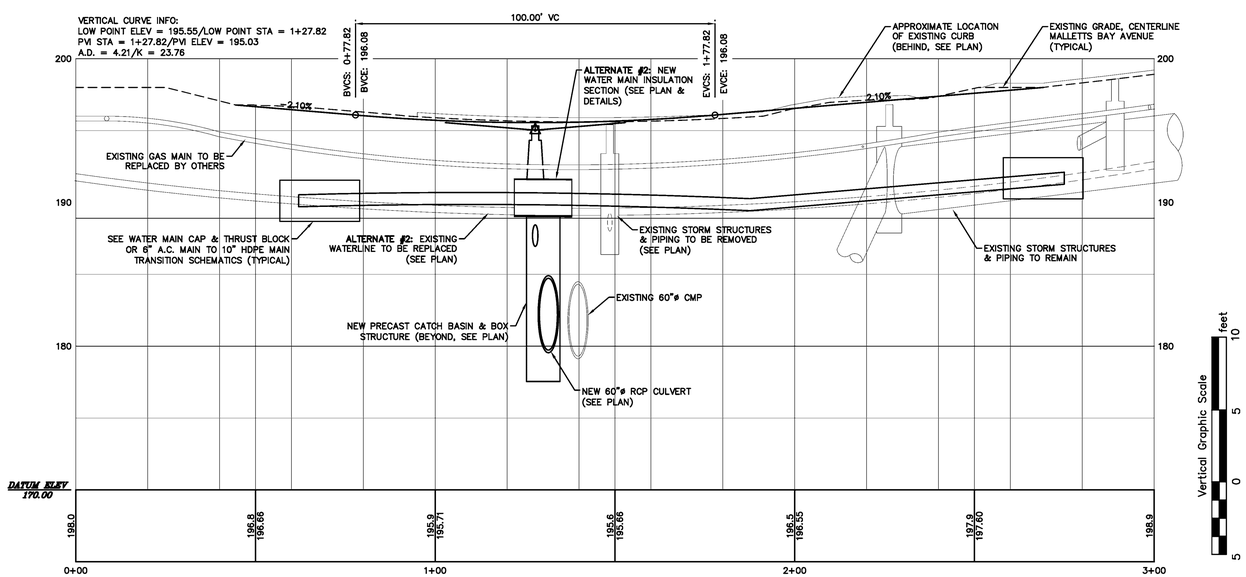
1 C-3 INLET SECTION (1)
SCALE: 1" = 20' HORIZ. – 1" = 5' VERT.



2 C-3 PROFILE
SCALE: 1" = 20' HORIZ. – 1" = 5' VERT.

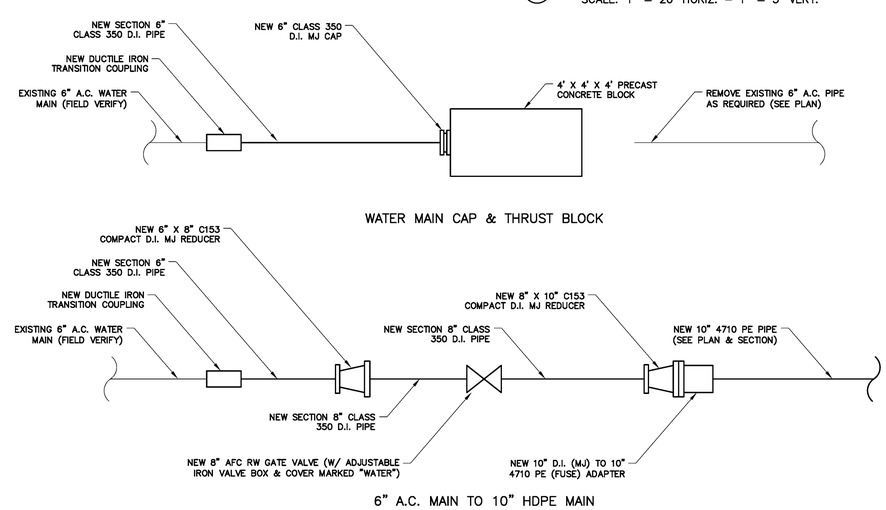


3 C-3 OUTLET SECTION (3)
SCALE: 1" = 20' HORIZ. – 1" = 5' VERT.



4 C-3 SECTION
SCALE: 1" = 20' HORIZ. – 1" = 5' VERT.

Horizontal Graphic Scale
20 0 20 40 feet



NOTES:

1. ALL WATER MAIN & SERVICE WORK SHALL BE COORDINATED WITH CWD & THE CITY OF WINOOSKI DEPT. OF PUBLIC WORKS.

2. ALL PIPE, FITTINGS, APPURTENANCES & ACCESSORIES USED SHALL BE BY APPROVED SUBMITTAL ONLY. REFER TO CWD SPECIFICATIONS, LATEST REVISION.

3. SEE SPECIFICATIONS.

5 C-3 WATER MAIN TRANSITION SCHEMATICS
N.T.S.

REVISION DATE & DESCRIPTION	BY

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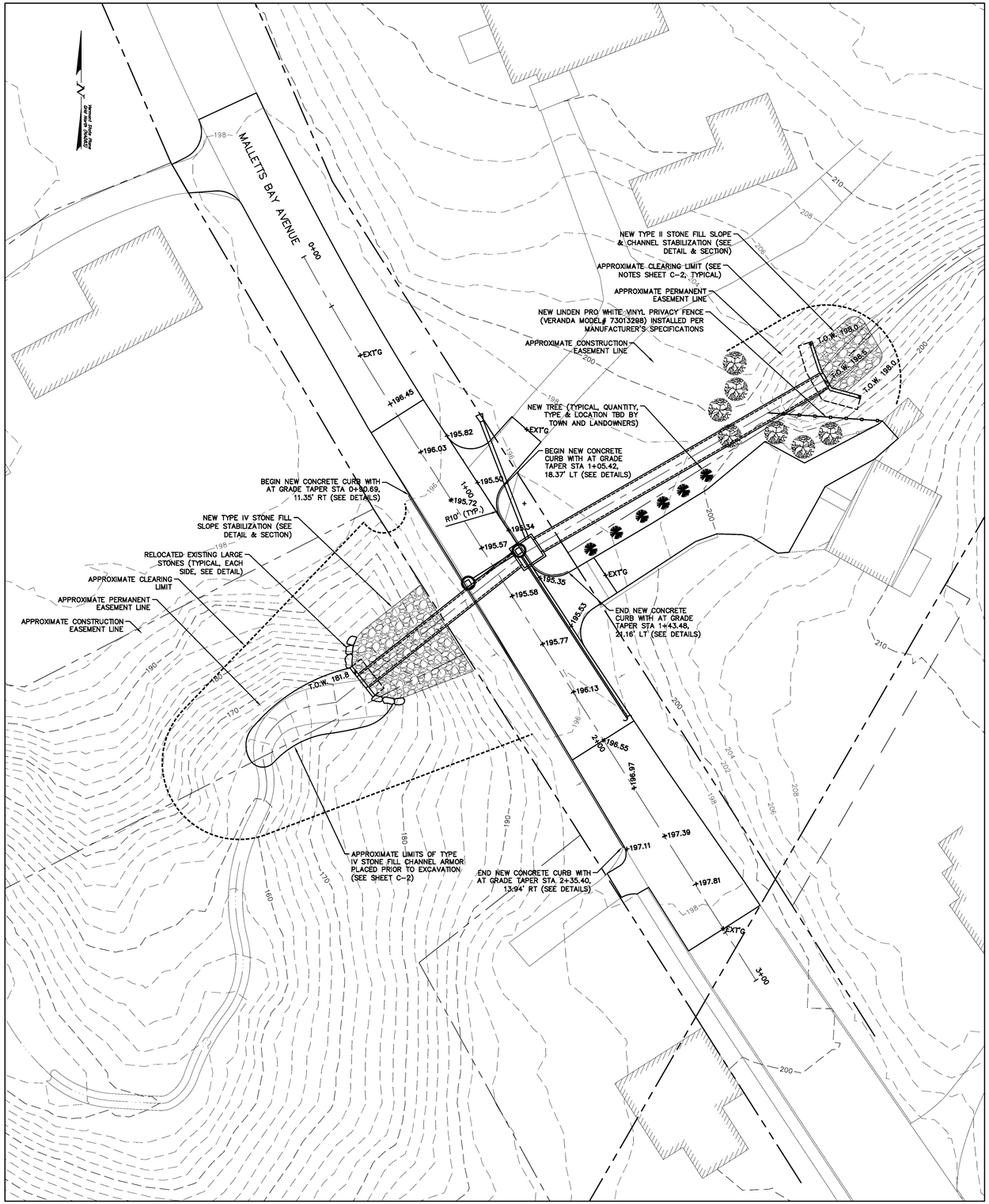
TOWN OF COLCHESTER
MOREHOUSE BROOK CULVERT
MALLETTS BAY AVENUE
PROFILE & SECTION
COLCHESTER VERMONT

DRAWN	CCE
CHECKED	GJB
SCALE	AS SHOWN
DATE	04/21/16
JOB NO.	13172
SHEET	C-3
OF	11 SHEETS



1 C-4 GRADING & LAYOUT PLAN

SCALE 1" = 20'

Graphic Scale

20 0 20 40 60 80 feet

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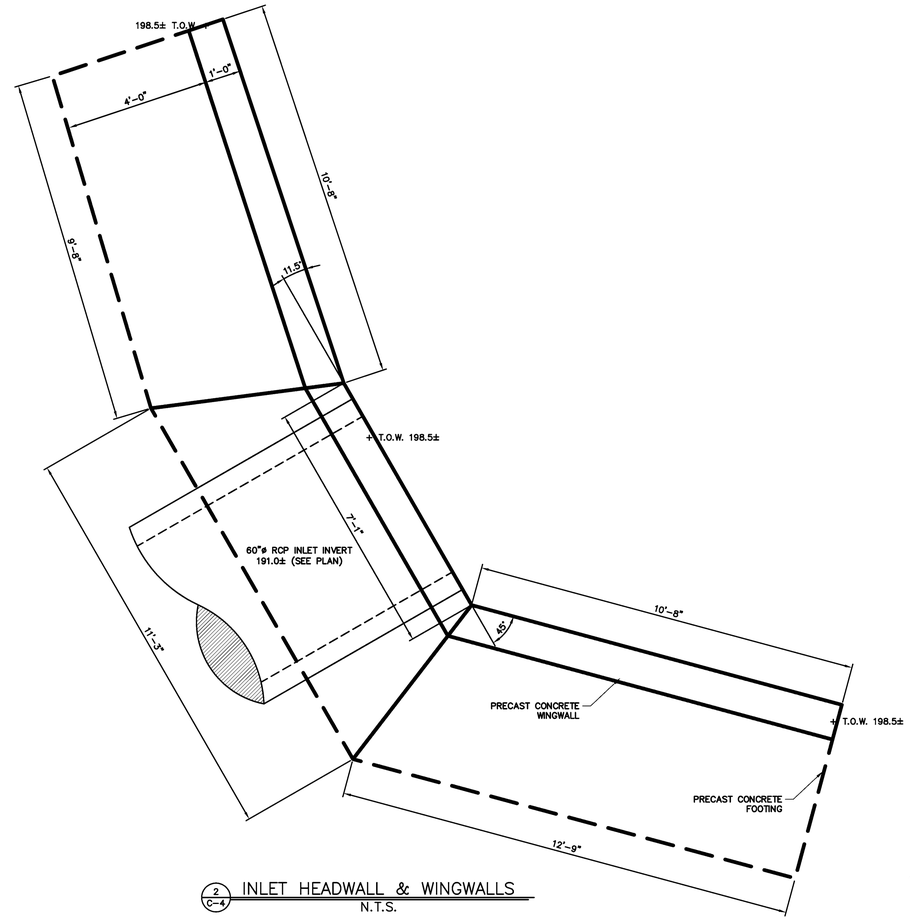


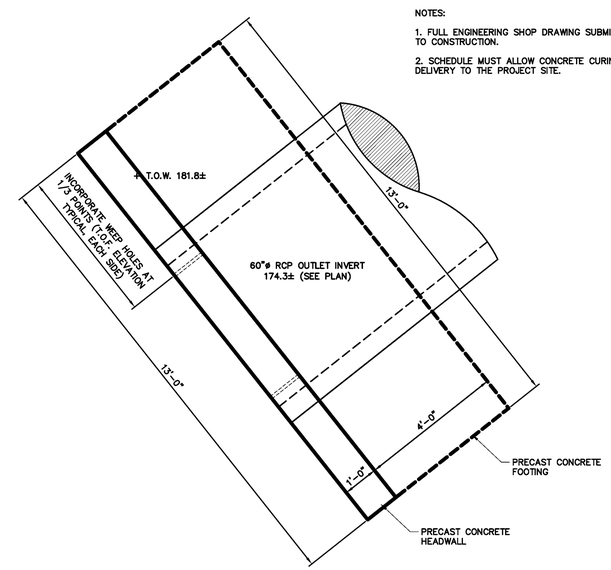
2 C-4 INLET HEADWALL & WINGWALLS

N.T.S.

NOTES:

1. FULL ENGINEERING SHOP DRAWING SUBMITTALS REQUIRED FOR REVIEW PRIOR TO CONSTRUCTION.

2. SCHEDULE MUST ALLOW CONCRETE CURING TO SPECIFIED STRENGTHS PRIOR TO DELIVERY TO THE PROJECT SITE.



3 C-4 OUTLET HEADWALL

N.T.S.

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GRADING & LAYOUT PLAN
COLCHESTER VERMONT

DRAWN	CCE
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SCALE	AS SHOWN
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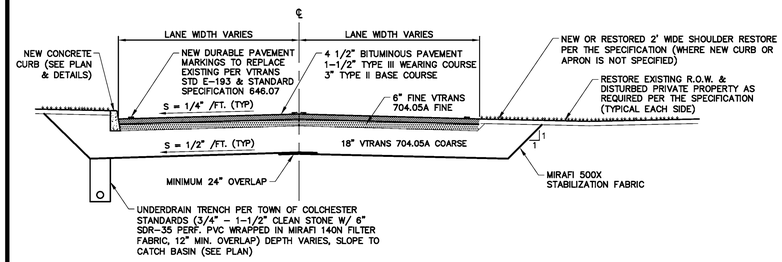
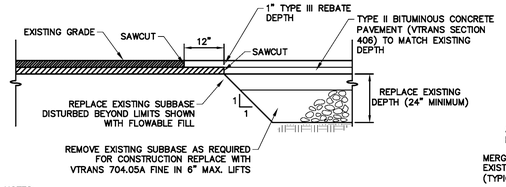
SHEET	C-4

OF 11 SHEETS



1 C-5 TYPICAL ROADWAY SECTION
N.T.S.



NOTES:

1. EXISTING PAVEMENT SHALL BE SAWCUT STRAIGHT & PLUMB (TYPICAL).

2. COAT SAWCUT WITH EMULSIFIED ASPHALT PRIOR TO PLACING PATCH MATERIAL PER SPECIFICATIONS.

3. ALL PAVEMENT SHALL HAVE A COMPACTED THICKNESS TO MATCH EXISTING.

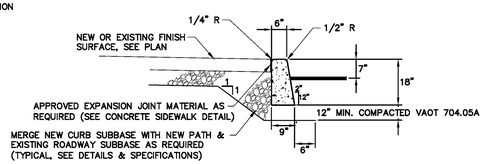
4. ALL EXISTING ROAD LINES WITHIN THE DISTURBED AREA SHALL BE REPLACED AS REQUIRED.

5. EXISTING PAVEMENT DAMAGED DURING CONSTRUCTION SUBSEQUENT TO INITIAL SAWCUTTING SHALL BE RECUT & PATCHED PER THE DETAIL.

6. REBATE FOLLOWING TRENCHING FOR NEW WATER MAIN (ALTERNATE #2) BEYOND STA ±2+00 (SEE PLAN) SHALL OMIT THE WEARING COURSE. PROVIDE COMPACTED TYPE II BASE COURSE FLUSH TO THE ADJACENT EXISTING PAVEMENT TO BE OVERLAYED.

7. SEE SPECIFICATIONS.

2 C-5 TYPICAL SAWCUT/REBATE SECTION
N.T.S.



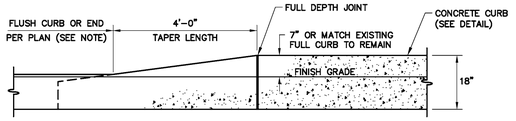
NOTES:
1. NEW CURB CONCRETE SHALL BE 4000 PSI.

2. ALL EXPOSED CONCRETE SURFACES SHALL RECEIVE TWO COATS OF AN APPROVED ANTISPALLING/CURING COMPOUND.

3. EXPANSION JOINTS SHALL BE CONSTRUCTED EVERY 20' & WHERE NEW TAPER ABUTS AN EXISTING FULL CURB SECTION.

4. SEE SPECIFICATIONS.

3 C-5 CONCRETE CURB TYPICAL SECTION
N.T.S.



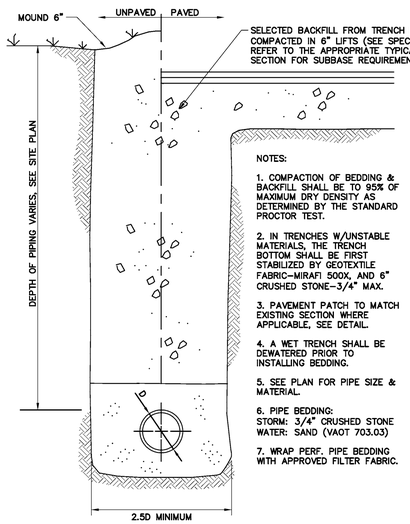
NOTES:

1. TAPERS TO FLUSH CURB SHALL HAVE NO VERTICAL REVEAL.

2. TAPERS CONSTRUCTED AT THE END OF LENGTHS OF NEW OR EXISTING CURB SHALL TERMINATE 1" BELOW GRADE WITH A 1/2" RADIUS.

3. SEE SPECIFICATIONS.

4 C-5 TYPICAL CURB TAPER
N.T.S.



NOTES:

1. COMPACTION OF BEDDING & BACKFILL SHALL BE TO 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST.

2. IN TRENCHES W/UNSTABLE MATERIALS, THE TRENCH BOTTOM SHALL BE FIRST STABILIZED BY GEOTEXTILE FABRIC–MIRAFI 500X, AND 6" CRUSHED STONE–3/4" MAX.

3. PAVEMENT PATCH TO MATCH EXISTING SECTION WHERE APPLICABLE, SEE DETAIL.

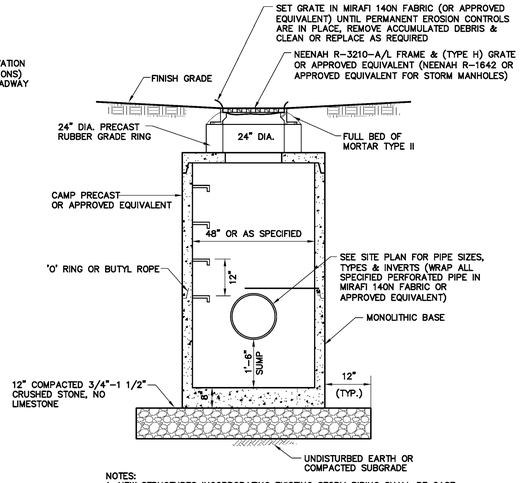
4. A WET TRENCH SHALL BE DEWATERED PRIOR TO INSTALLING BEDDING.

5. SEE PLAN FOR PIPE SIZE & MATERIAL.

6. PIPE BEDDING:
STORM: 3/4" CRUSHED STONE
WATER: SAND (VAOT 703.03)

7. WRAP PERF. PIPE BEDDING WITH APPROVED FILTER FABRIC.

5 C-5 TYPICAL EXCAVATION TRENCH DETAIL
N.T.S.

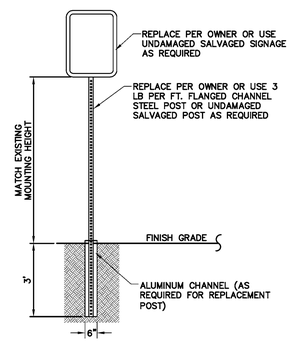


NOTES:
1. NEW STRUCTURES INCORPORATING EXISTING STORM PIPING SHALL BE CAST WITH INVERTS OF THE APPROPRIATE SIZE OR CORED ONSITE.

2. CONNECTION OF EXISTING PIPING SHALL BE MADE AS WATERTIGHT AS POSSIBLE USING APPROVED MANUFACTURED BOOT DEVICES OR APPROVED GROUT.

3. ALL DRAINAGE STRUCTURES & ASSOCIATED RIM ADJUSTMENTS, FRAMES & GRATES/COVERS SHALL MEET H-20 LOADING REQUIREMENTS.

6 C-5 TYPICAL CATCH BASIN
N.T.S.

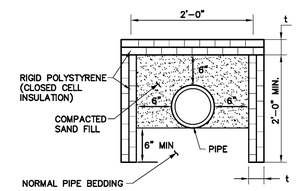


NOTES:

1. RESET EXISTING SIGNAGE DISTURBED BY CONSTRUCTION PER OWNER.

2. PROVIDE & INSTALL NEW SIGNAGE OR INSTALL OWNER SUPPLIED SIGNAGE AS REQUIRED.

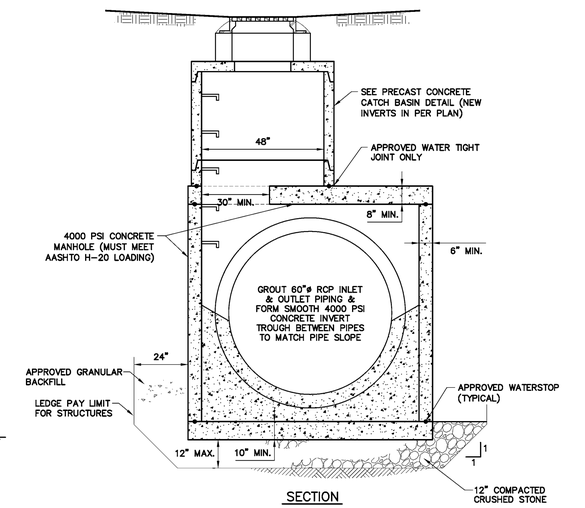
7 C-5 TYPICAL SIGN DETAIL
N.T.S.



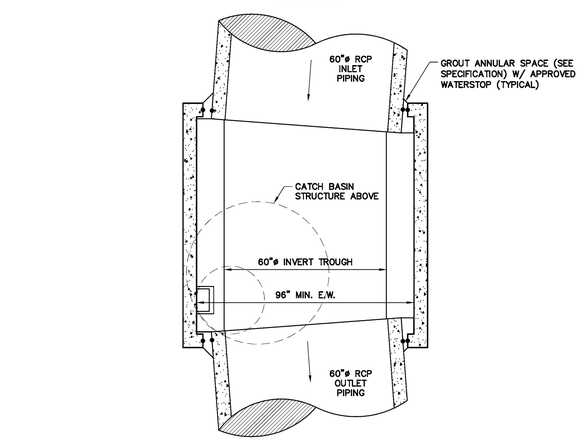
NOTE: INSULATE ALL SECTIONS OF STORM & SANITARY SEWER PIPING WITH LESS THAN 5'-6" OF COVER

t = 2" (COVER 4'-6" – 5'-6")
t = 4" (COVER LESS THAN 4'-6")

8 C-5 SEWER INSULATION DETAIL
N.T.S.



SECTION



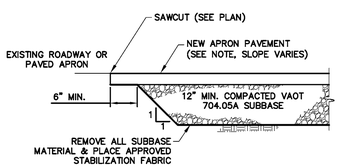
PLAN

NOTES:

1. FULL ENGINEERING SHOP DRAWING SUBMITTALS REQUIRED FOR REVIEW PRIOR TO CONSTRUCTION.

2. SCHEDULE MUST ALLOW CONCRETE CURING TO SPECIFIED STRENGTHS PRIOR TO DELIVERY TO THE PROJECT SITE.

12 C-5 PRECAST CATCH BASIN & BOX STRUCTURE
N.T.S.



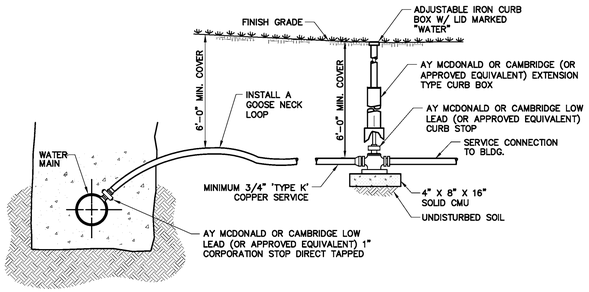
NOTES:
1. EXISTING PAVED APRONS SHALL BE SAWCUT STRAIGHT & PLUMB AS REQUIRED TO CONSTRUCT NEW APRONS TO THE LINES & GRADES SHOWN IN THE PLAN.

2. COAT SAWCUT WITH EMULSIFIED ASPHALT PRIOR TO PLACING NEW APRON SURFACE PER SPECIFICATIONS.

3. NEW APRON PAVEMENT SHALL HAVE A COMPACTED THICKNESS TO MATCH EXISTING ROADWAY AT THE JOINT (4" MIN.) & TAPER TO MATCH EXISTING DRIVE THICKNESS (2" MAX.).

4. SEE SPECIFICATIONS.

9 C-5 TYPICAL PAVED APRON SECTION
N.T.S.



NOTES:

1. TEFLON THREAD SEALANT TAPE WILL BE USED ON ALL CORPORATION STOPS PRIOR TO INSERTION.
A. SPIRAL WRAP COMPLETELY COVERING THE THREAD AREA WITH TWO WRAPS.
B. PIPE DOPE OR OTHER LIQUID THREAD SEALANTS ARE NOT ACCEPTABLE.

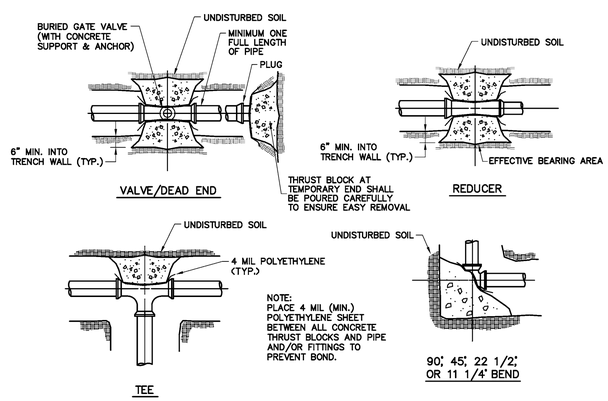
2. LEAVE ONE TO THREE THREADS SHOWING OUTSIDE OF PIPE (A TORQUE OF 35 LBS OR LESS IS RECOMMENDED).

3. CORPORATION STOPS SHALL NOT BE PLACED LESS THAN 1' APART ALONG PIPE.

4. CORPORATION BOXES AND STOPS SHALL NOT BE CONSTRUCTED BENEATH DRIVES OR SIDEWALKS.

5. VALVE ROD AND PINS SHALL BE STAINLESS STEEL.

10 C-5 TYPICAL CORPORATION STOP/WATER SERVICE DETAIL
N.T.S.



MINIMUM AREA OF BEARING SURFACE OF CONC. THRUST BLOCKS (in square feet)

3"				4"				6"				8"				10"				12"					
ENDS & TEES	90° ELB.	45° ELB.	22.5° ELB.	ENDS & TEES	90° ELB.	45° ELB.	22.5° ELB.	ENDS & TEES	90° ELB.	45° ELB.	22.5° ELB.	ENDS & TEES	90° ELB.	45° ELB.	22.5° ELB.	ENDS & TEES	90 ELB.	45 ELB.	22.5 ELB.	ENDS & TEES	90° ELB.	45° ELB.	22.5° ELB.	SOIL CONDITION	SAFE BEARING LOAD(P.S.F.)
0.5	0.5	0.5	0.5	0.5	1.0	0.5	0.5	1.0	1.5	1.0	0.5	2.0	2.5	1.5	1.0	3.5	4.5	2.5	1.5	4.0	5.5	3.0	1.5	SOUND SHALE	10,000
1.0	1.0	1.0	0.5	1.5	2.0	1.0	0.5	3.0	4.0	2.0	1.0	4.5	6.5	3.5	2.0	8.5	10.5	6.0	3.0	10.0	14.0	7.5	4.0	CEMENTED GRAVEL & SAND	4,000
1.0	1.5	1.0	0.5	2.0	2.5	1.5	1.0	3.5	5.0	3.0	1.5	6.0	8.5	5.0	2.5	11.0	14.0	8.0	4.0	13.0	18.5	10.0	5.0	COARSE & FINE GRAVEL & SAND	3,000
1.5	2.5	1.5	1.0	2.5	3.5	2.0	1.0	5.5	7.5	4.0	2.0	9.0	13.0	7.0	3.5	16.5	21.0	11.5	6.0	20.0	27.5	15.0	8.0	HARD CLAY OR MEDIUM SILT	2,000
3.0	4.5	2.5	1.5	5.0	7.0	4.0	2.0	10.5	15.0	8.0	4.0	18.0	25.0	14.0	7.0	33.0	42.0	23.0	12.0	39.0	55.0	30.0	15.0	SOFT CLAY	1,000

MAXIMUM WATER PRESSURE = 300 P.S.I. NOTE: REDUCER BEARING AREA = 45 BEND, LARGER PIPE

11 C-5 THRUST BLOCK DETAILS
N.T.S.

REVISION DATE & DESCRIPTION	BY

Champlain Consulting ENGINEERS
85 PRIM ROAD, P.O. BOX 453
COLCHESTER, VERMONT 05446
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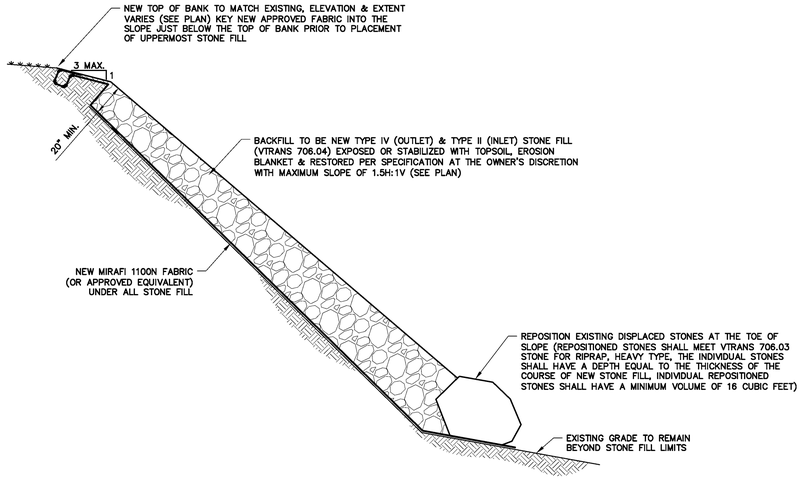
STATE OF VERMONT
GREGORY J. BOMBARDIER
NO. 4496
REGISTERED PROFESSIONAL ENGINEER

TOWN OF COLCHESTER
MOREHOUSE BROOK CULVERT
MALLETTS BAY AVENUE
SITE DETAILS
COLCHESTER VERMONT

DRAWN	CCE
CHECKED	GJB
SCALE	N.T.S.
DATE	04/21/16
JOB NO.	13172
SHEET	C-5

OF 11 SHEETS

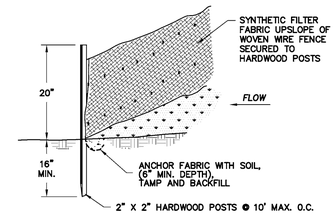


NOTES:

1. STONE FILL SHALL BE APPROVED BY THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.

2. **THE CONTRACTOR SHALL CAREFULLY CONSIDER THE EXTENT OF ALL EXISTING SLOPE FAILURE AREAS WITHIN THE WORK AREA DURING NEW STONE QUANTITY CALCULATIONS PRIOR TO CONSTRUCTION.**

1 C-6 NEW STONE FILL TYPICAL SECTION
N.T.S.



NOTES:

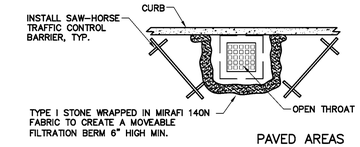
1. SILT FENCE SHALL BE INSTALLED & MAINTAINED DOWNSLOPE OF ALL DISTURBED AREAS & MATERIAL STOCKPILES TO PROTECT UNDISTURBED GRASSED OR LANDSCAPED AREAS, ROADWAYS, WALKWAYS AND WATERWAYS.

2. NO CONSTRUCTION ACTIVITY OR TRAFFIC SHALL BE ALLOWED DOWNSLOPE OF INSTALLED FENCES.

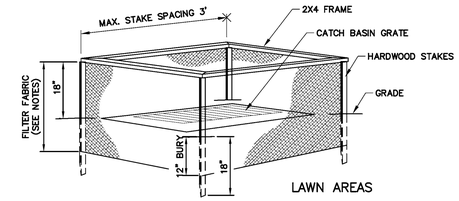
3. END SECTIONS OF FENCE SHALL BE ANGLED UPSLOPE & SHALL EXTEND BEYOND THE DISTURBED AREA SUCH THAT ALL SEDIMENT, SILT OR DEBRIS IS CONTAINED.

4. INSPECTIONS & MAINTENANCE SHALL BE PERFORMED AS REQUIRED UNTIL PERMANENT VEGETATION IS IN PLACE & THERE IS NO DANGER OF FURTHER EROSION.

2 C-6 SILT FENCE PROTECTION DETAIL
N.T.S.



PAVED AREAS



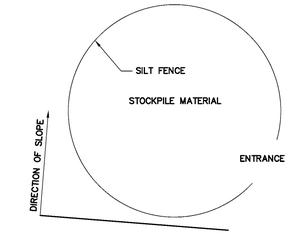
LAWN AREAS

NOTES:

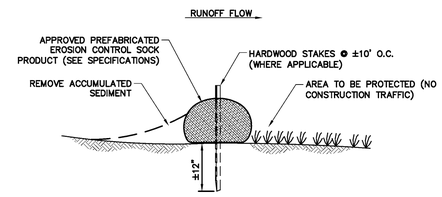
1. INLET PROTECTION SHALL BE INSTALLED & MAINTAINED FOR ALL STORM DRAINAGE STRUCTURES SUBJECT TO RUNOFF FROM THE CONSTRUCTION AREA.

2. INSPECTIONS & MAINTENANCE SHALL BE PERFORMED AS REQUIRED UNTIL NO SOURCES OF SEDIMENT, SILT OR DEBRIS WITHIN THE CONTRIBUTING AREA.

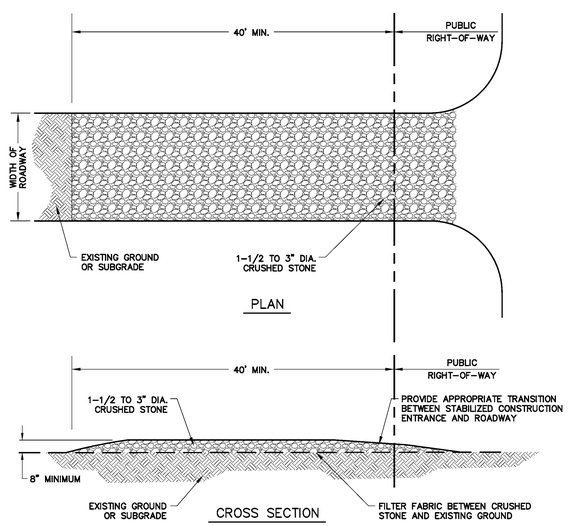
3 C-6 INLET PROTECTION DETAILS
N.T.S.



4 C-6 STOCKPILE EROSION CONTROL
N.T.S.



5 C-6 EROSION CONTROL SOCK TYPICAL SECTION
N.T.S.



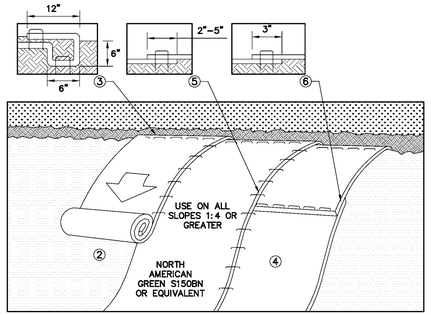
NOTES:

1. TO BE USED AT ALL CONSTRUCTION ACCESS POINTS. NO VEHICLES SHALL ACCESS THE SITE WHERE A STABILIZED ENTRANCE IS NOT PROVIDED.

2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN-OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT TRACKED, SPILLED, OR WASHED ONTO PUBLIC RIGHT-OF-WAYS SHALL BE REMOVED IMMEDIATELY BY THE CONTRACTOR.

3. THE USE OF CALCIUM CHLORIDE OR WATER MAY BE NECESSARY TO CONTROL DUST DURING THE SUMMER.

6 C-6 TEMPORARY STABILIZED CONSTRUCTION ENTRANCE DETAIL
N.T.S.



NOTES:

1. APPLY SLOPE STABILIZATION TO ALL DISTURBED SLOPES 1:4 OR GREATER.

2. PREPARE SOIL BEFORE INSTALLING BLANKETS INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, & SEED (SEE RESTORATION SPECIFICATION).

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

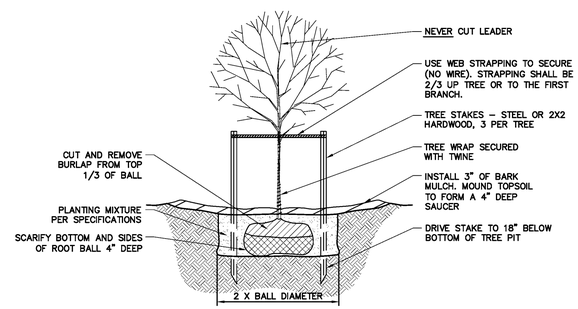
4. ROLL THE BLANKETS DOWN THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.

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

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

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

7 C-6 SLOPE STABILIZATION DETAIL
N.T.S.



NOTES:

1. STAKE TREES UNDER 3" CALIPER.

2. GUY TREES 3" CALIPER & LARGER.

3. TREE ROOT COLLAR SHALL BEAR SAME RELATION TO FINISHED GRADE AS IT BORE TO PREVIOUSLY EXISTING GRADE, EXCEPT IN AREAS OF COMPACTED FILL.

4. PLANT TREES SO ROOT COLLAR IS 2"-3" ABOVE FINISHED GRADE.

8 C-6 TYPICAL TREE PLANTING DETAIL
N.T.S.

SEEDING SPECIFICATION

CONSERVATION MIX GRASS SEED		
% BY WEIGHT	LBS. LIVE SEED PER ACRE	TYPE OF SEED
35	35	CREEPING RED FESCUE
23	23	KENTUCKY BLUEGRASS
15	15	ANNUAL RYE
11	11	WINTER HARDY, PERENNIAL RYE
6	6	WHITE CLOVER
10	10	HIGHLAND BENT GRASS
100	100 # LIVE SEED/ACRE	

FERTILIZER - 10 LBS PER 1000 SQ FT
SPRING SEEDING
FALL SEEDING

LIME - 90 LBS PER 1000 SQ FT
DOLOMITIC GROUND LIMESTONE
NOT LESS THAN 85% OF THE TOTAL CARBONATE

TOPSOIL
4" MINIMUM APPROVED TOPSOIL

STRAW MULCH - MINIMUM OF 3" THICK WITH AN 80-90% COVER
APPLY BINDER OR NETTING AS NEEDED

MAINTENANCE, GUARANTEE AND ACCEPTANCE OF SEEDING

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CARE AND MAINTENANCE, INCLUDING WATERING, OF SEEDED AREA UNTIL THE SEEDING IS INSPECTED AND ACCEPTED BY THE OWNER. INSPECTION SHALL BE MADE AFTER THE SECOND MOWING. THE CONTRACTOR SHALL NOTIFY THE OWNER 48 HOURS IN ADVANCE WHEN THE SECOND MOWING IS SCHEDULED.
RE-SEEDING SHALL BE DONE UNTIL ALL AREAS ARE COMPLETELY COVERED WITH A MATURE STAND OF GRASS. AN AREA SHALL BE CONSIDERED COVERED WHEN THE ENTIRE SURFACE CONTAINS A VIGOROUS STAND OF GRASS. AREAS THAT, IN THE OPINION OF THE OWNER, ARE PREDOMINANTLY WEEDS SHALL BE TILLED, FINE GRADED, FERTILIZED AND RE-SEEDED IN THE MANNER SPECIFIED ABOVE.

9 C-6 SITE RESTORATION
N.T.S.

EROSION CONTROL

A. General Notes
1. The Contractor shall construct and maintain all erosion measures in accordance with the "Vermont Standards & Specifications for Erosion Prevention & Sediment Control", current edition.

B. Construction Sequence
1. The Contractor shall be responsible for establishing all erosion control measures delineated on the plans and any additional measures that are necessary to minimize erosion. The Contractor shall have erosion control materials and installation equipment on site at all times.
2. Silt fences shall be installed along the base of the fill slopes. This shall remain in place until the project site has been stabilized. Construct stone check dams in grass-lined swales 50 feet on center to prevent silt from washing into the drainage system during construction. Hay bales shall be removed when vegetation is established.
3. Control dust through the application of water.
4. Excavated material from earth excavation and ditch digging shall be disposed of off site or used for project fill material if determined suitable by the Owner's Representative.
5. All temporary erosion control measures required for any proposed winter work shall be installed prior to the ground freezing. These measures shall be in place prior to the commencement of any site work or earth-moving.

C. Temporary Measures
1. Silt Fences - The silt fences shall be constructed in accordance with the construction detail. The fence shall generally be placed 10 feet from the toe of the slope or as shown on the plan. The ends of the fence shall be placed uphill to form a horseshoe shape to trap all runoff.

   The silt fences/check dams shall be inspected periodically for damage or build-up of sediments. All damaged fences shall be repaired or replaced. Sediment deposits shall be removed from the fence as they build up and be placed in an area where there is no danger of further erosion.
2. Erosion Matting - Erosion matting shall be placed on all grass-lined swales with profile grades exceeding 5.0% and shall be placed and maintained in accordance with the Vermont Agency of Transportation Standard Specifications Sections 654 and 755.07.
3. Dust Control - During construction, dust will be controlled with water distributed by a truck-mounted spray bar.
4. All stockpile material (topsoil, borrow, etc.) will have a crushed stone dike or silt fence constructed around the perimeter. Seed and mulch stockpile material as soon as possible to prevent soil erosion and sedimentation off site. Locate stockpiles on the uphill side of the disturbed area, if possible. During windy conditions, stockpiled material shall be covered or watered appropriately to prevent wind erosion.
5. Slopes greater than 1:3 shall have erosion control netting installed to stabilize the slope and reduce the erosion potential. Install netting over mulched slopes so that all parts are in contact with the soil and mulch. Pin netting per detail to ensure full bonding with soil surface.

D. Permanent Measures
1. Restoration - As soon as construction is completed in a given area, it shall be topsoiled, seeded, fertilized and mulched.

   The topsoil shall be submitted to the Extension Service for analysis. Fertilizer shall be applied at approximately a rate of 400 pounds per acre depending on soil analysis. If necessary, lime shall be applied to the topsoil to produce a soil pH of approximately 6.0.

   After the finished grade has been established and the fertilizer spread, plant the specific seed mixture and work firmly into the soil. Apply seed on the prepared seed bed with approved mechanical seeders or hydroseeding equipment. Upon completion of the above planting operations, roll all areas, leaving the surface of all areas true to grade, smooth, and free from hollows or other irregularities. Thoroughly water all newly planted areas immediately after planting using a fine spray. Protect banks and swales and prevent or repair erosion that occurs. Banks, swales or other graded areas that have been washed out or have become damaged shall be repaired immediately. Unless approval is granted by the Engineer to plant off season, seeding will be conducted only during the period from April 15th to October 15th. So as not to cause interference, no seeding is to proceed before other phases of the work have progressed sufficiently.

   After seeding, mulch shall be applied at a rate of 2 tons per acre.

E. Winter Construction
1. If due to the project schedule, construction during the winter months is necessary, the contractor shall, upon written approval from the Public Works Director, follow the winter construction procedures outlined in the "Vermont Handbook for Soil Erosion and Sediment Control on Construction Sites", current edition.
   a. Minimize disturbance between October and May.
   b. All erosion control measures shall be in place prior to the ground freezing.
   c. Mulch shall be applied to all disturbed area at a rate of 90 pounds per 1,000 square feet. The Contractor shall maintain all areas that are mulched until permanent vegetation can be established.

F. Maintenance, Guarantee and Acceptance
1. The Contractor shall be responsible for the care and maintenance including watering of seeded areas, until the seeding is inspected and accepted by the Owner.
2. Reseeding shall be done until all areas are completely covered with a mature stand of grass. An area shall be considered covered when the entire surface contains a verdurous stand of grass. Areas that, in the opinion of the Engineer, are predominantly weeds shall be plowed up, fine graded, fertilized and reseeded in the manner specified previously, exercising caution not to cause damage to new or existing plant material.
3. Maintain and guarantee all seeded areas until acceptance.

REVISION DATE & DESCRIPTION	BY

Champlain Consulting ENGINEERS
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STATE OF VERMONT
GREGORY J. BOMBARDIER
NO. 4496
REGISTERED PROFESSIONAL ENGINEER

TOWN OF COLCHESTER
MOREHOUSE BROOK CULVERT
MALLETTS BAY AVENUE
EPSC DETAILS
COLCHESTER VERMONT

DRAWN	CCE
CHECKED	GJB
SCALE	N.T.S.
DATE	04/21/16
JOB NO.	13172
SHEET	C-6

OF 11 SHEETS

MIKE'S BORING & CORING LLC.
PO Box 75 * East Barre, Vermont 05649 * 802 476-5073

TO: Greg Bombardier Champlain Consulting Engineers P.O. Box 453 Colchester, VT 05446	PROJECT NAME: Culvert Repair LOCATION: Colchester, VT MBC JOB #: 14024	SHEET: 1 DATE: 4-3-14 HOLE #: B-1 LINE & STA. OFFSET:

Ground Water Observations none at _0_ hours	Augers-Size I.D. 2.5 Split Spoon 2" Hammer Wt. 140# Hammer Fall 30"	Surface Elevation: Date Started: 4-3-14 Date Completed: 4-3-14 Boring Foreman: Shawn Bijolle Inspector: Soils Engineer: Greg Bombardier

LOCATION OF BORING: As shown

Sample Depths From/To (Feet)	Type of Sample	Blows per 6" on Sampler	Moisture Density or Consis.	Strata Change Elev.	Soil Identification	Sample No.	Sample Pen. Inches	Sample Rec. Inches
5'-7'	Dry	5/7/11/11	Moist		Very fine sand and silt	1	24	24
10'-12'	Dry	6/7/8/10	Moist		Very fine sand and silt	2	24	20
15'-17'	Dry	3/4/4/5	Damp	16.5'	Silty sand and clay	3	24	24
20'-22'	Dry	12/12/11/24	Damp	21.5'	Gray clay into reddish brown sand with rock fragments (hard pan)	4	24	23
23'-25'	Dry	29/59/100 for 6"	Damp		Reddish brown sand with rock fragments (hard pan)	5	18	18

Ground Surface to 23' Used 2.5" augers: Then S.S. to refusal at 24.5'

Earth Borings	24.5'
Rock Coring	
Samples:	5
HOLE NUMBER	B-1

MIKE'S BORING & CORING LLC.
PO Box 75 * East Barre, Vermont 05649 * 802 476-5073

TO: Greg Bombardier Champlain Consulting Engineers P.O. Box 453 Colchester, VT 05446	PROJECT NAME: Culvert Repair LOCATION: Colchester, VT MBC JOB #: 14024	SHEET: 2 DATE: 4-3-14 HOLE #: B-2 LINE & STA. OFFSET:

Ground Water Observations none at _0_ hours	Augers-Size I.D. 2.5 Split Spoon 2" Hammer Wt. 140# Hammer Fall 30"	Surface Elevation: Date Started: 4-3-14 Date Completed: 4-3-14 Boring Foreman: Shawn Bijolle Inspector: Soils Engineer: Greg Bombardier

LOCATION OF BORING: As shown

Sample Depths From/To (Feet)	Type of Sample	Blows per 6" on Sampler	Moisture Density or Consis.	Strata Change Elev.	Soil Identification	Sample No.	Sample Pen. Inches	Sample Rec. Inches
5'-7'	Dry	2/1/1/2	Damp		Sand	1	24	10
10'-12'	Dry	2/2/3/3	Damp	9'	Sand and gravel with a trace of gray clay	2	24	18
15'-16.5'	Dry	12/6/6/	Wet		Gravel	3	18	6
18'-19.5'	Dry	11/17/14	Wet		Reddish coarse gravel	4	18	18
20'-22'	Dry	9/11/17/24 for 4"	Wet		Reddish brown gravel (hard pan)	5	20	15

Ground Surface to 230' Used 2.5" augers: Then S.S. to refusal at 21'9"

Earth Borings	21'9"
Rock Coring	
Samples:	5
HOLE NUMBER	B-2

MIKE'S BORING & CORING LLC.
PO Box 75 * East Barre, Vermont 05649 * 802 476-5073

TO: Greg Bombardier, P.E. Champlain Consulting Engineers P.O. Box 453 Colchester, VT 05446	PROJECT NAME: Culvert Repair LOCATION: Colchester, VT MBC JOB #: 14038	SHEET: 1 DATE: 5-14-14 HOLE #: B-3 LINE & STA. OFFSET:

Ground Water Observations none at _0_ hours	Augers-Size I.D. 2.5 Split Spoon 2" Hammer Wt. 140# Hammer Fall 30"	Surface Elevation: Date Started: 5-14-14 Date Completed: 5-14-14 Boring Foreman: Mike McGinley Inspector: Soils Engineer: Greg Bombardier

LOCATION OF BORING: As shown

Sample Depths From/To (Feet)	Type of Sample	Blows per 6" on Sampler	Moisture Density or Consis.	Strata Change Elev.	Soil Identification	Sample No.	Sample Pen. Inches	Sample Rec. Inches
5'-7'	Dry	2/1/1/2	Dry		Brown medium fine sand	1	24	16
10'-12'	Dry	5/4/17/10	Damp/wet		Red brown silt with a trace of clay and rock fragments	2	24	14
13.5'-15.5'	Dry	24/46/29/24	Moist		Red brown silt, trace of clay and rock fragments	3	24	18
					Auger refusal at 15'			

Ground Surface to 13.5' Used 2.5" augers: Then S.S. to refusal at 15.5'

Earth Borings	15.5'
Rock Coring	
Samples:	3
HOLE NUMBER	B-3

MIKE'S BORING & CORING LLC.
PO Box 75 * East Barre, Vermont 05649 * 802 476-5073

TO: Greg Bombardier, P.E. Champlain Consulting Engineers P.O. Box 453 Colchester, VT 05446	PROJECT NAME: Culvert Repair LOCATION: Colchester, VT MBC JOB #: 14038	SHEET: 2 DATE: 5-14-14 HOLE #: B-4 LINE & STA. OFFSET:

Ground Water Observations none at _0_ hours	Augers-Size I.D. 2.5 Split Spoon 2" Hammer Wt. 140# Hammer Fall 30"	Surface Elevation: Date Started: 5-14-14 Date Completed: 5-14-14 Boring Foreman: Mike McGinley Inspector: Soils Engineer: Greg Bombardier

LOCATION OF BORING: As shown

Sample Depths From/To (Feet)	Type of Sample	Blows per 6" on Sampler	Moisture Density or Consis.	Strata Change Elev.	Soil Identification	Sample No.	Sample Pen. Inches	Sample Rec. Inches
4'-6'	Dry	3/2/1/2	Dry		Brown fine sand	1	24	14
9'-11'	Dry	2/2/2/5	Wet		Brown fine sand with some silt	2	24	16
14'-16'	Dry	8/8/30/38	Wet		Brown fine sand wt some silt	3	24	8
18'-20'	Dry	45/5- for 1"	Damp		Red brown fine sand with some silt and rock fragments	4	7	10
					Auger refusal at 18'			

Ground Surface to 18' Used 2.5" augers: Then S.S. to refusal at 18'7"

Earth Borings	18'7"
Rock Coring	
Samples:	4
HOLE NUMBER	B-4

MIKE'S BORING & CORING LLC.
PO Box 75 * East Barre, Vermont 05649 * 802 476-5073

TO: Greg Bombardier, P.E. Champlain Consulting Engineers P.O. Box 453 Colchester, VT 05446	PROJECT NAME: Culvert Repair LOCATION: Colchester, VT MBC JOB #: 14038	SHEET: 3 DATE: 5-14-14 HOLE #: B-5 LINE & STA. OFFSET:

Ground Water Observations none at _0_ hours	Augers-Size I.D. 2.5 Split Spoon 2" Hammer Wt. 140# Hammer Fall 30"	Surface Elevation: Date Started: 5-14-14 Date Completed: 5-14-14 Boring Foreman: Mike McGinley Inspector: Soils Engineer: Greg Bombardier

LOCATION OF BORING: As shown

Sample Depths From/To (Feet)	Type of Sample	Blows per 6" on Sampler	Moisture Density or Consis.	Strata Change Elev.	Soil Identification	Sample No.	Sample Pen. Inches	Sample Rec. Inches
5'-7'	Dry	5/5/5/7	Damp		Brown silty clay	1	24	16
10'-12'	Dry	42/42/60/30	Damp		Red brown silt and fine sand with rock fragments	2	24	14

Ground Surface to 10' Used 2.5" augers: Then S.S. to 12'

Earth Borings	12'
Rock Coring	
Samples:	2
HOLE NUMBER	B-5

REVISION DATE & DESCRIPTION	BY

Champlain Consulting ENGINEERS
85 PRIM ROAD, P.O. BOX 453
COLCHESTER, VERMONT 05446
(802) 863-8060 - 864-1878 FAX

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STATE OF VERMONT
GREGORY J. BOMBARDIER
NO. 4496
REGISTERED PROFESSIONAL ENGINEER

TOWN OF COLCHESTER
MOREHOUSE BROOK CULVERT
MALLETTS BAY AVENUE
SOIL BORING LOGS
COLCHESTER VERMONT

DRAWN	CCE
CHECKED	GJB
SCALE	NONE
DATE	04/21/16
JOB NO.	13172
SHEET	C-7

OF 11 SHEETS

GENERAL SPECIFICATIONS

The Standard Specifications shall refer to the Vermont Agency of Transportation Standard Specifications for Construction (Current Edition).
All site work shall also be completed in accordance with the Town of Colchester Public Works Standards and Specifications. Any discrepancies with the plans or specifications shall be reported to the Engineer prior to beginning that work.

A. Earthwork

1. The site shall be cleared of all debris and vegetation, and all topsoil shall be stripped prior to placing any fill material. Debris and vegetation shall be disposed of at an approved off site location.

2. The excavated material from on site shall not be used within five feet (5') of any building or under parking lots, roads or sidewalks. General imported fill material shall not be larger than two inches (2") or have more than 20% passing the NO. 200 sieve. All excess excavated material shall be disposed of at an approved off site location.

B. Paved Areas

1. The subgrade shall be prepared in accordance with Section 203.12 of the Standard Specifications.

2. Gravel for subbase shall meet the following grading requirements (Section 704.04):

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
No. 4	20 – 60
No. 100	0 – 12
No. 200	0 – 6

The gravel shall be uniformly graded from coarse to fine and the maximum size stone particle shall not exceed 2/3 of the thickness of the layer being placed. The gravel subbase shall be compacted to 95% of the maximum dry density as determined by AASHTO–T99.

3. Crushed gravel for Subbase: All materials shall be secured from approved sources. This gravel shall consist of angular and round fragments of hard durable rock of uniform quality throughout, reasonably free from thin elongated pieces, soft or disintegrated stone, dirt, organic or other objectionable matter. The grading requirements shall conform to the following table (Section 704.05 – Fine):

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
2"	100
1 1/2"	90 – 100
No. 4	30 – 60
No. 100	0 – 12
No. 200	0 – 6

The crushed gravel shall be compacted to 95% of the maximum dry density as determined by AASHTO–T99.

4. Dense Graded Crushed Stone for Subbase: Dense graded crushed stone for subbase shall consist of clean, hard, uniformly graded, crushed stone. It shall be reasonably free from dirt, deleterious material and pieces which are structurally weak and shall meet the following requirements (Section 704.06A):

a. Source: This material shall be obtained from approved sources and the area from which this material is obtained shall be stripped and cleaned before blasting.

b. Grading: This material shall meet the requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
3 1/2"	100
3"	90 – 100
2"	75 – 100
1"	50 – 80
1 1/2"	30 – 60
No. 4	15 – 40
No. 200	0 – 6

5. Bituminous Concrete Pavement: The materials, grading and composition, placement, and finishing for bituminous concrete pavement (Type II and III) shall meet the requirements of the Vermont Agency of Transportation Standard Specifications Sections 406, 702, and 704.10. Other requirements are as follows: Application of bituminous concrete pavement shall meet all the requirements of the Vermont Standard Specifications for Construction, Section 406, or as periodically amended, but not limited to the following:

a. Weather Limitations: Bituminous material shall not be placed between November 1 and May 1. Material shall not be placed when the air temperature at the paving site in the shade and away from artificial heat is 40 degrees Fahrenheit or below.

b. Compaction: Immediately after the bituminous mixture has been spread, struck off and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling. Along forms, curbs, headers, walls and other places not accessible to the rollers, the mixture shall be thoroughly compacted with hot or lightly oiled hand tampers, smoothing irons, or mechanical tampers. On depressed areas, a trench roller may be used, or cleated compression strips may be used under the roller to transmit compression to the depressed area.

c. Surface Tolerances: The surface will be tested by the Engineer using a 16–foot straight–edge at selected locations parallel with the centerline. Any variations exceeding 3/16 of an inch between any two contacts shall be satisfactorily eliminated. A 10–foot straight–edge may be used on a vertical curve. The straight–edges shall be provided by the Contractor.

d. Matching Surfaces: When a new pavement is to match an existing bituminous pavement for a roadway or trench, the Contractor shall vertically smooth cut the existing pavement along a straight line a minimum of one foot (1') into the existing pavement, over the existing gravel base. The smooth cut shall be thoroughly cleaned and coated with Emulsified Asphalt, RS–1, just prior to paving.

6. Stabilization Fabric: Stabilization fabric where required by the Engineer shall be MIRAFI 500X or equivalent. The fabric shall be installed in accordance with manufacturer's requirements.

C. Drainage Systems

1. All culverts and storm drains shall meet the requirements of the Town of Colchester Public Works Standards and Specifications and Section 601 of the Standard Specifications.

2. The Contractor(s) shall use only the materials specified in the Plans or Contract Documents with regard to:

a. Gravity or force main piping;

b. Structures and accessories;

c. Bedding and backfill;

d. Temporary erosion and/or sediment controls.

D. Grout

1. Materials

a. Grout shall consist of one part portland cement to three parts fine aggregate by volume.

b. Fine aggregate shall meet the requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
3/8"	100
No. 4	95 – 100
No. 16	50 – 80
No. 30	25 – 60
No. 50	10 – 30
No. 100	2 – 10

c. Water shall be clean, clear, suitable for drinking.

E. Grading areas to be paved:

1. Perform all rough grading, including excavation, formation of embankments, shaping, sloping, compaction, construction of ditches, disposal of surplus or unsuitable material, and any work necessary to prepare the subgrades of all roadways, walks and parking areas. Grading shall be brought to the bottom of the base course under paved or surfaced areas and to within a minimum of 24 inches of finished grade under side slopes and/or embankment areas to receive loam along roadways, walks or parking areas.

2. Accomplish all excavation and fill within the slope and grade lines as indicated on the Drawings unless otherwise authorized in writing by the Owner. Parking lots shall be graded to full cross section width at subgrade before placing any type of subbase or pavement except that partial width construction is permissible where necessary for the maintenance of traffic.

3. Do not use frozen material in the construction of embankments and do not place embankments or successive layers of embankment upon frozen material.

4. Place all embankment material in horizontal layers of uniform thickness across the full width of embankment except when it is impractical to construct full width of the embankment and partial width layers are authorized by the Owner.
Do not allow or place stumps, trees, rubbish or other unsuitable material in embankments. Begin layers of embankment at the deepest part of the fill.

5. Areas of soft, yielding or otherwise unsuitable material that will not meet compaction requirements shall be removed, replaced with suitable material and properly compacted at no cost to the Owner.

6. Place embankments for paved or surface areas in horizontal layers of depths which will result in layers of compacted material not exceeding 8 inches. Compact each layer as specified before placing each new layer. Use effective spreading equipment on each layer to obtain uniform thickness prior to compacting. Each layer shall be kept crowned to shed water to the outside edges of embankment and continuous leveling and manipulating will be required to assure uniform density. Construction equipment shall be routed uniformly over the entire surface of each layer.

7. If, during the construction of the embankments, there is any indication that serious bulging, cracking, or unstable movement may occur, the placing of fill shall be stopped or retarded to allow the material to stabilize.

8. All swales and drains shall be constructed so they will effectively drain the roadway or parking lot before any subbase or surface course material is placed. In handling materials, tools and equipment, the Contractor shall protect the subgrade from damage. In no case shall vehicles be allowed to travel in a single track and form ruts. If ruts are formed, the subgrade shall be reshaped and compacted and any pockets of clay, sand or soft material that may have been left in the subgrade shall be removed, replaced with approved material and properly compacted at the Contractor's expense. The subgrade shall be kept in such condition that it will drain. Subbase, base or surface material shall not be deposited on the subgrade until the subgrade has been checked and approved by the Owner. After the subgrade has been approved, hauling shall not be done nor equipment moved over the subgrade which will distort the cross section. A tolerance of 1/2 inch above or below the finished subgrade will be allowed provided that this 1/2 inch above or below subgrade is not maintained for a distance longer than 50 feet, and that the required cross section is maintained.

F. Compaction:

1. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification.

2. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well–defined moisture–density relationship determined in accordance with ASTM D 2049.

a. Lawn or unpaved areas: Compact top 6" of subgrade and each layer of backfill or fill material to 90% maximum dry density.

b. Compaction under paved and surfaced areas:
The entire area of each layer shall be uniformly compacted to at least the required minimum density by use of compaction equipment consisting of rollers, compactors or a combination thereof.
Earth–moving and other equipment not specifically manufactured for compaction purposes will not be considered as compaction equipment. Each layer for its full width shall be compacted to not less than 90 percent of the maximum dry density as determined by the Standard Method of Test for Moisture–Density Relations of Soils, ASTM–D698, Method C, except that the material in the top two feet of any embankment, immediately below the subgrade shall be compacted to not less than 95 percent of the maximum dry density. The field density determination will be made by a qualified testing laboratory using a nuclear density gauge.

c. Concrete Slabs: Compact each layer of backfill or material to 95% maximum dry density.

3. Moisture control: Where subgrade or a layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

G. Backfill and Fill:

1. General: Place acceptable soil material in layers to required subgrade elevation, for each area classification listed below.

a. In excavations, use satisfactory excavated or borrow material.
b. Under grassed areas, use satisfactory excavated or borrow material.
c. Under walks and pavements, use subbase materials as shown in details.

2. Backfill excavations as promptly as work permits, but not until completion of the following:

a. Review of construction below finished grade.
b. Testing, review, and recording locations of underground utilities.
c. Removal of trash and debris.

3. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fill. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface. Where existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture–condition to optimum moisture content, and compact to required depth and percentage of maximum dry density.

4. Placement and Compaction: Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand–operated tampers.

a. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or material on surfaces that are muddy, frozen, or contain frost or ice.

5. No fill shall be placed within 10' of any tree trunk without approval of the Owner.

SECTION 01340 – SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. Submit Shop Drawings, Product Data, and Samples required by the Contract Documents.

1.02 RELATED DOCUMENTS

A. The Conditions of the Contract and General Requirements of the Contract Documents apply to the General Contractor, Subcontractors, materials suppliers and all other persons furnishing labor and materials under this Section.

1.03 SHOP DRAWINGS

A. Drawings shall be presented in a clear and thorough manner.

1. Details shall be identified by reference to sheet and detail, or schedule shown on Contract Drawings.

1.04 PRODUCT DATA

A. Preparation:

1. Clearly mark each copy to identify pertinent products or models.
2. Show performance characteristics and capacities.
3. Show dimensions and clearances required.
4. Show wiring or piping diagrams and controls.

B. Manufacturer's standard schematic drawings and diagrams:

1. Modify drawings and diagrams to delete information which is not applicable to the Work.
2. Supplement standard information to provide information specifically applicable to the Work.

1.05 SAMPLES

A. Office samples shall be of sufficient size and quantity to clearly illustrate:
1. Functional characteristics of the product, with integrally related parts and attachment devices.
2. Full range of color, texture and pattern.

1.06 CONTRACTOR RESPONSIBILITIES

A. Review Shop Drawings, Product Data, and Samples prior to submission.

B. Determine and verify:

1. Field measurements.
2. Field construction criteria.
3. Catalog numbers and similar data.
4. Conformance with specifications.

C. Coordinate each submittal with requirements of the Work and of the Contract Documents.

D. Notify the Engineer in writing, at time of submission, of any deviations in the submittals from requirements of the Contract Documents.

E. Begin no fabrication or work which requires submittals until return of submittals with Engineer approval.

1.07 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with the approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.

B. Number of submittals required:

1. Shop Drawings: Submit the number of opaque reproductions which the Contractor requires, plus three copies, which will be retained by the Engineer.
2. Product Data: Submit the number of copies which the Contractor requires, plus three copies, which will be retained by the Engineer.
3. Samples: Submit the number stated in each individual specification section, or as appropriate for review and approval.

C. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.
2. The Project title and number.
3. Contract identification
4. The names of:
   a. Contractor.
   b. Supplier.
   c. Manufacturer.
5. Identification of the product, with the specification section number:
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the Work or materials.
8. Applicable standards, such as ASTM or Federal Specification numbers.
9. Identification of deviations from the Contract Documents.
10. Identification of all revisions on resubmittals.
11. A blank space for Contractor and Engineer review stamps.
12. Contractor's stamp, initialed or signed, certifying review of the submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and Contract Documents.

1.08 RESUBMISSION REQUIREMENTS

A. Make any corrections or changes in the submittals required by the Engineer and resubmit until approved.

B. Shop Drawings and Product Data:

1. Revise initial drawings or data, and resubmit as specified for the initial submittal.
2. Indicate any changes which have been made other than those requested by the Engineer.

C. Samples: Submit new samples as required for initial submittal.

1.09 DISTRIBUTION

A. Distribute reproductions of Shop Drawings and copies of Product Data which carry the Engineer stamp of approval to:

1. Job site file.
2. Record documents file.
3. Other affected contractors.
4. Subcontractors.
5. Supplier or Fabricator.
6. Others as required.

B. Distribute samples which carry the Engineer stamp of approval as directed by the Engineer.

1.10 ENGINEER DUTIES

A. Review submittals with reasonable promptness and in accord with the established project schedule.

B. Affix review stamp and initials or signature, and indicate requirements for resubmittal, or approval of submittal.

C. Return submittals to the Contractor for distribution, or for resubmissions.

END OF SECTION

SECTION 01410 – TESTING LABORATORY SERVICES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract and General Requirements of the Contract Documents apply to the General Contractor, Subcontractors, materials suppliers and all other persons furnishing labor and materials under this Section.

1.02 DESCRIPTION OF WORK

A. Work included:

1. Cooperate with the Owner's selected testing agency and all others responsible for testing and inspecting the Work.

2. Provide such other testing and inspecting as are specified to be furnished by the Contractor in this Section and/or elsewhere in the Contract Documents.

1.03 QUALITY ASSURANCE

A. The testing laboratory will be qualified to the Owner's approval.

B. Testing, when required, will be in accordance with all pertinent codes and regulations, and with selected standards of the American Society for Testing Materials. (ASTM)

PART 2 – PRODUCTS

2.01 PAYMENT FOR TESTING

A. Initial services: The Owner will pay for initial testing services requested by the Owner.

B. Retesting: When initial tests indicate non–compliance with the Contract Documents, subsequent retesting caused by the non–compliance shall be performed by the same testing agency, and those costs will be deducted by the Owner from the Contract Sum.

2.02 CODE COMPLIANCE TESTING

A. Inspections and tests required by codes or ordinances, or by a plan approval authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

2.03 CONTRACTOR'S CONVENIENCE TESTING

A. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

PART 3 – EXECUTION

3.01 COOPERATION WITH TESTING LABORATORY

A. Representatives of the testing laboratory shall have access to the Work at all times and at all locations where the Work is in progress.

3.02 TAKING SPECIMENS

A. All specimens and samples for testing, unless otherwise provided in the Contract Documents, shall be taken by the testing personnel. All sampling equipment and personnel will be provided by the testing laboratory. All deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

3.03 SCHEDULES FOR TESTING

A. Establishing schedule:

1. By advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its findings.

2. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

B. Revising schedule:

1. When changes of construction schedule are necessary during construction, coordinate all such changes with the testing laboratory as required.

C. Adherence to schedule:

1. When the testing laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra charges for testing attributable to the delay may be back–charged to the Contractor and shall not be borne by the Owner.

END OF SECTION

SECTION 02010 – DEMOLITION CONTROL

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract and General Requirements of the Contract Documents apply to the General Contractor, Subcontractors, materials supplier and all other persons furnishing labor and materials under this Section.

1.02 DESCRIPTION OF WORK

A. Work included: Provide all labor, materials, equipment and incidentals necessary to accomplish the demolition only as specified or as required by new construction as specified within the Contract Documents.

B. Responsibility: Demolition – Remove: All work as indicated on the Contract Documents to include existing utilities, surfaces, vegetation, soils, debris, trash, fill or other material(s) as required to complete the specified construction.

C. Maintain dust–free atmosphere during demolition and construction phases of this work. It will be the responsibility of the Contractor to devise methods and construct proper barriers to maintain such conditions. Method of execution shall be reviewed and approved by the Owner and/or Engineer.

D. Adequate precautions shall be taken to protect all personnel and the Owner's property during the progress of the Work.

E. Methods and scheduling of work shall be approved by the Owner before execution. Coordinate all work with other Contractors.

F. Any items of value scheduled for removal shall not leave the premises until the Owner has directed for their storage or been apprised of their salvage value and has accepted such value to be credited to the Contract between Owner and General Contractor.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

3.01 DISPOSAL AND DEMOLITION

A. Debris accumulation from demolition work shall be removed at the end of each working day and be disposed of or recycled in a legally acceptable manner.

PART 4 – ASBESTOS CEMENT PIPE

4.01 DESCRIPTION

A. This work shall consist of locating, removing, and disposing of asbestos cement water pipe as indicated on the Plans & in the Contract Documents.

4.02 GENERAL REQUIREMENTS

A. The Contractor shall coordinate with the Owners and CWD prior to the start of work to identify potential locations where asbestos cement pipe may be found. The Contractor shall perform exploratory excavations at those locations.

4.03 QUALITY CONTROL

A. In the performance of the work, the Contractor shall:

(1) Maintain environmental documentation to show compliance with applicable regulations.

(2) Document field location(s) of asbestos cement pipe by providing tie card with dimensions.

4.04 REGULATORY REQUIREMENTS

A. Asbestos cement pipe shall be removed, packaged, and disposed of in accordance with Section 6 of the Vermont Regulations for Asbestos Control (VRAC) current revision:

B. If the material is subject to dust producing activities or is in a friable condition, it is then subject to the work practices under VRAC 2.4 and notification and permit requirements under VRAC 9.

C. A current listing of Vermont–certified asbestos service providers can be obtained from the State of Vermont Department of Health.

4.05 SUBMITTALS

A. Signed or stamped manifests, receipts &/or other records providing documentation of proper delivery to a licensed disposal facility.

4.06 TESTING

A. Required testing is as referenced in REGULATORY REQUIREMENTS of this Section.

END OF SECTION

SECTION 02230 – SITE CLEARING

PART 1 – GENERAL

1.01 SECTION REQUIREMENTS:

A. Traffic: Minimize disruption of normal use of adjoining roads, streets, walks, and other adjacent occupied or used facilities during site–clearing operations. The contractor is solely responsible for all safety requirements.

B. Salvageable Items: Carefully remove items to be salvaged (see Demolition Control Specification) and store on Owner's premises or as directed.

C. The General Contractor shall contact DIG SAFE (1–888–344–7233) 72 hours prior to any site clearing or associated excavation to accurately establish the location of all underground utilities on the project site.

1.02 SUMMARY:

A. This Section includes the following:

1. Protecting existing trees and vegetation to remain.

2. Removing trees and other vegetation.

3. Clearing and Grubbing.

1.03 RELATED SECTIONS:

A. Section 02010 – Demolition Control.

1.04 MATERIALS OWNERSHIP:

A. Except for materials indicated to be reset, relocated, stockpiled or to remain property of the Owner, cleared materials shall become Contractor's property and shall be removed from the site (see Section 2.03, DISPOSAL)

1.05 SUBMITTALS:

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

PART 2 – EXECUTION

2.01 PREPARATION:

A. Protect and maintain benchmarks and survey control points as provided on the drawings.

B. Install erosion and sedimentation control measures before site clearing as required by grubbing & restoration work, and additional measures as ordered by the Engineer.

C. Protect site improvements to remain from damage. Restore damaged improvements to original condition, and to the satisfaction of the Owner.

D. In all cases remove trees, shrubs or ground vegetation only as required by the Work as determined in cooperation with the Owner.

E. Locate and clearly flag all trees and vegetation to be removed. The Owner shall be notified following flagging to evaluate the Work with regard to healthy existing trees that do not clearly fall within the clearing requirements.

F. Protect remaining trees and shrubs from damage and maintain existing vegetation to the maximum extent possible. Employ a licensed arborist to repair tree and shrub damage. Restore damaged vegetation. Replace damaged trees that cannot be restored to full growth, as determined by the arborist.

G. Do not store materials or equipment or permit excavation within the drip line of trees to remain.

H. Prior to site clearing, notify all utility companies and municipal utilities as to the construction schedule and location of clearing on the project site.

1. Do not close or obstruct streets, walks or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate vehicular and/or pedestrian routes around closed or obstructed traffic ways as required by the Owner and/or authorities having jurisdiction.

2.02 CLEARING AND GRUBBING:

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes grinding of stumps and exposed roots to 6" below finish grade.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

2. Cut minor roots and branches of trees indicated to remain as required to complete the Work in a clean and careful manner.

3. Completely remove stumps, roots, obstructions, and debris extending to a depth necessary for preparation of subgrade as required by new construction (6 inches below subgrade minimum) per VAOT Specification 203.12.

4. Use only hand methods for grubbing within drip line of trees to remain.

B. Fill depressions caused by clearing and grubbing operation with satisfactory soil material.

1. Place any required fill material in horizontal layers not exceeding 8–inch loose depth, and compact each layer to a density equal to adjacent original ground.

2.03 DISPOSAL:

A. Removing From Construction Site:

1. All materials removed during demolition shall be disposed of off the site in conformance with all municipal, state and federal regulations.

2. As part of the Construction Contract:

a. Hardwood trees >4"ø that must be removed for construction shall be limbed, cut into 12' long sections & stockpiled on the property from which they came, per the individual landowner for their exclusive use;

b. All coniferous trees, limbs, branches, short logs or any other cleared material rejected by the individual landowner & all grubbed materials removed during demolition shall become the property of the Contractor and shall be immediately removed from the site (unless otherwise noted) & shall be disposed of per this specification.

c. With the cooperation of the individual Owners, brush, limbs, deciduous trees <4"ø & coniferous trees may be chipped on site for reuse by the individual landowner.

3. Burning shall not be permitted.

4. Burying shall not be permitted.

END OF SECTION

REVISION DATE & DESCRIPTION	BY

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TOWN OF COLCHESTER
MOREHOUSE BROOK CULVERT
MALLETTS BAY AVENUE
COLCHESTER VERMONT
SITE SPECIFICATIONS

DRAWN	CCE
CHECKED	GJB
SCALE	NONE
DATE	04/21/16
JOB NO.	13172
SHEET	C–8

OF 11 SHEETS

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. The Conditions of the Contract and General Requirements of the Contract Documents apply to the General Contractor, Subcontractors, materials suppliers and all other persons furnishing labor and materials under this Section.

1.02 DESCRIPTION OF WORK

A. Furnish all forms and falsework required for cast-in-place concrete shown on the Contract Drawings, except those items and operations specifically excluded as follows:

1. Furnishing and setting sleeves for plumbing work.
2. Furnishing and setting sleeves for heating work.
3. Furnishing and setting sleeves and boxes for electrical work.

B. Furnish and place all steel reinforcing for cast-in-place concrete as required by Contract Drawings, except for items specifically excluded.

C. Furnish and install all concrete shown on the Drawings and/or as specified herein.

D. Install anchor bolts, leveling plates and bearing plates for structural steel. Furnish and place grout for structural steel work.

1.03 QUALITY ASSURANCE

A. Perform all work of this section in accordance with all applicable portions of the American Concrete Institute "Recommended Practice for Concrete Formwork", (ACI 347); "Building Code Requirements for Reinforced Concrete", (ACI 318); "Recommended Practice for Placing Reinforcing Bars", (CRSI 63); "Recommended Practice for Placing Bar Supports", (CRSI 65); "Manual of Standard Practice for Detailing Reinforced Concrete Structures", (ACI 315); "Specification for Structural Concrete for Buildings", (ACI 301); "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete", (ACI 304); Local Building Codes; as specified and recommended by ACI "Field Reference Manual", (SP-15), including "Recommended Practice for Hot Weather and Cold Weather Concreting", (ACI 305 and ACI 306) and as amended and supplemented by these Specifications.

B. Tests: During the course of the work, compression test cylinders shall be made and tested by testing laboratory approved by the Engineer. Test specimens shall be made, stored and tested in accordance with ASTM C31. Four test specimens for each 50 cubic yards of concrete, or on a per day pour basis when pouring less than 50 cubic yards. One cylinder shall be tested at 7 days and three at 28 days. Tests to be performed by testing laboratory employed by Owner.

C. Mix Proportion and Design: Design mix prepared by trial batch or field experience in accordance with ACI 211.1 shall be submitted to the Engineer for approval.

D. Finisher's Qualifications: Minimum of five (5) years experience on comparable concrete projects.

1.04 SUBMITTALS

A. Submit shop and location drawings for Engineer approval in accordance with Section 01340. Show size, strength, bending and locations of all bars; indicate typical clearance, laps at splices and required accessories.

B. Submit five (5) copies of Design Mix. Mix design shall be current within the past 12 months.

1.05 PRODUCT HANDLING, DELIVERY AND STORAGE

A. Deliver and store all products in strict accordance with current ACI recommended standards.

PART 2 – PRODUCTS

2.01 FORMWORK

A. Formwork:

1. Studs, wales, shores, braces, mudsills and stakes of wood species, lumber grade and size required by form design.
2. Plywood Sheathing: Exterior grade Douglas Fir Plywood, 3/4" thick, B-B Plyform, Class I and II, APA or Structural 1 Plyform, APA.
3. Form Ties: Bolts or rods, adjustable type, designed to leave no metal less than 1" from finished concrete surfaces.
4. Metal Forms: As approved by Engineer.

B. Reinforcement:

1. Concrete: Transit Mix. Conforming to all requirements of ASTM C94. Addition of water to batch will not be permitted.
2. Portland Cement: Shall conform to ASTM C150, Type I or II. Do not change sources or manufacturers. Use Type II only for concrete slabs.
3. Sand: Conforming to ASTM C33; no change in source during construction.
4. Coarse Aggregate: Conforming to ASTM C33; 1" to No. 4 sieve.
5. Water: Clean, clear, suitable for drinking.
6. Vapor Barrier: 6 mil polyethylene sheeting or approved equivalent.
7. Expansion Joint Fillers: Asphalt-impregnated fiberboard.
8. Other admixtures: Air-entraining admixtures, ASTM C260, no other allowed unless specifically approved in advance by the Engineer.

9. Concrete: Minimum compressive strength of not less than 3,000 psi at twenty-eight (28) days for all walls, footings and piers; minimum compressive strength of not less than 4,000 psi at twenty-eight (28) days for all slabs-on-grade, concrete walks, curbs & mechanical pads.

a. Slump: 2" to 4" when measured in accordance with ASTM C143. Slump at point of placement for concrete containing HRWR admixture (super plasticizer) shall not exceed 8", after addition of admixture, or less as required to prevent aggregate segregation.
b. Proportions: In accordance with ACI 318.
c. Water-cement ratios:

Min. Compressive Strength:	3,000psi
Min. Cement Content:	480 lb./yd.
Max. Water/Cement Ratio:	0.58
Min. Compressive Strength:	4,000psi
Min. Cement Content:	580 lb./yd.
Max. Water/Cement Ratio:	0.48

d. Air Content: Concrete subject to freezing and thawing after curing; 4% to 8%. All other concrete 2% to 4%.
e. Concrete shall conform to the following:

Sampling	ASTM C172
Slump	ASTM C143
Air Content	ASTM C231
Compressive Strength	ASTM C39

C. Curing:

1. Cure and Sealing Compound of plasticizing resins and chlorinated rubber conforming to requirements of ASTM C309 and AASHTO M 148.
2. Waterproof paper.
3. Wet sand.

D. Hardener:

1. Colorless solution of low surface tension containing chemically active concrete hardening agents that penetrates and reacts chemically with the free lime on and below the surface to permanently densify and harden the concrete.
a. "Surfhard": Euclid Chemical Co.
b. "Lapidolith": Sonneborn-Contech.
c. "Sonleseal": Master Builders.

E. Finishes:
1. Portland Cement: ASTM C150, Type I.
2. Sand shall be durable mason sand with 100 percent passing at No. 16 sieve.
3. Water shall be clear and free of dissolved compounds that may adversely affect the quality of the concrete.
4. Mixes:
a. Field mix ingredients in accordance with manufacturer's instructions.
b. Dry-pack mix shall consist of one part cement to four parts sand with sufficient water to permit a dense compact ball when molded with hand.
c. Slurry mix shall consist of one part cement to 1-1/2 parts sand.

F. Use of Calcium Chloride or any admixture containing Chloride ions for concrete poured on metal deck is strictly prohibited.

G. Non-Shrink, Non-Metallic Grout (For Structural Steel Work): Five Star Grout by U.S. Grout Company or approved equivalent.

PART 3 – EXECUTION

3.01 FORMWORK

A. All forms of concrete shall produce finished concrete of the exact size, shapes, lines and locations on Drawings.

B. Temporary clean-out openings shall be provided for cleaning and inspection of all formwork. Clean and inspect all formwork immediately before depositing concrete.

C. All forms shall be cleaned, adjusted and treated with form release agents before concrete is placed. In hot weather, just prior to placement of concrete, thoroughly wet all forms and steel to cool steel and wash out forms. Avoid standing water in forms.

D. Construction joints shall be formed with keyed bulkheads, unless noted otherwise; located as shown on Drawings and as specified herein.

E. Form ties shall be provided wherever necessary to prevent spreading of forms. Remove all form ties above grade.

F. Suitable bracing shall be provided to prevent displacement of walls due to pressure of construction equipment or earth until final completion of the building.

G. Engineer shall inspect all formwork prior to placing of concrete. Contractor shall notify Engineer not less than forty-eight (48) hours prior to placing concrete.

H. Removal of forms shall not be started until concrete has attained the necessary strength to support its own weight and any construction live loads.

I. All wood forms not specifically treated shall be sealed prior to installation, to assure that natural wood does not come in contact with concrete.

3.02 INSTALLATION OF EMBEDDED ITEMS

A. Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.

3.03 REINFORCING

A. Handle and store reinforcing in a manner to prevent unscheduled bending. Keep reinforcing bars and mesh free from dirt, mortar, oil and other materials tending to destroy bond with concrete.

B. Before placing any reinforcing, remove mill scale, loose rust and coatings that may reduce or destroy the bond to the concrete.

C. Reinforcing bars shall be supported and wired together to prevent displacement by construction loads or placing of concrete beyond the tolerances listed.

1. Bars used for concrete reinforcement shall meet the following requirements for fabricating tolerances:

a. Sheared length:	+ or – 1"
b. Depth of truss bars:	+ or – 0" to –1/2"
c. Stirrups, ties and spirals	+ or – 1/2"
d. All other bends:	+ or – 1"

2. Bars shall be placed to the following tolerances:

a. Concrete cover to formed surfaces:	+ or – 1/4"
b. Minimum spacing between bars:	+ or – 1/4"
c. Top bars in slabs and beams:	
1. Members 8" deep or less:	+ or – 1/4"
2. Members more than 8" but not over 2' deep:	+ or – 3/8"
3. Members over 2' deep:	+ or – 1/2"
d. Crosswise of members; spaced evenly in:	+ or – 2"
e. Lengthwise of members:	+ or – 2"

3. Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits or embedded items. If bars are moved other than one bar diameter, or enough to exceed above tolerances, the resulting arrangement or bars shall be subject to approval.

3.04 CONCRETE

A. Place concrete only when forms and bearings have been cleaned of all dirt, mortar and any other foreign matter. Coat all forms with a release agent. Remove release agent from reinforcing.

B. Convey concrete from mixer to final deposit as rapidly and continuously as practical until pouring is completed. Avoid segregation and loss of ingredients. Deposit concrete in forms as neatly as possible to final position for a minimum of rehandling. Pumping will not be allowed without specific approval of Engineer.

1. Place no concrete when ambient temperature is less than 40 degrees F. without specific approval of the Engineer. Should pouring at lower temperature be approved, follow procedures as outlined in the "Recommended Practice for Winter Concreting" (ACI 306).

C. Immediately following deposit of concrete, consolidate by vibrating with mechanical vibrator or other means as approved by the Engineer. Do not vibrate or otherwise disturb concrete after initial set.

3.05 PROTECTION AND CURING

A. Formwork:

1. Maintain temperature of 50 degrees F. minimum for seven days after placing concrete. Immediately after placing, protect concrete surfaces not covered by forms from loss of surface moisture.
2. Protect surfaces from which forms are removed or loosened before curing period has elapsed, as specified for surfaces not covered by forms.
3. Cure concrete as recommended in ACI 308-71, "Recommended Practice for Curing Concrete".

B. Flatwork:

1. Curing should start as soon as the method to be used will do no damage to the surface. In warm weather, 70 degrees F. or higher, a 5-day period is adequate; in cooler weather, a 7-day period is required while a temperature is maintained at 50 degrees F.
a. Liquid membrane-forming compounds may be sprayed on the surface as soon as possible after final finishing. Thorough coverage is essential. Apply a second coat at right angles to the first coat.
b. Cover slab with sand and keep sand continuously wet during curing.
c. Waterproof paper shall be installed with laps sealed and perimeter edges weighted down.
d. Do not use chemical curing compounds for any surfaces to receive chemical hardener or adhesively applied finish flooring.

3.06 FINISHES

A. Unexposed surfaces:

1. Applicable for all concrete surfaces concealed by other materials.
2. Remove all metal form ties and spreader cones.
3. Remove all fins, projections and irregularities.
4. Patch holes left by rock pockets and by spreader cones with drypack mix.

B. Exposed Surfaces:

1. Remove all metal form ties and spreader cones.
2. Remove all fins, projections and irregularities.
3. Patch holes left by rock pockets and by spreader cones with dry-pack mix.
4. Rub finish all exposed concrete wall surfaces, when surfaces are green, using carborundum bricks and water until fins, projections and hollows have been removed. Do not use mortar, grout or slurrying during operations.

C. Flatwork:

1. Immediately following placing and vibrating concrete in accordance with Paragraph 3.04, screed then fill voids and eliminate the ridges left by the screeding operation by darbying or bull-floating. Both methods shall not be done on the same surface.
2. Darbying or bull-floating shall be completed before bleed water or excess moisture appears on the surface.
3. Do not perform any finishing operation while there is bleed water or excess moisture on the surface.
4. When concrete has set and on average man is able to step on it and leave a foot print no deeper than 1/4" and there is no bleed water or excess moisture on the surface, edging and jointing may be done as required by drawings.
5. After edging and jointing, floating may be performed by machine or by hand. Combination floating-troweling machine must have float shoes attached.
6. Immediately or shortly after floating, troweling shall be performed either by hand or machine trowel.
a. Trowel blade shall work as flat as possible.
7. Concrete slabs not scheduled to receive additional finish or scheduled to receive hardener shall receive additional troweling, except exterior flatwork. Time must elapse between successive trowelings so that the concrete will set further. As the concrete sets, each successive troweling should be made with a smaller trowel, progressively tipped to a greater angle than the last.

D. Broom Finish:

1. Applicable for exterior exposed flatwork as indicated on drawings and/or as specified.
2. Follow the procedures for flatwork in this section.
3. Non-slip broom finish shall be applied by brooming perpendicular to main traffic route.

E. All concrete surfaces to be painted or have other finishes adhered to it shall not be sealed.

END OF SECTION

FLOWABLE FILL

PART 1 – EXECUTION

1.01 SECTION INCLUDES

A. Flowable fill (cement stabilized backfill).

1.02 RELATED SECTIONS

A. General Specifications
B. Cast-in-Place Concrete

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01330, Submittal Procedures.
1. Provide design mixes and test reports.
2. Batch tickets.
3. Field test reports.

1.04 DESCRIPTION

A. Flowable fill may be used for replacement of structural subbase material where traditional methods of compaction are impractical, trenches, pipe structures, fill for abandoned water and sewer lines, and other works where cavities exist and firm support is required.
B. The use of flowable fill around or adjacent to utility lines or structures shall be reviewed and approved by the appropriate utility's Engineering Department representative.

1.05 QUALITY ASSURANCE

A. When work or portions of work of this section are completed and require testing, notify the Engineer.
B. Ensure all required cast-in-place concrete, embedment items, and utility work has been completed prior to placing flowable fill.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Provide materials and construction requirements for Flowable Fill conforming to Vermont Agency of Transportation Standard Specifications

2.02 FLOWABLE FILL

A. Mix and deliver flowable fill in accordance with ASTM C94.
B. Use accelerating admixtures in cold weather only when approved by the Engineer. Use of admixtures will not relax cold weather placement requirements.
C. Use set retarding admixtures during hot weather only when approved by the Engineer.
D. Do not use calcium chloride as an admixture.
E. Add air-entraining agent if required to produce a flowable mix.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify that all items of cast-in-place concrete, grading, trenching, and all utilities and other embedded items are in place prior to placing flowable fill.
B. Flowable fill shall not be used as a substitute for sand bedding or earth backfill for primary utilities unless approved by the Utilities and Infrastructure System representative.

3.02 PREPARATION

A. Remove all loose material from the uneven tuff and the concrete structures.
B. Set elevation marks or otherwise determine the proper top elevation for the flowable fill.

3.03 PLACEMENT OF FLOWABLE FILL

A. Notify the Engineer a minimum of 24 hours prior to placement of flowable fill.
B. Flowable fill may be placed by direct discharge from the truck, by pumping, or by other approved methods.
C. The flowable fill shall be placed in a uniform manner that will prevent voids or segregation of the bedding and filling material. If required, the flowable fill shall be consolidated with internal vibrators.
D. Pipes, reinforcement, inserts, or other embedded parts shall be placed, supported, and secured in a manner that shall prevent the flowable fill from displacing, sagging, or from floating embedded items.
E. Flowable fill shall be brought up uniformly to the fill line shown on the plans. Formed walls or other bulkheads shall be constructed to withstand the exerted hydrostatic pressure and confine the material within a dedicated space.
F. Placement of flowable fill shall start only when weather conditions are favorable. The temperature shall be at least 35 degrees F and rising. Flowable fill shall not be placed on frozen ground or when it is raining.

3.04 CURING AND PROTECTION

A. Immediately after placement, protect flowable fill from premature drying, excessively hot or cold temperatures and mechanical injury.
B. The flowable fill shall not be subjected to load and shall remain undisturbed by construction activities for at least 24 hours after placement.

3.05 FIELD QUALITY CONTROL

A. Testing of flowable fill is not necessarily required. If testing is requested by the Owner it shall be in accordance with the appropriate Specification.
B. Provide unobstructed access to work and cooperate with appointed firm.

3.06 DEFECTIVE FLOWABLE FILL

A. Do not accept or place defective flowable fill that is not in conformance with acceptance criteria. Return the fresh flowable fill to the supplier.
B. Defective flowable fill is flowable fill having excessive honeycomb, embedded debris, higher than maximum compressive strength, or not conforming to required lines, details, dimensions, tolerances or specified requirements. Repair or replace defective flowable fill as directed by the Engineer.
C. Replace flowable fill not in conformance with details, tolerances, and other construction requirements at Contractor's expense.

END OF SECTION

WATER

Water distribution systems on the project are served by the Champlain Water District & the City of Winooski.

1. Notes:

a. Prior to the construction of any utilities or improvements, the Contractor shall notify the Public Works Department IN WRITING of the intent to proceed & shall arrange for a meeting with a representative of CWD & the Public Works Departments, the Engineer, the Owner & the Contractor to discuss the Project.

b. No valves, hydrants, curb stops or other appurtenance shall be operated without prior approval by CWD & the Public Works Departments.

c. An inspector employed by CWD shall be notified at least 48 hours in advance of any approved water line modification work scheduled. No work shall be completed without an inspector on site.

d. All water mains, fittings, appurtenances & other materials, & all construction & testing shall conform to AWWA 906 & all CWD, Town of Colchester & City of Winooski codes, standards & regulations.

2. Materials:

a. Piping.
i. Alternate #2 piping – HDPE C906 Type Water Pipe: (HDPE) plastic pressure pipe with fused joints shall meet the requirements of AWWA Standard C906. Size 10". Pressure rating DR11 with 4710 resin.

b. Gate Valves Resilient Seat: Valves shall be manufactured to meet all requirements of AWWA Specification C509 (latest version). Valves 12 inches and smaller shall be bubble tight, zero leakage at 200 psi working pressure. Valves shall have non-rising stems, open COUNTER CLOCKWISE and be provided with a two-inch (2") square operating nut with arrow cast in metal to indicate direction of opening. Valves shall be American Flow Control Resilient Wedge or approved equivalent.

c. Valve Box: Cast Iron New England style slide-type; five and one-quarter inch (5 1/4") shaft; 5 inch by 6 foot. Tested per NFPA 22. Cover shall be cast iron, marked "WATER" and indicating direction of opening.

All exterior nuts and bolts shall be Type 18-8 stainless steel.

3. Installation:

a. All pipe and fittings shall be inspected and tested in accordance with the manufacturer's specifications, the aforementioned AWWA Specifications. The Contractor shall furnish for approval certification from the pipe manufacturer that all tests have been performed with satisfactory results. Pipe shall not be installed without the Engineer's or the Town of Colchester & City of Winooski Department of Public Works and CWD approval.

b. Pipe, fittings, and accessories shall be carefully handled to avoid damage. Prior to the date of acceptance of the project work by the Owner, the Contractor shall replace any new pipe or accessory found to be defective at any time, including after installation, at no expense to the Owner.

c. All pipe showing cracks shall be rejected. If cracks occur in the pipe, the Contractor may, at his own expense and with the approval of the Engineer, cut off the cracked portions at a point at least 12 inches from the visible limits of the crack and use the sound portion of the pipe. Conductivity wedges shall be installed at all joints. Three per joint (min.)

d. All pipe and fittings shall be cleared of all foreign matter and debris prior to installation and shall be kept clean until the time of acceptance by the Owner.

e. At all times, when the pipe laying is not actually in progress, the open ends of the pipe shall be closed by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed. The pipe shall be installed in trenches and at the line and grade shown on the Contract Drawings. Any deflection joints shall be within the limits specified by the manufacturer.

f. All piping and appurtenances connected to the equipment shall be supported so that no strain will be imposed on the equipment. (If the equipment manufacturer's specifications include that piping loads are not to be transferred, the Contractor shall submit certification of compliance).

g. Concrete thrust blocks shall be installed on all plugs, tees, and bends deflecting 11 1/4 degrees or more. Care shall be taken to ensure that concrete will not come in contact with flanges, joints, or bolts. The required area of thrust blocks are indicated on the plans or shall be as approved by the Engineer.

i. A minimum 18 inch vertical separation between the outside pipe surfaces shall be maintained where force mains cross water mains. Force mains shall cross water mains at or near right angles with one full length of water pipe centered on the force mains so both end joints are at maximum separation from the force main. Special structural support for the water main and the force main may be required.

j. There shall be no physical connection between the distribution system and any pipes, pumps, hydrants, or tanks which are supplied or may be supplied with a water that is, or may be contaminated.

k. All trenching safety standards shall be in conformance with all applicable State and Federal guidelines and as specified on the plans.

l. The Contractor shall, at all times, keep the trenches entirely free of water until all work is finished and trenches are ready for backfilling.

m. Valve boxes are to be installed on all buried valves. The boxes shall be cast iron with a minimum 5 1/4" diameter and long enough to extend from the valve to finished grade. The boxes shall enclose the operating nut and stuffing box of the valves. Valve boxes shall not transfer loads onto the valve.

Covers shall be close fitting and dirt tight with the top of the cover flush with the top of the box rim. Covers shall be marked "WATER" with an arrow indicating direction of opening.

n. Chlorination of the water service shall be conducted only after the service has been flushed in accordance with AWWA standards. All chlorination testing shall be done by an independent third party approved by the Engineer and the Town of Colchester & City of Winooski Department of Public Works and CWD.

The Contractor shall furnish all labor, equipment, materials, and tools necessary to disinfect the pipe and appurtenances in accordance with the AWWA Standard for Disinfecting Water Mains C651-86 (tablet method not acceptable).

The method of disinfection shall be by the continuous feed method unless otherwise approved by the Engineer. After filling, flushing, and addition of chlorine solution, the chlorine concentration within the pipe shall be at least 10 mg/l. All disinfection shall be performed under the supervision of the Engineer. The disinfection process shall be deemed acceptable only after two samples of water from the flushed disinfected main show no evidence of bacteriological contamination.

o. The Contractor shall, at all times, keep the trenches entirely free of water until all work is finished and trenches are ready for backfilling.

p. The Contractor shall furnish all gauges, testing plugs, caps, and all other necessary equipment and labor to perform a pressure test in accordance with AWWA C-600, C-605 and C-651. All pressure testing shall be done by an independent third party approved by the Engineer and the Department of Public Works. The Contractor shall develop and maintain for two hours, 150 percent (150%) of the working pressure measured in pounds per square inch (200 psi – minimum). Failure to hold the designated pressure for the two hour period constitutes a failure of the section tested. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

S = Length of Pipe Tested (ft)
L = Allowable Leakage (Gals/HR)
D = Nominal Diameter of Pipe (in)
P = Average Test Pressure (psi)
N = Number of Joints in the Pipeline Tested

Pressure tests shall be up to the curb stop with corporations fully open. A corporation stop shall be installed in the main with a copper gooseneck assembly for testing. Following testing & sampling this corporation shall be shut off, disconnected & the gooseneck assembly removed. All water flushed during charging and sampling of the water main shall be dechlorinated.

q. If there is an area where a cover of six feet (6') cannot be maintained over the water line, the Contractor shall notify the Engineer (in writing) for a revised design.

r. As-Built plans shall be provided to the Town of Colchester & City of Winooski Department of Public Works, CWD and the Malletts Bay Water Company.

s. A tracer wire & tracer access boxes (per CWD Details & Specifications) are required for all HDPE pipe installations.

END OF SECTION

CONCRETE FORMWORK

PART 1 – GENERAL

1.01 DESCRIPTION

A. Construct all formwork systems to provide only those lines and delineations indicated, unless otherwise approved by the Engineer, construct formwork to allow erection in proper sequence and to permit removal without damage to the finished concrete surfaces. Construct all formwork to the shapes, lines and dimensions of concrete members with specified tolerances.

1.02 RELATED SECTIONS

A. Flowable Fill

B. Cast-in-Place Concrete

1.03 REFERENCE STANDARDS

A. Conform to requirements of the following Reference Standards as the Engineer judges them applicable and as modified and supplemented herein.

1. ACI Specifications for Structural Concrete for Buildings, ACI 301.

2. ACI Recommended Practice for Concrete Formwork, ACI 347.

1.04 QUALITY ASSURANCE

A. Special Inspection: Notify the Engineer at least 48 hours before pouring concrete for review of forms and reinforcement. No concrete shall be placed without formwork and reinforcement review by Engineer.

B. Inspection by Other Trades: Where items, such as anchors, fastenings, conduit, piping and other items are supplied by other trades and specified elsewhere in these Specifications, in the forms, obtain approval of their placement prior to placing any concrete.

1.05 HANDLING

A. Protection of Forms: Design, construct, and erect all forms for reuse; withdraw projecting nails or other objects from contact surfaces before reusing; clean and completely recondition all forms prior to reuse; and repair any damage to forming surfacing cause during previous usage. Obtain approval for each reuse. Formwork with patches or repairs affecting appearance of the concrete surfaces will not be permitted.

B. In order that reused forms will not contain patches resulting from alterations, reuse forms on identical sections only; reuse no forms showing excessive surface wear or other imperfections impairing quality of finish of concrete surface.

C. Precautions: Contractor is responsible for the strength and suitability of the formwork.

PART 2 – PRODUCTS

2.01 FORMS

A. Footings, Walls, and Concrete Slabs:
Construct with a minimum of joints, sufficiently tight to prevent leakage.

B. Materials:

1. Studs, wales, shores, braces, mudsills and stakes of wood species, lumber grade and size required by form design.
2. Plywood Sheathing: Exterior grade Douglas Fir Plywood, 3/4" thick, B-B Plyform, Class I and II, APA or Structural 1 Plyform, APA.
3. Form Ties: Bolts or rods, adjustable type, designed to leave no metal less than 1" from finished concrete surfaces.
4. Metal Forms: As approved by Engineer.

2.02 INSERTS/SLEEVES

A. As required by Manufacturer's Specifications.

2.03 FORM RELEASE AGENT

A. Release agent with non-staining and non-interference characteristic with bonding capabilities of paints, plasters, adhesives, other surface coatings or materials. Contractor shall guarantee proper bonding of such subsequent coatings or materials applied over concrete.

2.04 FORM TIES

A. Steel construction of adequate strength and of suitable design. Use one inch deep break off ties for all structures.

PART 3 – EXECUTION

3.01 PREPARATION

A. All areas of formwork and concrete placement shall have an approved crushed rock base as specified and shown on the Drawings prior to executing formwork.

B. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with plans.

3.02 DESIGN AND CONSTRUCTION

A. Erect forms to conform accurately to the shapes, dimensions, locations and profiles indicated, and in accordance with the requirements of ACI 301. Fit joints between adjacent assembled panels and components tightly and seal with gasket material. Inspect all contact surfaces prior to concrete placement; verify that surfaces are clean, smooth, and free from foreign matter or imperfections affecting appearance of finished concrete.

B. Camber: Design and erect formwork for anticipated deflection due to weight and pressure of fresh concrete. Provide positive means for adjustment of shores and struts to take up settlement during placement.

3.03 FORM TREATMENT

A. Before erection of forming, plug and seal all cracks, holes, slits, gaps, and other "telegraphing" imperfections in contact surfaces. Apply bond-breaking coating in amounts that will leave surfaces in proper condition to receive subsequent material application. Contractor shall be responsible for being certain that bond release coatings are applied only in amounts that will leave surfaces in proper condition to receive subsequent material application.

3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Locate and set in place items, which will be cast directly into the concrete. Furnish all hardware in completion of the work.

B. Install accessories and inserts in accordance with the manufacturer's recommendations, straight level, and plumb.

C. Make provisions within the formwork for all required openings as shown on the plans.

D. Coordinate penetrations and sleeves with the respective subcontractor.

E. Ensure all items within the formwork are not disturbed during concrete placement.

3.05 FORM REMOVAL

A. Formwork designed for easy removal without damaging or marring finished surfaces of the concrete. Prying against face of concrete will not be permitted; where mechanical means are necessary to release forms, use wood wedges only and then only if approved by the Engineer.

B. Removal Strength: Formwork for footings shall remain in place until concrete has hardened sufficiently to resist damage from the removal operations. Determine concrete removal strength based on test cylinders, field cured under the most unfavorable conditions prevailing for any portion of the work represented.

END OF SECTION

REVISION DATE & DESCRIPTION	BY

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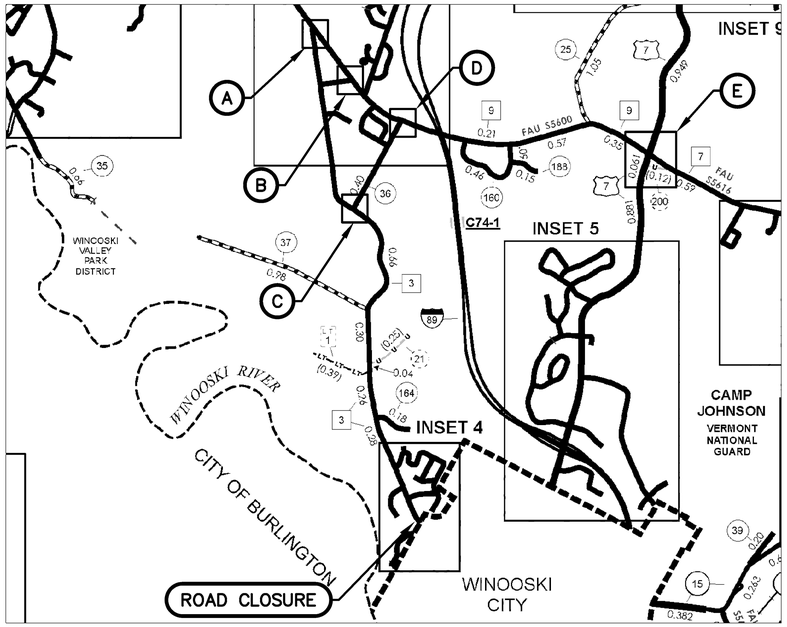
STATE OF VERMONT
GREGORY J. BOMBARDIER
NO. 4496
REGISTERED PROFESSIONAL ENGINEER

TOWN OF COLCHESTER
MOREHOUSE BROOK CULVERT
MALLETTS BAY AVENUE
SITE SPECIFICATIONS
COLCHESTER VERMONT

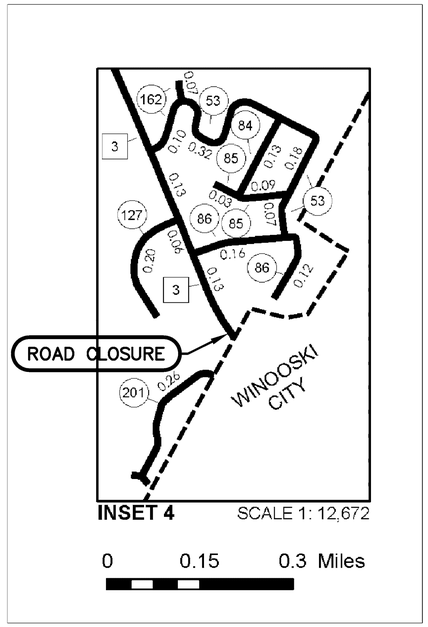
DRAWN	CCE
CHECKED	GJB
SCALE	NONE
DATE	04/21/16
JOB NO.	13172
SHEET	C-9

OF 11 SHEETS

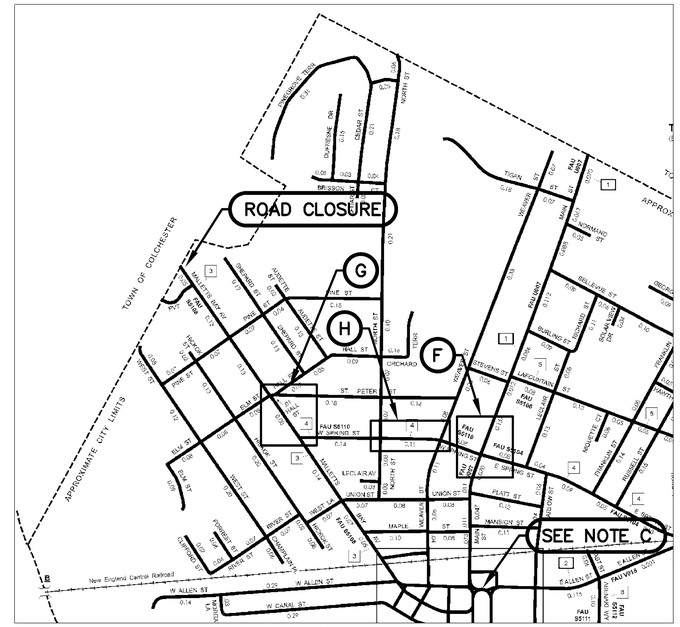


NOTE A:
MAP SECTIONS PRINTED FROM VERMONT GENERAL HIGHWAY MAPS:
– TOWN OF COLCHESTER DATED 10/10/2012;
– CITY OF WINOOSKI DATED 10/03/2014.

COLCHESTER



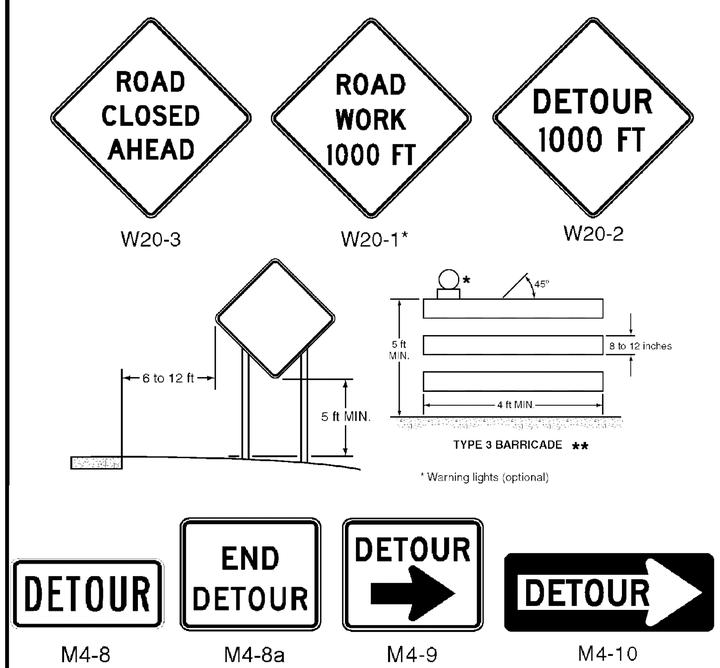
NOTE B:
TRAFFIC CONTROL SIGNAGE SHALL INCLUDE 2 VARIABLE MESSAGE BOARDS NOTIFYING THE PUBLIC OF UPCOMING ROAD CLOSURE 2 WEEKS PRIOR TO CLOSURE DATE. THE CONTRACTOR SHALL COORDINATE MESSAGE WORDING & LOCATIONS WITH THE TOWN OF COLCHESTER & THE CITY OF WINOOSKI.



NOTE C:
TRAFFIC CONTROL SIGNAGE SHALL INCLUDE "MALLETTS BAY AVENUE CLOSED TO THROUGH TRAFFIC AT COLCHESTER TOWN LINE" SIGNS AT THE CIRCULATOR. SIGN QUANTITY & LOCATION(S) TO BE COORDINATED WITH THE CITY OF WINOOSKI.

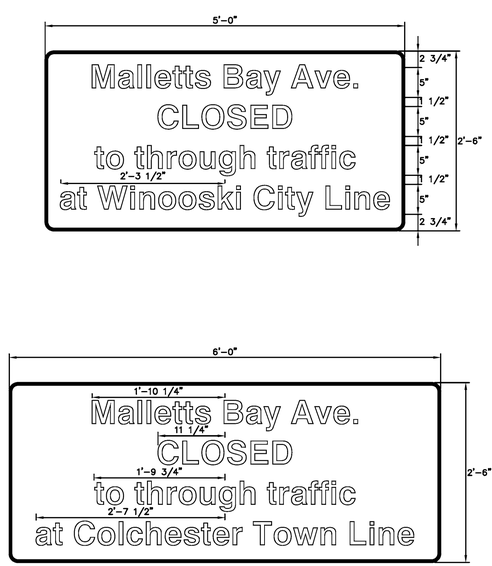
WINOOSKI

1/T-1 TRAFFIC CONTROL MAPS
N.T.S.

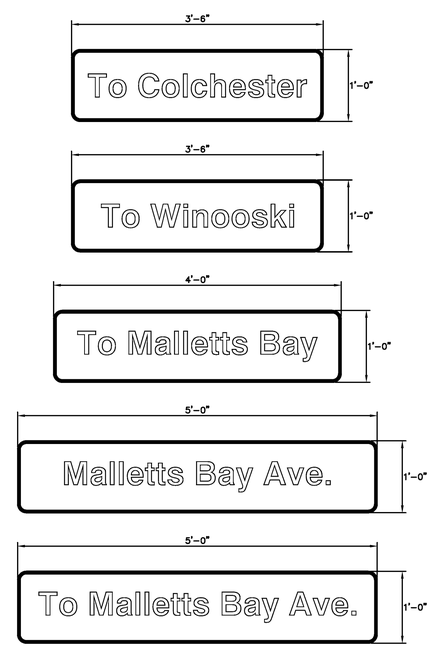


3/T-1 DETOUR & CONSTRUCTION SIGNS
N.T.S.

NOTES:
1. SEE SHEET T–2 FOR M4–9 & M4–10 ARROW DIRECTIONS.
2. ALL SIGNS SHALL BE CONVENTIONAL ROAD SIZES PER MUTCD (SEE SPECIFICATIONS).



4/T-1 TRAFFIC SIGN DETAILS
N.T.S.



1. TRAFFIC CONTROL DEVICES NOT DETAILED IN THE VERMONT AGENCY OF TRANSPORTATION (VAOT) "STANDARD DRAWINGS" OR THE PROJECT PLANS SHALL BE IN ACCORDANCE WITH THE "MANUAL ON TRAFFIC CONTROL DEVICES" (MUTCD) AND THE "STANDARD HIGHWAY SIGNS AND MARKINGS" BOOK (SHSM) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).
2. CONSTRUCTION SIGNS SHALL BE ERECTED BEFORE THE START OF ANY WORK AND SHALL BE COVERED UNTIL WORK COMMENCES, DURING PERIODS OF INACTIVITY OR UPON COMPLETION OF THE WORK. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER.
3. CONSTRUCTION SIGN COVERS SHALL CONSIST OF A PANEL, PAINTED FLAT BLACK, THE SAME SIZE AS THE SIGN IT COVERS. THE PANEL SHALL BE OF WOOD, PLYWOOD, HARDBOARD OR ANY MATERIAL SATISFACTORY TO THE ENGINEER. NO MATERIAL WILL BE APPROVED THAT WILL DETERIORATE BY EXPOSURE TO THE WEATHER DURING THE PROJECT. MOUNTING OF THE PANEL SHALL BE DONE IN SUCH A WAY AS NOT TO DAMAGE THE SIGN FACE MATERIAL.
4. SIGNS SHALL BE MAINTAINED IN A CLEAN AND LEGIBLE CONDITION SATISFACTORY TO THE ENGINEER. THEY SHALL BE KEPT PLUMB AND LEVEL, AND ALWAYS PRESENT A NEAT APPEARANCE. DAMAGED, DEFACED OR DIRTY SIGNS SHALL BE REPAIRED, CLEANED OR REPLACED AS ORDERED BY THE ENGINEER.
5. NO CROSS-BRACING OR BACK-BRACING TO KEEP POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO POSTS.
6. CONSTRUCTION SIGNS INSTALLED ON POSTS SHALL BE SET SECURELY IN THE GROUND. THE BOTTOM OF A SIGN SHALL BE AT LEAST FIVE FEET ABOVE THE EDGE OF PAVEMENT AND THE NEAREST EDGE OF A SIGN SHALL BE AT LEAST SIX FEET OUTSIDE THE SHOULDER POINT, FOUR FEET OUTSIDE GUARDRAIL OR TWO FEET OUTSIDE CURBING OR SIDEWALK. THE INSTALLATION OF SIGNS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER. IN URBAN AREAS, THE BOTTOM OF THE SIGN SHALL BE AT LEAST SEVEN FEET ABOVE THE SIDEWALK OR EDGE OF PAVEMENT, WHICHEVER IS HIGHER.
7. PORTABLE SIGNS SHALL BE PLACED ON THE EDGE OF ROADWAY AND A MINIMUM OF ONE FOOT ABOVE THE TRAVELED WAY. ALL VEGETATION THAT INTERFERES WITH VISIBILITY OF THE SIGNS SHALL BE REMOVED. WHEN PLACED BEHIND GUARDRAIL, THE BOTTOM OF THE SIGN FACE SHALL BE ABOVE THE TOP OF THE GUARDRAIL.
8. SIGNS SHALL BE REMOVED UPON COMPLETION OF THE WORK AT THE DISCRETION OF THE ENGINEER.
9. ROLL UP CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ("AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956) TYPE VI AND TYPE VII (UNLESS OTHERWISE NOTED).
10. SOLID SUBSTRATE CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ("AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956) TYPE VIII OR IX (REQUIREMENTS UNLESS OTHERWISE NOTED.
11. WHERE CONSTRUCTION SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARDRAIL OR OTHER APPROVED TRAFFIC BARRIERS, ALL SIGN STANDS AND POST INSTALLATIONS SHALL MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350 OR THE AASHTO "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION. NO SIGN POSTS SHALL EXTEND OVER THE TOP OF THE SIGN INSTALLED ON SAID POSTS, WHEN ANCHORS ARE INSTALLED. STUBS SHALL NOT BE GREATER THAN FOUR INCHES ABOVE EXISTING GROUND.
12. ROADWAY AND SHOULDER WIDTHS DEPICTED ON THE STANDARD DRAWINGS MAY VARY.
13. THESE STANDARD DRAWINGS ARE INTENDED TO SERVE AS VTRANS STANDARD OPERATING PROCEDURE. IT IS NOTED THAT COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL WORK ZONE MAY BE MODIFIED DUE TO FIELD CONDITIONS, AT THE DISCRETION OF THE ENGINEER.

2/T-1 VTRANS TRAFFIC NOTES
N.T.S.

TRAFFIC CONTROL

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work included: Provide all facilities and traffic controls needed to allow safe conduct of the Work while maintaining access to the site by officials or emergency personnel, including, but not necessarily limited to:

1. Warning signs, barriers, delineators, lights, cones, personnel, equipment, etc.

B. Traffic control shall be the sole responsibility of the Contractor.

1.02 QUALITY ASSURANCE

A. Inspect all traffic control devices at least twice per day (at intervals not greater than 4 hours during construction activities) to verify all controls are in place and the site is in proper and safe condition throughout the progress of the Work.

1.03 JOB CONDITIONS

A. The suggested procedure for maintaining traffic through the work zone is:

1. Coordinate all blockages of drives with the affected property owners. Provide at least 24 hour advance notice of all such blockage.

2. Coordinate all partial or full disruption of traffic with VTrans and the Town as required. Provide at least 24 hour advance notice of all such disruption.

B. No street is to be closed completely to through traffic with the exception of Malletts Bay Avenue as approved. An approved traffic control plan shall be in effect and all appropriate signs in place prior to construction activities affecting traffic flow.

PART 2 – PRODUCTS

2.01 TRAFFIC CONTROL PLAN

A. The Contractor shall provide a Traffic Control Plan to the Engineer for submission and approval of the Town and Vtrans Maintenance District 5 for all traffic pertaining to construction.

B. Locate on the plan all signs and devices to be employed for the control of traffic. The plan shall indicate general sign locations for all work activity.

C. Include on the plan, but do not necessarily limit control devices to:

1. Type and location of warning signs;

2. Type and location of delineators, barriers, cones or similar devices;

3. Location and schedule of flaggers and/or uniformed traffic control officers;

4. Location of existing pavement marking removal and/or temporary markings;

5. Key indicating wording or symbols used.

PART 3 – EXECUTION

3.01 MAINTENANCE OF TRAFFIC

A. The Contractor shall provide and maintain at all times during the Work, an adequate ingress and egress for the residents in or adjacent to the work site.

B. Emergency vehicle access shall be allowed within the work site at all times.

C. The Contractor shall provide emergency service at nights and on the weekends should the work site need attention due to weather conditions or similar problems. An on–call number shall be given to the Town and affected property owners.

END OF SECTION

5/T-1 SPECIFICATION
N.T.S.

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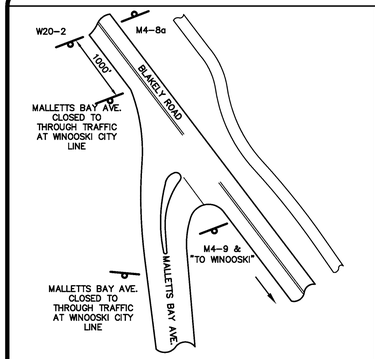
NO. 4496
REGISTERED PROFESSIONAL ENGINEER

TOWN OF COLCHESTER
MOREHOUSE BROOK CULVERT
MALLETTS BAY AVENUE
TRAFFIC CONTROL NOTES & DETAILS
COLCHESTER VERMONT

DRAWN	CCE
CHECKED	GJB
SCALE	NONE
DATE	04/21/16
JOB NO.	13172
SHEET	T–1

OF 11 SHEETS



1 T-2 INTERSECTION A
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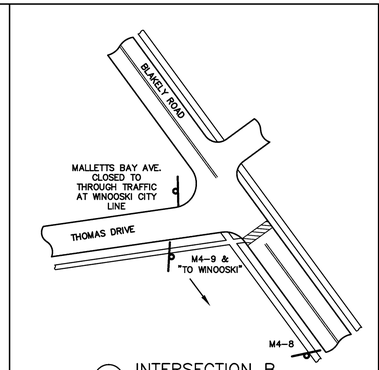

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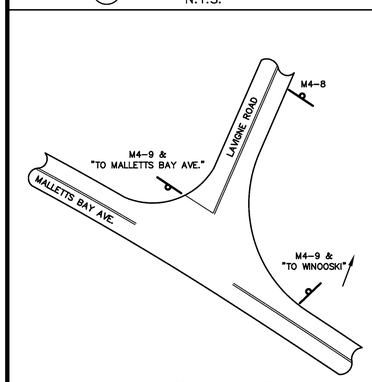

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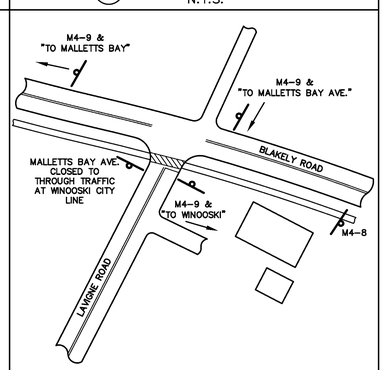

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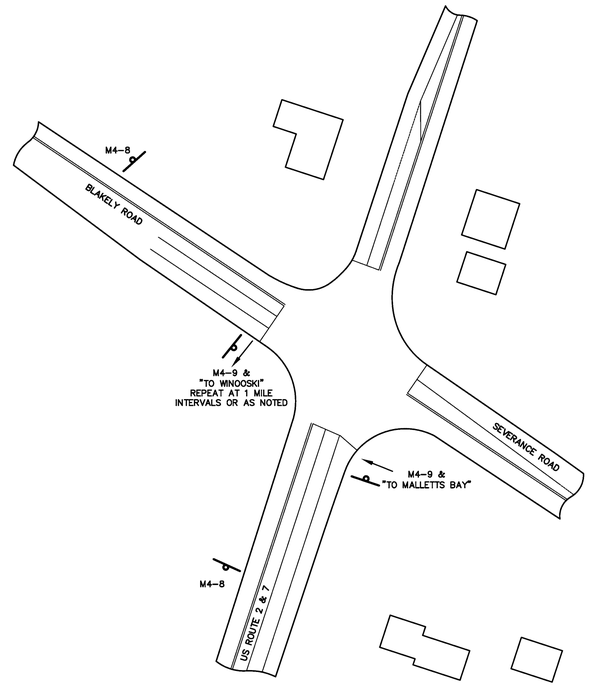

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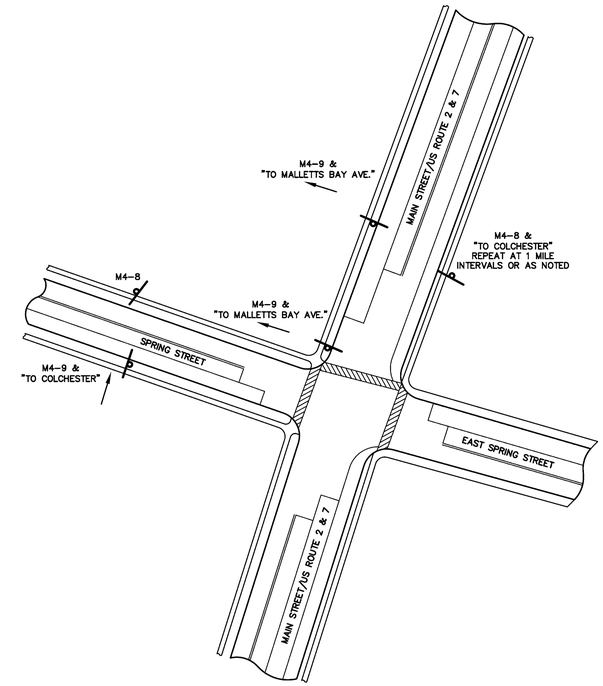

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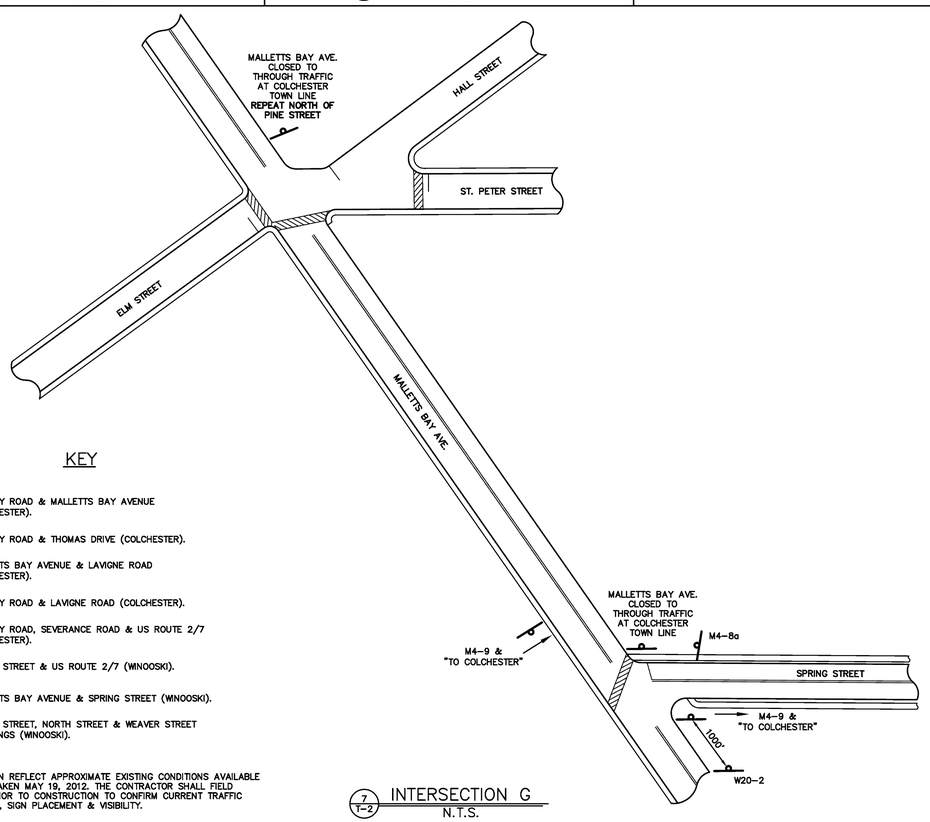
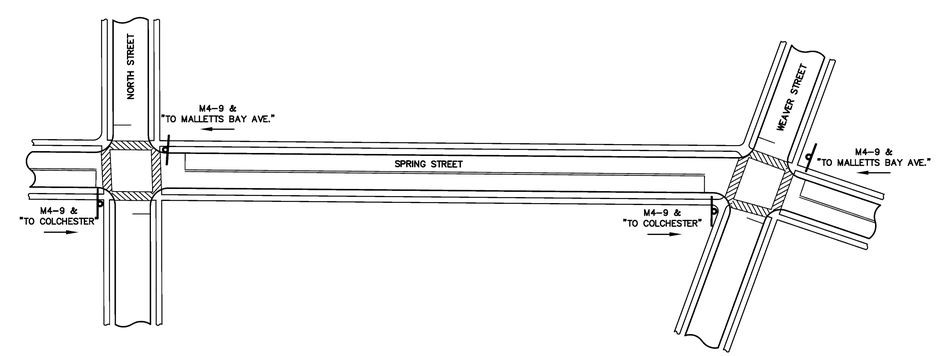


KEY

- (A) BLAKELY ROAD & MALLETTS BAY AVENUE (COLCHESTER).
- (B) BLAKELY ROAD & THOMAS DRIVE (COLCHESTER).
- (C) MALLETTS BAY AVENUE & LAVIGNE ROAD (COLCHESTER).
- (D) BLAKELY ROAD & LAVIGNE ROAD (COLCHESTER).
- (E) BLAKELY ROAD, SEVERANCE ROAD & US ROUTE 2/7 (COLCHESTER).
- (F) SPRING STREET & US ROUTE 2/7 (WINOOSKI).
- (G) MALLETTS BAY AVENUE & SPRING STREET (WINOOSKI).
- (H) SPRING STREET, NORTH STREET & WEAVER STREET CROSSINGS (WINOOSKI).

MAP SECTIONS SHOWN REFLECT APPROXIMATE EXISTING CONDITIONS AVAILABLE ON ORTHO IMAGES TAKEN MAY 19, 2012. THE CONTRACTOR SHALL FIELD VERIFY ALL SITES PRIOR TO CONSTRUCTION TO CONFIRM CURRENT TRAFFIC MOVEMENT PATTERNS, SIGN PLACEMENT & VISIBILITY.

7 T-2 INTERSECTION G
N.T.S.



8 T-2 INTERSECTION H
N.T.S.

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