

Table with 7 columns: CURVE, RADIUS, LENGTH, TANGENT, CHORD, BEARING, DELTA. It lists curve data for various segments of the boundary.

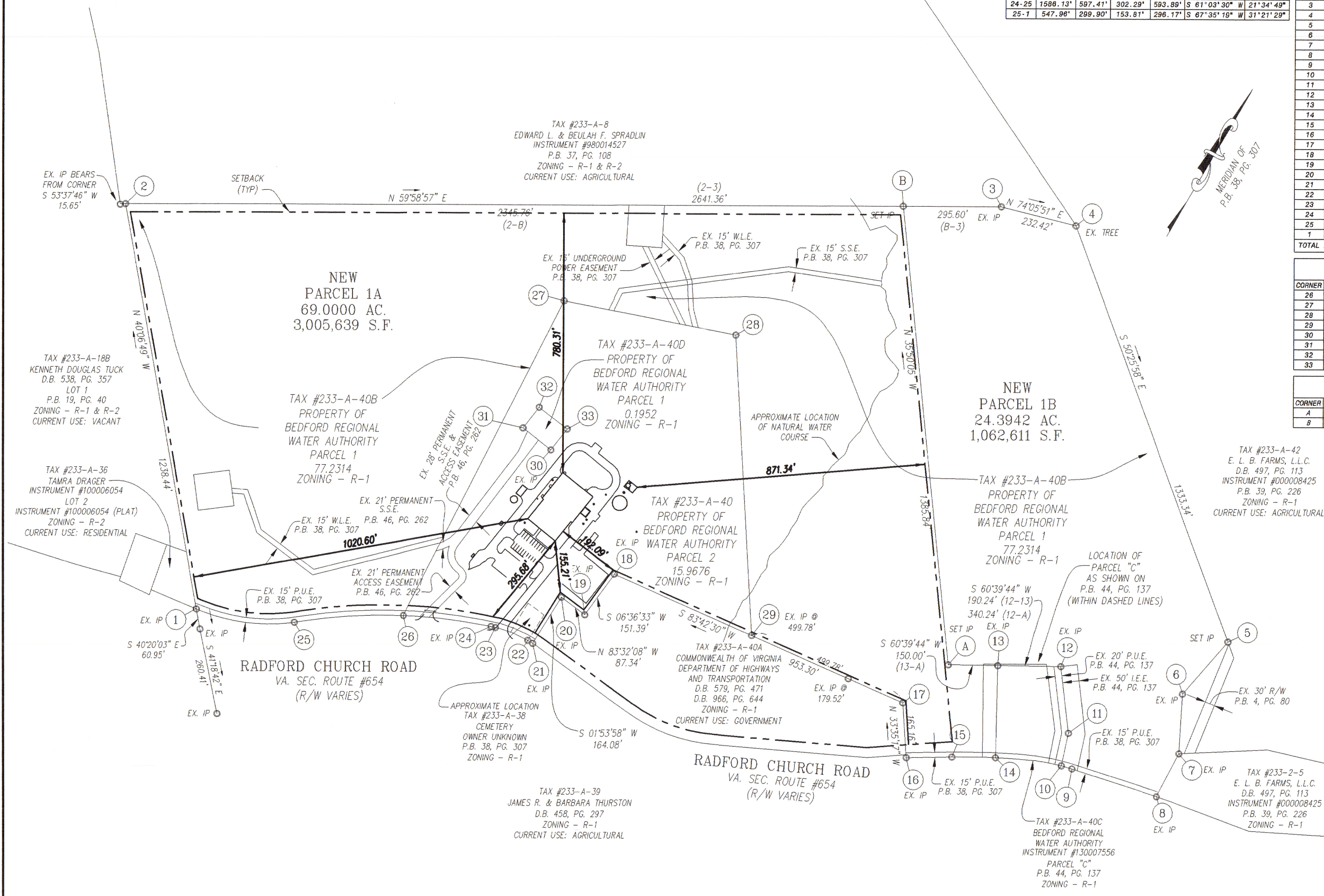
Table with 3 columns: CORNER, NORTHING, EASTING. It lists coordinates for various corners and points along the boundary.

Table with 3 columns: CORNER, NORTHING, EASTING. It lists coordinates for vacated interior boundary lines.

Table with 3 columns: CORNER, NORTHING, EASTING. It lists coordinates for new division lines.

Table with 4 columns: LINE, BEARING, DISTANCE. It lists data for original deed lines.

Table with 4 columns: LINE, BEARING, DISTANCE. It lists data for exterior boundary lines.



WTP PLAT MAP AND ADJACENT PROPERTY
1:150

ISSUED FOR CONSTRUCTION

Professional seal and title block for Black & Veatch, including project information, sheet number, and date.

NOTES:

1. WTP CONTRACTOR TO PROVIDE PLAIN END OF DIP FOR CONNECTION BY RAW WATER PIPELINE CONTRACTOR.
2. WATER METER WILL BE LOCATED INSIDE THE BUILDING.

MEMBRANE BUILDING - YARD PIPING AND UTILITY PLAN

1" = 30' - 0"

30' 20' 10' 0 30' 60'
1"=30'

ISSUED FOR CONSTRUCTION

DESIGNED: MBS
DETAILED: MAK
CHECKED: MBS
APPROVED: PJD
DATE: 11/23/15
PROJECT NO.
182262
C-30-104
SHEET
OF

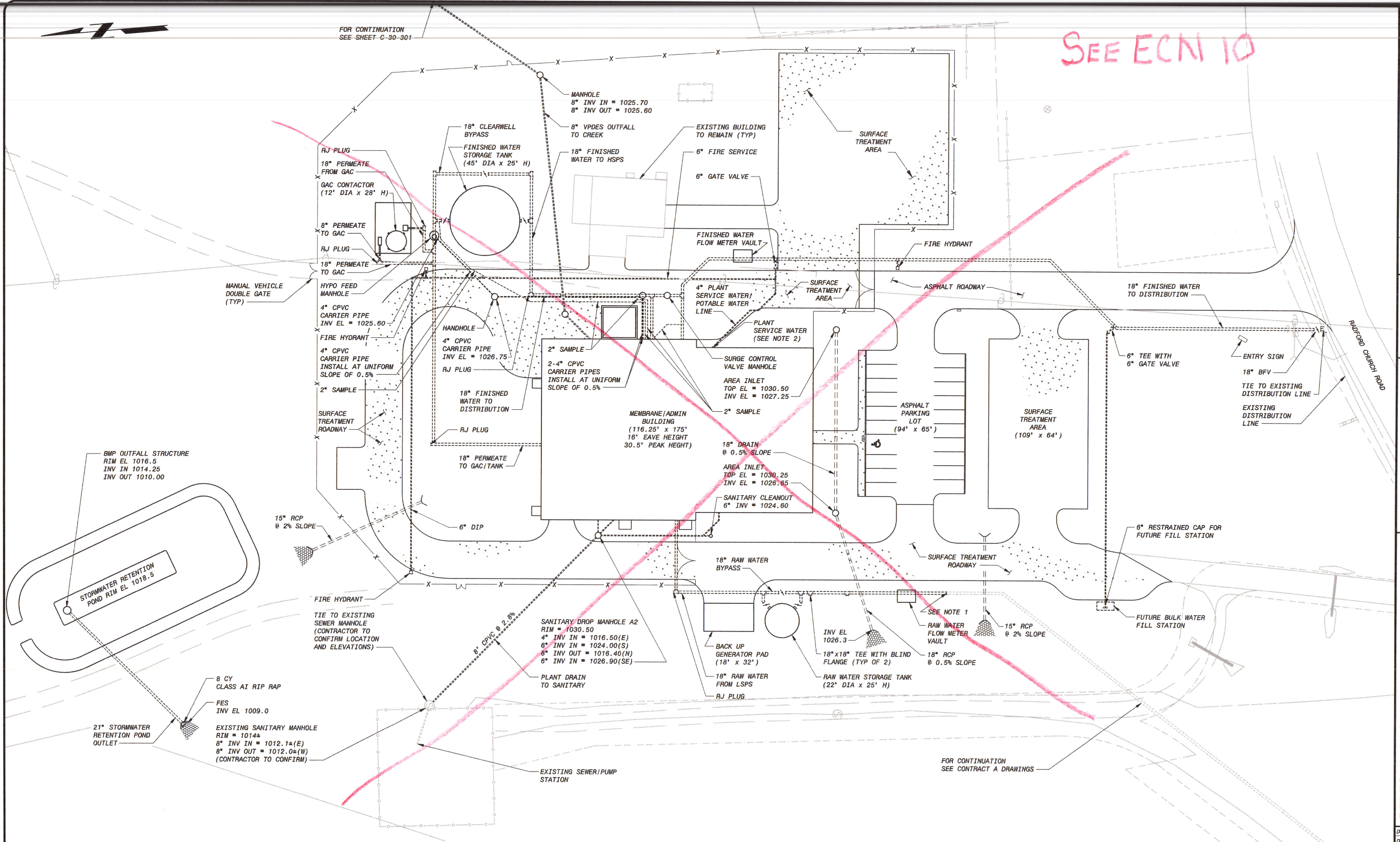
BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP &
RAW WATER PUMPING STATION / INTAKE
CIVIL
MEMBRANE BUILDING
YARD PIPING AND UTILITY PLAN

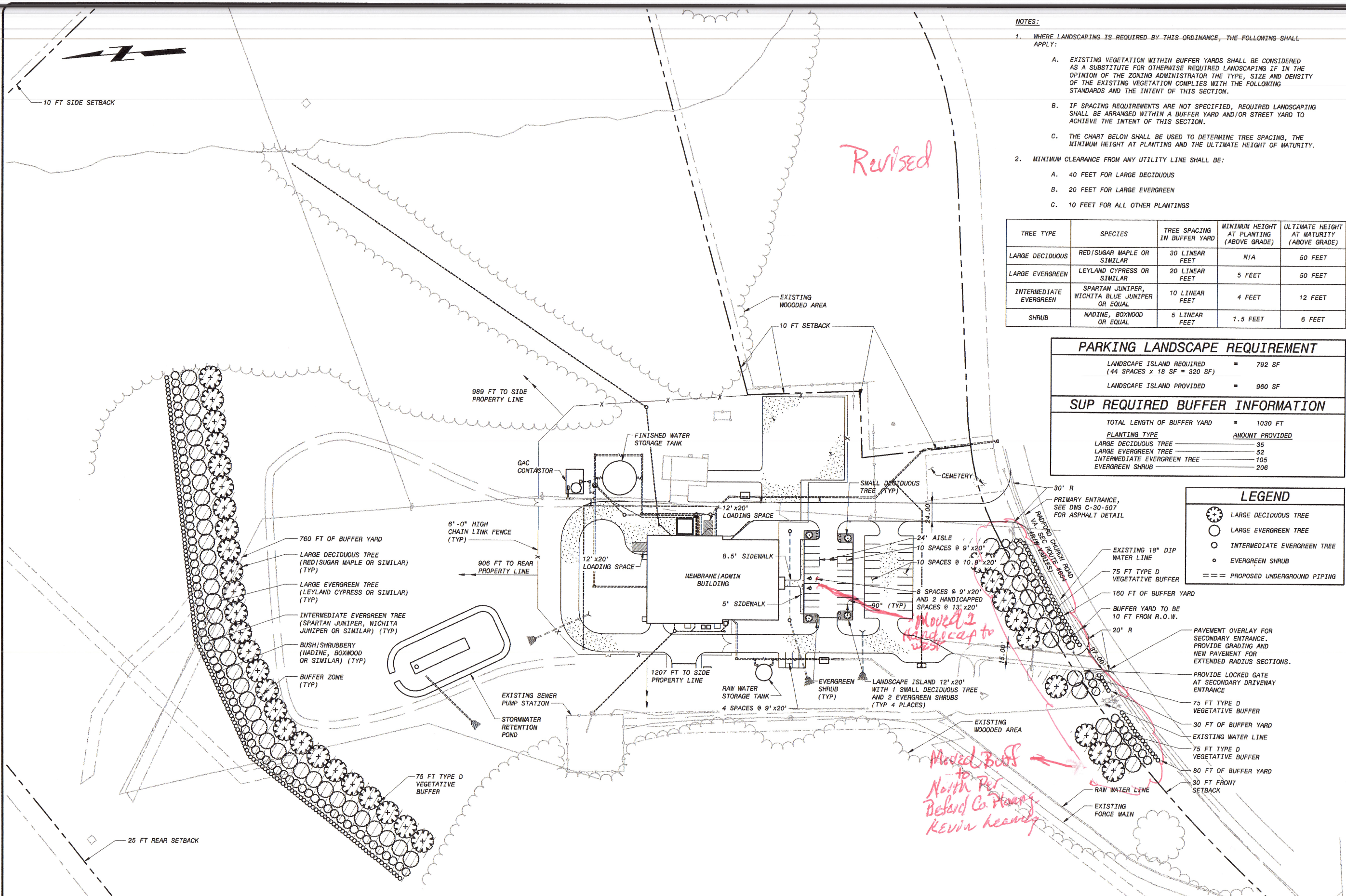
BLACK & VEATCH
Building a world of difference.
Black & Veatch Corporation
Virginia Beach, VA



DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CHK	APP.
11/23/15	ISSUED FOR CONSTRUCTION	0	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	1	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	2	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	3	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	4	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	5	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	6	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	7	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	8	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	9	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	10	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	11	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	12	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	13	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	14	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	15	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	16	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	17	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	18	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	19	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	20	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	21	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	22	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	23	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	24	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	25	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	26	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	27	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	28	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	29	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	30	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	31	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	32	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	33	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	34	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	35	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	36	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	37	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	38	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	39	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	40	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	41	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	42	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	43	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	44	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	45	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	46	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	47	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	48	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	49	MAK	MBS	PJD
05/20/15	REVISED: C-30-104.dwg	50	MAK	MBS	PJD

SEE ECN 10





- NOTES:
- WHERE LANDSCAPING IS REQUIRED BY THIS ORDINANCE, THE FOLLOWING SHALL APPLY:
 - EXISTING VEGETATION WITHIN BUFFER YARDS SHALL BE CONSIDERED AS A SUBSTITUTE FOR OTHERWISE REQUIRED LANDSCAPING IF IN THE OPINION OF THE ZONING ADMINISTRATOR THE TYPE, SIZE AND DENSITY OF THE EXISTING VEGETATION COMPLIES WITH THE FOLLOWING STANDARDS AND THE INTENT OF THIS SECTION.
 - IF SPACING REQUIREMENTS ARE NOT SPECIFIED, REQUIRED LANDSCAPING SHALL BE ARRANGED WITHIN A BUFFER YARD AND/OR STREET YARD TO ACHIEVE THE INTENT OF THIS SECTION.
 - THE CHART BELOW SHALL BE USED TO DETERMINE TREE SPACING, THE MINIMUM HEIGHT AT PLANTING AND THE ULTIMATE HEIGHT OF MATURITY.
 - MINIMUM CLEARANCE FROM ANY UTILITY LINE SHALL BE:
 - 40 FEET FOR LARGE DECIDUOUS
 - 20 FEET FOR LARGE EVERGREEN
 - 10 FEET FOR ALL OTHER PLANTINGS

TREE TYPE	SPECIES	TREE SPACING IN BUFFER YARD	MINIMUM HEIGHT AT PLANTING (ABOVE GRADE)	ULTIMATE HEIGHT AT MATURITY (ABOVE GRADE)
LARGE DECIDUOUS	RED/SUGAR MAPLE OR SIMILAR	30 LINEAR FEET	N/A	50 FEET
LARGE EVERGREEN	LEYLAND CYPRESS OR SIMILAR	20 LINEAR FEET	5 FEET	50 FEET
INTERMEDIATE EVERGREEN	SPARTAN JUNIPER, WICHITA BLUE JUNIPER OR EQUAL	10 LINEAR FEET	4 FEET	12 FEET
SHRUB	NADINE, BOXWOOD OR EQUAL	5 LINEAR FEET	1.5 FEET	6 FEET

PARKING LANDSCAPE REQUIREMENT	
LANDSCAPE ISLAND REQUIRED (44 SPACES x 18 SF = 320 SF)	792 SF
LANDSCAPE ISLAND PROVIDED	960 SF

SUP REQUIRED BUFFER INFORMATION	
TOTAL LENGTH OF BUFFER YARD	1030 FT
PLANTING TYPE	AMOUNT PROVIDED
LARGE DECIDUOUS TREE	35
LARGE EVERGREEN TREE	52
INTERMEDIATE EVERGREEN TREE	105
EVERGREEN SHRUB	206

LEGEND	
	LARGE DECIDUOUS TREE
	LARGE EVERGREEN TREE
	INTERMEDIATE EVERGREEN TREE
	EVERGREEN SHRUB
	PROPOSED UNDERGROUND PIPING

MEMBRANE BUILDING - LANDSCAPING AND PARKING PLAN
1" = 60'-0"

ISSUED FOR COUNTY PERMITTING APPROVAL

11/30/16 ISSUED FOR PLOT PLAN APPROVAL
11/23/15 ISSUED FOR COUNTY PERMITTING APPROVAL
11/17/15 ISSUED FOR COUNTY PERMITTING APPROVAL
10/15/15 ISSUED FOR COUNTY PERMITTING APPROVAL
DATE REVISIONS AND RECORD OF ISSUE
NO. BY CK APP
30.3189 - CIVIL Drafting
C-30-105.dwg
XREF1: 18282-C-30-Membrane-01.dwg
XREF2: C-30-E-SITE SURVEY.dwg
XREF3: 20-C-30-LANDSCAPE.dwg
XREF4: BORDER.dwg
PLOTTER:
USER: K0649353
DWG VER: 1001

BLACK & VEATCH
Building a world of difference.
Black & Veatch Corporation
Virginia Beach, VA

BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP &
RAW WATER PUMPING STATION / INTAKE
CIVIL
MEMBRANE/ADMIN BUILDING
LANDSCAPING AND PARKING PLAN

DESIGNED:
DETAILED:
CHECKED:
APPROVED:
DATE:

PROJECT NO.
189317
C-30-105
SHEET
OF



Ordinance #O 092214-06

At a regular meeting of the Board of Supervisors of the County of Bedford, Virginia held at the Bedford County Administration Building on the 22nd day of September 2014, 2014, beginning at 7:30 p.m.:

AN ORDINANCE
TO APPROVE A SPECIAL USE PERMIT
FOR A "UTILITY SERVICES, MAJOR" USE
ON PROPERTIES IDENTIFIED AS TAX MAP 233-A-40, 233-A-40B, AND 233-A-40D

WHEREAS, The Bedford Regional Water Authority has submitted Special Use Permit application #SU150002 requesting to construct a 30,000 square foot water treatment plant ("Utility Services, Major" use) in a R-1 (Low-Density Residential) District on properties identified as Tax Map Number 233-A-40, 233-A-40B, and 233-A-40D; and

WHEREAS, the application has been submitted pursuant to Section 30-79-2 of the Zoning Ordinance, which allows a "Utility Services, Major" use in the R-1 Zoning District after a Special Use Permit has been approved in accordance with Section 30-19 of the Zoning Ordinance; and

WHEREAS, the Board of Supervisors has carefully considered the public record, the public testimony, and the recommendation of the Planning Commission; and

WHEREAS, the Board finds that the request meets the goals and objectives of the Comprehensive Plan and the purposes of the Zoning Ordinance for issuance of a Special Use Permit; and now

THEREFORE, **BE IT ORDAINED**, by the Board of Supervisors that a Special Use Permit pursuant to application #SU150001 be and it hereby is approved with the following conditions:

- Sections 30-83-12A *General Standards* shall apply in perpetuity until the "Utility Services, Major" use has been discontinued.
- Section 30-82-12(A7) has been modified with the approval of this special use permit to require the applicant to only plant a Type D buffer along the rear and front of the applicable properties (as shown on the landscaping sketch dated June 19, 2014) with the existing buffer along the east and west side of the applicable properties remaining. Should the existing buffer along the east and west sides of the applicable properties be removed, the applicant shall plant a type D buffer along those property lines.
- The site shall be developed in conformance with the concept plan dated May 30, 2014 as prepared by Black & Veatch Corporation, except as modified by the final site development plan process.

A Copy-Teste:


Mark K. Reeter
County Administrator

11/23/15	ISSUED FOR CONSTRUCTION	0	MBS	PJD
DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CHK APP
50_3730 - CIVIL Drawings				
	C-30-106.dwg			
SAVED: X0249353, 10/21/2015 3:15:49 PM				
PLOTTED:				
USER: X0249353				
DWG VER: 1000				
	XREF1:			
	XREF2:			
	XREF3:			
	XREF4:			



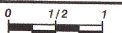
**BLACK & VEATCH**
Building a world of difference

Black & Veatch Corporation
Virginia Beach, VA

BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP &
RAW WATER PUMPING STATION / INTAKE

CIVIL
MEMBRANE / ADMIN BUILDING
SPECIAL USE CONDITIONS

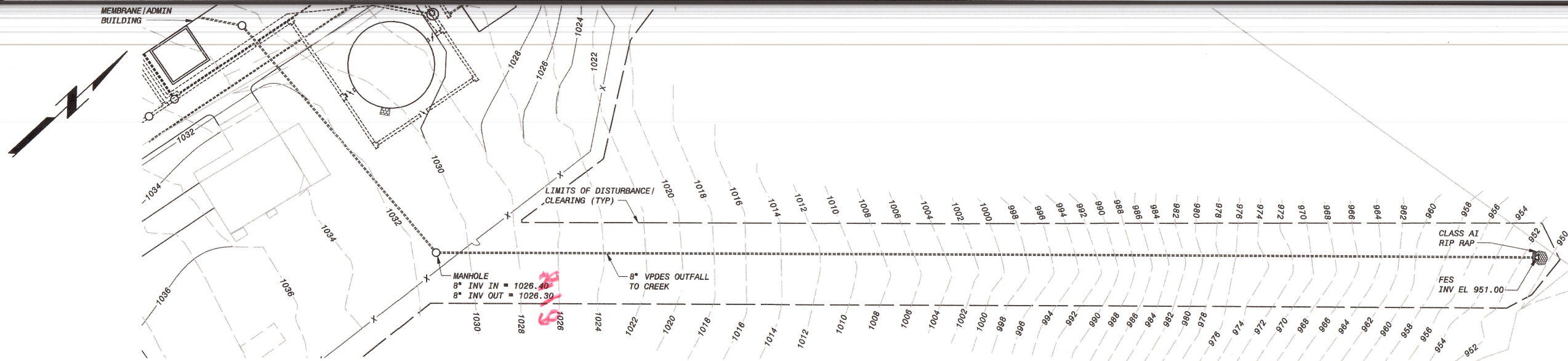
DESIGNED: MBS
DETAILED: MAK
CHECKED: MBS
APPROVED: PJD
DATE: 11/23/15


IF THIS BAR DOES NOT
MEASURE 1" THEN DRAWING IS
NOT TO FULL SCALE

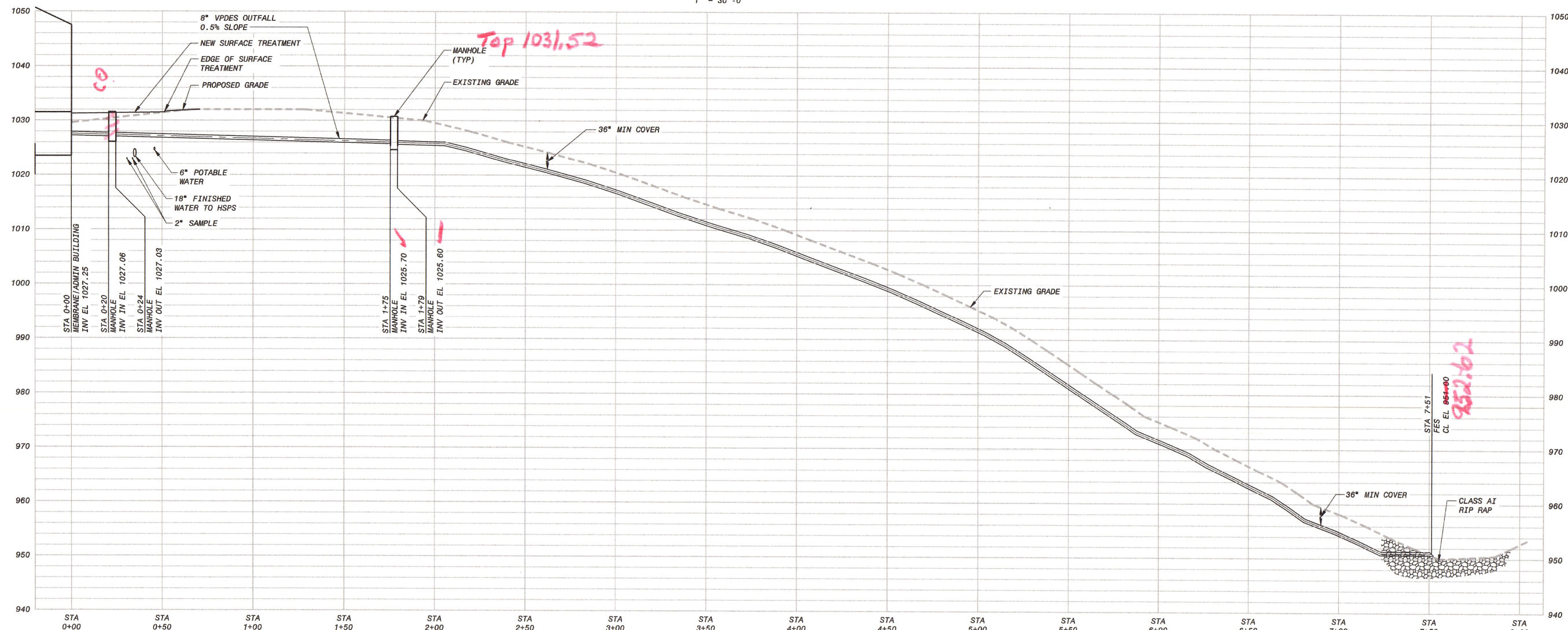
PROJECT NO.
182262

C-30-106
SHEET
OF

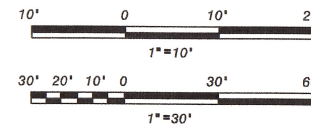
ISSUED FOR CONSTRUCTION



VPDES OUTFALL - PLAN
1" = 30'-0"



VPDES OUTFALL - PROFILE
VERT 1" = 10'
HORIZ 1" = 30'



ISSUED FOR CONSTRUCTION

DESIGNED: MBS CHECKED: MBS APPROVED: PJD DATE: 11/23/15		PROJECT NO. 182262	
BEDFORD REGIONAL WATER AUTHORITY SMITH MOUNTAIN LAKE WTP & RAW WATER PUMPING STATION / INTAKE		CIVIL MEMBRANE BUILDING VPDES OUTFALL - PLAN AND PROFILE	
BLACK & VEATCH Building a world of difference		Black & Veatch Corporation Virginia Beach, VA	
11/23/15 DATE 50.3180 - CIVIL Drawings C-30-301.dwg XREF1: BORDER.dwg XREF2: 2D-A-30-MEMBRANE.dwg XREF3: 182262-C-30-MEMBRANE.dwg XREF4: 2D-S-30-MEMBRANE.dwg USER: JOE49553 DWG VER: 1002		ISSUED FOR CONSTRUCTION REVISIONS AND RECORD OF ISSUE NO. BY CR APP	

GENERAL EROSION AND SEDIMENT CONTROL NOTES

ES-1: UNLESS OTHERWISE INDICATED, CONSTRUCT AND MAINTAIN ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, AND VIRGINIA REGULATIONS VR 625-02-00 EROSION AND SEDIMENT CONTROL REGULATIONS.

ES-2: INSPECTORS WILL MAKE A CONTINUING REVIEW AND EVALUATION OF THE METHODS AND EFFECTIVENESS OF THE E.S.C. PLAN.

ES-3: PLACE ALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO OR AS THE FIRST STEP IN CLEARING, GRADING, OR LAND DISTURBANCE.

ES-4: MAINTAIN A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN ON THE SITE AT ALL TIMES.

ES-5: PRIOR TO COMMENCING LAND-DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFFSITE BORROW OR WASTE AREA), SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE ARCHITECT/ENGINEER FOR REVIEW AND ACCEPTANCE.

ES-6: PROVIDE ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE LOCAL AUTHORITY HAVING JURISDICTION.

ES-7: ALL DISTURBED AREAS SHALL DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND-DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT.

ES-8: DURING DEWATERING OPERATIONS, PUMP WATER INTO AN APPROVED FILTERING DEVICE.

ES-9: INSPECT ALL EROSION CONTROL MEASURES DAILY AND AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT. MAKE ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES IMMEDIATELY.

NO OFFSITE STORAGE AREAS ARE ANTICIPATED FOR THE WATER TREATMENT PLANT. THE AREA TO THE NORTH OF THE WTP WILL BE USED FOR TEMPORARY STORAGE OF EXCAVATED MATERIAL.

THE PREDOMINANT SOILS ON THIS SITE ARE CECIL FINE SANDY LOAM. TYPICAL PROPERTIES FOR THIS CLASS OF SOILS INCLUDE WELL DRAINED SOILS WITH MODERATELY HIGH TO HIGH PERMEABILITY AND SLOPES RANGING FROM 7% TO 15%.

THERE ARE NO CRITICAL EROSION AREAS IN THE PROJECT AREA.

THE SITE HAS BEEN DIVIDED INTO THREE CONTRIBUTING AREAS. MOST OF THE PROJECT AREA (APPROXIMATELY 3.3 ACRES) SHEETS FLOWS TOWARD THE NORTHWEST WITH SOME OF THE FLOW CONCENTRATING IN A SHALLOW SWALE JUST NORTH OF THE EXISTING SEWER PUMP STATION. THE CONTRIBUTING AREA WILL BE PROVIDED WITH A STORMWATER RETENTION BASIN TO PROVIDE EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION AND REDUCE THE STORMWATER RUNOFF TO PREDEVELOPMENT CONDITIONS AFTER CONSTRUCTION IS COMPLETE. THE POST-DEVELOPMENT AREA IS LARGER (4 ACRES) WITH A HIGHER IMPERVIOUS AREA. THE BASIN WILL BE SIZED TO REDUCE THE 2-YEAR PEAK STORM FLOW TO BE EQUAL TO OR LESS THAN THE PRE-DEVELOPED TWO YEAR STORM FOR THE ENTIRE PROJECT AREA.

THE NORTHEAST AREA (1.12 ACRES) OF THE SITE SHEETS FLOWS OUT OF THE PROJECT AREA TOWARDS THE NORTHEAST. THIS AREA WILL BE PROTECTED BY SILT FENCE DURING CONSTRUCTION. THE POST-DEVELOPMENT AREA IS SLIGHTLY SMALLER (1.08 ACRES) WITH A HIGHER IMPERVIOUS AREA, RESULTING IN A 0.6% INCREASE IN THE POST-DEVELOPMENT RUN-OFF. THIS MINOR INCREASE IN FLOW WILL BE MITIGATED BY OVERSIZING THE STORMWATER RETENTION BASIN IN THE NORTHWEST AREA.

THE SOUTHWEST AREA (1.87 ACRES) SHEET FLOWS TOWARD THE SOUTHWEST AND FLOWS THROUGH TWO EXISTING CULVERTS UNDER THE WESTERN DRIVEWAY. SILT FENCE AND CULVERT INLET PROTECTION ARE THE PRIMARY EROSION AND SEDIMENT CONTROL FEATURES IN THIS AREA. THE POST-DEVELOPMENT AREA IS SMALLER (1.23 ACRES) WITH A LOWER IMPERVIOUS AREA, RESULTING IN A LOWER POST-DEVELOPMENT RUNOFF.

DIVERSION DIKES WILL BE INSTALLED TO DIRECT RUNOFF FROM MOST OF THE SITE INTO THE STORMWATER RETENTION BASIN DURING CONSTRUCTION. PERMANENT SWALES WILL BE INSTALLED DURING FINAL GRADING TO DIRECT RUNOFF TO THE BASIN.

SILT FENCE WILL BE THE PRIMARY EROSION CONTROL FEATURE FOR PORTIONS OF THE SITE NOT FLOWING TO THE STORMWATER RETENTION BASIN.

THE TWO EXISTING CULVERTS WILL BE PROVIDED WITH CULVERT INLET PROTECTION.

A CONSTRUCTION ENTRANCE WILL BE PROVIDED ALONG THE WESTERN DRIVEWAY.

TEMPORARY CONSTRUCTION ENTRANCE - 3.02: A TEMPORARY CONSTRUCTION ENTRANCE WITH A WASH RACK WILL BE PLACED ALONG THE EXISTING WESTERN DRIVEWAY.
SILT FENCE - 3.05: THE ONLY STRUCTURAL MEASURE EMPLOYED WILL BE SILT FENCE, WHICH WILL SURROUND THE CONSTRUCTION AREA. A SECOND ROW OF SILT FENCE WILL BE INSTALLED ALONG THE SHORELINE.
TEMPORARY SEDIMENT BASIN - 3.14: A STORMWATER RETENTION BASIN WILL BE INSTALLED TO SERVE AS AN EROSION AND SEDIMENT CONTROL SEDIMENT BASIN FOR THE NORTHWEST AREA OF THE SITE DURING CONSTRUCTION.
AT THE COMPLETION OF THE CONSTRUCTION, THE STORMWATER RETENTION BASIN WILL BE CONVERTED TO A PERMANENT STORMWATER QUANTITY CONTROL MEASURE. SPECIFIC DIMENSIONS AND CALCULATIONS ARE SHOWN ON SHEET C-30-505, AND IN THE ATTACHED CALCULATIONS.
TEMPORARY DIVERSION DIKES - 3.09: A SYSTEM OF DIVERSION DIKES WILL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION TO DIVERT STORMWATER FROM MUCH OF THE PROJECT AREA INTO THE STORMWATER RETENTION BASIN, AS INDICATED ON SHEET C-30-503.
OUTLET PROTECTION - 3.18: RIP-RAP WILL BE PLACED AT OUTLETS OF ALL PIPES AS INDICATED IN THE DETAILS SHOWN ON SHEET C-30-506.

TEMPORARY SEEDING - 3.31: ALL DENUDED AREAS WHICH WILL BE LEFT DORMANT FOR EXTENDED PERIODS OF TIME SHALL BE SEEDDED WITH FAST GERMINATING TEMPORARY VEGETATION IMMEDIATELY FOLLOWING GRADING. SELECTION OF THE SEED MIXTURE WILL DEPEND ON THE TIME OF YEAR IT IS APPLIED.

PERMANENT SEEDING - 3.32: ALL DENUDED AREAS WHICH WILL BE LEFT DORMANT FOR A YEAR OR MORE SHALL BE SEEDDED WITH PERMANENT VEGETATIVE COVER.

MULCHING - 3.35: LANDSCAPED AREAS WILL BE MULCHED AFTER PLANTING AS INDICATED ON THE LANDSCAPING PLAN.

SILT FENCE, CONSTRUCTION ENTRANCE, AND THE CULVERT INLET PROTECTION WILL BE THE FIRST ITEMS INSTALLED ON THE SITE. THE STAGING AREA IN THE SOUTHWEST AREA WILL THEN BE CONSTRUCTED. THE STORMWATER RETENTION POND AND ASSOCIATED DIVERSION DIKES WILL THEN BE CONSTRUCTED TO THE TEMPORARY SEDIMENT BASIN STANDARDS IN THE ES&C HANDBOOK. THESE MEASURES WILL BE IN PLACE FOR THE DURATION OF CONSTRUCTION UNTIL THE SITE IS READY FOR FINAL GRADING. BASED ON BORINGS TAKEN AT THE SITE, AND THE LOCATION ALONG A RIDGE, GROUNDWATER IS NOT EXPECTED TO BE ENCOUNTERED. IF GROUNDWATER IS ENCOUNTERED, IT WILL BE DISCHARGED IN A LOCATION THAT WILL FLOW INTO THE STORMWATER RETENTION POND. FOLLOWING THE MASS GRADING, UNDERGROUND PIPING, AND CONSTRUCTION OF ALL THE FOUNDATIONS, THE SITE WILL HAVE TEMPORARY SEEDING INSTALLED WHILE THE BALANCE OF CONSTRUCTION WITHIN EACH STRUCTURE IS COMPLETED. TEMPORARY SEEDING WILL BE INSTALLED ON ANY AREA THAT IS TO BE LEFT UNDISTURBED FOR MORE THAN 15 DAYS. FOLLOWING CONSTRUCTION OF THE WATER TREATMENT FACILITIES, THE SITE WILL BE BROUGHT TO FINAL GRADE, PERMANENT SWALES WILL BE ESTABLISHED, PARKING AND ROADS WILL BE PAVED, AND PERMANENT SEEDING WILL BE INSTALLED. THE OUTLET STRUCTURE OF THE STORMWATER RETENTION POND WILL BE MODIFIED TO PROVIDE THE PERMANENT OUTLET ORIFICE.

THE LANDSCAPED AREAS WILL BE MULCHED IMMEDIATELY FOLLOWING PLANTING. GRASSED AREAS WILL HAVE PERMANENT SEEDING INSTALLED IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

RUN-OFF CALCULATIONS ARE SHOWN ON SHEET C-30-504 AND IN THE ATTACHED CALCULATIONS. THE SITE DOES NOT REQUIRE ANY WATER QUALITY MEASURES AS THE EXISTING LAND COVER CONDITION OF 1% IMPERVIOUS AND THE PROPOSED LAND COVER CONDITION OF 3.1% ARE BOTH LESS THAN AVERAGE LAND COVER CONDITION OF 16% IMPERVIOUS AREA.

THE STORMWATER RETENTION POND IS DESIGNED TO ENSURE THE POST-DEVELOPED PEAK RUNOFF FROM THE PROJECT AREA IS LESS THAN OR EQUAL TO THE PRE-DEVELOPED RUNOFF FOR THE 2-YEAR DESIGN STORM.

THE SILT FENCE BARRIER WILL BE CHECKED REGULARLY FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT SHALL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES HALF-WAY TO THE TOP OF THE BARRIER.

THE STORMWATER RETENTION POND WILL BE CLEANED OUT WHEN THE LEVEL OF SEDIMENT BUILDUP REACHES HALF-FULL, WHICH IS AN ELEVATION OF 1013.00.

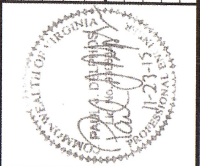
DIVERSION DIKES WILL BE CHECKED REGULARLY TO CONFIRM THEIR INTEGRITY AND ENSURE THEY ARE CHANNELING RUNOFF TO THE STORMWATER RETENTION BASIN.

SEEDING AREAS WILL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND IS MAINTAINED. AREAS WILL BE FERTILIZED AND RE-SEEDING AS NECESSARY TO DEVELOP AND MAINTAIN A GOOD STAND.

THE GENERAL CONTRACTOR SHALL INSPECT DISTURBED AREAS OF THE SITE THAT HAVE NOT BEEN FINALLY STABILIZED, AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION, STRUCTURAL CONTROL MEASURES, AND THE AREA OF CONSTRUCTION VEHICLE ACCESS AT LEAST EVERY FOURTEEN (14) CALENDAR DAYS, AND WITHIN FORTY-EIGHT (48) HOURS OF THE END OF A STORM EVENT PRODUCING 1/2" OR GREATER OF PRECIPITATION. WHERE AREAS HAVE BEEN FINALLY OR TEMPORARILY STABILIZED OR RUNOFF IS UNLIKELY DUE TO WINTER CONDITIONS (SITE IS COVERED WITH SNOW, ICE, OR FROZEN GRADE EXISTS) SUCH INSPECTIONS SHALL BE CONDUCTED AT LEAST ONCE EVERY MONTH.

INSPECT DISTURBED AREAS AND AREAS OF MATERIALS STORAGE THAT ARE EXPOSED TO PRECIPITATION FOR EVIDENCE OF, OR THE POTENTIAL FOR SEDIMENT ENTERING THE STORM DRAIN SYSTEM. INSPECT E8S CONTROLS IN ACCORDANCE WITH REQUIREMENTS STATED HEREIN, AND INSPECT POINTS OF STORM DRAIN DISCHARGE FOR EXCESSIVE SEDIMENTATION. CORRECT SITE CONTROLS AS REQUIRED TO REDUCE SEDIMENTATION OF STORM DRAINS, CULVERTS, AND RECEIVING CHANNELS. IF CONTROLS OR SEDIMENT PREVENTION AREAS ARE FOUND TO BE IN NEED OF REPAIR OR MODIFICATION, THE GENERAL CONTRACTOR SHALL PROVIDE ADDITIONAL MEASURES OR MODIFICATIONS TO EXISTING MEASURES AS REQUIRED. ANY ADDITIONAL MEASURES OR MODIFICATIONS TO EXISTING MEASURES SHALL BE RECORDED AS FIELD REVISIONS TO THESE PLANS. IN THE EVENT THAT ADDITIONAL CONTROLS ARE FOUND TO BE REQUIRED, THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING THESE CONTROLS BEFORE THE NEXT ANTICIPATED STORM EVENT. IF IMPLEMENTATION BEFORE THE NEXT STORM EVENT IS IMPRACTICAL, THEY SHALL BE IMPLEMENTED AS SOON AS PRACTICAL.

A REPORT SUMMARIZING THE SCOPE OF INSPECTIONS, NAME OF INSPECTOR, INSPECTOR'S QUALIFICATIONS, DATES OF INSPECTIONS, MAJOR OBSERVATIONS PERTAINING TO THE IMPLEMENTATION OF THESE EROSION CONTROL PLANS, AND ACTIONS TAKEN SHALL BE MADE AND RETAINED AS A PART OF THESE PLANS. MAJOR OBSERVATIONS OF THESE REPORTS SHALL INCLUDE: THE LOCATIONS OF EXCESSIVE SEDIMENTATION FROM THE SITE; LOCATIONS OF CONTROLS IN NEED OF REPAIR; LOCATIONS OF FAILED OR INADEQUATE CONTROLS; AND LOCATIONS WHERE ADDITIONAL CONTROLS ARE NEEDED.

[illegible]

BLACK & VEATCH
Building a world of difference.[®]

Black & Veatch Corporation
Virginia Beach, VA

**BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP &
RAW WATER PUMPING STATION / INTAKE**

CIVIL
EROSION AND SEDIMENT CONTROL
NARRATIVE AND DETAILS - SHEET 1 OF 2

DESIGNED: MBS
 DETAILED: MAK
 CHECKED: MBS
 APPROVED: PJD
 DATE: 11/23/15

0 1/2 1

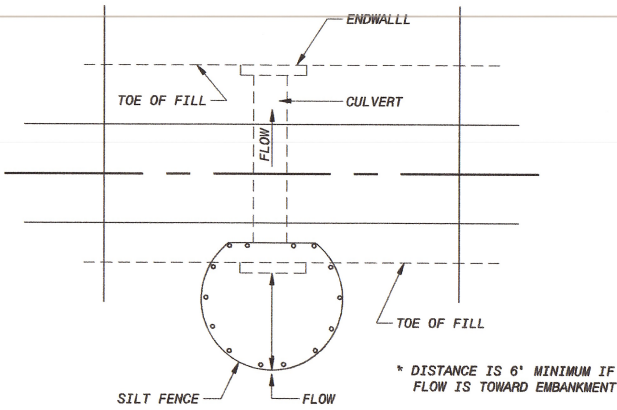
IF THIS BAR DOES NOT
 MEASURE 1" THEN DRAWING IS
 NOT TO FULL SCALE

PROJECT NO.
 182262

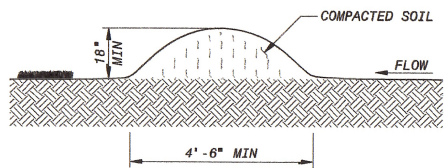
C-30-501

SHEET
 OF

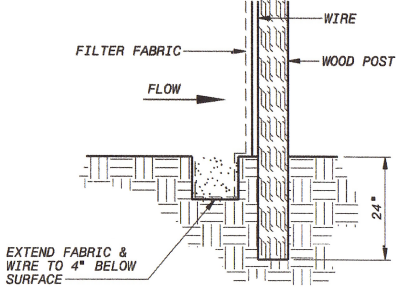
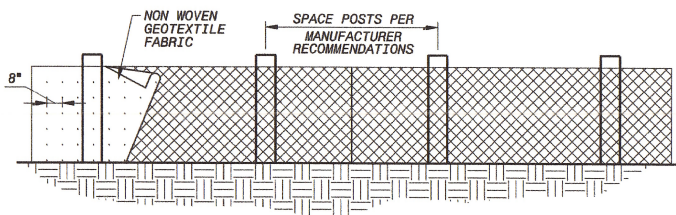
MINIMUM STANDARDS		
THE FOLLOWING STANDARDS ARE TO BE PROVIDED OR ADDRESSED ON EVERY DEVELOPMENT PROJECT EXCEEDING 10,000 SF IN AREA OF DISTURBANCE. THESE STANDARDS ARE CONSIDERED A MINIMUM AND MAY REQUIRE ADDITIONAL MEASURES AS DEEMED NECESSARY BY THE LOCAL APPROVING AUTHORITY OR THE CONSULTING ENGINEER.		
NO.	CRITERIA, TECHNIQUE OR METHOD	PRACTICES PROVIDED
1	PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN (7) DAYS AFTER FINAL GRADE HAS BEEN REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN (7) DAYS TO DENUDED AREAS THAT MAY BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN THIRTY (30) DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN 1 YEAR.	(TS) (PS) (MU) FOR ALL DENUDED AREAS
2	DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TAPPING MEASURES. THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.	(TS) (SF) SILT FENCE DOWNSTREAM OF STOCKPILE. TEMP SEEDING IF STOCKPILE IS UNDISTURBED FOR MORE THAN 15 DAYS.
3	A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT, IN THE OPINION OF THE WMA, IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.	(TS) (PS) (MU) FOR ALL DENUDED AREAS
4	SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE AND DISTURBANCE TAKES PLACE.	(SF) (DD) (CIP) (SB)
5	STABILIZATION METHODS SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.	(TS) (PS) (OP)
6	SEDIMENT TRAPS AND BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN.	(SB)
7	CUT AND FILL SLOPES SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZATION MEASURES UNTIL THE PROBLEM IS CORRECTED.	(TS) (PS) (MU) FOR ALL ERODING SLOPES
8	CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME OR SLOPE DRAINAGE STRUCTURE.	(DD) (SCC)
9	WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.	SHOULD STEEPS OCCUR IN ANY EXISTING OR NEW CUT OR FILL SLOPE, THE CONTRACTOR SHALL FIRST INSURE THAT THERE ARE NOT AREAS OF PONDED WATER AT THE SLOPES, AND THEN SHALL CONTACT BOTH THE DESIGN ENGINEER AND THE PROJECT GEOTECHNICAL ENGINEER FOR ON-SITE EVALUATION OF THE AREAS OF SEEPAGE.
10	ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.	(CIP)
11	BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.	(OP) (TS) (PS)
12	WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF ARMORED BY NONERODIBLE COVER MATERIALS.	(OP) INSTALL OUTLET PROTECTION IMMEDIATELY AFTER INSTALLATION OF 8" VPDES OUTFALL
13	WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN ANY SIX (6) MONTH PERIOD, A TEMPORARY STREAM CROSSING CONSTRUCTED OF NONERODIBLE MATERIAL.	NOT APPLICABLE
14	ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET. THE BEDS AND BANKS OF ANY WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.	(OP) INSTALL OUTLET PROTECTION IMMEDIATELY AFTER INSTALLATION OF 8" VPDES OUTFALL
15	THE BEDS AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.	(OP) INSTALL OUTLET PROTECTION IMMEDIATELY AFTER INSTALLATION OF 8" VPDES OUTFALL
16	UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA: 1) NO MORE THAN 500 LINEAR FEET OF ANY TRENCH MAY BE OPENED AT ONE TIME. 2) EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES. 3) EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY. 4) MATERIAL USED FOR BACKFILLING TRENCHES SHALL BE PROPERLY COMPACTED IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZATION. 5) RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THESE REGULATIONS. 6) APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.	(SF) (DS) ALL UTILITY LINES ON SITE PROTECTED BY SILT FENCE BARRIER FILTER ANY TRENCH DEWATERING
17	WHERE CONSTRUCTION VEHICLES ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.	(CE) MAINTAIN TRAFFIC ON PAVED AREAS OF SITE TO MAXIMUM EXTENT. INSPECT VEHICLES FOR SEDIMENT AND WASH SEDIMENT AS NECESSARY.
18	ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN THIRTY (30) DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE LOCAL PROGRAM ADMINISTRATOR. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.	(TS) (PS) (MU)
19	PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE PROTECTED FROM SEDIMENT DISPOSITION, EROSION AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY AND PEAK FLOW RATE OF STORMWATER RUNOFF FOR THAT STATED FREQUENCY STORM OF 24-HOUR DURATION IN ACCORDANCE WITH THE APPLICABLE CRITERIA.	(SB) STORMWATER RETENTION BASIN DESIGNED TO REDUCE RUNOFF TO PRE-DEVELOPEMENT RATES FOR 2-YEAR STORM.



SILT FENCE CULVERT INLET (CIP)
PROTECTION DETAIL
NO SCALE



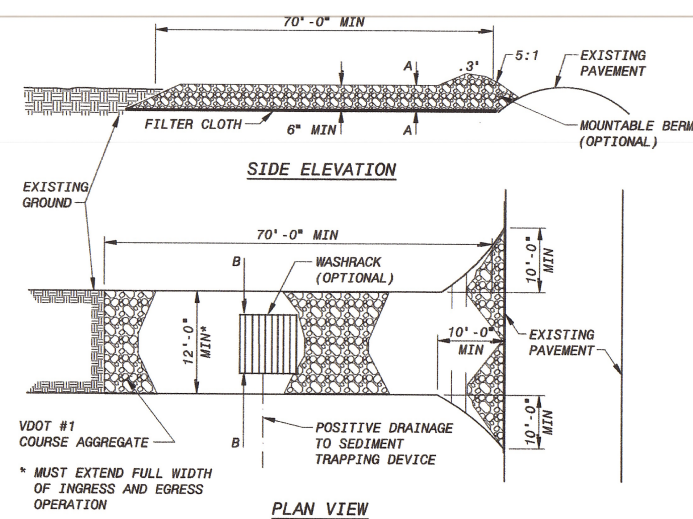
DIVERSION DIKE DETAIL (DD)
NO SCALE



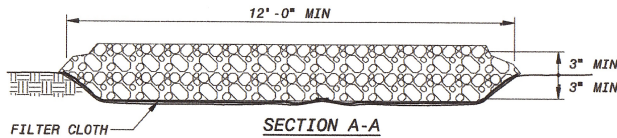
SILT FENCE CONSTRUCTION (SF)
NO SCALE

NOTES:

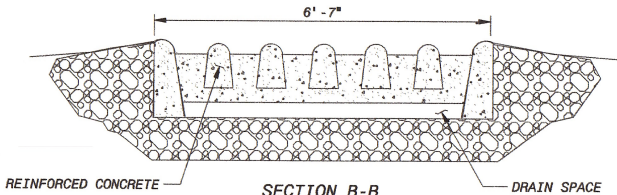
- POSTS SHALL HAVE A MINIMUM LENGTH OF 36 INCHES PLUS BURIAL DEPTH. POST MATERIAL SHALL BE WOOD, STEEL, OR SYNTHETIC, AND SHALL BE OF SUFFICIENT STRENGTH TO RESIST DAMAGE DURING INSTALLATION AND TO SUPPORT APPLIED LOADS.
- FABRIC SHALL BE A WOVEN GEOTEXTILE FABRIC CONSISTING OF STRONG, ROT RESISTANT, MATERIALS RESISTANT TO DETERIORATION FROM ULTRAVIOLET AND HEAT EXPOSURE.



PLAN VIEW



SECTION A-A



SECTION B-B

STONE CONSTRUCTION ENTRANCE (CE)
NO SCALE

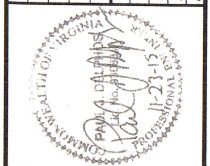
OUTLET PROTECTION MAINTENANCE REQUIREMENTS

- INSPECT RIP RAP OUTLET PROTECTION AFTER STORM EVENTS FOR STONE DISPLACEMENT AND FOR EROSION AT THE SIDES AND ENDS OF THE APRON.
- MAKE NEEDED REPAIRS IMMEDIATELY, USE APPROPRIATE SIZE STONE, AND DO NOT PLACE ABOVE THE FINISHED GRADE

OUTLET PROTECTION (OP)
NO SCALE

ISSUED FOR CONSTRUCTION

0	MAK	MBS	PJD	CK	APP
NO.	BY	NO.	BY	NO.	BY
11/23/15	ISSUED FOR CONSTRUCTION	DATE	11/23/15	REVISIONS AND RECORD OF ISSUE	
50-3130 - CIVIL Drawings					
SAVED: X0240353, 10/15/2015 8:11:30 AM					
PLOTTED:					
USER: X0240353					
DWG VER: 1000					
XREF1:					
XREF2:					
XREF3:					
XREF4:					



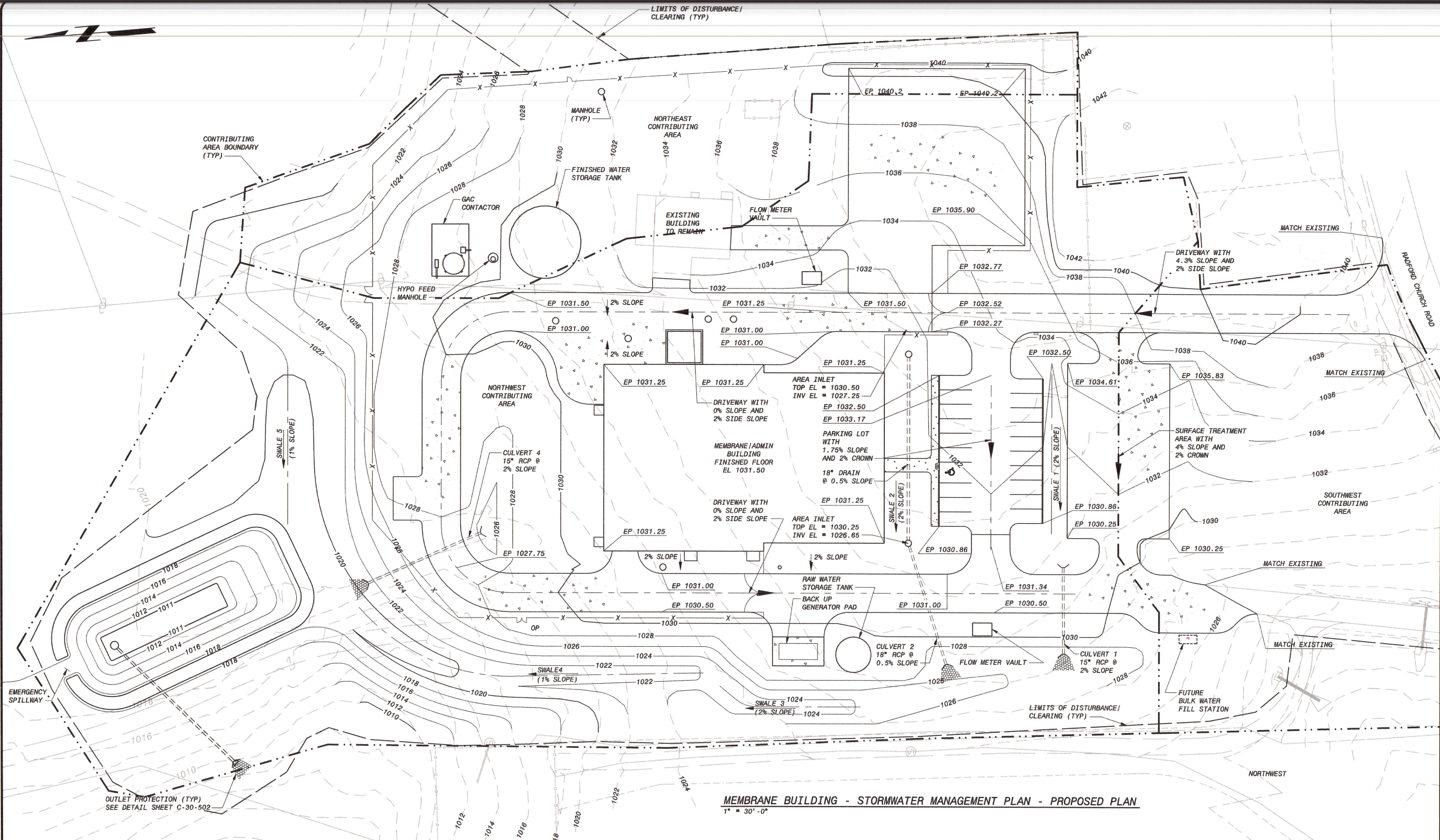
BLACK & VEATCH
Building a world of difference™

Black & Veatch Corporation
Virginia Beach, VA

BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP & RAW WATER PUMPING STATION / INTAKE

CIVIL
EROSION AND SEDIMENT CONTROL
NARRATIVE AND DETAILS - SHEET 2 OF 2

DESIGNED: MBS
DETAILED: MAK
CHECKED: MBS
APPROVED: PJD
DATE: 11/23/15
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE
PROJECT NO. 182262
C-30-502
SHEET OF

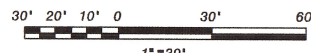


MEMBRANE BUILDING - STORMWATER MANAGEMENT PLAN - PROPOSED PLAN
1" = 30' - 0"

CONTRIBUTING AREA CALCULATIONS					
CONTRIBUTING AREA	POST-DEVELOPED CONDITIONS				
	AREA	IMPERVIOUS	2-YEAR STORM FLOW	25-YEAR STORM	100-YEAR STORM
NORTHWEST	4.0	42.4%	12.6	26.5	33.1
NORTHEAST	1.1	17.1%	2.4	6.5	8.4
SOUTHWEST	1.2	23.8%	2.9	7.4	9.5
TOTAL	6.3	34.4%	17.9	40.4	51.1

SWALE CALCULATIONS									
SWALE	POST-DEVELOPED CONDITIONS								
	CONTRIBUTING AREA	100-YEAR STORM RUNOFF, CFS	SHAPE	WIDTH, FT	SIDE SLOPE	DEPTH, FT	SLOPE	CAPACITY, CFS	VELOCITY, FPS
1	0.6	4.99	VEE	NA	3:1	1.0	2.0%	12.8	4.3
2	1.2	10.70	VEE	NA	3:1	1.0	2.0%	12.8	4.3
3	0.8	16.84	TRAPEZOID	4.0	3:1	1.0	2.0%	19.0	2.7
4	2.7	22.23	TRAPEZOID	6.0	3:1	1.0	1.0%	31.5	3.9
5	0.4	2.93	VEE	NA	6:1	0.75	1.0%	4.3	1.3

CULVERT CALCULATIONS						
SWALE	POST-DEVELOPED CONDITIONS					
	CONTRIBUTING AREA	100-YEAR STORM	DIAMETER, IN	SLOPE	CAPACITY FLOWING FULL, CFS	CAPACITY
1	0.6	4.99	15.0	2.0%	9.2	1.0
2 & 3	1.2	10.70	18.0	2.0%	14.9	1.0
4	0.61	5.22	15.0	2.0%	9.2	1.0



ISSUED FOR CONSTRUCTION

11/23/15
11/23/15
50.3150 - CIVIL Drawings
C-30-504B.dwg
XREF1:182262-C-30-Membrane-01.dwg
XREF2:20-A-50-Membrane.dwg
XREF3:182262-C-30-Membrane-01-E.dwg
XREF4:BORDER.dwg
USER: JCE49553
DWG VER: 1000

ISSUED FOR CONSTRUCTION
DATE
NO. BY
OK APP

REVISIONS AND RECORD OF ISSUE

PAUL D. BROWN
Professional Engineer
No. 11-21-15
Virginia

BLACK & VEATCH
Building a world of difference.
Black & Veatch Corporation
Virginia Beach, VA

BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP &
RAW WATER PUMPING STATION / INTAKE

CIVIL
MEMBRANE BUILDING
STORMWATER MANAGEMENT PLAN - PROPOSED SITE

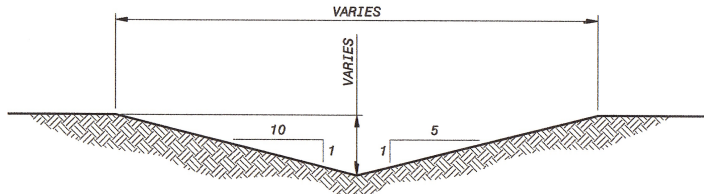
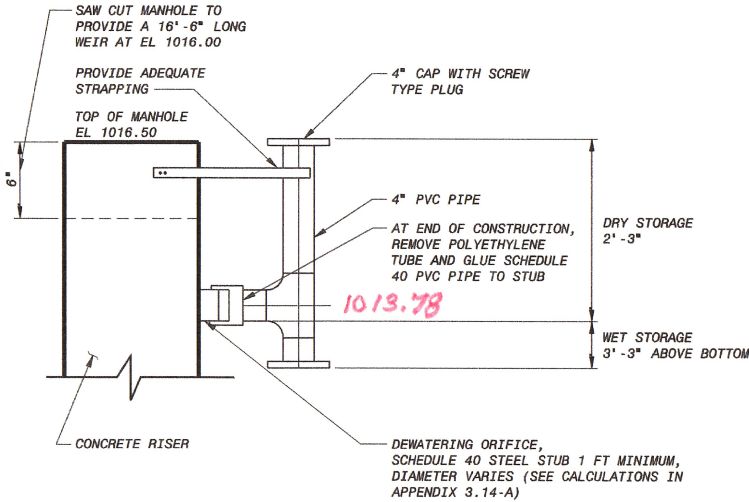
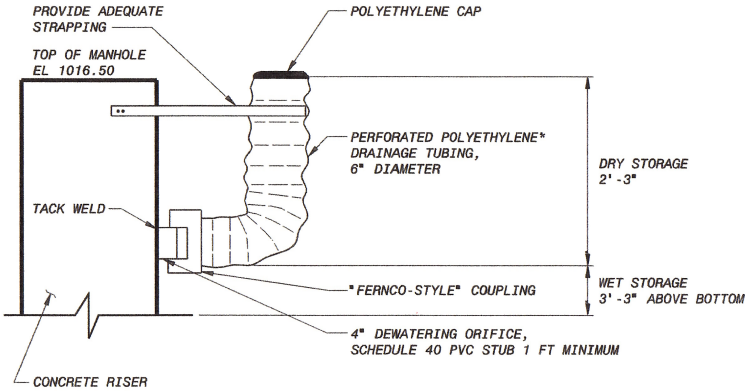
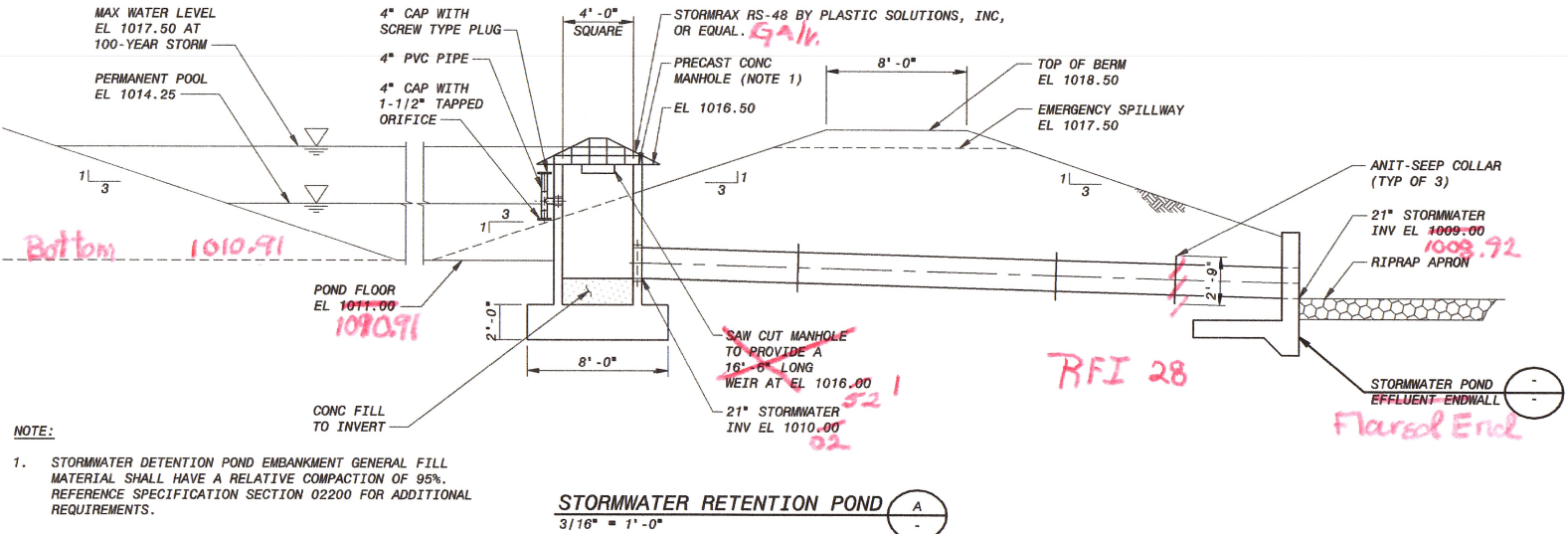
DESIGNED: MBS
DETAILED: MAK
CHECKED: MBS
APPROVED: PJD
DATE: 11/23/15

0 1/2 1
IF THIS BAR DOES NOT
MEASURE 1" THEN DRAWING IS
NOT TO FULL SCALE

PROJECT NO.
182262
C-30-504
SHEET
OF

TEMPORARY SEDIMENT BASIN DESIGN CRITERIA			
CRITERIA	REQUIREMENT	PROVIDED	REMARKS
DISTURBED AREA		4 AC	MAXIMUM DISTURBED AREA AFTER DIVERSION DIKES INSTALLED
WET STORAGE	67 CY/AC x 4 AC = 268 CY	295 CY	VOLUME B/W FLOOR AND DEWATERING ORIFICE
DRY STORAGE	67 CY/AC x 4 AC = 268 CY	408 CY	VOLUME B/W RISER CREST AND DEWATERING ORIFICE
LENGTH TO WIDTH RATIO	2:1	3.1:1	AT ELEVATION OF DEWATERING ORIFICE
RISER DIAMETER	21" TO PASS 2-YEAR STORM	48"	
BARREL DIAMETER	12" TO PASS 2-YEAR STORM	21"	

PERMANENT STORMWATER RETENTION POND DESIGN CRITERIA			
CRITERIA	REQUIREMENT	PROVIDED	REMARKS
CONTRIBUTING AREA		4 AC	
WET STORAGE	NA	295 CY	VOLUME B/W FLOOR AND DEWATERING ORIFICE
DETENTION STORAGE	371 CY	408 CY	VOLUME B/W RISER CREST AND DEWATERING ORIFICE
RISER DIAMETER	36" TO PASS 100-YEAR STORM	48"	
BARREL DIAMETER	21" TO PASS 100-YEAR STORM	21"	



BLACK & VEATCH
Building a world of difference.
Black & Veatch Corporation
Virginia Beach, VA

BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP &
RAW WATER PUMPING STATION / INTAKE
CIVIL
STORMWATER RETENTION POND
DETAILS

DESIGNED: MBS
DETAILED: MAK
CHECKED: MBS
APPROVED: PJD
DATE: 11/23/15
PROJECT NO.
182262
C-30-505
SHEET
OF

ISSUED FOR CONSTRUCTION

NEVER CUT LEADER. THIN UP TO 1/3 OF BRANCHES RETAINING NATURAL SHAPE OF TREE. DO NOT LEAVE STUBS.

HOSE GUARDS AND GUY WIRE
SET TOP OF ROOT CROWN 4" ABOVE FINISH GRADE
CUT ALL BINDING AND REMOVE WRAPPING FROM TOP OF BALL
2" - 3" HARDWOOD BARK MULCH KEEP MULCH 2" - 3" FROM TRUNK
4" SAUCER AROUND PLANTING PIT

PLANTING MIXTURE AS SPECIFIED
LOOSEN SUBGRADE AROUND CENTER MOUND AND INSTALL GRANULAR MATERIAL AS NEEDED TO PROVIDE ADEQUATE DRAINAGE AND AERATION

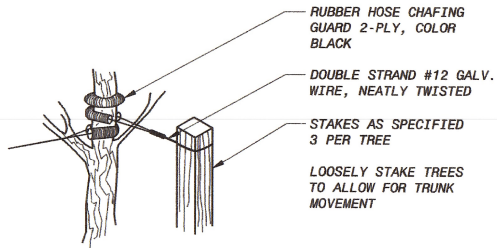
STAKE TO BE 18" BELOW PIT IN UNDISTURBED SUBGRADE. (SET 120° APART)

MULTI-STEM TREE PLANTING DETAIL

NO SCALE

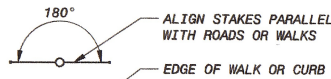
NOTES:

1. EACH TREE IS BE PLANTED WITH THE ROOT FLARE AT OR ABOVE GRADE. REMOVE ANY SOIL THAT COVERS THE TOP OF THE ROOT FLARE. IN WET AND COMPACTED AREAS, POSITION THE FLARE 1" - 2" ABOVE GRADE.
2. REMOVE METAL AND PLASTIC CONTAINERS COMPLETELY.
3. FOR PLANTS WITH WIRE BASKETS, REMOVE AND CUT WIRE BASKET AROUND THE ROOT BALL. BEFORE TREE IS IN PIT, REMOVE BOTTOM OF BASKET. REMOVE VERTICAL WIRE, SECTIONS AFTER TREE IS IN PIT. REMOVE TWINE, ROPE, AND BURLAP FROM TOP OF BALL.
4. REMOVE TAGS AND LABELS.
5. WATER THOROUGHLY TO ELIMINATE AIR POCKETS.

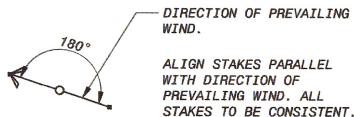


STAKING DETAIL

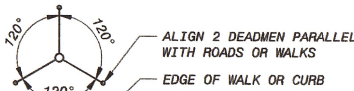
NO SCALE



TREE STAKING ALONG ROADS OR WALLS



TREE STAKING IN OPEN PLACES



TREE GUYING

NOTES:

1. EACH TREE IS BE PLANTED WITH THE ROOT FLARE AT OR ABOVE GRADE. REMOVE ANY SOIL THAT COVERS THE TOP OF THE ROOT FLARE. IN WET AND COMPACTED AREAS, POSITION THE FLARE 1" - 2" ABOVE GRADE.
2. REMOVE METAL AND PLASTIC CONTAINERS COMPLETELY.
3. FOR PLANTS WITH WIRE BASKETS, REMOVE AND CUT WIRE BASKET AROUND THE ROOT BALL. BEFORE TREE IS IN PIT, REMOVE BOTTOM OF BASKET. REMOVE VERTICAL WIRE, SECTIONS AFTER TREE IS IN PIT. REMOVE TWINE, ROPE, AND BURLAP FROM TOP OF BALL.
4. REMOVE TAGS AND LABELS.
5. WATER THOROUGHLY TO ELIMINATE AIR POCKETS.

NEVER CUT LEADER. THIN UP TO 1/3 OF BRANCHES RETAINING NATURAL SHAPE OF TREE. DO NOT LEAVE STUBS.

ATTACH GUY WIRE AND HOSE ABOVE FIRST BRANCH.

STAKE TREES UNDER 3" CAL. USE WOOD STAKES, 3 PER TREE @ 120°. ALL STAKES AND GUY WIRES TO BE REMOVED WITHIN ONE YEAR.

GUY TREES 3" CAL. AND LARGER, USE 2"x4" STAKES DRIVEN BELOW GRADE. (3 STAKES 120° APART) ALL STAKES AND GUY WIRES TO BE REMOVED WITHIN ONE YEAR.

EXCAVATE TO TOP FLARE ROOT, SET TOP OF ROOT CROWN 4" ABOVE FINISH GRADE.

CUT ALL BINDING AND REMOVE WRAPPING FROM TOP OF BALL.

2" - 3" HARDWOOD BARK MULCH KEEP MULCH 2" - 3" FROM TRUNK

4" DIA x 4" SAUCER AROUND PLANTING PIT

PULVERIZE SOIL EXCAVATED FROM HOLE AND USE AS BACKFILL

*SOIL SEPARATOR

STAKE TO BE 18" BELOW PIT IN UNDISTURBED SUBGRADE.

*4" PERFORATED PIPE

*FILTER AND GRANULAR MATERIAL

UNDISTURBED SUBGRADE BASE

SHADE TREE PLANTING DETAIL

NO SCALE

4" WIDE TAPE CONSISTING OF 2 LAYERS OF CRINKLED PAPER CEMENTED TOGETHER, UP TO FIRST BRANCHES.
EXCAVATE HOLE 12" LARGER THAN ROOT BALL
CONSTRUCTION TAPE
FINISH GRADE
SCARIFY SIDES OF HOLE
LOOSEN SUBGRADE AROUND CENTER MOUND AND INSTALL GRANULAR MATERIAL AS NEEDED TO PROVIDE ADEQUATE DRAINAGE AND AERATION
*INCLUDE SUBDRAIN IN SLOPE CONDITIONS GREATER THAN 3:1, OR HEAVILY COMPACTED SOIL.

HOSE GUARDS AND GUY WIRE

GUY TREES 8' HEIGHT AND TALLER. USE 2"x4" STAKES DRIVEN BELOW GRADE. 3 STAKES @ 120° APART. STAKES AND GUY Wires TO BE REMOVED WITHIN ONE YEAR.
EXCAVATE TO TOP FLARE ROOT, SET TOP OF ROOT CROWN 4" ABOVE FINISH GRADE.
CUT ALL BINDING AND REMOVE WRAPPING FROM TOP OF BALL.
2" - 3" HARDWOOD BARK MULCH KEEP MULCH 2" - 3" FROM TRUNK
4" DIA x 4" SAUCER AROUND PLANTING PIT
PULVERIZE SOIL EXCAVATED FROM HOLE AND USE AS BACKFILL

EXCAVATE TO TOP FLARE ROOT, SET TOP OF ROOT CROWN 4" ABOVE FINISH GRADE.

CUT ALL BINDING AND REMOVE WRAPPING FROM TOP OF BALL.

2" - 3" HARDWOOD BARK MULCH KEEP MULCH 2" - 3" FROM TRUNK

4" DIA x 4" SAUCER AROUND PLANTING PIT

PULVERIZE SOIL EXCAVATED FROM HOLE AND USE AS BACKFILL

*SOIL SEPARATOR

*4" PERFORATED PIPE

*FILTER AND GRANULAR MATERIAL

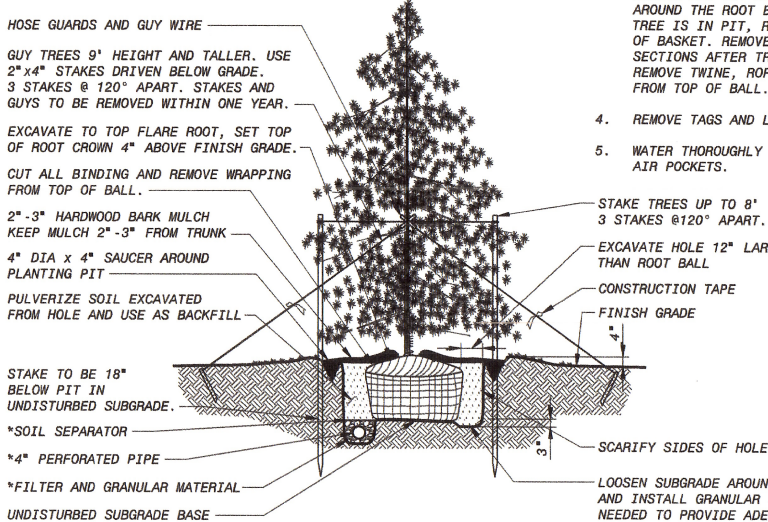
UNDISTURBED SUBGRADE BASE

EVERGREEN TREE PLANTING DETAIL

NO SCALE

NOTES:

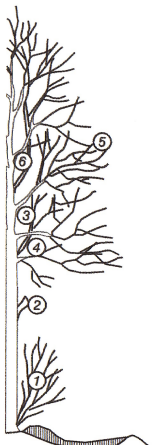
1. EACH TREE IS BE PLANTED WITH THE ROOT FLARE AT OR ABOVE GRADE. REMOVE ANY SOIL THAT COVERS THE TOP OF THE ROOT FLARE. IN WET AND COMPACTED AREAS, POSITION THE FLARE 1" - 2" ABOVE GRADE.
2. REMOVE METAL AND PLASTIC CONTAINERS COMPLETELY.
3. FOR PLANTS WITH WIRE BASKETS, REMOVE AND CUT WIRE BASKET AROUND THE ROOT BALL. BEFORE TREE IS IN PIT, REMOVE BOTTOM OF BASKET. REMOVE VERTICAL WIRE, SECTIONS AFTER TREE IS IN PIT. REMOVE TWINE, ROPE, AND BURLAP FROM TOP OF BALL.
4. REMOVE TAGS AND LABELS.
5. WATER THOROUGHLY TO ELIMINATE AIR POCKETS.



TREE PRUNING DETAIL

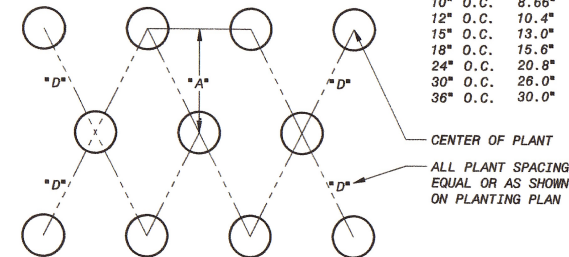
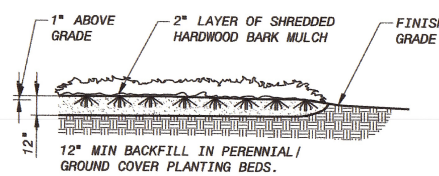
NO SCALE

1. REMOVE SUCKER SHOOTS AT BASE OF TREE
2. MAKE CLEAN CUTS AT TRUNK ON OLD STUBS, IF PRESENT.
3. REMOVE SUCKER SHOOTS AT BASE OF TRUNK
4. REMOVE LOWER BRANCH WHERE AN OVERLYING BRANCH OCCUPIES ABOUT THE SAME AREA.
5. REMOVE INJURED, DISEASED AND DAMAGED BRANCHES.
6. REMOVE CROSS BRANCHES AND THOSE DEVELOPING INTO SECONDARY LEADERS.

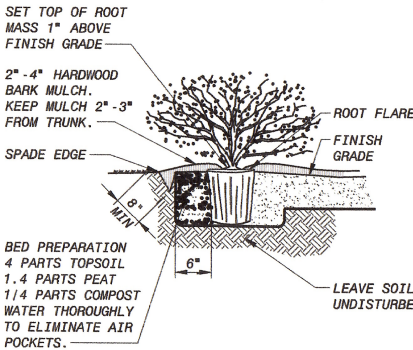


PERENNIAL/GROUND COVER PLANTING DETAIL

NO SCALE



D	*A*	PLANTS/SF
6" O.C.	5.2"	4.61
8" O.C.	6.93"	2.6
10" O.C.	8.66"	1.66
12" O.C.	10.4"	1.15
15" O.C.	13.0"	0.738
18" O.C.	15.6"	0.512
24" O.C.	20.8"	0.29
30" O.C.	26.0"	0.185
36" O.C.	30.0"	0.128

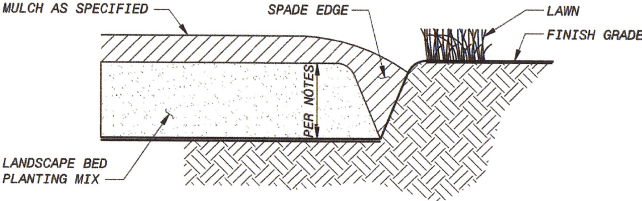


SHRUB AND SMALL TREE PLANTING DETAIL

NO SCALE

NOTES:

1. EACH SHRUB IS BE PLANTED WITH THE ROOT FLARE AT OR ABOVE GRADE. REMOVE ANY SOIL THAT COVERS THE TOP OF THE ROOT FLARE. IN WET AND COMPACTED AREAS, POSITION THE FLARE 1" - 2" ABOVE GRADE.
2. REMOVE TWINE, ROPE AND BURLAP FROM TOP OF BALL.
3. REMOVE METAL AND PLASTIC CONTAINERS COMPLETELY.
4. REMOVE TAGS AND LABELS.



SPADED EDGE DETAIL

NO SCALE

DESIGNED: MBS
DETAILED: MAK
CHECKED: MBS
APPROVED: RJD
DATE: 11/23/15

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
182262

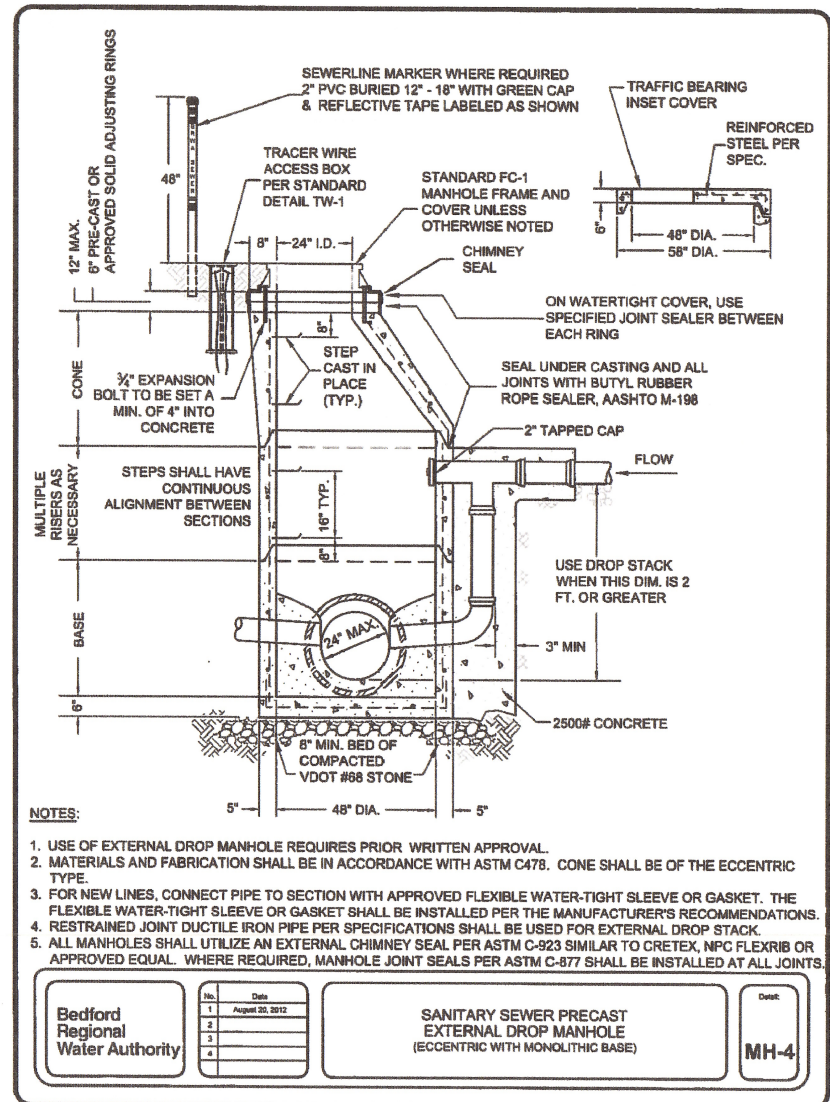
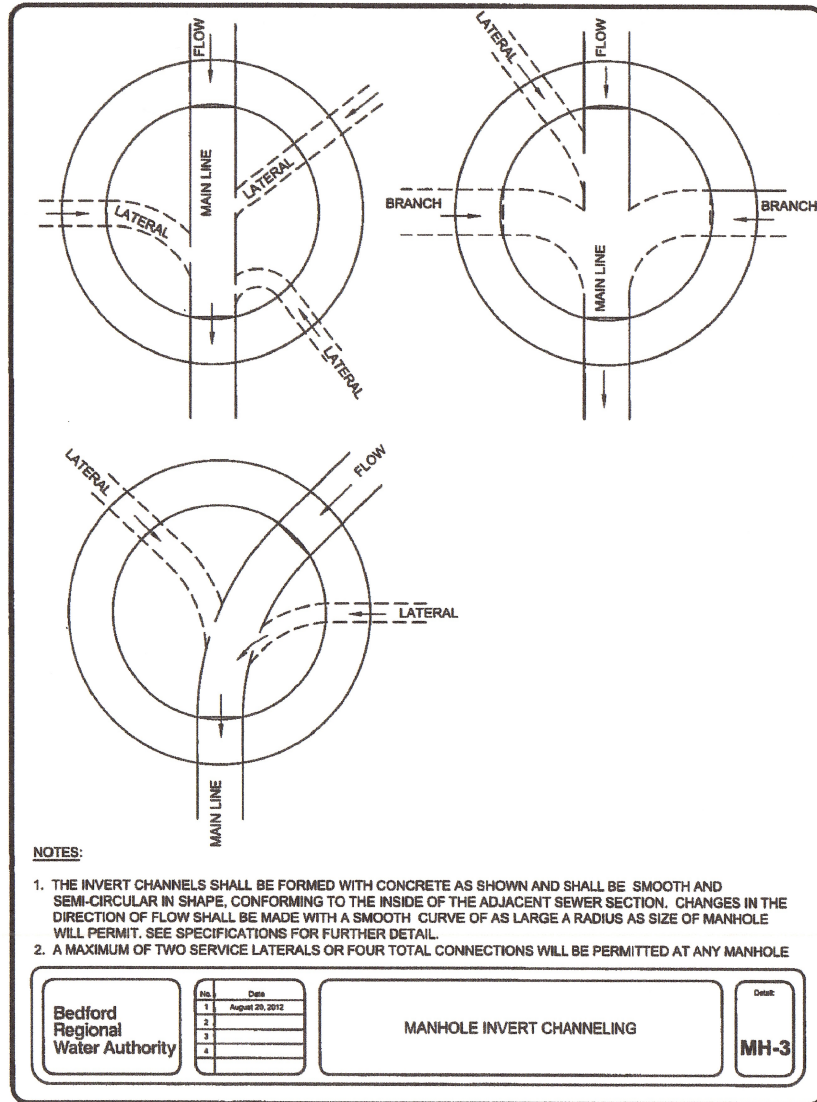
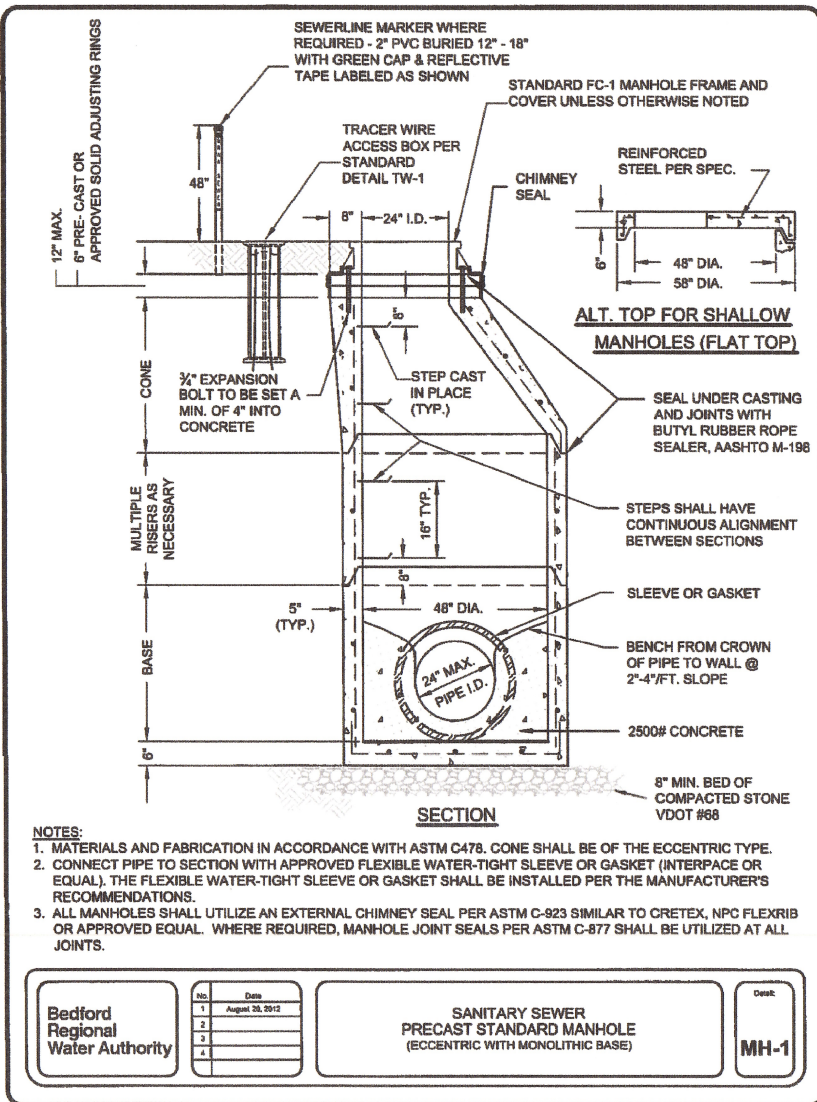
C-30-506
SHEET
OF

BLACK & VEATCH
Building a world of difference®

Black & Veatch Corporation
Virginia Beach, VA

BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP &
RAW WATER PUMPING STATION / INTAKE

CIVIL
LANDSCAPING DETAILS



ISSUED FOR CONSTRUCTION	11/23/15	0	MAK	MBS	PJD
DATE	8/30/15	NO.	BY	CHK	APP
REVISIONS AND RECORD OF ISSUE	C-30-508.dwg				
SAVED: 8/30/2015 3:58:35 PM	XREF1:				
USER: 10648503	XREF2:				
DWG VER: 1000	XREF3:				
	XREF4:				

BLACK & VEATCH
Building a world of difference.
Black & Veatch Corporation
Virginia Beach, VA

BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP &
RAW WATER PUMPING STATION / INTAKE

CIVIL
DETAILS

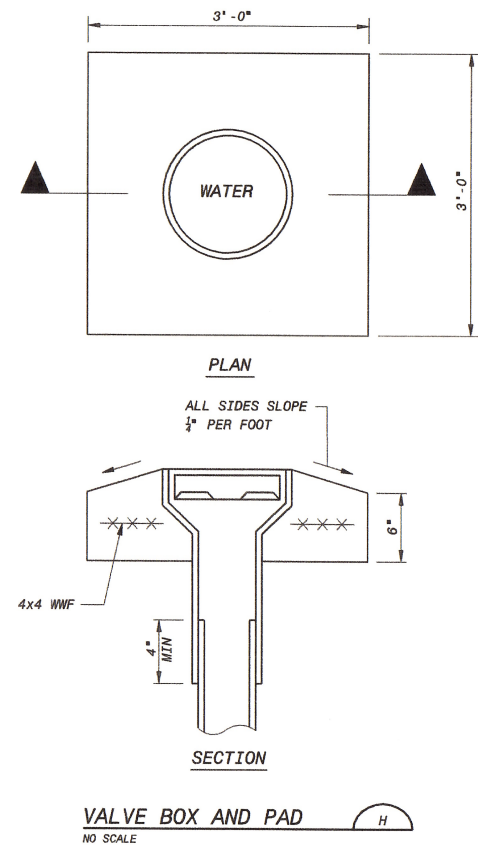
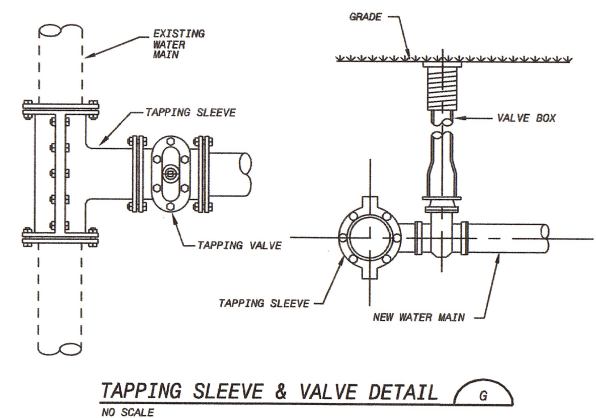
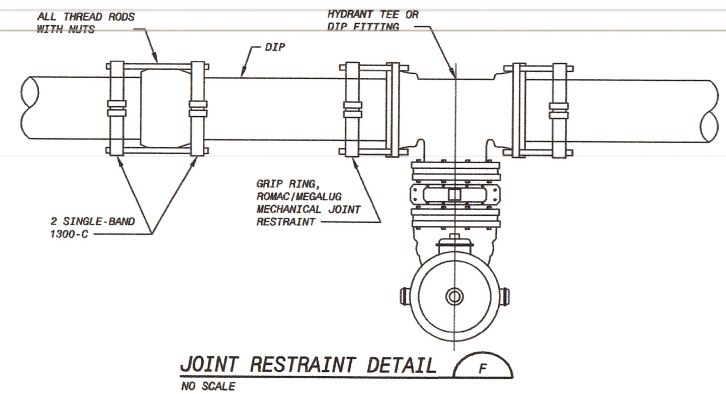
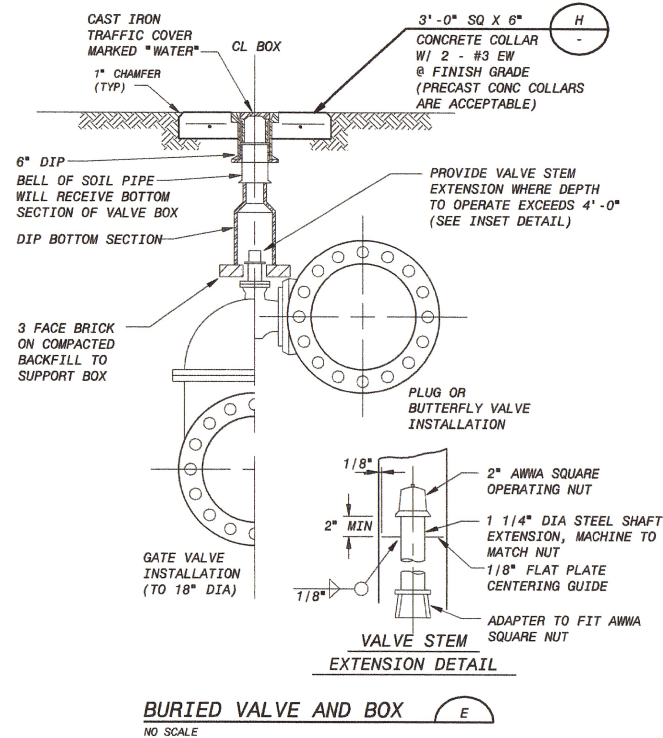
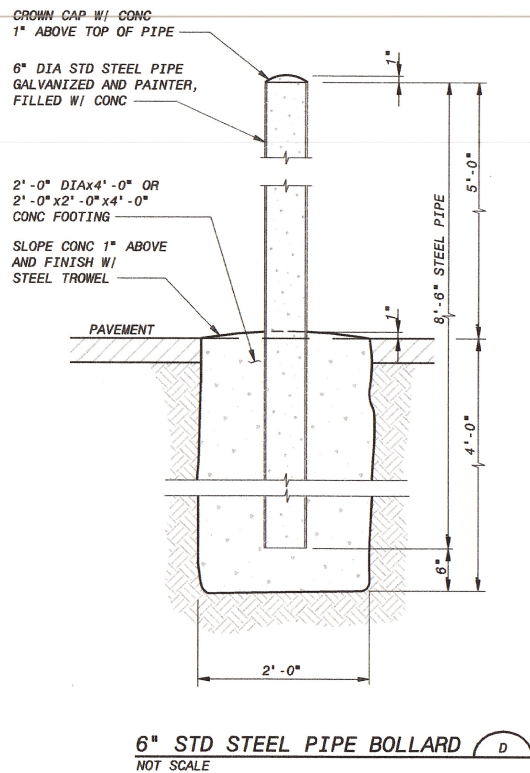
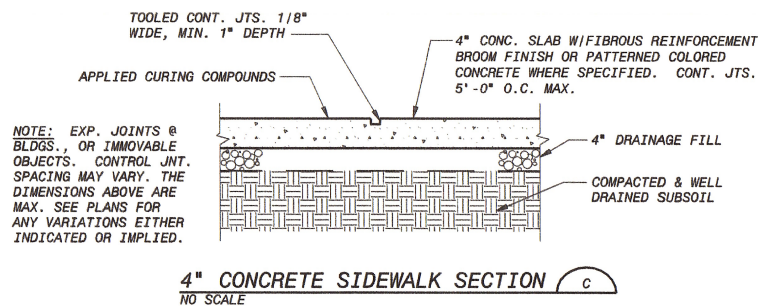
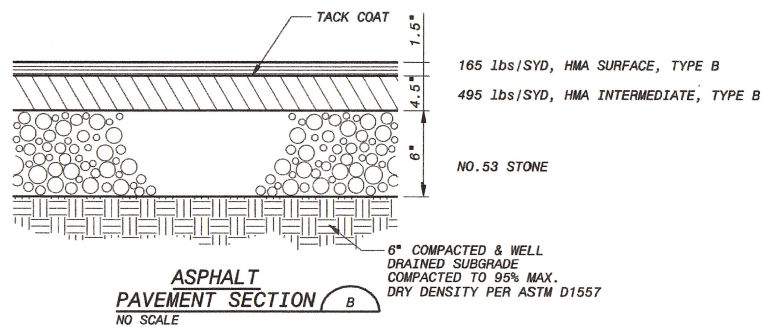
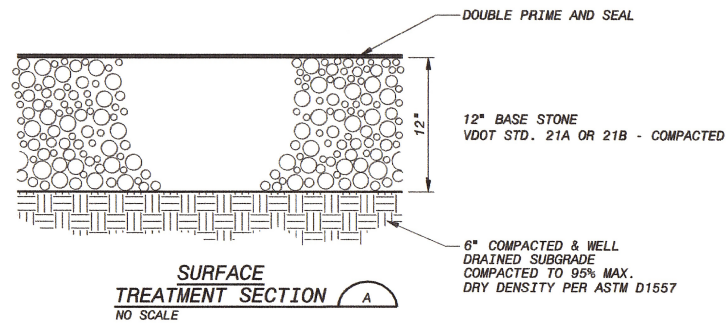
DESIGNED: MBS
DETAILED: MAK
CHECKED: MBS
APPROVED: PJD
DATE: 11/23/15

0 1/2 1
IF THIS BAR DOES NOT
MEASURE 1" THEN DRAWING IS
NOT TO FULL SCALE

PROJECT NO.
182262

C-30-508
SHEET
OF

ISSUED FOR CONSTRUCTION



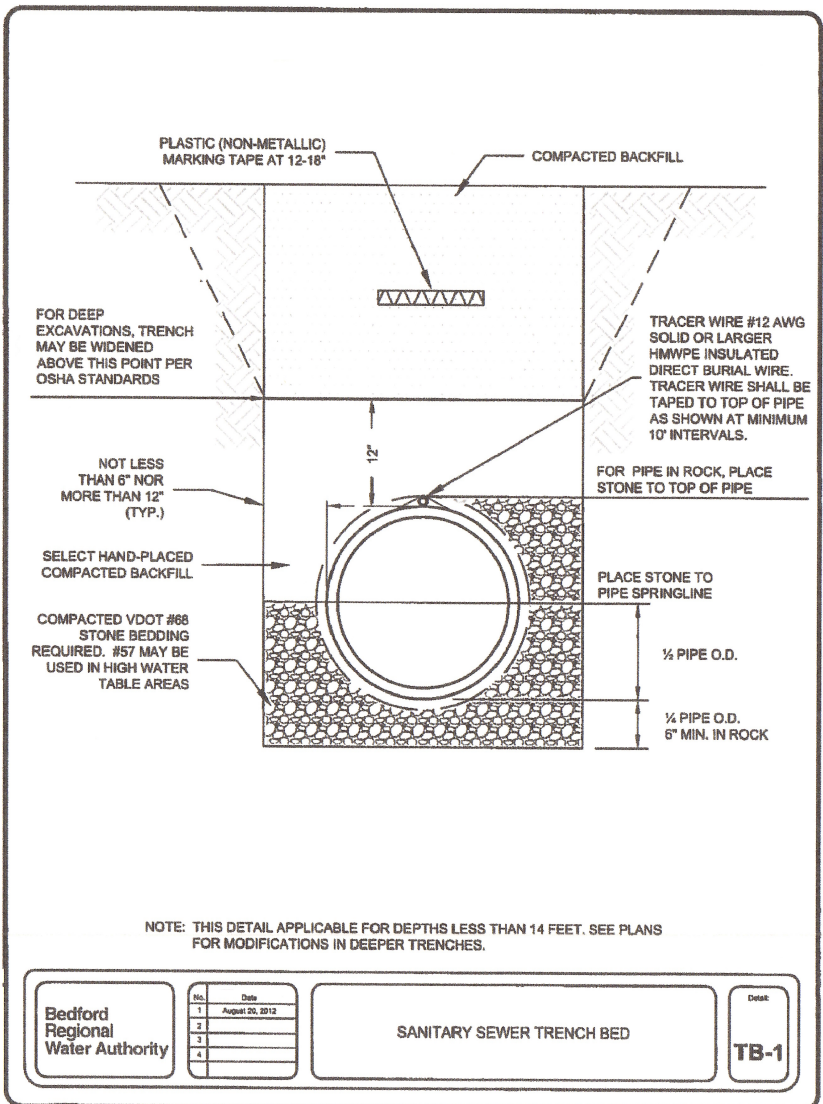
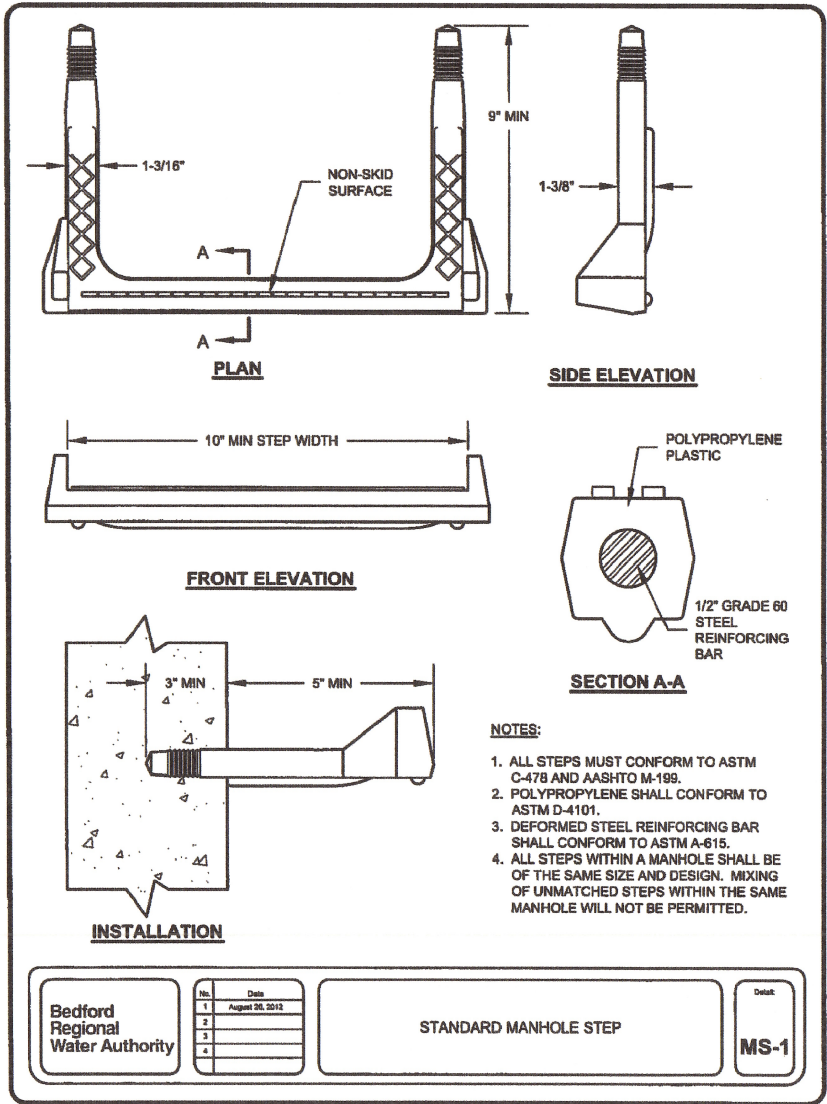
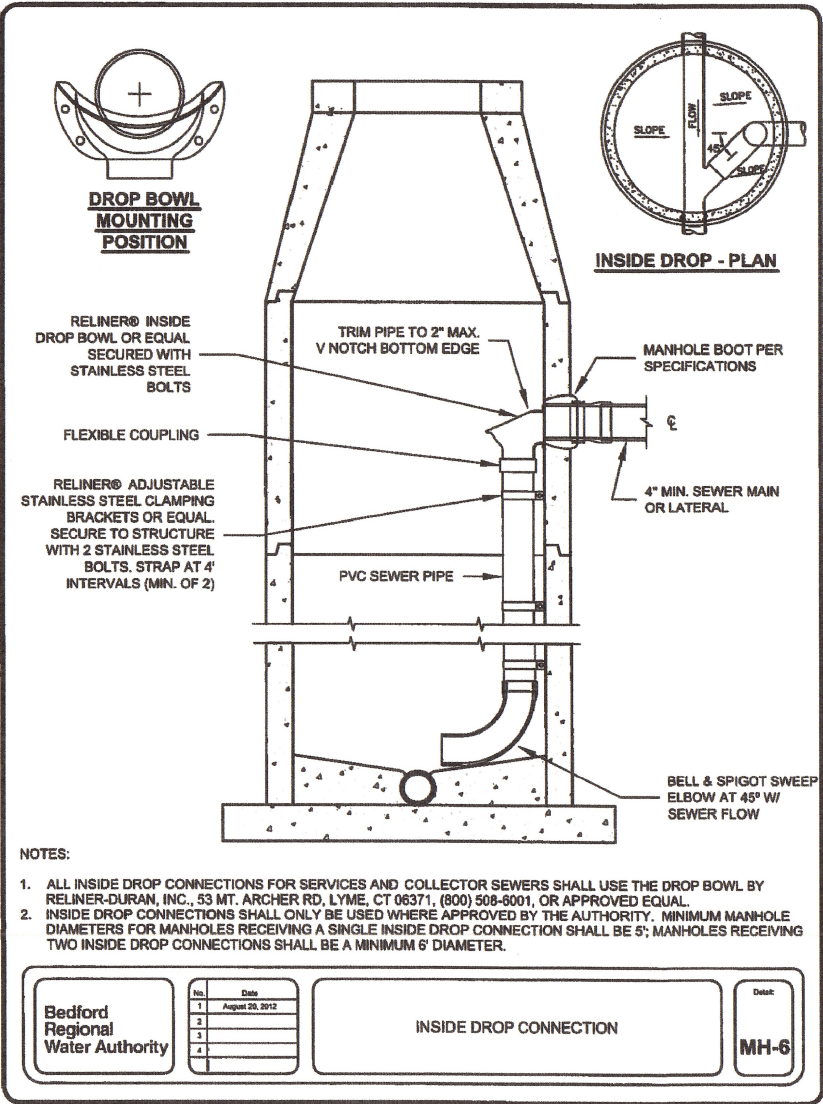
ISSUED FOR CONSTRUCTION

DESIGNED: MBS		DATE: 11/23/15	
DETAILED: MSK		PROJECT NO. 182262	
CHECKED: MBS		SHEET OF	
APPROVED: PJD		C-30-507	
IF THIS BAR DOES NOT MEASURE 1\"/>			
NOT TO FULL SCALE		NOT TO FULL SCALE	
PROJECT NO. 182262		SHEET OF	
C-30-507		SHEET OF	

BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP & RAW WATER PUMPING STATION / INTAKE

CIVIL DETAILS

BLACK & VEATCH
Building a world of difference.
Black & Veatch Corporation
Virginia Beach, VA



11/23/15	ISSUED FOR CONSTRUCTION	0	MBS	RJD
DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CHK
50.3130 - CIVIL Drawings				
SAVED: K0E49355_8/13/2015 4:23:27 PM				
PLOTTED:				
USER: K0E49355				
DWG VER: 1000				

BLACK & VEATCH
Building a world of difference.
Black & Veatch Corporation
Virginia Beach, VA

BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP & RAW WATER PUMPING STATION / INTAKE

CIVIL DETAILS

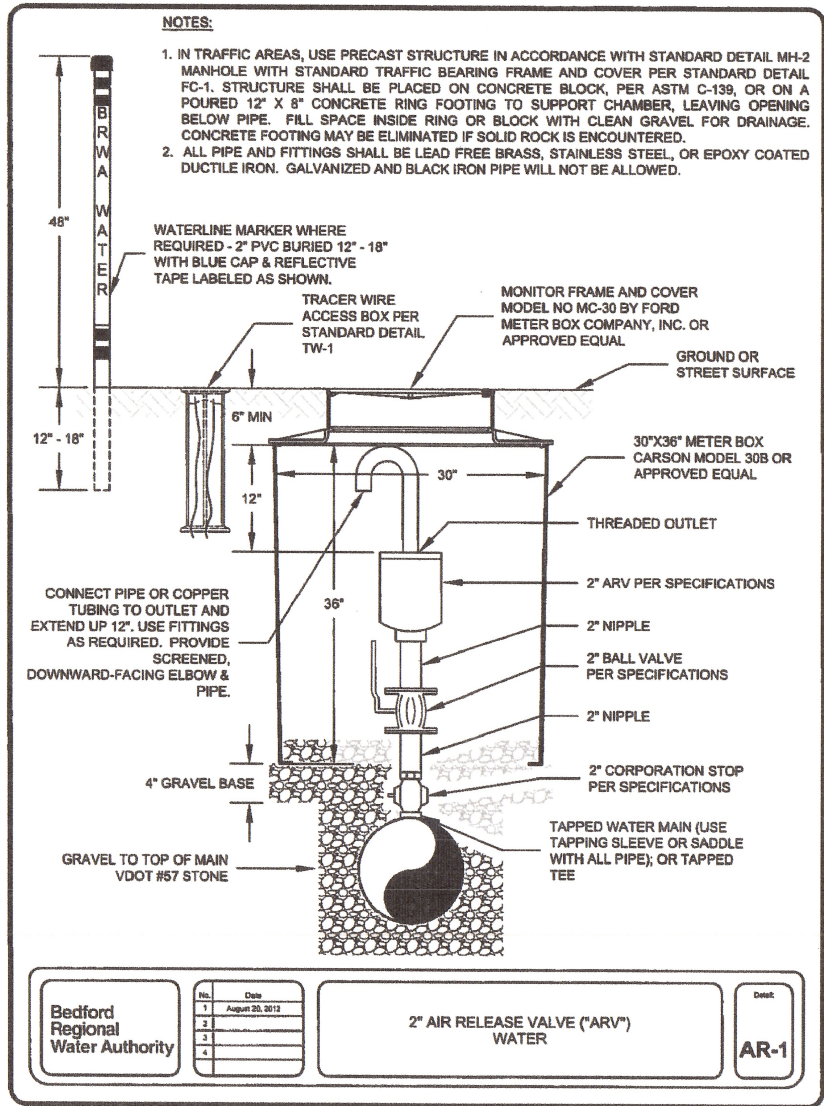
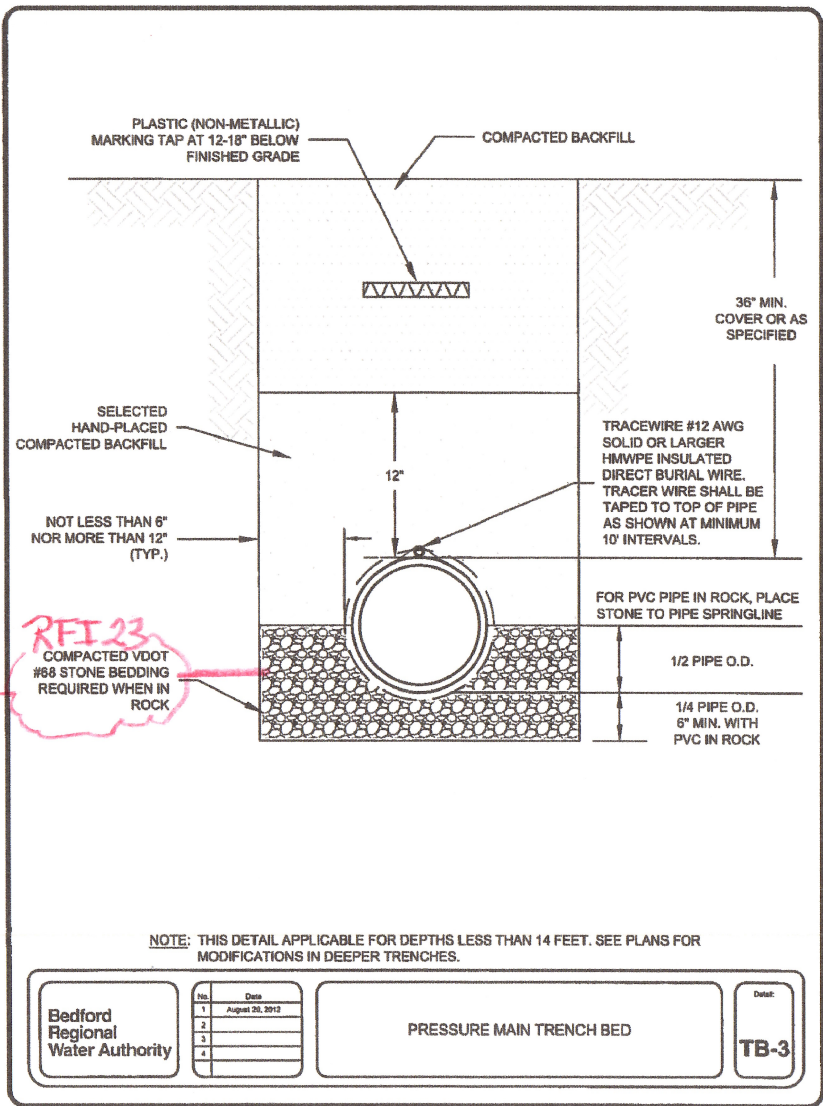
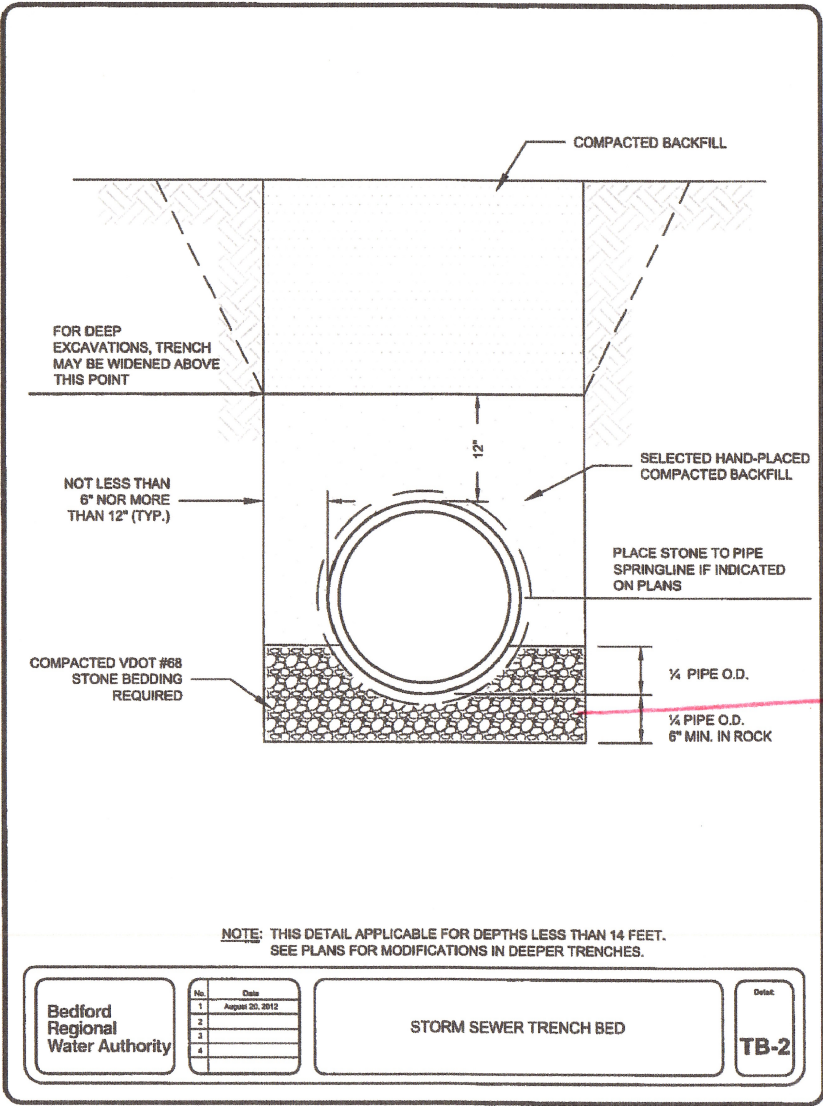
DESIGNED: MBS
DETAILED: MAK
CHECKED: MBS
APPROVED: RJD
DATE: 11/23/15

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
182262

C-30-509
SHEET
OF

ISSUED FOR CONSTRUCTION



ISSUED FOR CONSTRUCTION	11/23/15	DATE	50.3100 - Civil Drawings	NO. BY	0	MBS	P.J.D.
REVISED AND RECORD OF ISSUE							
SAVED: XREF1: XREF2: XREF3: XREF4:							
USER: XREF1: XREF2: XREF3: XREF4:							

BLACK & VEATCH
Building a world of difference

Black & Veatch Corporation
Virginia Beach, VA

CIVIL
DETAILS

DESIGNED: MBS
DETAILED: MAK
CHECKED: MBS
APPROVED: P.J.D.
DATE: 11/23/15

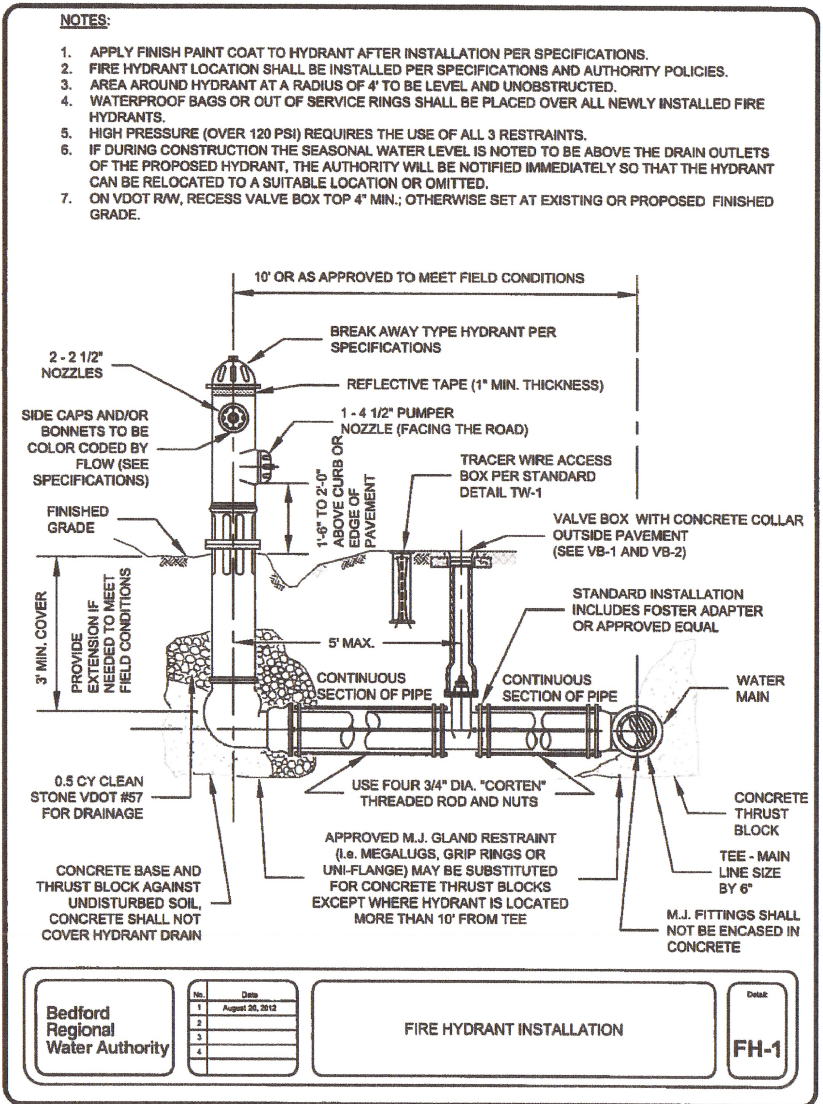
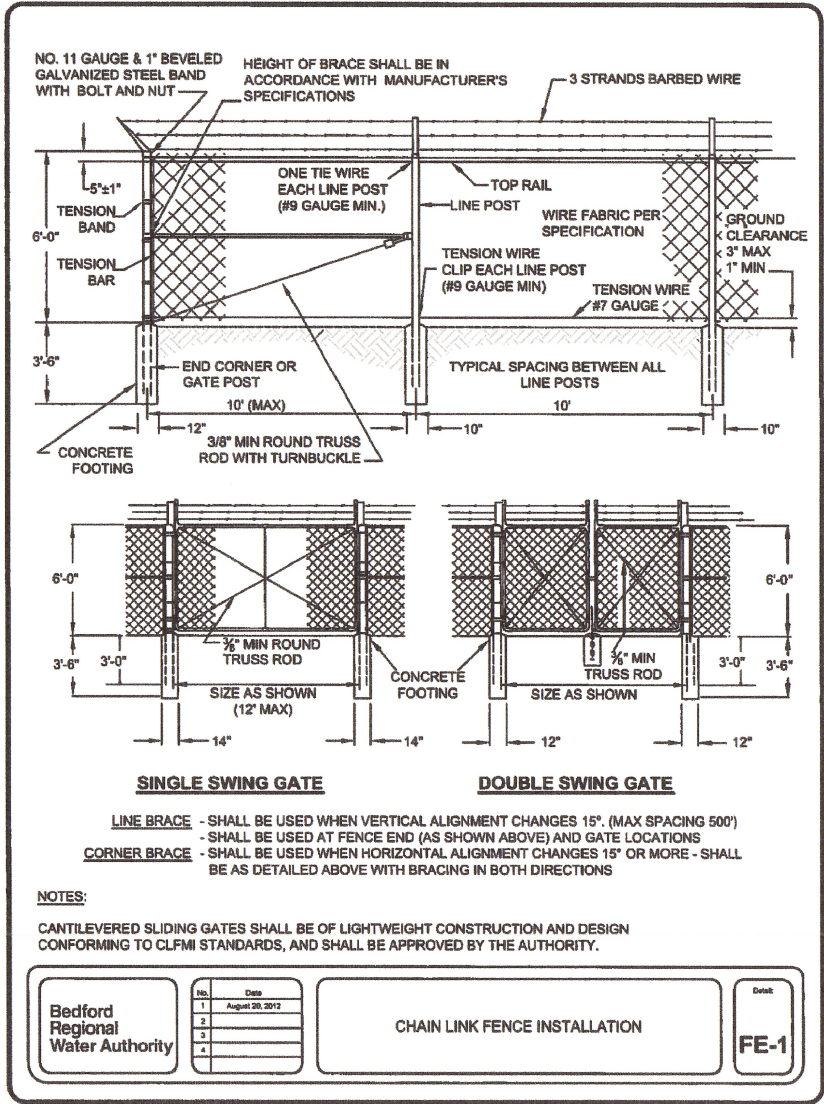
0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 182262

C-30-510
SHEET OF

FD7000
D7000



ISSUED FOR CONSTRUCTION	DATE	NO.	BY	CHK	APP
11/23/15	80-3180 - CIVIL Drawings	0	MAK		
REVISIONS AND RECORD OF ISSUE					
C-30-512.dwg					
XREF1: XREF2: XREF3: XREF4:					
SAVED: K0246553, 8/13/2015 4:36:19 PM					
PLOTTED: USER: K0246553					
DWS VER: 1000					

BLACK & VEATCH
Building a world of difference®
Black & Veatch Corporation
Virginia Beach, VA

BEDFORD REGIONAL WATER AUTHORITY
SMITH MOUNTAIN LAKE WTP &
RAW WATER PUMPING STATION / INTAKE

CIVIL DETAILS

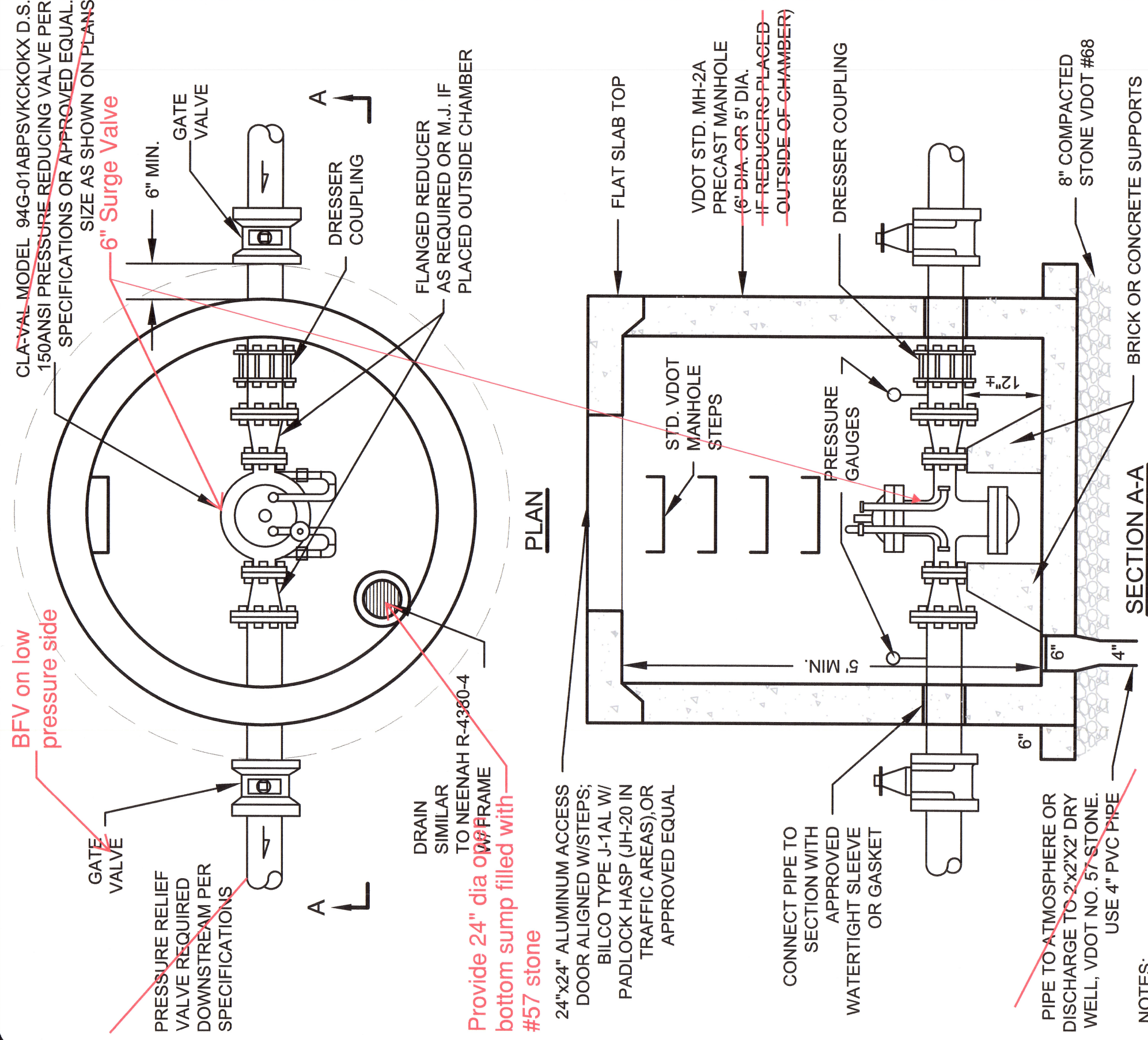
DESIGNED: MBS
DETAILED: MAK
CHECKED: MBS
APPROVED: PJD
DATE: 11/23/15

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
182262

C-30-512
SHEET OF

ISSUED FOR CONSTRUCTION



No.	Date
1	August 20, 2012
2	
3	
4	

Detail:
RV-2

PRESSURE REDUCING VALVE
(FOR P.R.V.'S SMALLER THAN 3")