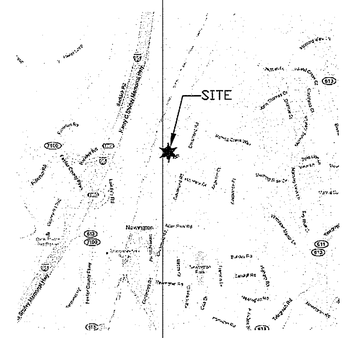
RECEIVED
Department of Planning & Zoning
DEC 06 2010
Zoning Evaluation Division

CINDER BED ROAD BUS DIVISION

SPECIAL EXCEPTION

CINDER BED ROAD
LORTON
FAIRFAX COUNTY, VIRGINIA 22079

SPECIAL EXCEPTIONS	
CATEGORY	DESCRIPTION
4	REGIONAL NON-RAIL TRANSIT FACILITY
6	USE IN A FLOODPLAIN
6	DRIVEWAY IN AN "R" DISTRICT



LOCATION MAP
SCALE: 1"=1000'

	SHEET INDEX
C-000	COVER SHEET
C-001	EXISTING BOUNDARY MAP
C-002	EXISTING TOPOGRAPHIC MAP
C-101	PROPOSED SITE PLAN
C-102	PROPOSED SITE PLAN
C-110	CONCEPT DEVELOPMENT DATA
C-201	PRELIMINARY SWM/ BMP PRACTICES PLAN
C-202	PRELIMINARY SWM/ BMP PRACTICES PLAN
C-203	PRELIMINARY STORMSEWER COMPUTATIONS
C-204	PRELIMINARY SWM/ BMP PRACTICES PLAN
C-205	PRELIMINARY STORMWATER DETAILS - DETENTION VAULT #1
C-206	PRELIMINARY STORMWATER DETAILS - DETENTION VAULT #2
C-207	PRELIMINARY STORMWATER DETAILS - DETENTION VAULT #3
C-208	PRELIMINARY STORMWATER DETAILS - STORM FILTER #1
C-209	PRELIMINARY STORMWATER DETAILS - STORM FILTER #3
C-210	STORMWATER MANAGEMENT NARRATIVE
C-211	PRELIMINARY OUTFALL ANALYSIS
T-300	CINDER BED ROAD. PROFILE & PLAN
T-301	CINDER BED ROAD. PROFILE & PLAN
T-302	PRELIMINARY CROSS SECTIONS
T-303	ACCESS ROAD PROFILE
L-400	EXISTING VEGETATION MAP
L-401	CONCEPTUAL LANDSCAPE PLAN
L-500	TREE PRESERVATION CALCULATIONS
L-501	TREE PROTECTION NOTES & DETAILS
L-502	SITE DETAILS & ENLARGEMENTS
F-600	FLOODPLAIN MAP

UTILITY CONTACT INFORMATION:

ELECTRIC
DOMINION POWER
1901 REDDY DRIVE
WOODBRIDGE, VA 22194
PHONE: (703) 490-2815

GAS
WASHINGTON GAS
6861 INDUSTRIAL ROAD
SPRINGFIELD, VA 22151
PHONE: (703) 750-1000

WATER
FAIRFAX WATER
8560 ARLINGTON BLVD.
MERRIFIELD, VA 20178
PHONE: (703) 289-6000

PROPERTY INFORMATION
CINDER BED ROAD
LORTON, VA 22079
TAX MAP #99-2-203-03, LOTS 1, 2, 3A, 3B
PARCELS: 1668 & 1732

OWNERS
SDNEWING, LLC
8179 ANOA AVENUE
LADYSMITH, VA 22521

LVR-NEWINGTON LLC.
8221 OLD COURTHOUSE ROAD
SUITE 300
VIENNA, VA 22182

APPLICANT
ISKALO CBR LLC
(ON BEHALF OF WMATA)

HARBINGER SQUARE
5166 MAIN STREET
WILLIAMSVILLE, NY 14221
PH: (716) 633-2096
FX: (716) 633-5776
www.iskalo.com

MISS UTILITY
CALL 811 IN VA
OR 1-800-552-7001

NOTE: CONTRACTOR SHALL CALL MISS UTILITY AT LEAST 48 HOURS IN ADVANCE TO HAVE ALL EXISTING UTILITIES MARKED, PRIOR TO ANY CONSTRUCTION ACTIVITIES.

PREPARED BY:
WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
1420 KING STREET, SUITE 510
ALEXANDRIA, VA 22314
PH: (703) 299-8718
FX: (703) 299-8719
www.wd-ae.com

Application No. SE 2010-LE-017 Staff S.W.
APPROVED (SE) SP PLAN
SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011
Sheet 1 of 27

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CONTRACT NO.
439601

DESIGNED	WD-AE	01/22/10 DATE
DRAWN	CML	05/18/10 DATE
CHECKED	RJF	06/01/10 DATE
APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS		
DATE	BY	DESCRIPTION
10/06/10	RJF	1 SHEET 23 OF 27 AND SHEET 24 OF 27
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Lic. No. 19005
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

SCALE: AS SHOWN

DRAWING NO. 1 OF 27

C-000

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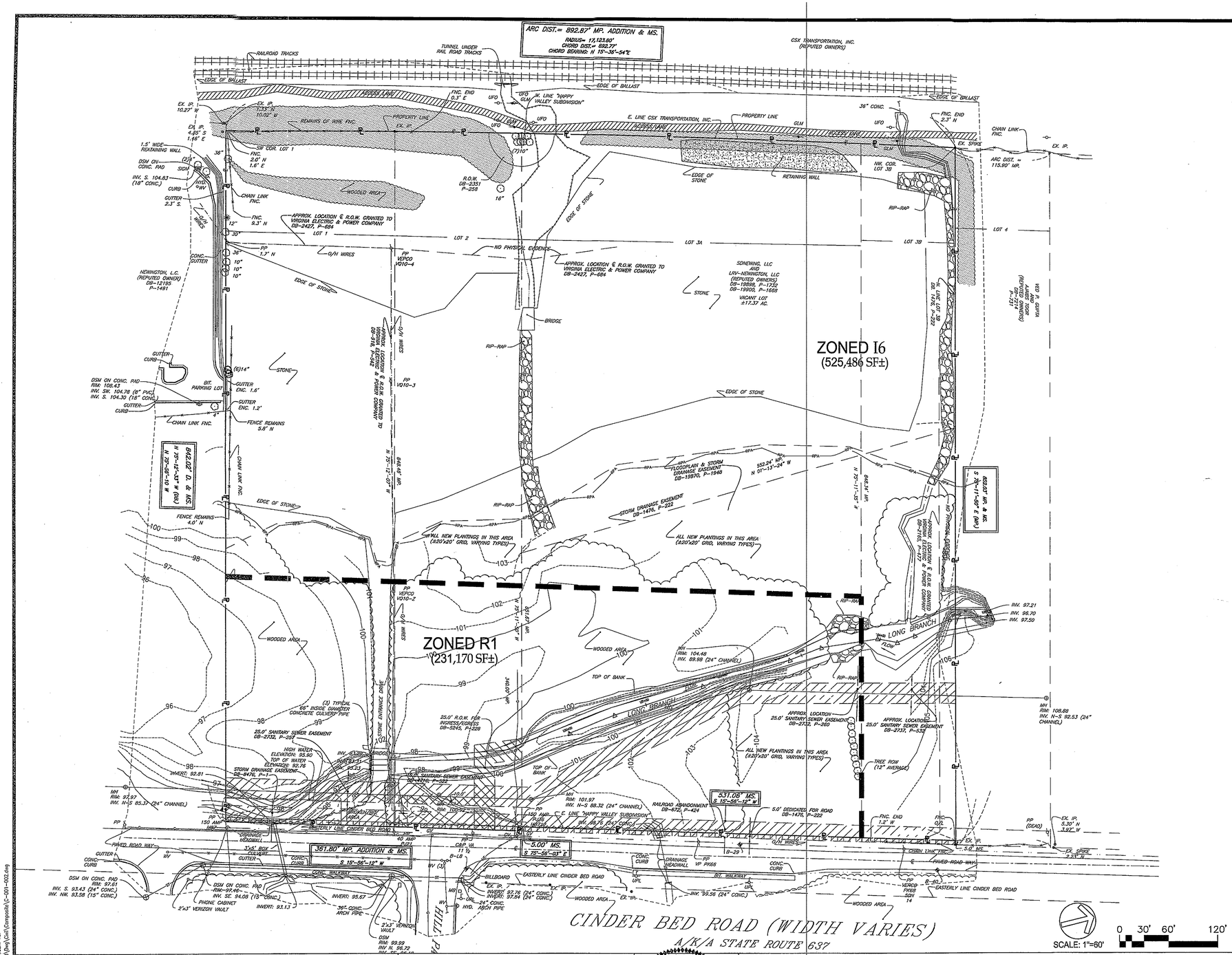

SITE DATA

Property Location: 7901 Cinder Bed Road
Lorton, Virginia
Fairfax County

Lot Area: 756,637 SF± (17.37 ac.±)

Current Zoning: R-1 = 231,170 SF± (5.31 ac.±)
I-6 = 525,486 SF± (12.06 ac.±)

LEGEND

0"	✳	CONIFEROUS TREE
16"	◌	DECIDUOUS TREE
AC.		ACRES
APPROX.		APPROXIMATE
BIT.		BITUMINOUS
B-	◆	BORE LOCATION
CONC.		CONCRETE
COR.		CORNER
DB-		DEED BOOK
DIST.		DISTANCE
DSM	⊕	DRAINAGE STRUCTURE MANHOLE
E		EAST
ENC.		ENCROACH
EX. IP.	⊗	EXISTING IRON PIPE/PIN
FNC.		FENCE
HYD.		HYDRANT
INV.		INVERT
MH	⊕	MANHOLE
MP.		MAP
MS.		MEASURE
N		NORTH
O/H		OVERHEAD WIRES
P-		PAGE
℄		PROPERTY LINE
PP		UTILITY POLE
R.O.W.		RIGHT OF WAY
		SIGN
S		SOUTH
UFO		UNDERGROUND FIBER OPTIC INDICATOR
W		WEST
WV		WATER VALVE
100.00		EXISTING SPOT ELEVATION
		UNDERGROUND TELEPHONE LINE
		UNDERGROUND ELECTRIC LINE
		UNDERGROUND WATER LINE
		UNDERGROUND STORM LINE
		FLOOD PLAIN & STORM DRAINAGE EASEMENT
		LIMITS OF RESOURCE PROTECTION AREA
		LIMITS OF WOODED AREA
		PERIMETER OF METES & BOUNDS

Application No. SE 2010-LE-017 Staff S.W.

APPROVED SE SP PLAN

SEE DEV CONDS DATED March 8, 2011
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Sheet 2 of 27

CONTRACT NO. 439601

DESIGNED	WD-AE	01/22/10 DATE
DRAWN	RJF	05/20/10 DATE
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APPROVED	DCD	07/15/10 DATE

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12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Lic. No. 17029
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER
ARCHITECTS & ENGINEERS
www.wd-ae.com

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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

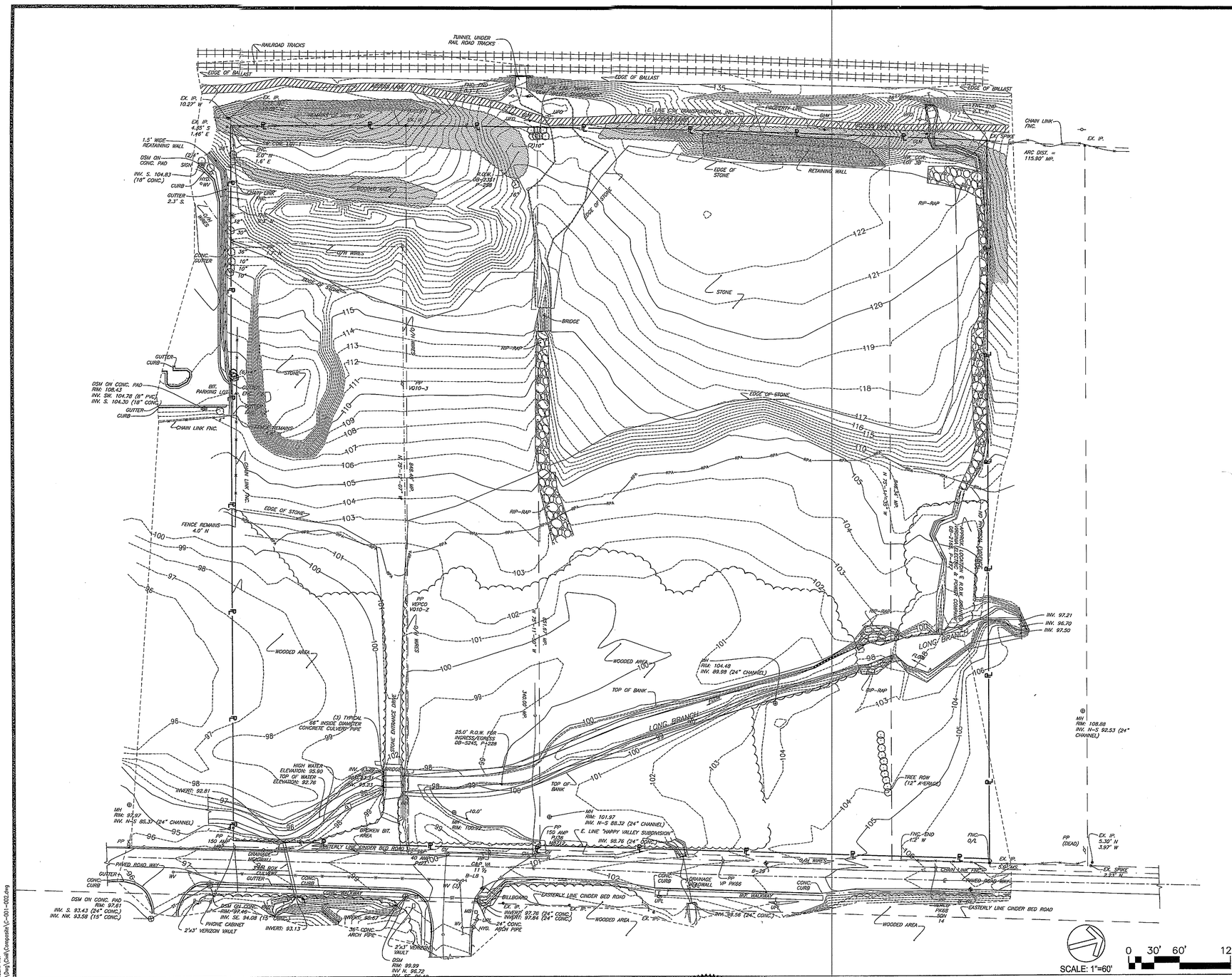
EXISTING BOUNDARY MAP

SCALE: AS SHOWN

DRAWING NO. 2 OF 27

C-001

PRINT DATE: Nov 30, 2010 11:56 AM USER: RJF
FILE NAME: E:\439601 Cinder Bed Road\Dwg\Civil\Composite\C-001-002.dwg



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12/01/10
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GENERAL NOTES

1. HORIZONTAL DATUM: REFERENCED TO NAD83, VIRGINIA STATE PLANE, NORTH ZONE, COORDINATE SYSTEM (U.S. SURVEY FEET).
2. DATA SHOWN ON THIS MAP WAS COLLECTED AS FIELD RUN SURVEY BY WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS ON DECEMBER 18, 2009. ADDITIONAL TOPOGRAPHY FOR PARTS OF THE EASTERN PORTION OF THE SITE WERE PROVIDED BY VIKA, INC. CONTOUR INTERVAL IS ONE FOOT.
3. DIMENSIONS ARE FROM FACE OF BUILDING, CURB OR EDGE OF PAVEMENT UNLESS NOTED OTHERWISE.
4. SURVEY OBTAINED USING BENCHMARK E314.
5. THERE ARE NO GRAVES ON THE SITE.
6. THERE ARE NO EASEMENTS OVER 25' IN WIDTH.
7. WATER AND SEWER WILL BE PROVIDED OFF CINDER BED ROAD.
8. THERE ARE NO REQUIRED TRAILS.

Application No. SE 2010-LE-017 Staff S.W.

APPROVED SE SP PLAN

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Sheet 3 of 27

CONTRACT NO. 439601

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REFERENCE DRAWINGS

NUMBER	DESCRIPTION

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12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID D. DUCHSCHERER
Lic. No. 19020
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

EXISTING TOPOGRAPHIC MAP

SCALE: AS SHOWN

DRAWING NO. 3 OF 27

C-002

PRINT DATE: Nov 30, 2010 11:56 AM USER: RJF
FILE NAME: E:\439601 Cinder Bed Road\Dwg\Civil\Composite\C-001-002.dwg

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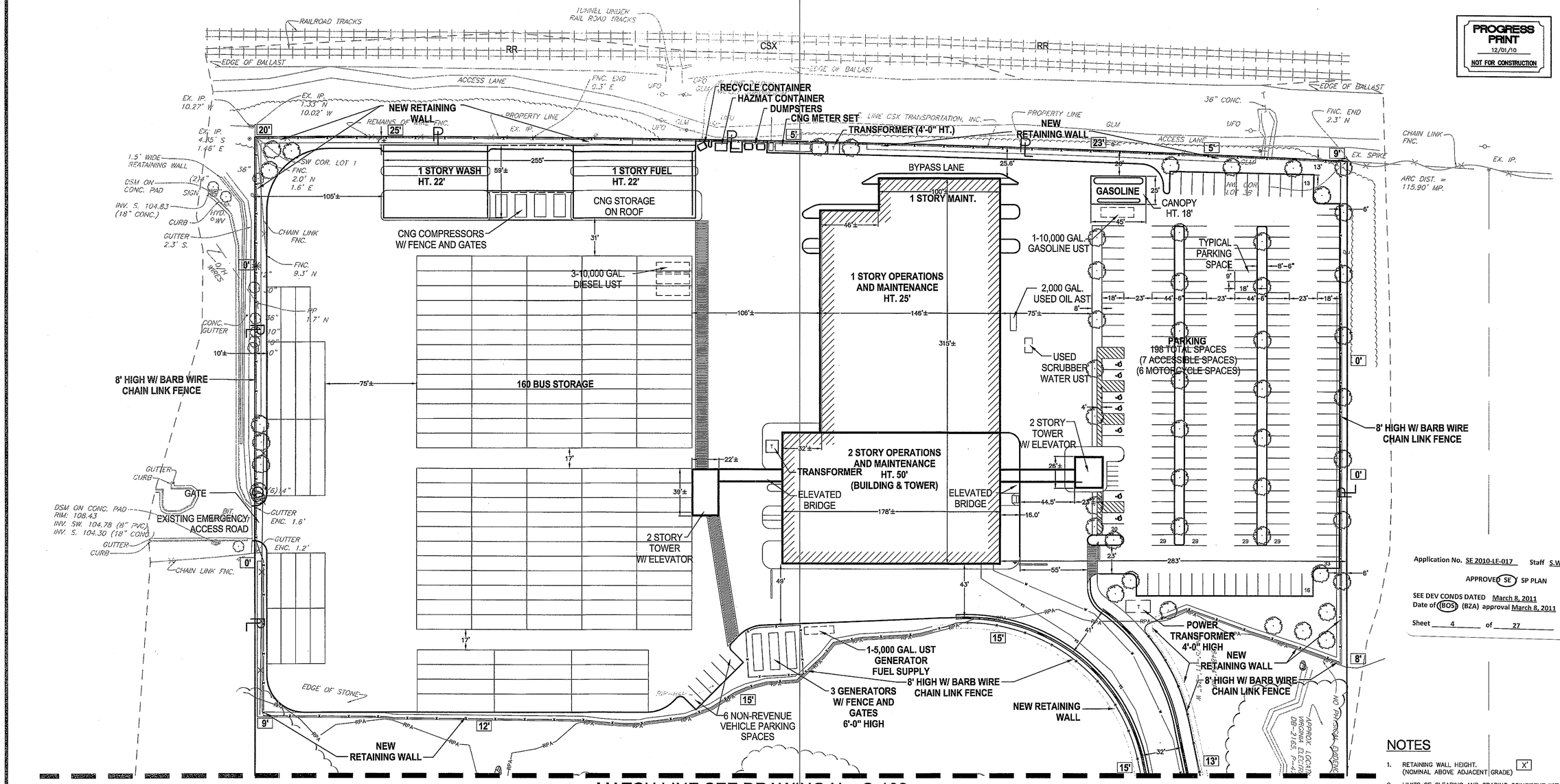

MATCH LINE SEE DRAWING No. C-102

Application No. SE 2010-LE-017 Staff S.W.

APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011

Sheet 4 of 27

NOTES

1. RETAINING WALL HEIGHT. (NOMINAL ABOVE ADJACENT GRADE) [X']
2. LIMITS OF CLEARING AND GRADING COINCIDENT WITH RPA AND/ OR LOT LINE.
3. FLOODPLAIN LINE SEE SHEET C-001, EXISTING BOUNDARY MAP.
4. 4'-0" MINIMUM LOT LINE BUFFER AROUND PERIMETER PER I-6 ZONING.

SCALE: 1"=40'

0 20' 40' 80'

DESIGNED	WD-AE	01/22/10 DATE
DRAWN	RJF	05/20/10 DATE
CHECKED	SMR	06/01/10 DATE
APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

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DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
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CONTRACT NO. 439601

CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

PROPOSED SITE PLAN

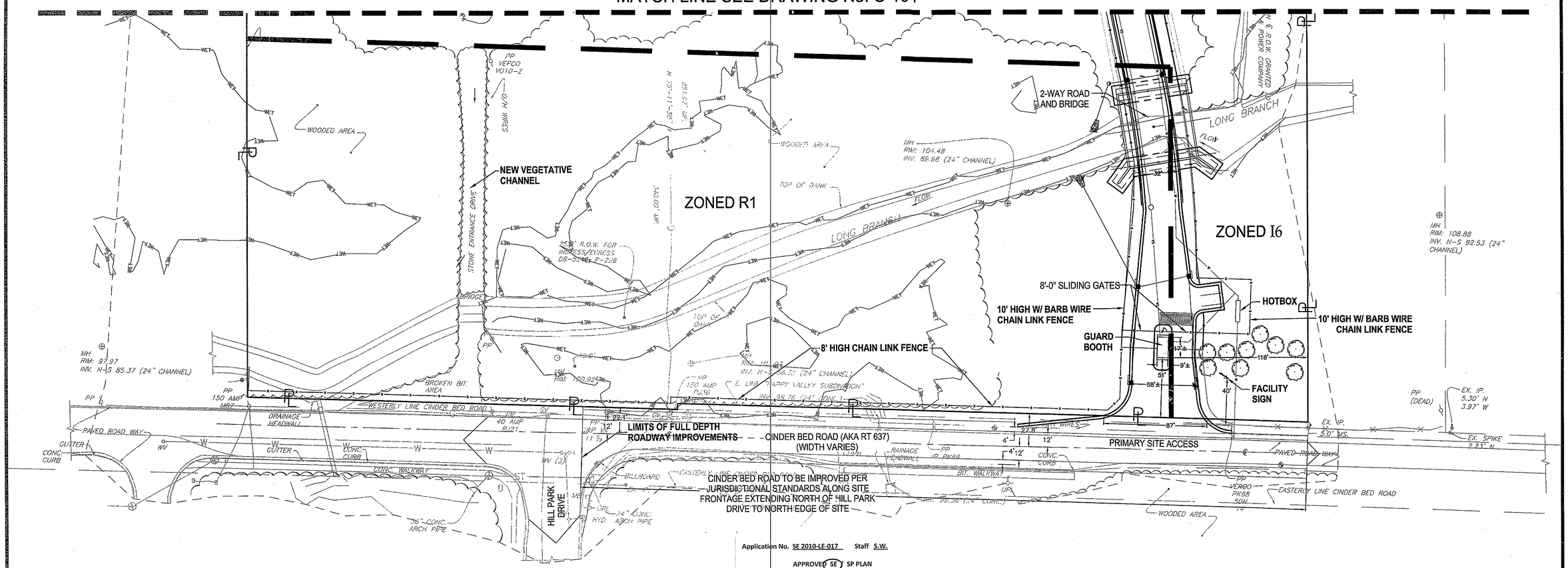
SCALE: AS SHOWN

DRAWING NO. 4 OF 27

C-101

PRINT DATE: Dec 1, 2010 09:44 AM USER: RJF
FILE NAME: E:\439601 Cinder Bed Road\Dwg\Civil\Composite\SE C-101-102.dwg

MATCH LINE SEE DRAWING No. C-101



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APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011

Sheet 5 of 27

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SCALE: 1"=40'

DESIGNED	WD-AE	01/22/10 DATE
DRAWN	RJF	05/20/10 DATE
CHECKED	SMR	06/01/10 DATE
APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS	
NUMBER	DESCRIPTION

REVISIONS		
DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Lic. No. 19029
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

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CONTRACT NO. 439601

CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

PROPOSED SITE PLAN

SCALE: AS SHOWN

DRAWING NO. 5 OF 27

C-102

PRINT DATE: Dec 1, 2010 12:59 PM USER: RJF
FILE NAME: C:\Vsdata\Cinder Bed Road\Dwg\Civil\Composite\SE C-101-102.dwg

SITE TABULATIONS

EXISTING PARCEL ANALYSIS				
PARCEL	AREA (SF)	AREA (AC)	CURRENT ZONING	RECORD LOCATION
0992-03-0001	174,763	4.01 AC	I-6 & R-1	DB-19900 PG 1668
0992-03-0002	131,725 SF	3.02 AC	I-6 & R-1	DB-19900 PG 1668
0992-03-0003A	354,361 SF	8.14 AC	I-6 & R-1	DB-19898 PG 1732
0992-03-0003B	95,788 SF	2.20 AC	I-6	DB-19898 PG 1732
TOTALS +/-	756,637 SF	17.37 AC		

EXISTING SITE AREA	756,637 SF OR 17.37 AC
EXISTING ZONES	I-6 & R-1
PROPOSED USE	CAT. 4: REGIONAL NON-RAIL TRANSIT FACILITY CAT. 6: USE IN FLOODPLAIN CAT. 6: DRIVEWAY IN "R" DISTRICT
PROPOSED BUILDING GROSS FLOOR AREA	94,300 SFA (I-6)
MAX. FAR IN I-6 DISTRICT	.5 FAR
PROPOSED FAR IN I-6 DISTRICT	.19 FAR
MAXIMUM BUILDING HEIGHT IN I-6 DISTRICT	75'
PROPOSED BUILDING HEIGHTS IN I-6 DISTRICT	25'& 50'
BULK PLANE REQUIREMENT FOR I-6 DISTRICT	45 DEG., OR 40' MIN. FRONT YARD
PROPOSED BUILDING GROSS FLOOR AREA	200 SFA (R-1)
MAX. FAR IN R-1 DISTRICT	.15 FAR
PROPOSED FAR IN R-1 DISTRICT	.001 FAR
MAXIMUM BUILDING HEIGHT IN R-1 DISTRICT	60'
PROPOSED BUILDING HEIGHTS IN R-1 DISTRICT	10'
BULK PLANE REQUIREMENT FOR R-1 DISTRICT	50 DEG., OR 40' MIN. FRONT YARD

BUILDING DATA CHART

BUILDING	USE	MAX FLOORS	MAX BUILDING HT.
A	MAINTENANCE	1	25'
B	OPERATIONS & MAINTENANCE	2	50'
C	GUARD BOOTH	1	10'

PARKING / LOADING COMPUTATIONS

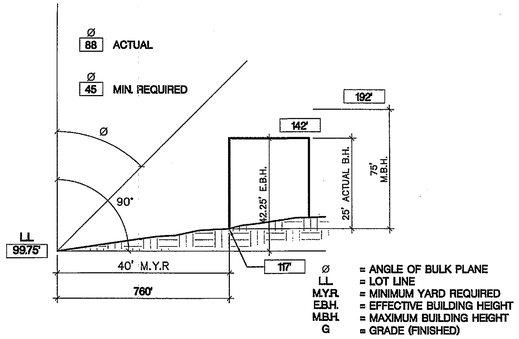
MAX. REQUIRED PARKING

- VEHICLE TRANSPORTATION SERVICE ESTABLISHMENT: BASED ON THE SIZE AND MAX. NUMBER OF COMPANY VEHICLES STORED ON SITE WITH A MINIMUM OF ONE (1) SPACE PER (1) EMPLOYEE ON MAJOR SHIFT, PLUS ONE (1) SPACE PER COMPANY VEHICLE STORED ON SITE

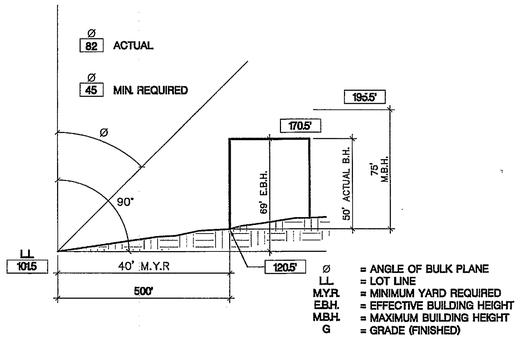
35 STAFF EMPLOYEES
+160 BUS DRIVERS
195 REQUIRED SPACES

MAX. PROPOSED PARKING

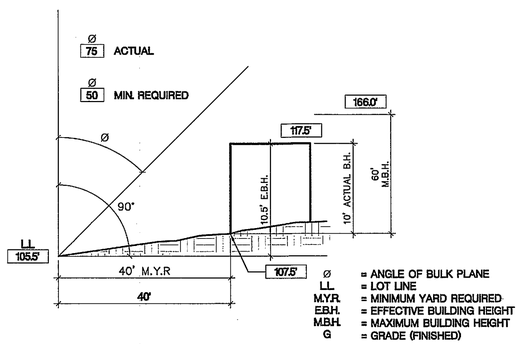
204 TOTAL SPACES



1 DETAIL ANGLE OF BULK PLANE
SCALE: NTS — BUILDING A AT CINDER BED RD.



2 DETAIL ANGLE OF BULK PLANE
SCALE: NTS — BUILDING B AT CINDER BED RD.



3 DETAIL ANGLE OF BULK PLANE
SCALE: NTS — BUILDING C AT CINDER BED RD.

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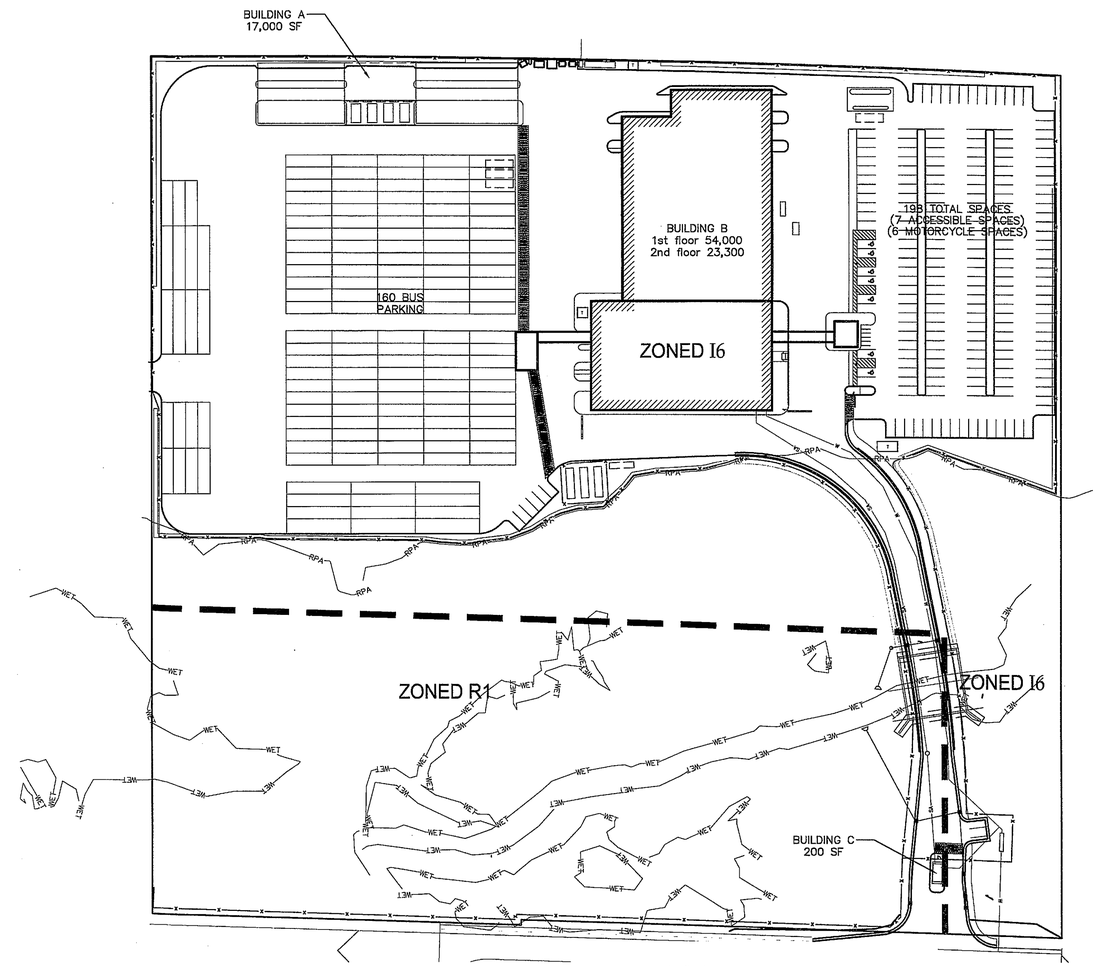

Application No. SE 2010-LE-017 Staff S.W.

APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011

Sheet 6 of 27

CONTRACT NO. 439601

DESIGNED WD-AE	01/22/10	DATE
DRAWN CML	05/18/10	DATE
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APPROVED DCD	07/15/10	DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
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COMMONWEALTH OF VIRGINIA
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WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DIVISION
CINDER BED ROAD LORTON, VA
CONCEPT DEVELOPMENT DATA

SCALE: AS SHOWN

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C-110

PRINT DATE: Dec 1, 2010 11:36 AM USER: RJF
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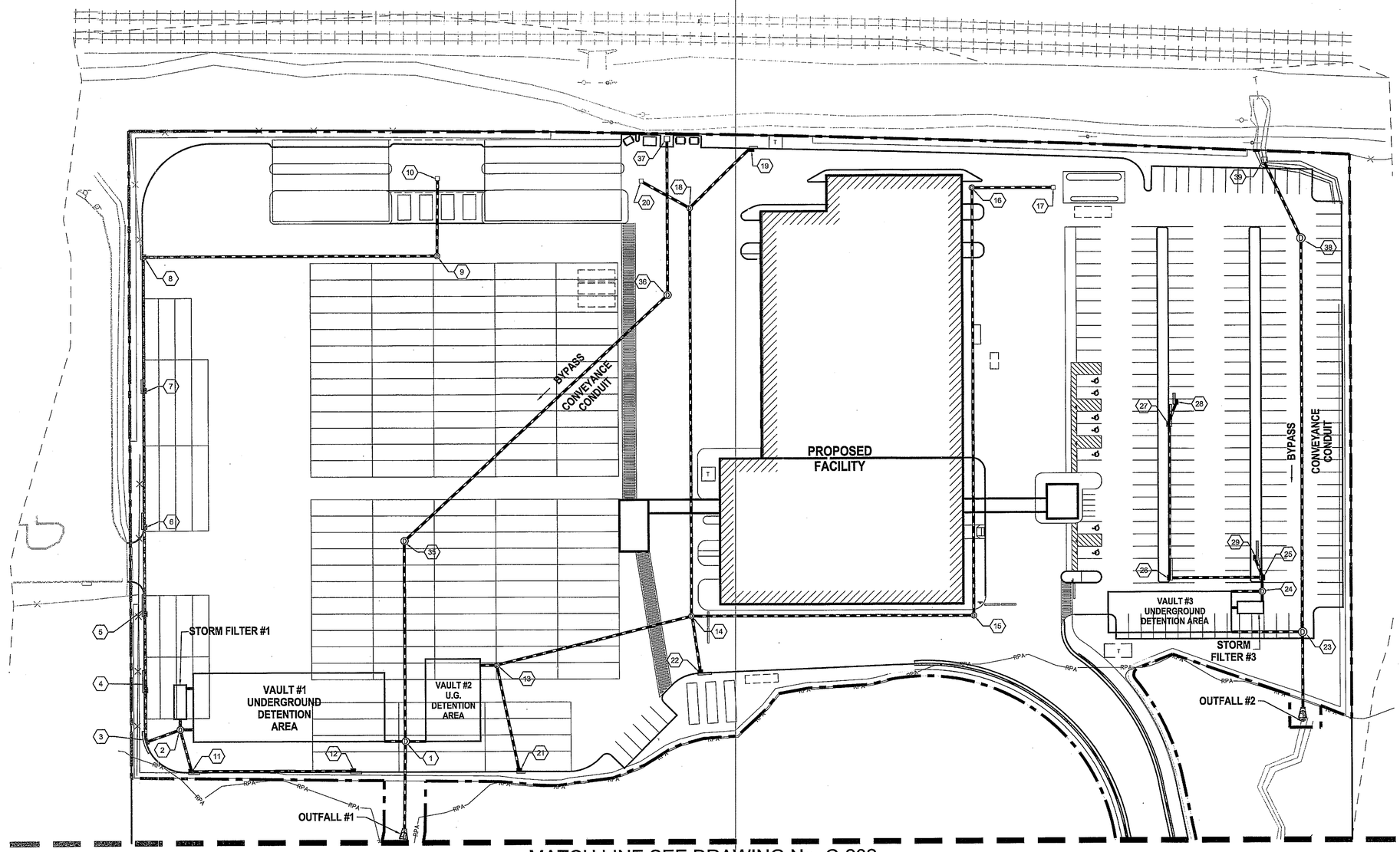

MATCH LINE SEE DRAWING No. C-202

LEGEND

- LIMITS OF DISTURBANCE
- STORM STRUCTURE LABEL
- STORM MANHOLE
- STORM INLET
- GRATE INLET
- 2.0% PAVEMENT SLOPE (TYP.)

0 20' 40' 80'

Application No. SE 2010-LE-017 Staff S.W.

APPROVED SE SP PLAN

SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011

Sheet 7 of 27

CONTRACT NO. 439601

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DRAWN	CC1	06/01/10 DATE
CHECKED	SMR	06/01/10 DATE
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REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

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12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

PRELIMINARY SWM/ BMP PRACTICES PLAN

SCALE: AS SHOWN

DRAWING NO. 7 OF 27

C-201

PRINT DATE: Dec 1, 2010 01:04 PM USER: RJF
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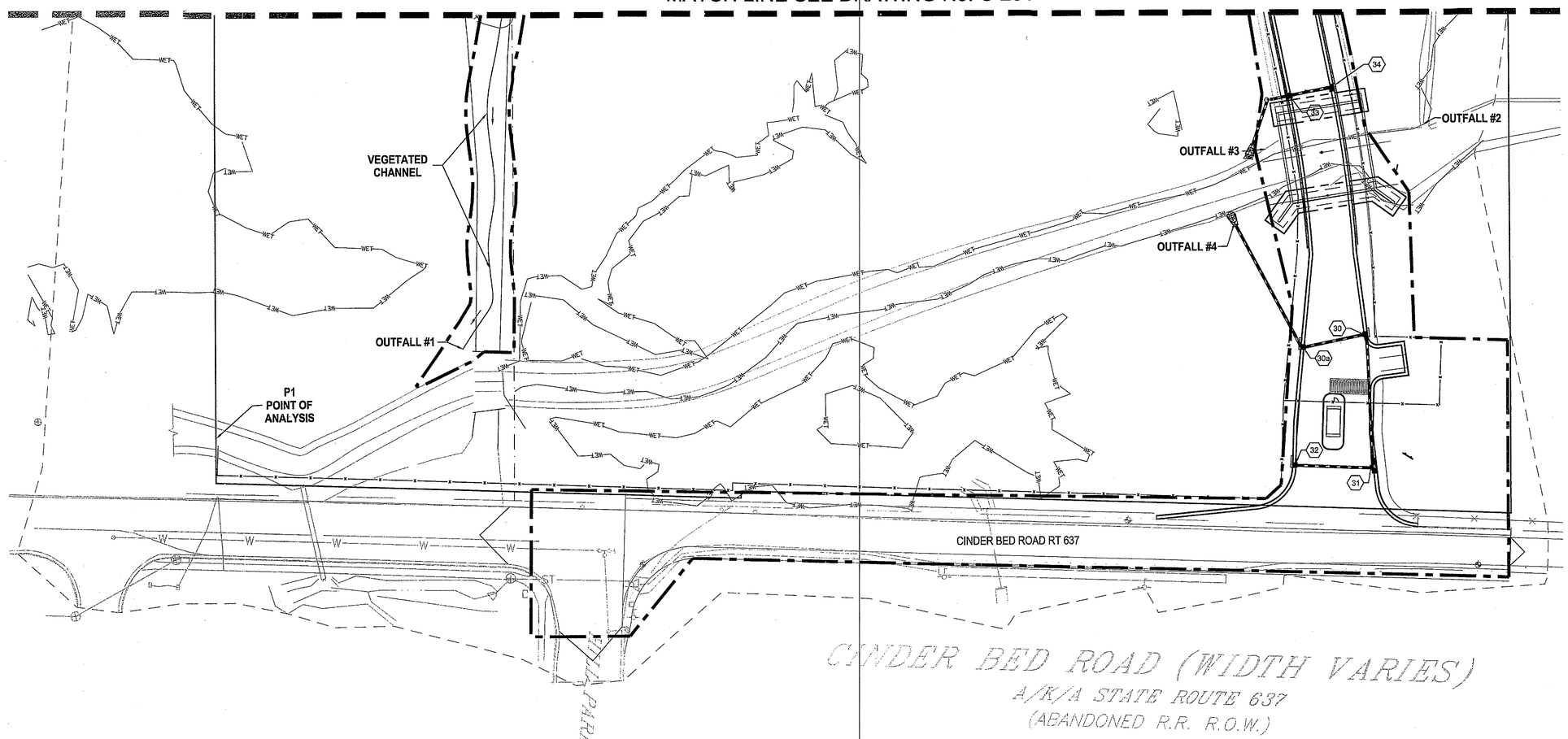

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12/01/10
NOT FOR CONSTRUCTION

LEGEND

- LIMITS OF DISTURBANCE
- STORM STRUCTURE LABEL
- STORM MANHOLE
- STORM INLET
- GRATE INLET
- 2.0% PAVEMENT SLOPE (TYP.)

0 20' 40' 80'

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REFERENCE DRAWINGS

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DAVID C. DUCHSCHERER
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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

PRELIMINARY SWM/ BMP PRACTICES PLAN

SCALE: AS SHOWN

DRAWING NO. 8 OF 27

C-202

PRINT DATE: Dec 1, 2010 01:04 PM USER: RJF
FILE NAME: E:\439601 Cinder Bed Road\Dwg\Civil\Composite\XE C-201-202.dwg

Appendix 9B-1 LD-204 Stormwater Inlet Computations

LD-204
Rev. 6-85

RTE ____ PROJ 439601 DATE 06/02/2010 SHEET ____ OF ____

INLET NUMBER	INLET TYPE	INLET LENGTH (FT)	STATION	DRAINAGE AREA (AC)	C	CA INCREMENTAL	CA ACCUMULATED	I (IN/HR)	Q INCREMENTAL (CFS)	Q CARRYOVER (CFS)	Q_T GUTTER FLOW	S GUTTER SLOPE (FT/FT)	S_X CROSS SLOPE (FT/FT)	T (SPREAD)	W (FT)	W/T	S_V (FT/FT)	S_V/S_X	E_O (#10)	a (IN)	$S'W = a/(12W)$	$S_W = S_X + S'_W E_O$	L_T (FT) 15	P EFFEC. LENGTH (FT)	L/L_T	d (FT)	E (#16)	h (FT)	Q INTERCEPTED (CFS)	d/h	Q_b CARRYOVER (CFS)	T-SPREAD @ SAG (FT)	SUMP	SHEET 1 OF 1 REMARKS
12	2B	8		0.15	0.90	0.14	0.14	7.27	0.98		0.98	0.0300	0.0300	2.90	2.0	0.69	0.083	2.78	0.98	3.3	0.137	0.164	7.6		1.05		1.00		0.98		0.00			10 YEAR
11	2B	8		0.15	0.90	0.14	0.14	7.27	0.98		0.98	0.0300	0.0300	2.90	2.0	0.69	0.083	2.77	0.98	3.3	0.136	0.164	7.7		1.05		1.00		0.98		0.00			10 YEAR
8	2B	10		0.07	0.90	0.06	0.06	7.27	0.46		0.46	0.0300	0.0300	4.02	2.0	0.50	0.083	2.77	0.90	3.3	0.136	0.153	5.8		1.73		1.00		0.46		0.00			10 YEAR
7	2B	10		0.11	0.90	0.10	0.10	7.27	0.72		0.72	0.0300	0.0300	2.33	2.0	0.86	0.083	2.77	1.00	3.3	0.136	0.166	6.7		1.50		1.00		0.72		0.00			10 YEAR
6	2B	10		0.27	0.90	0.24	0.24	7.27	1.77		1.77	0.0300	0.0300	4.33	2.0	0.46	0.083	2.77	0.87	3.3	0.136	0.149	10.4		0.96		1.00		1.76		0.00			10 YEAR
5	2B	16		1.45	0.90	1.31	1.31	7.27	9.49		9.49	0.0300	0.0300	9.77	2.0	0.20	0.083	2.77	0.50	3.3	0.136	0.098	27.0		0.59		0.80		7.61		1.88			10 YEAR
4	2B	16		1.11	0.90	1.00	1.00	7.27	7.26	1.88	9.14	0.0300	0.0300	9.59	2.0	0.21	0.083	2.78	0.51	3.3	0.137	0.100	26.3		0.61		0.81		7.45		0.00			10 YEAR
3	2F	16		0.60	0.90	0.54	0.54	7.27	3.93		5.81	0.0300	0.0300											19.60		0.26		0.46		0.55		8.50	Y	10 YEAR
19	2B	6		0.06	0.90	0.05	0.05	7.27	0.39		0.39	0.0300	0.0250	1.65	2.0	1.21	0.083	3.32	1.00	3.4	0.141	0.166	5.2		1.16		1.00		0.39		0.00			10 YEAR
22	2B	10		0.21	0.90	0.19	0.19	7.27	1.37		1.37	0.0300	0.0250	3.69	2.0	0.54	0.083	3.32	0.92	3.4	0.141	0.155	9.1		1.10		1.00		1.37		0.00			10 YEAR
21	2B	6		0.04	0.90	0.04	0.04	7.27	0.26		0.26	0.0300	0.0250	1.44	2.0	1.39	0.083	3.32	1.00	3.4	0.141	0.166	4.4		1.38		1.00		0.26		0.00			10 YEAR
28	2B	8		0.23	0.90	0.21	0.21	7.27	1.50		1.50	0.0150	0.0200	5.96	2.0	0.34	0.083	4.15	0.82	3.5	0.146	0.140	8.2		0.98		1.00		1.50		0.00			10 YEAR
27	2B	16		0.82	0.90	0.74	0.74	7.27	5.37		5.37	0.0150	0.0200	11.30	2.0	0.18	0.083	4.15	0.51	3.5	0.146	0.095	17.6		0.91		0.99		5.29		0.07			10 YEAR
26	2B	10		0.26	0.90	0.23	0.23	7.27	1.70	0.07	1.77	0.0200	0.0200	6.04	2.0	0.33	0.083	4.15	0.81	3.5	0.146	0.139	9.6		1.04		1.00		1.77		0.00			10 YEAR
29	2B	14		0.45	0.90	0.41	0.41	7.27	2.94		3.04	0.0150	0.0200	8.70	2.0	0.23	0.083	4.15	0.64	3.5	0.146	0.114	12.4		1.13		1.00		3.04		0.00			10 YEAR
25	2F	16		0.56	0.90	0.50	0.50	7.27	3.66		6.03	0.0150	0.0200											19.60		0.26		0.46		0.57		13.08	Y	10 YEAR
32	2B	8		0.14	0.90	0.13	0.13	7.27	0.92		0.92	0.0100	0.0250	3.52	2.0	0.57	0.083	3.32	0.97	3.4	0.141	0.162	5.4		1.49		1.00		0.92		0.00			10 YEAR
31	2B	8		0.13	0.90	0.12	0.12	7.27	0.85		0.85	0.0100	0.0250	3.19	2.0	0.63	0.083	3.32	0.98	3.4	0.141	0.164	5.2		1.54		1.00		0.85		0.00			10 YEAR
30	2B	6		0.06	0.90	0.05	0.05	7.27	0.39		0.39	0.0100	0.0250	1.66	2.0	1.20	0.083	3.32	1.00	3.4	0.141	0.166	3.7		1.62		1.00		0.39		0.00			10 YEAR
34	3B	8		0.16	0.90	0.14	0.14	7.27	1.05		1.05	0.0380	0.0200	3.16	2.0	0.63	0.083	4.15	1.00	3.5	0.146	0.166	8.4		0.96		1.00		1.04		0.00			10 YEAR
33	3B	8		0.12	0.90	0.11	0.11	7.27	0.79		0.79	0.0380	0.0200	2.19	2.0	0.91	0.083	4.15	1.00	3.5	0.146	0.166	7.4		1.08		1.00		0.79		0.00			10 YEAR

Appendix 9B-2 LD-229 Storm Drain Design Computations

LD-229
July 2000

STORM SEWER DESIGN COMPUTATIONS

ROUTE: ____ PROJ: CINDER BED ROAD BUS DIVISON
COUNTY: FAIRFAX DISTRICT: ____
DESCRIPTION: ____ SHEET ____ OF ____

FROM POINT	TO POINT	DRAINAGE AREA (ac)	RUNOFF COEFF. (C)	CA INCRE. CxA	CA TOTAL CxA	INLET TIME (min)	INTENSITY OF SYSTEM (in/hr)	RUNOFF (cfs)	INVERT ELEV. INV. UP (ft)	INVERT ELEV. INV. DN. (ft)	LENGTH (ft)	SLOPE (%)	DIA. (in)	CAPACITY (cfs)	VELOCITY (ft/s)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
D-10	D-9	0.3	0.9	0.27	0.27	5	7.27	1.96	113.42	113.15	54	0.5	12	2.52	2.5
D-9	D-8	0.17	0.9	0.15	0.42	5	7.15	3.03	113.15	110.48	213	1.25	12	3.99	4.36
D-8	D-7	0.07	0.9	0.06	0.49	5	6.88	3.35	110.48	107.98	100	2.5	12	5.63	5.36
D-7	D-6	0.11	0.9	0.1	0.59	5	6.78	3.98	107.36	104.86	100	2.5	15	10.21	4.5
D-6	D-5	0.27	0.9	0.24	0.83	5	6.64	5.5	104.54	103.93	60.5	1.01	18	10.54	3.62
D-5	D-4	1.45	0.9	1.31	2.13	5	6.55	13.98	103.14	102.75	52	0.75	24	19.59	4.45
D-4	D-3	1.11	0.9	1	3.13	5	6.5	20.37	102.46	102.19	36	0.75	24	19.59	6.49
D-3	D-2	0.6	0.9	0.54	3.67	5	6.48	23.8	101.2	101.05	26	0.54	30	30.09	4.85
D-12	D-11	0.15	0.9	0.14	0.14	5	7.27	0.98	107.15	104.19	118.5	2.5	12	5.63	2.54
D-11	D-2	0.15	0.9	0.14	0.27	5	6.8	1.84	103.89	103.1	31.5	2.5	12	5.64	3.56
D-2	VAULT #1	0	0.9	0	3.94	5	6.46	25.46	100.83	100.35	9.5	5	30	92.19	7.22
D-2	ST. FLT. #1	0	0	0	0	0	0	2.14	100.83	100.78	10	0.5	12	2.5	2.65
ST. FLT. #1	VAULT #1	0	0	0	0	0	0	2.14	98.03	98	5	0.5	12	2.5	2.65
VAULT #1	D-1	0	0	0	0	0	0	4.22	98	97.85	15	1	15	6.45	5.56
D-37	D-36	0	0	0	0	0	0	56.7	112.12	110.88	108	1.15	36	71.46	8.02
D-36	D-35	0	0	0	0	0	0	56.7	110.88	105.63	263	2	36	94.23	8.91
D-35	D-1	0	0	0	0	0	0	56.7	103.59	100.65	147	2	36	94.32	9.23
D-20	D-18	0.28	0.9	0.25	0.25	5	7.27	1.83	115.74	115.55	37	0.51	12	2.55	3.53
D-19	D-18	0.06	0.9	0.05	0.05	5	7.27	0.39	115.12	114.8	63	0.51	12	2.54	1.08
D-18	D-14	0	0.9	0	0.31	5	6.66	2.04	114.49	111.51	299	1	12	3.56	4.39
D-17	D-16	0.14	0.9	0.13	0.13	5	7.27	0.92	115.34	115.05	57	0.51	12	2.54	1.43
D-16	D-15	1.11	0.9	1	1.13	5	7.02	7.89	114.25	112.35	313.5	0.61	18	8.18	4.9
D-15	D-14	0	0.9	0	1.13	5	6.7	7.53	111.97	110.41	206.5	0.76	18	9.13	4.98
D-22	D-14	0.21	0.9	0.19	0.19	5	7.27	1.37	114.7	114.28	41.5	1.01	12	3.58	3.89
D-21	D-13	0.04	0.9	0.04	0.04	5	7.27	0.26	110.5	109.94	74	0.76	12	3.1	2.24
D-14	D-13	0	0.9	0	1.62	5	6.22	10.07	109.59	108.75	142	2	18	14.85	7.28
D-13	VAULT #2	0	0.9	0	1.66	5	6.13	10.15	105.38	105	12.5	3.04	18	18.31	6.6
VAULT #2	D-1							4.16	103	100	15	20	15	28.88	16.61
D-1	OUTFALL #1	0	0	0	0	0	0	65.26	97.49	95.6	63	3	36	115.52	9.23
D-29	D-25	0.45	0.9	0.41	0.41	5	7.27	2.94	111.24	111.09	15	1	12	3.56	3.75
D-28	D-27	0.23	0.9	0.21	0.21	5	7.27	1.5	113.05	112.62	17	2.53	12	5.66	1.92
D-27	D-26	0.82	0.9	0.74	0.95	5	7.22	6.82	112.62	111.77	113	0.75	18	9.11	3.86
D-26	D-25	0.26	0.9	0.23	1.18	5	7.07	8.34	111.77	111.09	67.5	1.01	18	10.54	4.72
D-25	D-24	0.56	0.9	0.5	2.09	5	7	14.62	111.09	111	8.5	1.06	24	23.27	4.65
D-24	VAULT #3	0	0.9	0	2.09	5	6.99	14.6	110.81	110.6	20.5	1.02	24	22.89	6.45
D-24	ST. FLT. #3	0	0	0	0	0	0	1.16	110.81	110.78	5.5	0.5	12	2.5	2.65
ST. FLT #3	VAULT #3	0	0	0	0	0	0	1.16	108.03	108	5	0.5	12	2.5	2.65
VAULT #3	D-23	0	0	0	0	0	0	5	108	107.79	42	0.5	15	5	4.16
D-39	D-38	0	0	0	0	0	0	141	113.07	112.12	63	1.51	48	176.4	11.22
D-38	D-23	0	0	0	0	0	0	141	112.12	107.83	285	1.51	48	176.24	11.22
D-23	OUTFALL #2	0	0	0	0	0	0	146	107.83	107	55	1.51	48	176.46	11.7
D-34	D-33	0.16	0.9	0.14	0.14	5	7.27	1.05	105.73	105.48	25	1	12	3.56	3.56
D-33	OUTFALL #3	0.12	0.9	0.11	0.25	5	7.17	1.81	102.71	101	28.5	6	12	8.72	3.91
D-32	D-31	0.14	0.9	0.13	0.13	5	7.27	0.92	101.67	101.4	54	0.5	12	2.52	1.81
D-31	D-30	0.13	0.9	0.12	0.24	5	7.03	1.71	101.4	100.95	90	0.5	12	2.52	2.86
D-30	OUTFALL #4	0.05	0.9	0.05	0.30	5	6.84	2.03	100.95	100.5	90	0.5	12	2.52	3.57

Application No. SE 2010-LE-017 Staff S.W.
APPROVED (SE) SP PLAN
SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011
Sheet 9 of 27

PROGRESS PRINT
12/02/10
NOT FOR CONSTRUCTION

CONTRACT NO. 439601

DESIGNED	WD-AE	01/22/10 DATE
DRAWN	CC1	06/01/10 DATE
CHECKED	SMR	06/01/10 DATE
APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Lic. No. 19018
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
www.wd-ae.com

metro

CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

PRELIMINARY STORM SEWER COMPUTATIONS

SCALE: N/A
DRAWING NO. 9 OF 27
C-203

PRINT DATE: Dec 2, 2010 03:01 PM USER: GLY
FILE NAME: E:\439601 Cinder Bed Road\Dwg\Grdr\Composite\C-203.dwg

BMP FACILITY DESIGN CALCULATIONS:

PLAN NAME: CINDER BED ROAD
PLAN NUMBER: SPECIAL EXCEPTION

DATE: 5-25-2010
ENGINEER:TJZ

I. Water Quality Narrative

THE SITE CONSISTS OF A 17.37 ACRE INDUSTRIAL DEVELOPMENT PROJECT CONSISTING OF 9.78 ACRES OF DEVELOPED / DISTURBED AREA AND 7.59 ACRES OF UNDISTURBED / OPEN SPACE. 6.75 ACRES OF THE DEVELOPMENT WILL DRAIN TO TWO SEPARATE STORMFILER UNITS, 3.03 ACRES OF DEVELOPED AREA IS UNCONTROLLED, AND 7.59 ACRES NOT DRAINING TO THE BMP QUALIFY FOR OPEN SPACE BMP CREDIT. NO OFFSITE DRAINAGE ENTERS THE BMP FACILITY AND IT WILL BE PRIVATELY MAINTAINED. THE NEW DEVELOPMENT IS LOCATED WITHIN THE CHESAPEAKE BAY PRESERVATION AREA AND THEREFOR REQUIRES THAT THE PHOSPHOROUS LOAD AFTER DEVELOPMENT BE REDUCED BY AT LEAST 40%.

II. Watershed Data

PART 1: LIST ALL OF THE SUBAREAS AND "C" FACTORS USED IN THE BMP CALCULATIONS.

SUBAREA DESIGNATION AND DESCRIPTION	C"	ACRES
A1 - ONSITE STORMFILTER CONTROLLED	0.90	4.44
A2 - ONSITE DEVELOPED UNCONTROLLED	0.90	1.97
A3 - ONSITE STORMFILTER CONTROLLED	0.90	2.31
A4 - ONSITE DEVELOPED UNCONTROLLED	0.90	0.86
A5 - ONSITE UNDEVELOPED UNCONTROLLED	0.20	1.06
A6 - ONSITE UNDEVELOPED UNCONTROLLED	0.20	6.53
A7 - ONSITE DEVELOPED UNCONTROLLED	0.30	0.20
	TOTAL	17.37

PART 2: COMPUTE THE WEIGHTED AVERAGE "C" FOR THE SITE.

(A) AREA OF THE SITE (a) 17.37 ACRES

(B) SUBAREA DESIGNATION

SUBAREA DESIGNATION AND DESCRIPTION	"C"		ACRES		PRODUCT
A1 - ONSITE STORMFILTER CONTROLLED	0.90	X	4.44	=	4.0
A2 - ONSITE ONSITE DEVELOPED UNCONTROLLED	0.90	X	1.97	=	1.8
A3 - ONSITE STORMFILTER CONTROLLED	0.90	X	2.31	=	2.1
A4 - ONSITE UNDEVELOPED UNCONTROLLED	0.90	X	0.86	=	0.8
A5 - ONSITE UNDEVELOPED UNCONTROLLED	0.20	X	1.06	=	0.2
A6 - ONSITE UNDEVELOPED UNCONTROLLED	0.20	X	6.53	=	1.3
A7 - ONSITE DEVELOPED UNCONTROLLED	0.30	X	0.20	=	0.1
			TOTAL		10.3

(C) WEIGHTED AVERAGE "C" FACTOR 0.59

PART 3: COMPUTE THE TOTAL PHOSPHOROUS REMOVAL FOR THE SITE.

SUBAREA DESIG.	BMP TYPE	REMOVAL EFF. (%)		AREA RATIO		"C" FACTOR RATIO		PRODUCT
A1	STORMFILTER	50	X	0.26	X	1.53	=	19.89
A2	UNCONTROLLED	0	X	0.11	X	1.53	=	0
A3	STORMFILTER	50	X	0.13	X	1.53	=	9.95
A4	UNCONTROLLED	0	X	0.05	X	1.53	=	0
A5	OPEN SPACE	100	X	0.06	X	0.34	=	2.04
A6	OPEN SPACE	100	X	0.38	X	0.34	=	12.92
A7	UNCONTROLLED	0	X	0.01	X	0.51	=	0
						(a) TOTAL=		44.80%

PART 4: DETERMINE COMPLIANCE WITH PHOSPHOROUS REMOVAL REQUIREMENT.

(A) SELECT REQUIREMENT (a) 40%

- WATER SUPPLY OVERLAY DISTRICT (OCCOQUAN WATERSHED) — 50% (FAIRFAX AND PRINCE WILLIAM COUNTY)
- CHESAPEAKE BAY PRESERVATION AREA (NEW DEVELOPMENT) — 40% (FAIRFAX COUNTY); 50% (PRINCE WILLIAM COUNTY)
- CHESAPEAKE BAY PRESERVATION AREA (1-0.9 X ("I"PRE / "I"POST)) * 100 — N/A%

(B) IF LINE 3(a) 44.8% > LINE 4(a) 40% THEN PHOSPHOROUS REMOVAL REQUIREMENT IS SATISFIED

STORMFILTER SIZING COMPUTATIONS

STORM FILTER #1
4.28 AC OF IMPERVIOUS AREA
4.28 * 0.5CFS = 2.14CFS
(2.14CFS/22.5GPM)*(449GPM/1CFS)=42.7 = 43 CARTRIDGES

STORM FILTER #2
NOT USED

STORM FILTER #3
2.31 AC OF IMPERVIOUS AREA
2.31 * 0.5CFS = 1.16CFS
(1.16CFS/22.5GPM)*(449GPM/1CFS)=23.1 = 24 CARTRIDGES

MINIMUM STORMWATER INFORMATION FOR REZONING, SPECIAL EXCEPTION, SPECIAL PERMIT AND DEVELOPMENT PLAN APPLICATIONS

The following information is required to be shown or provided in all zoning applications, or a waiver request of the submission requirement with justification shall be attached. Note: Waivers will be acted upon separately. Failure to adequately address the required submission information may result in a delay in processing this application.

This information is required under the following Zoning Ordinance paragraphs:

Special Permits (8-011 2J & 2L)	Special Exceptions (9-011 2J & 2L)
Cluster Subdivision (9-615 1G & 1N)	Commercial Revitalization Districts (9-622 2A (12)&(14))
Development Plans PRC District (16-302 2 & 4L)	PRC Plan (16-303 1E & 10)
FDP P Districts (except PRC) 916-502 1F & 1Q)	Amendments (18-202 10F & 101)

1. Plat is at a minimum scale of 1"=50' (unless it is depicted on one sheet with a minimum scale of 1"=100).
2. A graphic depicting the stormwater management facility(ies) and limits of clearing and grading accommodate the stormwater management facility(ies), storm drainage pipe systems and outlet protection, pond spillways, access roads, site outfalls, energy dissipation devices, and stream stabilization measures as shown on Sheet C-101,C-201, C-202 AND T-303
3. Provide:

Facility Name/ Type & No.	On-Site area served (acres)	Off-Site area served (acres)	Drainage area (acres)	Footprint area (sf.)	Storage Volume (cf.)	If pond, dam height (ft.)
(e.g. dry pond A, infil. Trench, underground vault, etc.)						
VAULT 1	4.44	0	4.44	7,000	41,992	N/A
VAULT 2	1.97	0	1.97	2,400	14,418	N/A
VAULT 3	2.31	0	2.31	2,700	16,204	N/A
			8.72	12,100	72,614 Totals	

4. Onsite drainage channels, outfalls and pipe systems are shown on Sheet C-201 & C-202
5. Maintenance accesses (road) to stormwater management facility(ies) are shown on Sheet C-201 & C-202
6. Landscaping and tree preservation shown in and near the stormwater management facility is shown on Sheet. L-401
7. A "stormwater management narrative" which contains a description of how detention and best management practices requirements will be met is provided on Sheet C-204. & C-210
8. A description of the existing conditions of each numbered site outfall extended downstream from the site to a point which is at least 100 times the site area or which has a drainage area of at least one square mile (640 acres) is provided on Sheet. C-211
9. A description of how the outfall requirements, including contributing drainage areas of the Public Facilities Manual will be satisfied is provided on Sheet C-210 & C-211
10. Existing topography with maximum contour intervals of two (2) feet and a note as to whether it is an air survey or field run is provided on Sheets. C-002
11. A submission waiver is requester for N/A
12. Stormwater management is not required because N/A

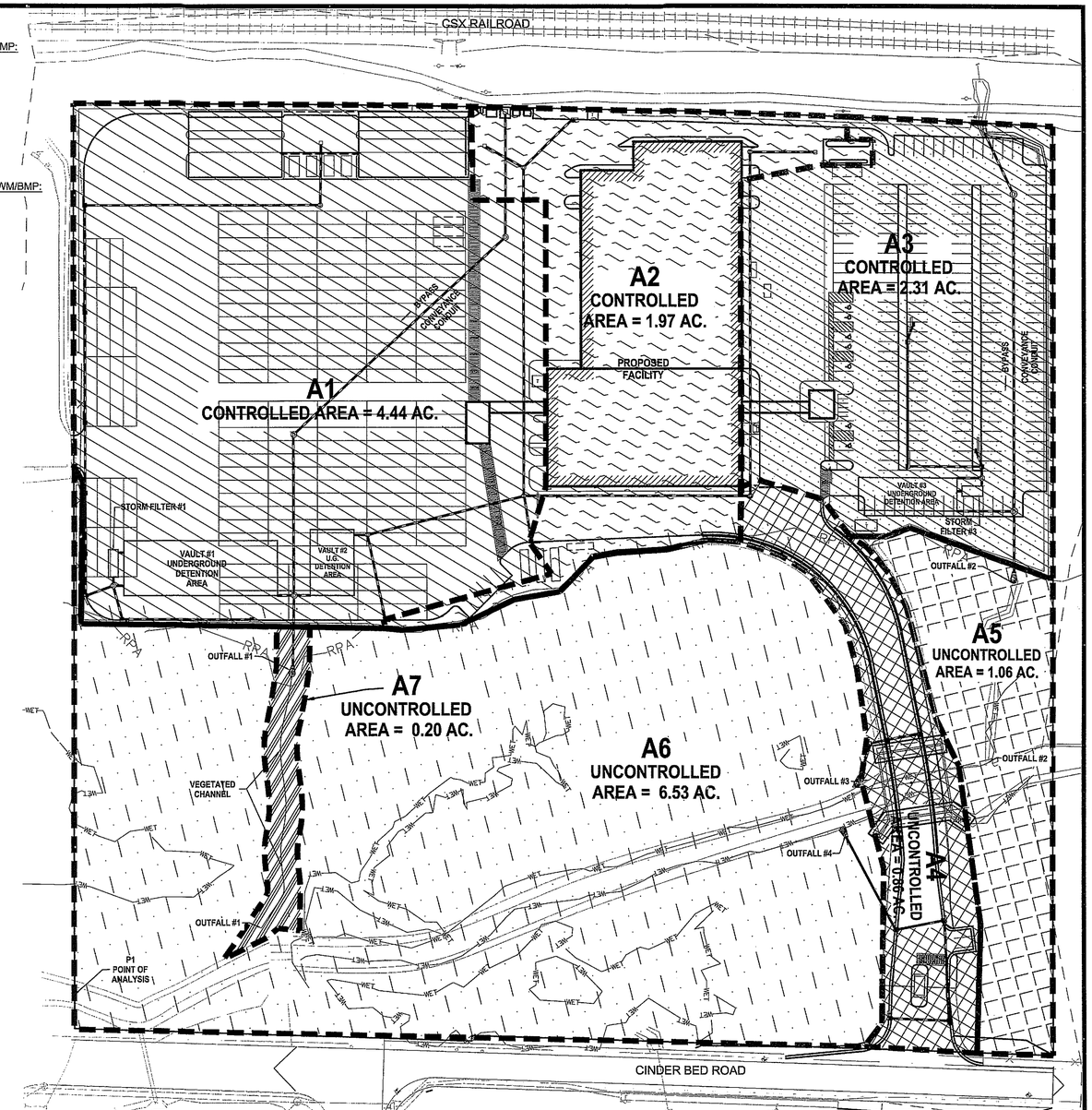
LEGEND:

AREAS CONTROLLED BY SWM/BMP:

A1
A2
A3

AREAS NOT CONTROLLED BY SWM/BMP:

A4
A5
A6
A7



OVERALL BMP AREA MAP
SCALE: 1" = 60'

0 30' 60' 120'

Application No. SE 2010-LE-017 Staff S.W.
APPROVED SE SP PLAN
SEE DEV CONDS DATED March 8, 2011
Date of BOS (BZA) approval March 8, 2011
Sheet 10 of 27

PROGRESS PRINT 12/01/10 NOT FOR CONSTRUCTION

CONTRACT NO. 439601

		DATE
DESIGNED	WD-AE	01/22/10
DRAWN	CC1	06/01/10
CHECKED	SMR	06/01/10
APPROVED	DCD	07/15/10

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA — DAVID C. DUCHSCHERER Lic. No. 19010 — PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

PRELIMINARY SWM/ BMP PRACTICES PLAN

SCALE: AS SHOWN
DRAWING NO. 10 OF 27
C-204

FRIDAY DATE: Dec 1, 2010 01:16 PM USER: RJF
FILE NAME: E:\439601 Cinder Bed Road\Dwg\Civil\Composite\SE C-204.dwg

Proposed Conditions Model IV_05-26-10 *Type II 24-hr 2-yr Rainfall=3.20"*
Prepared by Wendel Duchscherer
HydroCAD® 8.00 s/n 000557 © 2006 HydroCAD Software Solutions LLC 5/26/2010

Pond 1P: Vault 1

Inflow Area = 4.440 ac, Inflow Depth = 2.97" for 2-yr event
Inflow = 20.30 cfs @ 11.95 hrs, Volume= 1.098 af
Outflow = 1.66 cfs @ 12.45 hrs, Volume= 1.093 af, Atten= 92%, Lag= 29.9 min
Primary = 1.66 cfs @ 12.45 hrs, Volume= 1.093 af

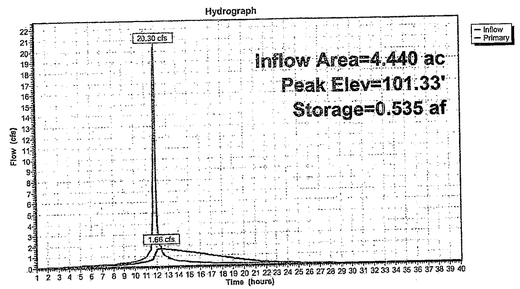
Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 101.33' @ 12.45 hrs Surf.Area= 0.161 ac Storage= 0.535 af

Plug-Flow detention time= 180.7 min calculated for 1.093 af (100% of inflow)
Center-of-Mass det. time= 177.9 min (929.5 - 751.6)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	0.964 af	**50.00'W x 140.00'L x 6.00'H Vault 1**

Device	Routing	Invert	Outlet Devices
#1	Primary	98.00'	**15.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 97.85' S= 0.0100 '/' Cc= 0.900 n= 0.013
#2	Device 1	98.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	101.40'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	103.50'	**10.0' long x 0.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=1.66 cfs @ 12.45 hrs HW=101.33' (Free Discharge)
└**1=Culvert** (Passes 1.66 cfs of 9.71 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 1.66 cfs @ 8.45 fps)
├**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)



Stage-Discharge for Pond 1P: Vault 1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
98.00	0.00	99.04	0.84	100.08	1.28	101.12	1.60	102.16	2.97	103.20	4.14
98.02	0.00	99.06	0.85	100.10	1.29	101.14	1.61	102.18	3.00	103.22	4.16
98.04	0.01	99.08	0.86	100.12	1.29	101.16	1.61	102.20	3.03	103.24	4.17
98.06	0.01	99.10	0.87	100.14	1.30	101.18	1.62	102.22	3.06	103.26	4.19
98.08	0.02	99.12	0.88	100.16	1.31	101.20	1.62	102.24	3.08	103.28	4.21
98.10	0.03	99.14	0.89	100.18	1.31	101.22	1.63	102.26	3.11	103.30	4.23
98.12	0.04	99.16	0.90	100.20	1.32	101.24	1.63	102.28	3.14	103.32	4.25
98.14	0.06	99.18	0.91	100.22	1.33	101.26	1.64	102.30	3.17	103.34	4.26
98.16	0.07	99.20	0.92	100.24	1.33	101.28	1.65	102.32	3.19	103.36	4.28
98.18	0.08	99.22	0.93	100.26	1.34	101.30	1.65	102.34	3.22	103.38	4.30
98.20	0.11	99.24	0.94	100.28	1.35	101.32	1.66	102.36	3.25	103.40	4.32
98.22	0.13	99.26	0.95	100.30	1.35	101.34	1.66	102.38	3.27	103.42	4.33
98.24	0.16	99.28	0.96	100.32	1.36	101.36	1.67	102.40	3.30	103.44	4.35
98.26	0.18	99.30	0.97	100.34	1.37	101.38	1.67	102.42	3.32	103.46	4.37
98.28	0.20	99.32	0.98	100.36	1.37	101.40	1.68	102.44	3.35	103.48	4.38
98.30	0.23	99.34	0.99	100.38	1.38	101.42	1.68	102.46	3.37	103.50	4.40
98.32	0.28	99.36	1.00	100.40	1.39	101.44	1.69	102.48	3.40	103.52	4.49
98.34	0.28	99.38	1.00	100.42	1.39	101.46	1.71	102.50	3.42	103.54	4.65
98.36	0.31	99.40	1.01	100.44	1.40	101.48	1.72	102.52	3.44	103.56	4.86
98.38	0.34	99.42	1.02	100.46	1.41	101.50	1.74	102.54	3.47	103.58	5.09
98.40	0.39	99.44	1.03	100.48	1.41	101.52	1.76	102.56	3.49	103.60	5.36
98.42	0.39	99.46	1.04	100.50	1.42	101.54	1.78	102.58	3.51	103.62	5.65
98.44	0.41	99.48	1.05	100.52	1.42	101.56	1.81	102.60	3.54	103.64	5.96
98.46	0.44	99.50	1.06	100.54	1.43	101.58	1.84	102.62	3.56	103.66	6.30
98.48	0.46	99.52	1.07	100.56	1.44	101.60	1.86	102.64	3.58	103.68	6.66
98.50	0.47	99.54	1.07	100.58	1.44	101.62	1.90	102.66	3.60	103.70	7.03
98.52	0.49	99.56	1.08	100.60	1.45	101.64	1.93	102.68	3.63	103.72	7.43
98.54	0.51	99.58	1.09	100.62	1.46	101.66	1.96	102.70	3.65	103.74	7.86
98.56	0.53	99.60	1.10	100.64	1.46	101.68	2.00	102.72	3.67	103.76	8.29
98.58	0.54	99.62	1.11	100.66	1.47	101.70	2.04	102.74	3.69	103.78	8.75
98.60	0.56	99.64	1.11	100.68	1.47	101.72	2.06	102.76	3.71	103.80	9.23
98.62	0.58	99.66	1.12	100.70	1.48	101.74	2.12	102.78	3.73	103.82	9.72
98.64	0.59	99.68	1.13	100.72	1.49	101.76	2.16	102.80	3.75	103.84	10.23
98.66	0.61	99.70	1.14	100.74	1.49	101.78	2.21	102.82	3.77	103.86	10.76
98.68	0.62	99.72	1.15	100.76	1.50	101.80	2.25	102.84	3.79	103.88	11.30
98.70	0.63	99.74	1.15	100.78	1.50	101.82	2.32	102.86	3.81	103.90	11.86
98.72	0.65	99.76	1.16	100.80	1.51	101.84	2.34	102.88	3.83	103.92	12.44
98.74	0.66	99.78	1.17	100.82	1.52	101.86	2.39	102.90	3.85	103.94	13.05
98.76	0.68	99.80	1.18	100.84	1.52	101.88	2.44	102.92	3.87	103.96	13.65
98.78	0.69	99.82	1.18	100.86	1.53	101.90	2.48	102.94	3.89	103.98	13.67
98.80	0.70	99.84	1.19	100.88	1.53	101.92	2.53	102.96	3.91	104.00	13.70
98.82	0.71	99.86	1.20	100.90	1.54	101.94	2.57	102.98	3.93		
98.84	0.73	99.88	1.21	100.92	1.54	101.96	2.62	103.00	3.95		
98.86	0.74	99.90	1.21	100.94	1.55	101.98	2.66	103.02	3.97		
98.88	0.75	99.92	1.22	100.96	1.55	102.00	2.70	103.04	3.99		
98.90	0.76	99.94	1.23	100.98	1.56	102.02	2.74	103.06	4.01		
98.92	0.77	99.96	1.24	101.00	1.57	102.04	2.76	103.08	4.03		
98.94	0.79	99.98	1.24	101.02	1.57	102.06	2.81	103.10	4.05		
98.96	0.80	100.00	1.25	101.04	1.58	102.08	2.84	103.12	4.07		
98.98	0.81	100.02	1.26	101.06	1.58	102.10	2.87	103.14	4.08		
99.00	0.82	100.04	1.26	101.08	1.59	102.12	2.90	103.16	4.10		
99.02	0.83	100.06	1.27	101.10	1.60	102.14	2.94	103.18	4.12		

Proposed Conditions Model IV_05-26-10 *Type II 24-hr 10-yr Rainfall=5.20"*
Prepared by Wendel Duchscherer
HydroCAD® 8.00 s/n 000557 © 2006 HydroCAD Software Solutions LLC 5/26/2010

Pond 1P: Vault 1

Inflow Area = 4.440 ac, Inflow Depth > 4.96" for 10-yr event
Inflow = 33.23 cfs @ 11.95 hrs, Volume= 1.836 af
Outflow = 4.22 cfs @ 12.20 hrs, Volume= 1.831 af, Atten= 87%, Lag= 14.9 min
Primary = 4.22 cfs @ 12.20 hrs, Volume= 1.831 af

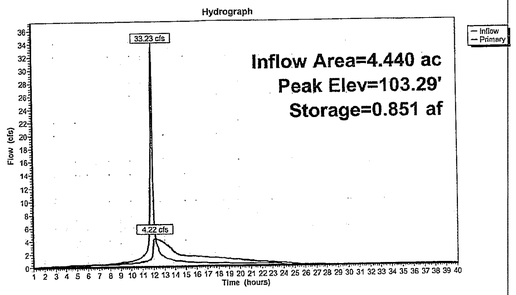
Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 103.29' @ 12.20 hrs Surf.Area= 0.161 ac Storage= 0.851 af

Plug-Flow detention time= 168.3 min calculated for 1.829 af (100% of inflow)
Center-of-Mass det. time= 167.2 min (909.6 - 742.4)

Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	0.964 af	**50.00'W x 140.00'L x 6.00'H Vault 1**

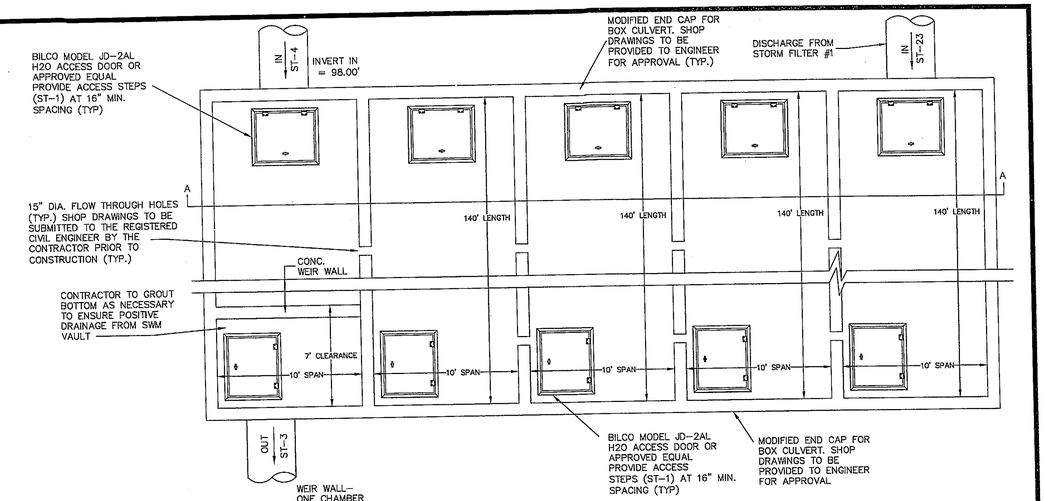
Device	Routing	Invert	Outlet Devices
#1	Primary	98.00'	**15.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 97.85' S= 0.0100 '/' Cc= 0.900 n= 0.013
#2	Device 1	98.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	101.40'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	103.50'	**10.0' long x 0.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=4.22 cfs @ 12.20 hrs HW=103.29' (Free Discharge)
└**1=Culvert** (Passes 4.22 cfs of 12.77 cfs potential flow)
├**2=Orifice/Grate** (Orifice Controls 2.12 cfs @ 10.81 fps)
├**3=Orifice/Grate** (Orifice Controls 2.10 cfs @ 6.01 fps)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)



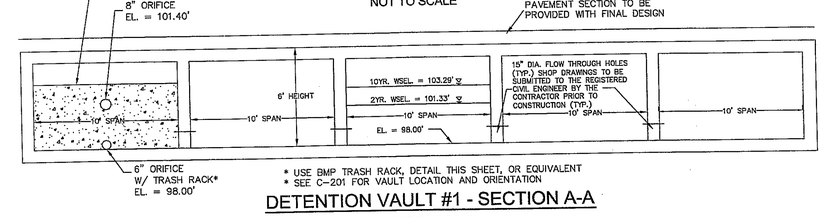
Stage-Area-Storage for Pond 1P: Vault 1

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
98.00	0.000	99.04	0.167	100.08	0.334	101.12	0.501	102.16	0.669	103.20	0.836
98.02	0.003	99.06	0.170	100.10	0.337	101.14	0.505	102.18	0.672	103.22	0.839
98.04	0.006	99.08	0.174	100.12	0.341	101.16	0.508	102.20	0.675	103.24	0.842
98.06	0.010	99.10	0.177	100.14	0.344	101.18	0.511	102.22	0.678	103.26	0.845
98.08	0.013	99.12	0.180	100.16	0.347	101.20	0.514	102.24	0.681	103.28	0.848
98.10	0.016	99.14	0.183	100.18	0.350	101.22	0.517	102.26	0.685	103.30	0.852
98.12	0.019	99.16	0.188	100.20	0.354	101.24	0.521	102.28	0.688	103.32	0.855
98.14	0.022	99.18	0.190	100.22	0.357	101.26	0.524	102.30	0.691	103.34	0.858
98.16	0.026	99.20	0.193	100.24	0.360	101.28	0.527	102.32	0.694	103.36	0.861
98.18	0.029	99.22	0.196	100.26	0.363	101.30	0.530	102.34	0.697	103.38	0.865
98.20	0.032	99.24	0.199	100.28	0.366	101.32	0.534	102.36	0.701	103.40	0.868
98.22	0.035	99.26	0.202	100.30	0.370	101.34	0.537	102.38	0.704	103.42	0.871
98.24	0.039	99.28	0.206	100.32	0.373	101.36	0.540	102.40	0.707	103.44	0.874
98.26	0.042	99.30	0.209	100.34	0.376	101.38	0.543	102.42	0.710	103.46	0.877
98.28	0.045	99.32	0.212	100.36	0.379	101.40	0.546	102.44	0.713	103.48	0.881
98.30	0.048	99.34	0.215	100.38	0.382	101.42	0.550	102.46	0.717	103.50	0.884
98.32	0.051	99.36	0.219	100.40	0.386	101.44	0.553	102.48	0.720	103.52	0.887
98.34	0.055	99.38	0.222	100.42	0.389	101.46	0.556	102.50	0.723	103.54	0.890
98.36	0.058	99.40	0.225	100.44	0.392	101.48	0.559	102.52	0.726	103.56	0.893
98.38	0.061	99.42	0.228	100.46	0.395	101.50	0.562	102.54	0.730	103.58	0.897
98.40	0.064	99.44	0.231	100.48	0.399	101.52	0.566	102.56	0.733	103.60	0.900
98.42	0.067	99.46	0.235	100.50	0.402	101.54	0.569	102.58	0.736	103.62	0.903
98.44	0.071	99.48	0.238	100.52	0.405	101.56	0.572	102.60	0.739	103.64	0.908
98.46	0.074	99.50	0.241	100.54	0.408	101.58	0.575	102.62	0.742	103.66	0.910
98.48	0.077	99.52	0.244	100.56	0.411	101.60	0.579	102.64	0.746	103.68	0.913
98.50	0.080	99.54	0.247	100.58	0.415	101.62	0.582	102.66	0.749	103.70	0.916
98.52	0.084	99.56	0.251	100.60	0.418	101.64	0.585	102.68	0.752	103.72	0.919
98.54	0.087	99.58	0.254	100.62	0.421	101.66	0.588	102.70	0.755	103.74	0.922
98.56	0.090	99.60	0.257	100.64	0.424	101.68	0.591	102.72	0.758	103.76	0.926
98.58	0.093	99.62	0.260	100.66	0.427	101.70	0.595	102.74	0.762	103.78	0.929
98.60	0.096	99.64	0.264	100.68	0.431	101.72	0.598	102.76	0.765	103.80	0.932
98.62	0.100	99.66	0.267	100.70	0.434	101.74	0.601	102.78	0.768	103.82	0.935
98.64	0.103	99.68	0.270	100.72	0.437	101.76	0.604	102.80	0.771	103.84	0.938
98.66	0.106	99.70	0.273	100.74	0.440	101.78	0.607	102.82	0.775	103.86	0.942
98.68	0.109	99.72	0.276	100.76	0.444	101.80	0.611	102.84	0.778	103.88	0.945
98.70	0.112	99.74	0.280	100.78	0.447	101.82	0.614	102.86	0.781	103.90	0.948
98.72	0.116	99.76	0.283	100.80	0.450	101.84	0.617	102.88	0.784	103.92	0.951
98.74	0.119	99.78	0.286	100.82	0.453	101.86	0.620	102.90	0.787	103.94	0.955
98.76	0.122	99.80	0.289	100.84	0.456	101.88	0.624	102.92	0.791	103.96	0.958
98.78	0.125	99.82	0.292	100.86	0.460	101.90	0.627	102.94	0.794	103.98	0.961
98.80	0.129	99.84	0.296	100.88	0.463	101.92	0.630	102.96	0.797	104.00	0.964
98.82	0.132	99.86	0.299	100.90	0.466	101.94	0.633	102.98	0.800		
98.84	0.135	99.88	0.302	100.92	0.469	101.96	0.636	103.00	0.803		
98.86	0.138	99.90	0.305	100.94	0.472	101.98	0.640	103.02	0.807		
98.88	0.141	99.92	0.309	100.96	0.476	102.00	0.643	103.04	0.810		
98.90	0.145	99.94	0.312	100.98	0.479	102.02	0.646	103.06	0.813		
98.92	0.148	99.96	0.315	101.00	0.482	102.04	0.649	103.08	0.816		
98.94	0.151	99.98	0.318	101.02	0.485	102.06	0.652	103.10	0.820		
98.96	0.154	100.00	0.321	101.04	0.489	102.08	0.656	103.12	0.823		
98.98	0.157	100.02	0.325	101.06	0.492	102.10	0.659	103.14	0.826		
99.00	0.161	100.04	0.328	101.08	0.495	102.12	0.662	103.16	0.829		
99.02	0.164	100.06	0.331	101.10	0.498	102.14	0.665	103.18	0.832		



DETENTION VAULT #1 - PLAN VIEW

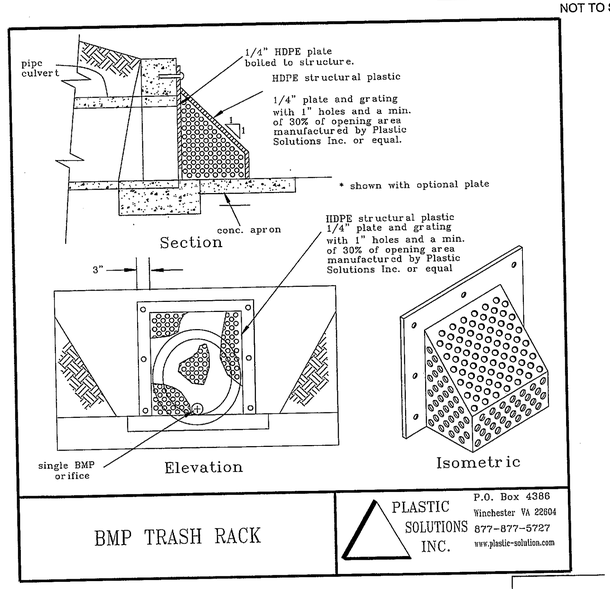
NOT TO SCALE



* USE BMP TRASH RACK, DETAIL THIS SHEET, OR EQUIVALENT
* SEE C-201 FOR VAULT LOCATION AND ORIENTATION

DETENTION VAULT #1 - SECTION A-A

NOT TO SCALE



BMP TRASH RACK

PLASTIC SOLUTIONS INC.
P.O. Box 4386
Winchester VA 22604
877-877-5727
www.plastic-solution.com

Application No. SE 2010-LE-017 Staff S.W.
APPROVED (SE) SP PLAN
SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011
Sheet 11 of 27

PROGRESS PRINT 12/02/10 NOT FOR CONSTRUCTION

CONTRACT NO. 439601

DESIGNED	WD-AE	01/22/10 DATE
DRAWN	CC1	06/01/10 DATE
CHECKED	SMR	06/01/10 DATE
APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Lic. No. 19024
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WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA
PRELIMINARY STORMWATER DETAILS
DETENTION VAULT #1

SCALE: AS SHOWN
DRAWING NO. 11 OF 27
C-205

PRINT DATE: Jul 18, 2010 12:25 PM USER: CML
FILE NAME: E:\439601 Cinder Bed Road\Dwg\Civil\Composite\C-205-C-207.dwg

Proposed Conditions Model IV_05-26-10 *Type II 24-hr 2-yr Rainfall=3.20"*
Prepared by Wendel Duchscherer
HydroCAD® 8.00 s/n 000557 © 2006 HydroCAD Software Solutions LLC 5/26/2010

Pond 2P: Vault 2

Inflow Area = 1.970 ac, Inflow Depth = 2.97" for 2-yr event
Inflow = 9.01 cfs @ 11.95 hrs, Volume= 0.487 af
Outflow = 1.64 cfs @ 12.12 hrs, Volume= 0.487 af, Atten= 82%, Lag= 10.4 min
Primary = 1.64 cfs @ 12.12 hrs, Volume= 0.487 af

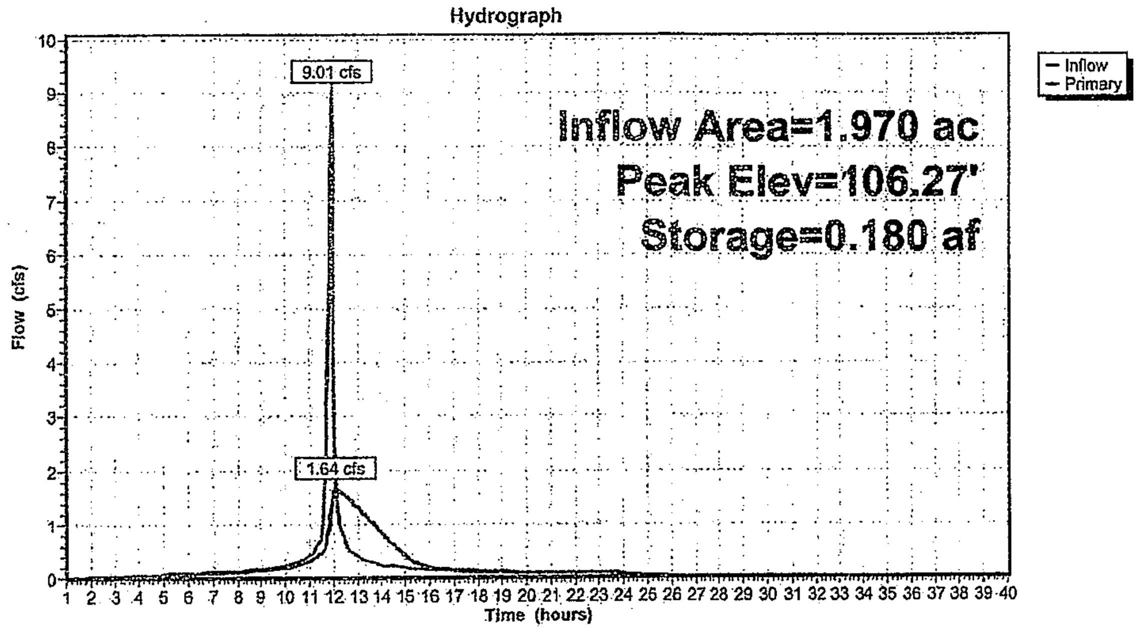
Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 106.27' @ 12.12 hrs Surf.Area= 0.055 ac Storage= 0.180 af

Plug-Flow detention time= 64.7 min calculated for 0.486 af (100% of inflow)
Center-of-Mass det. time= 65.3 min (816.9 - 751.6)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	0.331 af	**40.00'W x 60.00'L x 6.00'H Vault 2**

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**15.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 100.00' S= 0.2000 '/' Cc= 0.900 n= 0.013
#2	Device 1	103.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	106.30'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	108.50'	**10.0' long x 0.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=1.64 cfs @ 12.12 hrs HW=106.26' (Free Discharge)
└─1=**Culvert** (Passes 1.64 cfs of 9.59 cfs potential flow)
  ├─2=**Orifice/Grate** (Orifice Controls 1.64 cfs @ 8.35 fps)
  ├─3=**Orifice/Grate** (Controls 0.00 cfs)
  └─4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)



Proposed Conditions Model IV_05-26-10 *Type II 24-hr 10-yr Rainfall=5.20"*
Prepared by Wendel Duchscherer
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Pond 2P: Vault 2

Inflow Area = 1.970 ac, Inflow Depth > 4.96" for 10-yr event
Inflow = 14.74 cfs @ 11.95 hrs, Volume= 0.815 af
Outflow = 4.17 cfs @ 12.09 hrs, Volume= 0.815 af, Atten= 72%, Lag= 8.4 min
Primary = 4.17 cfs @ 12.09 hrs, Volume= 0.815 af

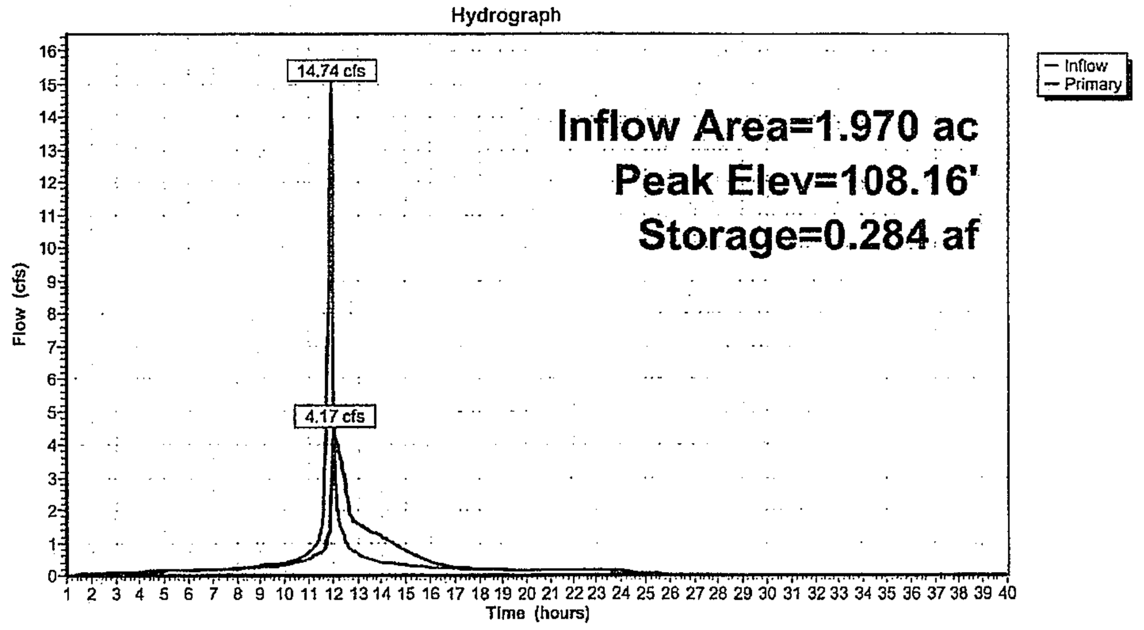
Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 108.16' @ 12.09 hrs Surf.Area= 0.055 ac Storage= 0.284 af

Plug-Flow detention time= 58.3 min calculated for 0.814 af (100% of inflow)
Center-of-Mass det. time= 58.8 min (801.2 - 742.4)

Volume	Invert	Avail.Storage	Storage Description
#1	103.00'	0.331 af	**40.00'W x 60.00'L x 6.00'H Vault 2**

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**15.0" x 15.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 100.00' S= 0.2000 '/' Cc= 0.900 n= 0.013
#2	Device 1	103.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	106.30'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	108.50'	**10.0' long x 0.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=4.16 cfs @ 12.09 hrs HW=108.14' (Free Discharge)
└─1=**Culvert** (Passes 4.16 cfs of 12.56 cfs potential flow)
  ├─2=**Orifice/Grate** (Orifice Controls 2.09 cfs @ 10.65 fps)
  ├─3=**Orifice/Grate** (Orifice Controls 2.07 cfs @ 5.92 fps)
  └─4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

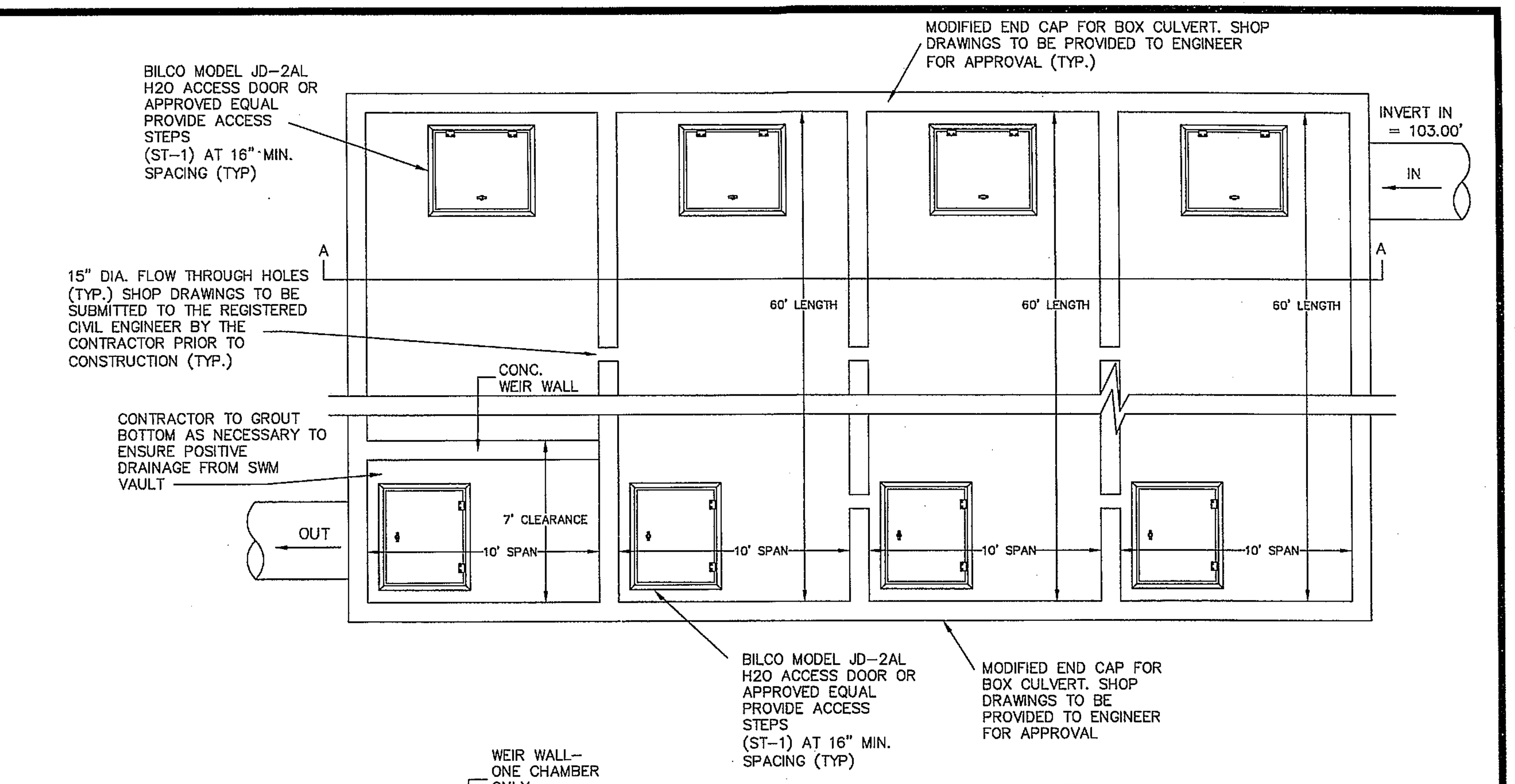


Stage-Discharge for Pond 2P: Vault 2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
103.00	0.00	104.04	0.84	105.08	1.28	106.12	1.60	107.16	3.09	108.20	4.21
103.02	0.00	104.06	0.85	105.10	1.29	106.14	1.61	107.18	3.12	108.22	4.22
103.04	0.01	104.08	0.86	105.12	1.29	106.16	1.61	107.20	3.14	108.24	4.24
103.06	0.01	104.10	0.87	105.14	1.30	106.18	1.62	107.22	3.17	108.26	4.26
103.08	0.02	104.12	0.88	105.16	1.31	106.20	1.62	107.24	3.20	108.28	4.28
103.10	0.03	104.14	0.89	105.18	1.31	106.22	1.63	107.26	3.22	108.30	4.29
103.12	0.04	104.16	0.90	105.20	1.32	106.24	1.63	107.28	3.25	108.32	4.31
103.14	0.06	104.18	0.91	105.22	1.33	106.26	1.64	107.30	3.27	108.34	4.33
103.16	0.07	104.20	0.92	105.24	1.33	106.28	1.65	107.32	3.30	108.36	4.35
103.18	0.09	104.22	0.93	105.26	1.34	106.30	1.65	107.34	3.32	108.38	4.36
103.20	0.11	104.24	0.94	105.28	1.35	106.32	1.66	107.36	3.35	108.40	4.38
103.22	0.13	104.26	0.95	105.30	1.35	106.34	1.67	107.38	3.37	108.42	4.40
103.24	0.16	104.28	0.96	105.32	1.36	106.36	1.68	107.40	3.40	108.44	4.41
103.26	0.18	104.30	0.97	105.34	1.37	106.38	1.70	107.42	3.42	108.46	4.43
103.28	0.20	104.32	0.98	105.36	1.37	106.40	1.71	107.44	3.44	108.48	4.45
103.30	0.23	104.34	0.99	105.38	1.38	106.42	1.73	107.46	3.47	108.50	4.46
103.32	0.26	104.36	1.00	105.40	1.39	106.44	1.76	107.48	3.49	108.52	4.56
103.34	0.28	104.38	1.00	105.42	1.39	106.46	1.78	107.50	3.51	108.54	4.72
103.36	0.31	104.40	1.01	105.44	1.40	106.48	1.81	107.52	3.54	108.56	4.92
103.38	0.34	104.42	1.02	105.46	1.41	106.50	1.84	107.54	3.56	108.58	5.15
103.40	0.36	104.44	1.03	105.48	1.41	106.52	1.87	107.56	3.58	108.60	5.42
103.42	0.39	104.46	1.04	105.50	1.42	106.54	1.90	107.58	3.60	108.62	5.71
103.44	0.41	104.48	1.05	105.52	1.42	106.56	1.94	107.60	3.62	108.64	6.02
103.46	0.44	104.50	1.06	105.54	1.43	106.58	1.98	107.62	3.65	108.66	6.36
103.48	0.46	104.52	1.07	105.56	1.44	106.60	2.01	107.64	3.67	108.68	6.72
103.50	0.47	104.54	1.07	105.58	1.44	106.62	2.05	107.66	3.69	108.70	7.09
103.52	0.49	104.56	1.08	105.60	1.45	106.64	2.10	107.68	3.71	108.72	7.49
103.54	0.51	104.58	1.09	105.62	1.46	106.66	2.14	107.70	3.73	108.74	7.91
103.56	0.53	104.60	1.10	105.64	1.46	106.68	2.18	107.72	3.75	108.76	8.35
103.58	0.54	104.62	1.11	105.66	1.47	106.70	2.23	107.74	3.77	108.78	8.81
103.60	0.56	104.64	1.11	105.68	1.47	106.72	2.27	107.76	3.79	108.80	9.29
103.62	0.58	104.66	1.12	105.70	1.48	106.74	2.32	107.78	3.81	108.82	9.78
103.64	0.59	104.68	1.13	105.72	1.49	106.76	2.36	107.80	3.83	108.84	10.29
103.66	0.61	104.70	1.14	105.74	1.49	106.78	2.41	107.82	3.85	108.86	10.81
103.68	0.62	104.72	1.15	105.76	1.50	106.80	2.46	107.84	3.87	108.88	11.35
103.70	0.63	104.74	1.15	105.78	1.50	106.82	2.50	107.86	3.89	108.90	11.91
103.72	0.65	104.76	1.16	105.80	1.51	106.84	2.55	107.88	3.91	108.92	12.50
103.74	0.66	104.78	1.17	105.82	1.52	106.86	2.59	107.90	3.93	108.94	13.10
103.76	0.68	104.80	1.18	105.84	1.52	106.88	2.64	107.92	3.95	108.96	13.65
103.78	0.69	104.82	1.18	105.86	1.53	106.90	2.68	107.94	3.97	108.98	13.67
103.80	0.70	104.84	1.19	105.88	1.53	106.92	2.72	107.96	3.99	109.00	13.70
103.82	0.71	104.86	1.20	105.90	1.54	106.94	2.75	107.98	4.01		
103.84	0.73	104.88	1.21	105.92	1.54	106.96	2.78	108.00	4.03		
103.86	0.74	104.90	1.21	105.94	1.55	106.98	2.82	108.02	4.04		
103.88	0.75	104.92	1.22	105.96	1.56	107.00	2.85	108.04	4.06		
103.90	0.76	104.94	1.23	105.98	1.56	107.02	2.88	108.06	4.08		
103.92	0.77	104.96	1.24	106.00	1.57	107.04	2.91	108.08	4.10		
103.94	0.79	104.98	1.24	106.02	1.57	107.06	2.94	108.10	4.12		
103.96	0.80	105.00	1.25	106.04	1.58	107.08	2.97	108.12	4.14		
103.98	0.81	105.02	1.26	106.06	1.58	107.10	3.00	108.14	4.15		
104.00	0.82	105.04	1.26	106.08	1.59	107.12	3.03	108.16	4.17		
104.02	0.83	105.06	1.27	106.10	1.60	107.14	3.06	108.18	4.19		

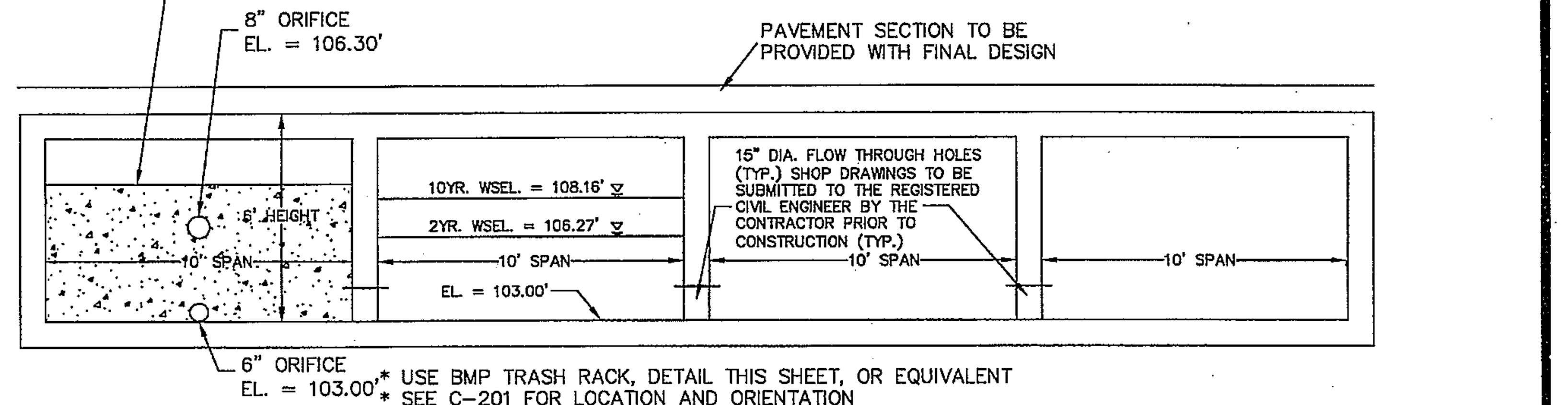
Stage-Area-Storage for Pond 2P: Vault 2

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
103.00	0.000	104.04	0.057	105.08	0.115	106.12	0.172	107.16	0.229	108.20	0.287
103.02	0.001	104.06	0.058	105.10	0.116	106.14	0.173	107.18	0.230	108.22	0.288
103.04	0.002	104.08	0.060	105.12	0.117	106.16	0.174	107.20	0.231	108.24	0.289
103.06	0.003	104.10	0.061	105.14	0.118	106.18	0.175	107.22	0.233	108.26	0.290
103.08	0.004	104.12	0.062	105.16	0.119	106.20	0.176	107.24	0.234	108.28	0.291
103.10	0.006	104.14	0.063	105.18	0.120	106.22	0.177	107.26	0.235	108.30	0.292
103.12	0.007	104.16	0.064	105.20	0.121	106.24	0.179	107.28	0.236	108.32	0.293
103.14	0.008	104.18	0.065	105.22	0.122	106.26	0.180	107.30	0.237	108.34	0.294
103.16	0.009	104.20	0.066	105.24	0.123	106.28	0.181	107.32	0.238	108.36	0.295
103.18	0.010	104.22	0.067	105.26	0.125	106.30	0.182	107.34	0.239	108.38	0.296
103.20	0.011	104.24	0.068	105.28	0.126	106.32	0.183	107.36	0.240	108.40	0.298
103.22	0.012	104.26	0.069	105.30	0.127	106.34	0.184	107.38	0.241	108.42	0.299
103.24	0.013	104.28	0.071	105.32	0.128	106.36	0.185	107.40	0.242	108.44	0.300
103.26	0.014	104.30	0.072	105.34	0.129	106.38	0.186	107.42	0.244	108.46	0.301
103.28	0.015	104.32	0.073	105.36	0.130	106.40	0.187	107.44	0.245	108.48	0.302
103.30	0.017	104.34	0.074	105.38	0.131	106.42	0.188	107.46	0.246	108.50	0.303
103.32	0.018	104.36	0.075	105.40	0.132	106.44	0.190	107.48	0.247	108.52	0.304
103.34	0.019	104.38	0.076	105.42	0.133	106.46	0.191	107.50	0.248	108.54	0.305
103.36	0.020	104.40	0.077	105.44	0.134	106.48	0.192	107.52	0.249	108.56	0.306
103.38	0.021	104.42	0.078	105.46	0.136	106.50	0.193	107.54	0.250	108.58	0.307
103.40	0.022	104.44	0.079	105.48	0.137	106.52	0.194	107.56	0.251	108.60	0.309
103.42	0.023	104.46	0.080	105.50	0.138	106.54	0.195	107.58	0.252	108.62	0.310
103.44	0.024	104.48	0.082	105.52	0.139	106.56	0.196	107.60	0.253	108.64	0.311
103.46	0.025	104.50	0.083	105.54	0.140	106.58	0.197	107.62	0.255	108.66	0.312
103.48	0.026	104.52	0.084	105.56	0.141	106.60	0.198	107.64	0.256	108.68	0.313
103.50	0.028	104.54	0.085	105.58	0.142	106.62	0.199	107.66	0.257	108.70	0.314
103.52	0.029	104.56	0.086	105.60	0.143	106.64	0.201	107.68	0.258	108.72	0.315
103.54	0.030	104.58	0.087	105.62	0.144	106.66	0.202	107.70	0.259	108.74	0.316
103.56	0.031	104.60	0.088	105.64	0.145	106.68	0.203	107.72	0.260	108.76	0.317
103.58	0.032	104.62	0.089	105.66	0.147	106.70	0.204	107.74	0.261	108.78	0.318
103.60	0.033	104.64	0.090	105.68	0.148	106.72	0.205	107.76	0.262	108.80	0.320
103.62	0.034	104.66	0.091	105.70	0.149	106.74	0.206	107.78	0.263	108.82	0.321
103.64	0.035	104.68	0.093	105.72	0.150	106.76	0.207	107.80	0.264	108.84	0.322
103.66	0.036	104.70	0.094	105.74	0.151	106.78	0.208	107.82	0.266	108.86	0.323
103.68	0.037	104.72	0.095	105.76	0.152	106.80	0.209	107.84	0.267	108.88	0.324
103.70	0.039	104.74	0.096	105.78	0.153	106.82	0.210	107.86	0.268	108.90	0.325
103.72	0.040	104.76	0.097	105.80	0.154	106.84	0.212	107.88	0.269	108.92	0.326
103.74	0.041	104.78	0.098	105.82	0.155	106.86	0.213	107.90	0.270	108.94	0.327
103.76	0.042	104.80	0.099	105.84	0.156	106.88	0.214	107.92	0.271	108.96	0.328
103.78	0.043	104.82	0.100	105.86	0.158	106.90	0.215	107.94	0.272	108.98	0.329
103.80	0.044	104.84	0.101	105.88	0.159	106.92	0.216	107.96	0.273	109.00	0.331
103.82	0.045	104.86	0.102	105.90	0.160	106.94	0.217	107.98	0.274		
103.84	0.046	104.88	0.104	105.92	0.161	106.96	0.218	108.00	0.275		
103.86	0.047	104.90	0.105	105.94	0.162	106.98	0.219	108.02	0.277		
103.88	0.048	104.92	0.106	105.96	0.163	107.00	0.220	108.04	0.278		
103.90	0.050	104.94	0.107	105.98	0.164	107.02	0.221	108.06	0.279		
103.92	0.051	104.96	0.108	106.00	0.165	107.04	0.223	108.08	0.280		
103.94	0.052	104.98	0.109	106.02	0.166	107.06	0.224	108.10	0.281		
103.96	0.053	105.00	0.110	106.04	0.167	107.08	0.225	108.12	0.282		
103.98	0.054	105.02	0.111	106.06	0.169	107.10	0.226	108.14	0.283		
104.00	0.055	105.04	0.112	106.08	0.170	107.12	0.227	108.16	0.284		
104.02	0.056	105.06	0.113	106.10	0.171	107.14	0.228	108.18	0.285		



DETENTION VAULT #2 - PLAN VIEW

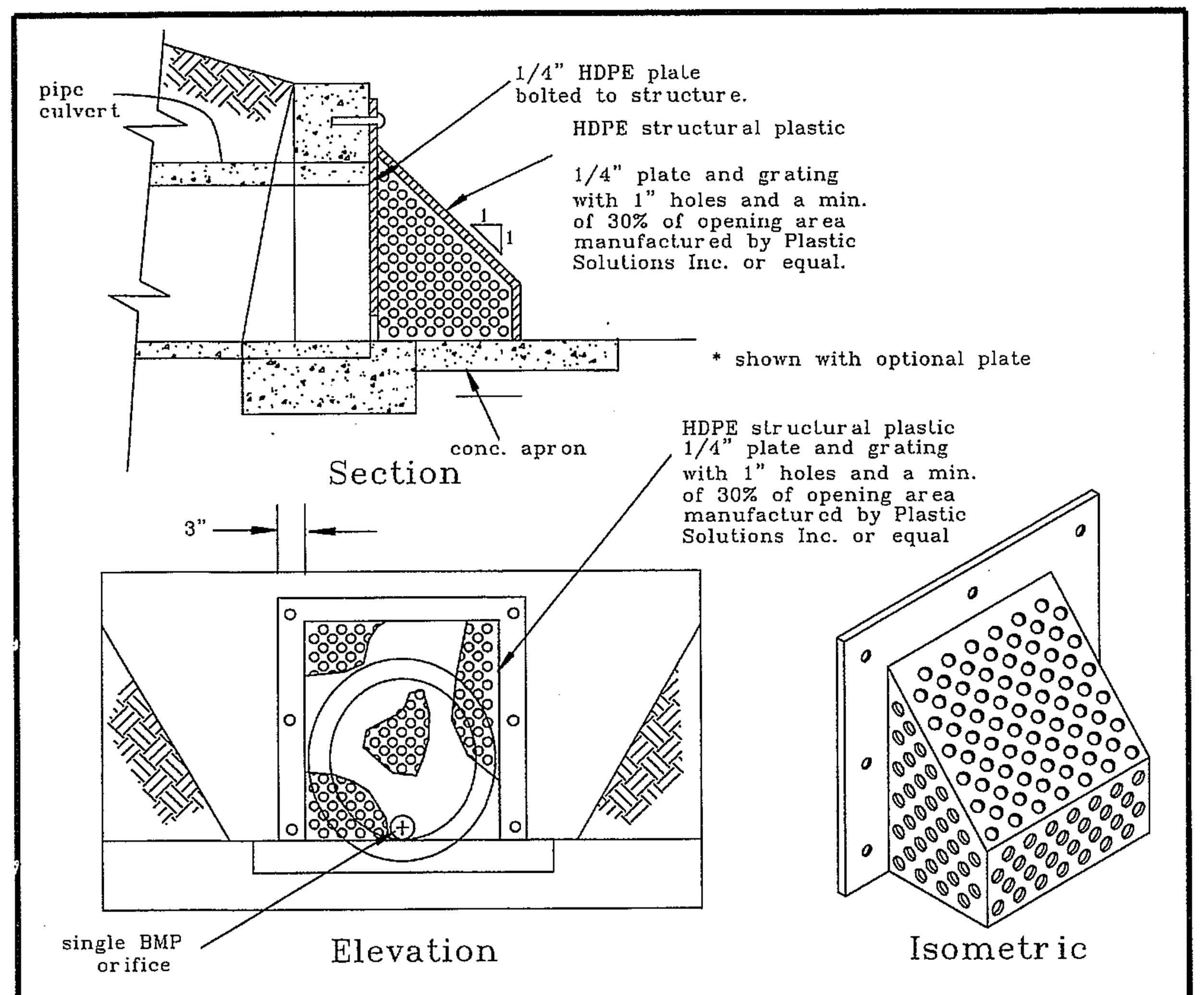
NOT TO SCALE



* USE BMP TRASH RACK, DETAIL THIS SHEET, OR EQUIVALENT
* SEE C-201 FOR LOCATION AND ORIENTATION

DETENTION VAULT #2 - SECTION A-A

NOT TO SCALE



BMP TRASH RACK	PLASTIC SOLUTIONS INC. P.O. Box 4386 Winchester VA 22604 877-877-5727 www.plastic-solution.com

Application No. SE 2010-LE-017 Staff S.W.
APPROVED (SE) SP PLAN
SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011
Sheet 12 of 27

PROGRESS PRINT 12/02/10 NOT FOR CONSTRUCTION

CONTRACT NO. 439601

DESIGNED	WD-AE	01/22/10	DATE
DRAWN	CC1	06/01/10	DATE
CHECKED	SMR	06/01/10	DATE
APPROVED	DCD	07/15/10	DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA DAVID C. DUCHSCHERER Lic. No. 25929 PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

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metro

CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA
PRELIMINARY STORMWATER DETAILS
DETENTION VAULT #2

SCALE: AS SHOWN | DRAWING NO. 12 OF 27 | C-206

PRINT DATE: Jul 19, 2010 12:35 PM USER: CML
FILE NAME: E:\439601 Cinder Bed Road\Dwg\Civil\Composite\C-205-C-207.dwg

Proposed Conditions Model IV_05-26-10 *Type II 24-hr 2-yr Rainfall=3.20"*
Prepared by Wendel Duchscherer
HydroCAD® 8.00 s/n 000557 © 2006 HydroCAD Software Solutions LLC 5/26/2010

Pond 3P: Vault 3

Inflow Area = 2.310 ac, Inflow Depth = 2.97" for 2-yr event
Inflow = 10.56 cfs @ 11.95 hrs, Volume= 0.571 af
Outflow = 1.72 cfs @ 12.14 hrs, Volume= 0.571 af, Atten= 84%, Lag= 11.6 min
Primary = 1.72 cfs @ 12.14 hrs, Volume= 0.571 af

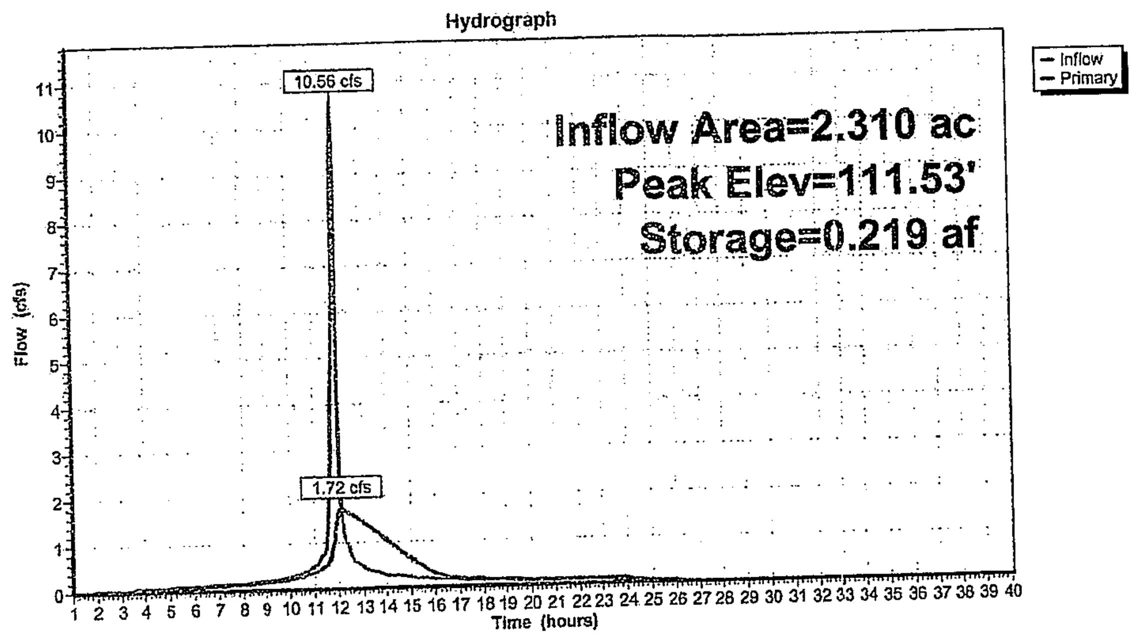
Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 111.53' @ 12.14 hrs Surf.Area= 0.062 ac Storage= 0.219 af

Plug-Flow detention time= 73.6 min calculated for 0.571 af (100% of inflow)
Center-of-Mass det. time= 73.4 min (825.0 - 751.6)

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	0.372 af	**30.00'W x 90.00'L x 6.00'H Vault 3**

Device	Routing	Invert	Outlet Devices
#1	Primary	108.00'	**15.0" x 42.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 107.79' S= 0.0050 '/' Cc= 0.900 n= 0.013
#2	Device 1	108.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	111.50'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	113.50'	**10.0' long x 0.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=1.72 cfs @ 12.14 hrs HW=111.53' (Free Discharge)
1=**Culvert** (Passes 1.72 cfs of 9.87 cfs potential flow)
2=**Orifice/Grate** (Orifice Controls 1.71 cfs @ 8.72 fps)
3=**Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.59 fps)
4=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)



Proposed Conditions Model IV_05-26-10 *Type II 24-hr 10-yr Rainfall=5.20"*
Prepared by Wendel Duchscherer
HydroCAD® 8.00 s/n 000557 © 2006 HydroCAD Software Solutions LLC 5/26/2010

Pond 3P: Vault 3

Inflow Area = 2.310 ac, Inflow Depth > 4.96" for 10-yr event
Inflow = 17.29 cfs @ 11.95 hrs, Volume= 0.955 af
Outflow = 5.00 cfs @ 12.10 hrs, Volume= 0.955 af, Atten= 71%, Lag= 8.9 min
Primary = 5.00 cfs @ 12.10 hrs, Volume= 0.955 af

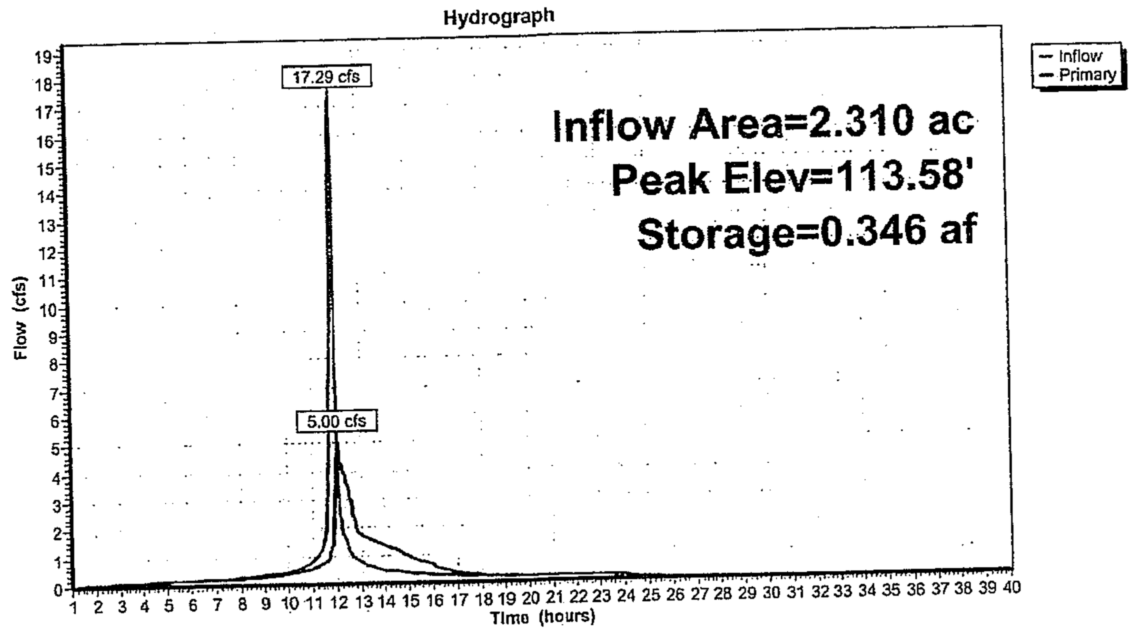
Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 113.58' @ 12.09 hrs Surf.Area= 0.062 ac Storage= 0.346 af

Plug-Flow detention time= 65.4 min calculated for 0.954 af (100% of inflow)
Center-of-Mass det. time= 66.0 min (808.4 - 742.4)

Volume	Invert	Avail.Storage	Storage Description
#1	108.00'	0.372 af	**30.00'W x 90.00'L x 6.00'H Vault 3**

Device	Routing	Invert	Outlet Devices
#1	Primary	108.00'	**15.0" x 42.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 107.79' S= 0.0050 '/' Cc= 0.900 n= 0.013
#2	Device 1	108.00'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	111.50'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	113.50'	**10.0' long x 0.7' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=4.97 cfs @ 12.10 hrs HW=113.58' (Free Discharge)
1=**Culvert** (Passes 4.97 cfs of 13.15 cfs potential flow)
2=**Orifice/Grate** (Orifice Controls 2.18 cfs @ 11.11 fps)
3=**Orifice/Grate** (Orifice Controls 2.22 cfs @ 6.35 fps)
4=**Broad-Crested Rectangular Weir** (Weir Controls 0.57 cfs @ 0.76 fps)

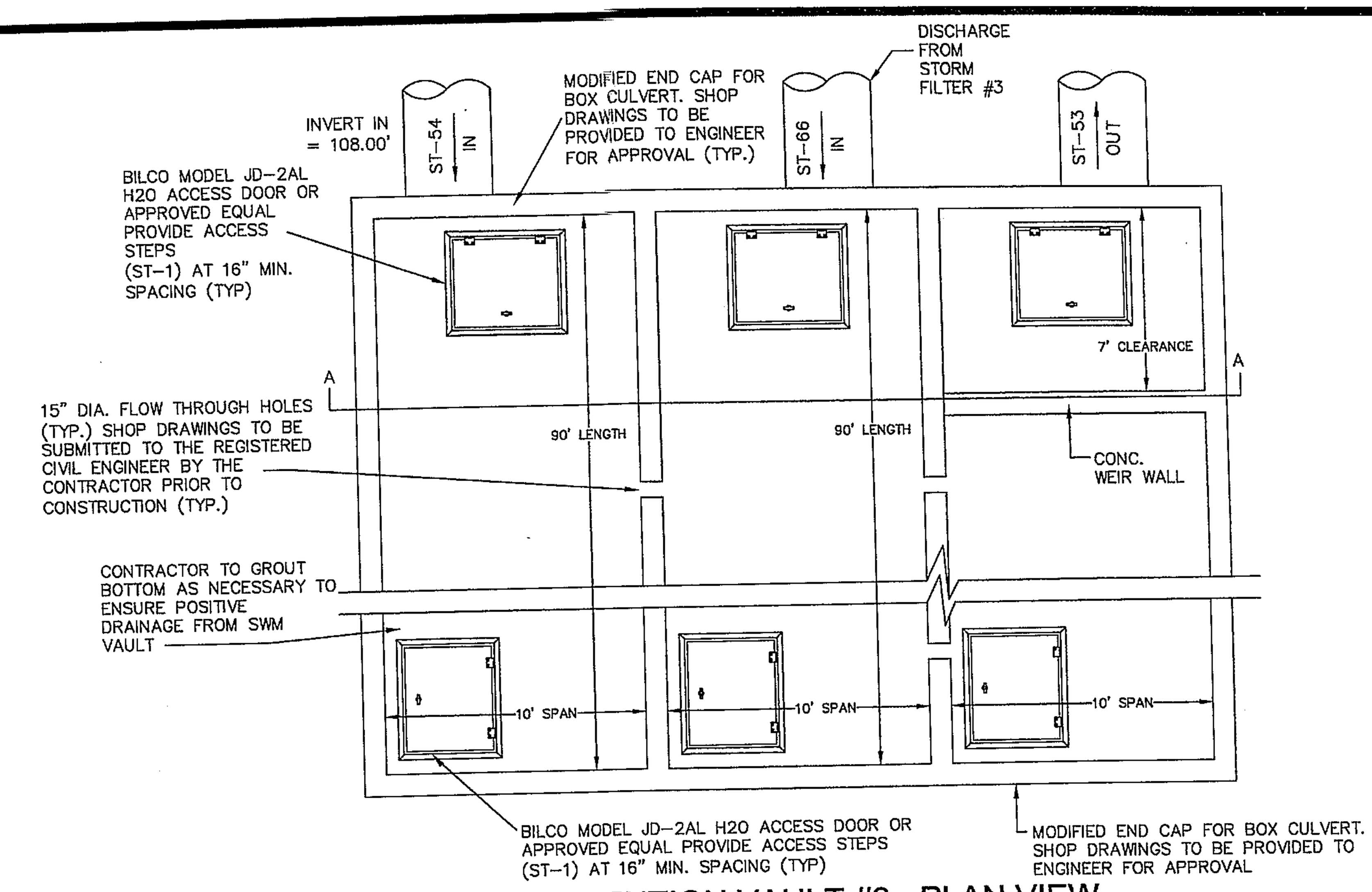


Stage-Discharge for Pond 3P: Vault 3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
108.00	0.00	109.04	0.84	110.08	1.28	111.12	1.60	112.16	2.83	113.20	4.07
108.02	0.00	109.06	0.85	110.10	1.29	111.14	1.61	112.18	2.86	113.22	4.09
108.04	0.00	109.08	0.86	110.12	1.29	111.16	1.61	112.20	2.90	113.24	4.11
108.06	0.01	109.10	0.87	110.14	1.30	111.18	1.62	112.22	2.93	113.26	4.12
108.08	0.02	109.12	0.88	110.16	1.31	111.20	1.62	112.24	2.96	113.28	4.14
108.10	0.03	109.14	0.89	110.18	1.31	111.22	1.63	112.26	2.99	113.30	4.16
108.12	0.04	109.16	0.90	110.20	1.32	111.24	1.63	112.28	3.02	113.32	4.18
108.14	0.06	109.18	0.91	110.22	1.33	111.26	1.64	112.30	3.05	113.34	4.20
108.16	0.07	109.20	0.92	110.24	1.33	111.28	1.65	112.32	3.08	113.36	4.21
108.18	0.09	109.22	0.93	110.26	1.34	111.30	1.65	112.34	3.11	113.38	4.23
108.20	0.11	109.24	0.94	110.28	1.35	111.32	1.66	112.36	3.14	113.40	4.25
108.22	0.13	109.26	0.95	110.30	1.35	111.34	1.66	112.38	3.16	113.42	4.27
108.24	0.16	109.28	0.96	110.32	1.36	111.36	1.67	112.40	3.19	113.44	4.28
108.26	0.18	109.30	0.97	110.34	1.37	111.38	1.67	112.42	3.22	113.46	4.30
108.28	0.20	109.32	0.98	110.36	1.37	111.40	1.68	112.44	3.24	113.48	4.32
108.30	0.23	109.34	0.99	110.38	1.38	111.42	1.68	112.46	3.27	113.50	4.34
108.32	0.26	109.36	1.00	110.40	1.39	111.44	1.69	112.48	3.30	113.52	4.43
108.34	0.28	109.38	1.00	110.42	1.39	111.46	1.69	112.50	3.32	113.54	4.59
108.36	0.31	109.40	1.01	110.44	1.40	111.48	1.70	112.52	3.35	113.56	4.79
108.38	0.34	109.42	1.02	110.46	1.41	111.50	1.70	112.54	3.37	113.58	5.03
108.40	0.36	109.44	1.03	110.48	1.41	111.52	1.71	112.56	3.40	113.60	5.29
108.42	0.39	109.46	1.04	110.50	1.42	111.54	1.72	112.58	3.42	113.62	5.58
108.44	0.41	109.48	1.05	110.52	1.42	111.56	1.73	112.60	3.44	113.64	5.90
108.46	0.44	109.50	1.06	110.54	1.43	111.58	1.75	112.62	3.47	113.66	6.24
108.48	0.46	109.52	1.07	110.56	1.44	111.60	1.77	112.64	3.49	113.68	6.59
108.50	0.47	109.54	1.07	110.58	1.44	111.62	1.79	112.66	3.51	113.70	6.97
108.52	0.49	109.56	1.08	110.60	1.45	111.64	1.81	112.68	3.54	113.72	7.37
108.54	0.51	109.58	1.09	110.62	1.46	111.66	1.83	112.70	3.56	113.74	7.80
108.56	0.53	109.60	1.10	110.64	1.46	111.68	1.86	112.72	3.58	113.76	8.24
108.58	0.54	109.62	1.11	110.66	1.47	111.70	1.89	112.74	3.60	113.78	8.69
108.60	0.56	109.64	1.11	110.68	1.47	111.72	1.92	112.76	3.63	113.80	9.17
108.62	0.58	109.66	1.12	110.70	1.48	111.74	1.95	112.78	3.65	113.82	9.66
108.64	0.59	109.68	1.13	110.72	1.49	111.76	1.99	112.80	3.67	113.84	10.17
108.66	0.61	109.70	1.14	110.74	1.49	111.78	2.03	112.82	3.69	113.86	10.70
108.68	0.62	109.72	1.15	110.76	1.50	111.80	2.07	112.84	3.71	113.88	11.24
108.70	0.63	109.74	1.15	110.78	1.50	111.82	2.11	112.86	3.73	113.90	11.80
108.72	0.65	109.76	1.16	110.80	1.51	111.84	2.15	112.88	3.75	113.92	12.38
108.74	0.66	109.78	1.17	110.82	1.52	111.86	2.19	112.90	3.77	113.94	12.99
108.76	0.68	109.80	1.18	110.84	1.52	111.88	2.23	112.92	3.80	113.96	13.61
108.78	0.69	109.82	1.18	110.86	1.53	111.90	2.28	112.94	3.82	113.98	13.67
108.80	0.70	109.84	1.19	110.88	1.53	111.92	2.32	112.96	3.84	114.00	13.70
108.82	0.71	109.86	1.20	110.90	1.54	111.94	2.37	112.98	3.86		
108.84	0.73	109.88	1.21	110.92	1.54	111.96	2.41	113.00	3.88		
108.86	0.74	109.90	1.21	110.94	1.55	111.98	2.46	113.02	3.90		
108.88	0.75	109.92	1.22	110.96	1.56	112.00	2.51	113.04	3.92		
108.90	0.76	109.94	1.23	110.98	1.56	112.02	2.55	113.06	3.93		
108.92	0.77	109.96	1.24	111.00	1.57	112.04	2.60	113.08	3.95		
108.94	0.79	109.98	1.24	111.02	1.57	112.06	2.64	113.10	3.97		
108.96	0.80	110.00	1.25	111.04	1.58	112.08	2.69	113.12	3.99		
108.98	0.81	110.02	1.26	111.06	1.58	112.10	2.73	113.14	4.01		
109.00	0.82	110.04	1.26	111.08	1.59	112.12	2.77	113.16	4.03		
109.02	0.83	110.06	1.27	111.10	1.60	112.14	2.80	113.18	4.05		

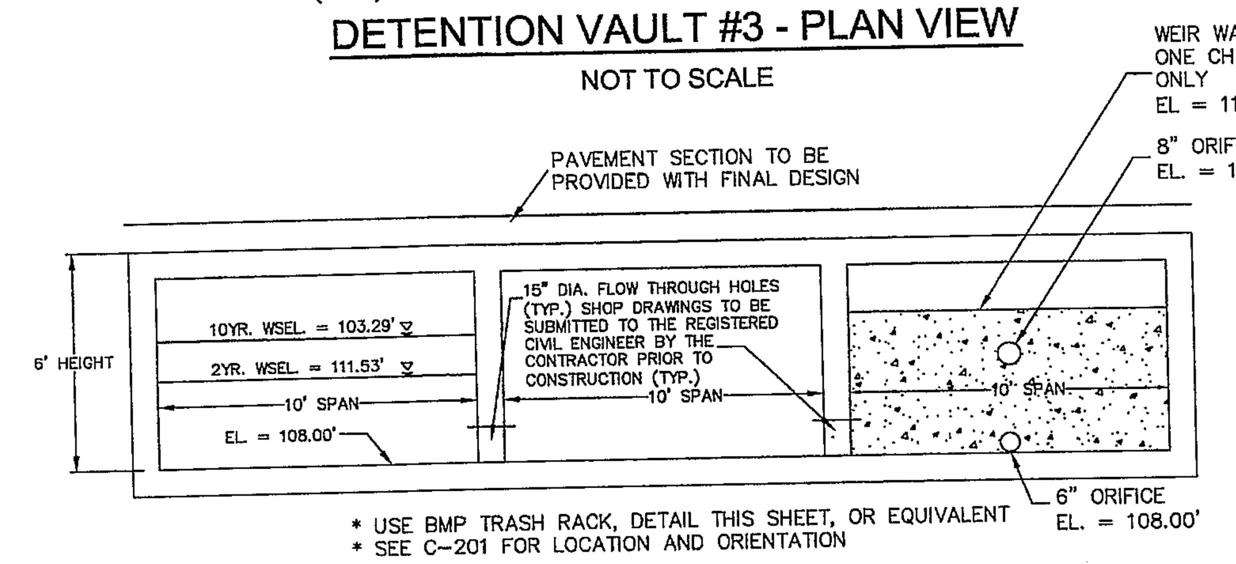
Stage-Area-Storage for Pond 3P: Vault 3

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
108.00	0.000	109.04	0.064	110.08	0.129	111.12	0.193	112.16	0.258	113.20	0.322
108.02	0.001	109.06	0.066	110.10	0.130	111.14	0.195	112.18	0.259	113.22	0.324
108.04	0.002	109.08	0.067	110.12	0.131	111.16	0.196	112.20	0.260	113.24	0.325
108.06	0.004	109.10	0.068	110.14	0.133	111.18	0.197	112.22	0.262	113.26	0.326
108.08	0.005	109.12	0.069	110.16	0.134	111.20	0.198	112.24	0.263	113.28	0.327
108.10	0.006	109.14	0.071	110.18	0.135	111.22	0.200	112.26	0.264	113.30	0.329
108.12	0.007	109.16	0.072	110.20	0.136	111.24	0.201	112.28	0.265	113.32	0.330
108.14	0.009	109.18	0.073	110.22	0.138	111.26	0.202	112.30	0.267	113.34	0.331
108.16	0.010	109.20	0.074	110.24	0.139	111.28	0.203	112.32	0.268	113.36	0.332
108.18	0.011	109.22	0.076	110.26	0.140	111.30	0.205	112.34	0.269	113.38	0.333
108.20	0.012	109.24	0.077	110.28	0.141	111.32	0.206	112.36	0.270	113.40	0.335
108.22	0.014	109.26	0.078	110.30	0.143	111.34	0.207	112.38	0.271	113.42	0.336
108.24	0.015	109.28	0.079	110.32	0.144	111.36	0.208	112.40	0.273	113.44	0.337
108.26	0.016	109.30	0.081	110.34	0.145	111.38	0.210	112.42	0.274	113.46	0.338
108.28	0.017	109.32	0.082	110.36	0.146	111.40	0.211	112.44	0.275	113.48	0.340
108.30	0.019	109.34	0.083	110.38	0.148	111.42	0.212	112.46	0.276	113.50	0.341
108.32	0.020	109.36	0.084	110.40	0.149	111.44	0.213	112.48	0.278	113.52	0.342
108.34	0.021	109.38	0.086	110.42	0.150	111.46	0.214	112.50	0.279	113.54	0.343
108.36	0.022	109.40	0.087	110.44	0.151	111.48	0.216	112.52	0.280	113.56	0.345
108.38	0.024	109.42	0.088	110.46	0.152	111.50	0.217	112.54	0.281	113.58	0.346
108.40	0.025	109.44	0.089	110.48	0.154	111.52	0.218	112.56	0.283	113.60	0.347
108.42	0.026	109.46	0.090	110.50	0.155	111.54	0.219	112.58	0.284	113.62	0.348
108.44	0.027	109.48	0.092	110.52	0.156	111.56	0.221	112.60	0.285	113.64	0.350
108.46	0.029	109.50	0.093	110.54	0.157	111.58	0.222	112.62	0.286	113.66	0.351
108.48	0.030	109.52	0.094	110.56	0.159	111.60	0.223	112.64	0.288	113.68	0.352
108.50	0.031	109.54	0.095	110.58	0.160	111.62	0.224	112.66	0.289	113.70	0.353
108.52	0.032	109.56	0.097	110.60	0.161	111.64	0.226	112.68	0.290	113.72	0.355
108.54	0.033	109.58	0.098	110.62	0.162	111.66	0.227	112.70	0.291	113.74	0.356
108.56	0.035	109.60	0.099	110.64	0.164	111.68	0.228	112.72	0.293	113.76	0.357
108.58	0.036	109.62	0.100	110.66	0.165	111.70	0.229	112.74	0.294	113.78	0.358
108.60	0.037	109.64	0.102	110.68	0.166	111.72	0.231	112.76	0.295	113.80	0.360
108.62	0.038	109.66	0.103	110.70	0.167	111.74	0.232	112.78	0.296	113.82	0.361
108.64	0.040	109.68	0.104	110.72	0.169	111.76	0.233	112.80	0.298	113.84	0.362
108.66	0.041	109.70	0.105	110.74	0.170	111.78	0.234	112.82	0.299	113.86	0.363
108.68	0.042	109.72	0.107	110.76	0.171	111.80	0.236	112.84	0.300	113.88	0.364
108.70	0.043	109.74	0.108	110.78	0.172	111.82	0.237	112.86	0.301	113.90	0.366
108.72	0.045	109.76	0.109	110.80	0.174	111.84	0.238	112.88	0.302	113.92	0.367
108.74	0.046	109.78	0.110	110.82	0.175	111.86	0.239	112.90	0.304	113.94	0.368
108.76	0.047	109.80	0.112	110.84	0.176	111.88	0.240	112.92	0.305	113.96	0.369
108.78	0.048	109.82	0.113	110.86	0.177	111.90	0.242	112.94	0.306	113.98	0.371
108.80	0.050	109.84	0.114	110.88	0.179	111.92	0.243	112.96	0.307	114.00	0.372
108.82	0.051	109.86	0.115	110.90	0.180	111.94	0.244	112.98	0.309		
108.84	0.052	109.88	0.117	110.92	0.181	111.96	0.245	113.00	0.310		
108.86	0.053	109.90	0.118	110.94	0.182	111.98	0.247	113.02	0.311		
108.88	0.055	109.92	0.119	110.96	0.183	112.00	0.248	113.04	0.312		
108.90	0.056	109.94	0.120	110.98	0.185	112.02	0.249	113.06	0.314		
108.92	0.057	109.96	0.121	111.00	0.186	112.04	0.250	113.08	0.315		
108.94	0.058	109.98	0.123	111.02	0.187	112.06	0.252	113.10	0.316		
108.96	0.060	110.00	0.124	111.04	0.188	112.08	0.253	113.12	0.317		
108.98	0.061	110.02	0.125	111.06	0.190	112.10	0.254	113.14	0.319		
109.00	0.062	110.04	0.126	111.08	0.191	112.12	0.255	113.16	0.320		
109.02	0.063	110.06	0.128	111.10	0.192	112.14	0.257	113.18	0.321		



DETENTION VAULT #3 - PLAN VIEW

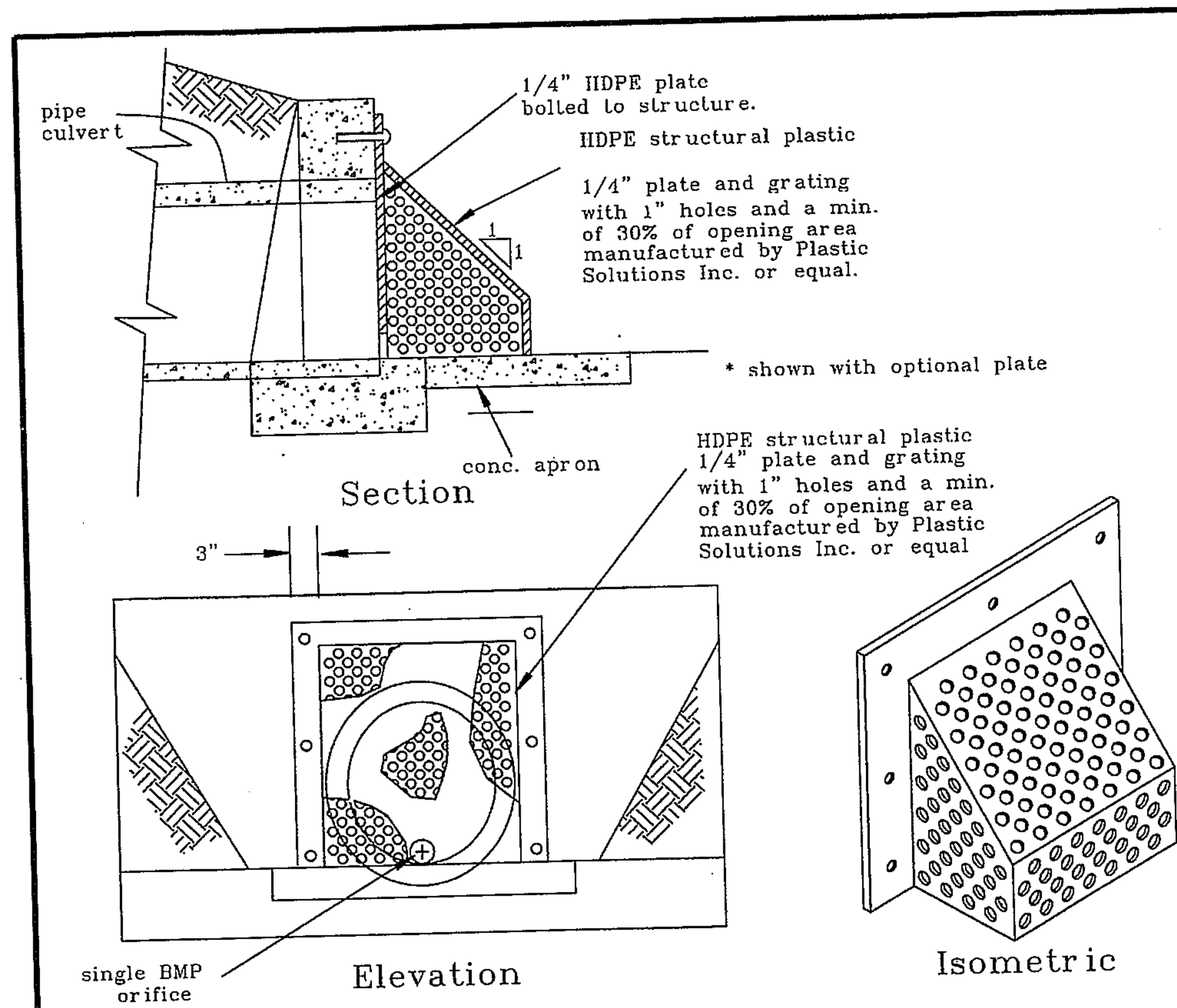
NOT TO SCALE



* USE BMP TRASH RACK, DETAIL THIS SHEET, OR EQUIVALENT
* SEE C-201 FOR LOCATION AND ORIENTATION

DETENTION VAULT #3 - SECTION A-A

NOT TO SCALE



BMP TRASH RACK

PLASTIC SOLUTIONS INC.
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877-877-5727
www.plastic-solution.com

PROGRESS PRINT
12/02/10
NOT FOR CONSTRUCTION

Application No. SE 2010-LE-017 Staff S.W.
APPROVED (SE) SP PLAN
SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011
Sheet 13 of 27

CONTRACT NO. 439601

DESIGNED	WD-AE	01/22/10 DATE
DRAWN	CC1	06/01/10 DATE
CHECKED	SMR	06/01/10 DATE
APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Lic. No. 10029
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
www.wd-ae.com

metro

CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA
PRELIMINARY STORMWATER DETAILS
DETENTION VAULT #3

SCALE: AS SHOWN

DRAWING NO. 13 OF 27

C-207

PRINT DATE: Jul 19, 2010 12:35 PM USER: CML
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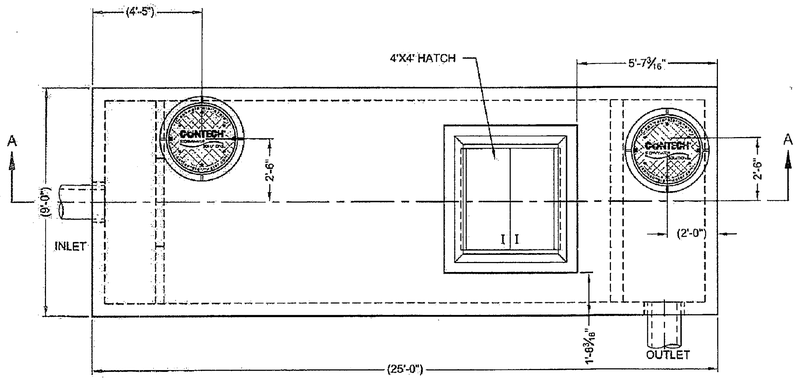
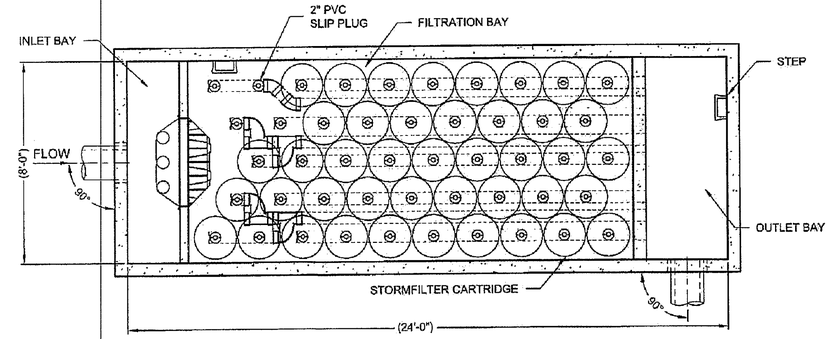


PLAN VIEW



SECTION B-B

VAULT STYLE: 16I-8, -14, -20 INLET BAY - FULL HEIGHT BAFFLE WALL

MATERIAL LIST- PROVIDED BY CONTECH

COUNT	DESCRIPTION	INSTALLED BY
43	27", 22.5 GPM, ZPG CARTRIDGE (GLD)	CONTECH
4	2" PVC SLIP PLUG	CONTECH
1	FLOW KIT	CONTECH
1	ENERGY DISSAPATOR	CONTECH
1	FLOW SPREADER	CONTECH
1	4'X4' ACCESS HATCH	
2	Ø30" x 4" FRAME AND COVER	CONTRACTOR
1	JOINT SEALANT (BY PRECASTER)	CONTRACTOR
3 PLCS	GRADE RINGS/RISERS	CONTRACTOR

SITE DESIGN DATA

WATER QUALITY FLOW RATE	2.16 CFS
PEAK FLOW RATE	T.B.D. CFS
RETURN PERIOD OF PEAK FLOW	T.B.D. YRS
FILTER MEDIA TYPE	ZPG

PERFORMANCE SPECIFICATION

FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. **RADIAL MEDIA DEPTH SHALL BE 7-INCHES.** FILTER MEDIA CONTACT TIME SHALL BE AT LEAST **37 SECONDS.** SPECIFIC FLOW RATE SHALL BE **2 GPM/SF (MAXIMUM).** SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE **6 GPM/CF OF MEDIA (MAXIMUM).**

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.contech-cpi.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.

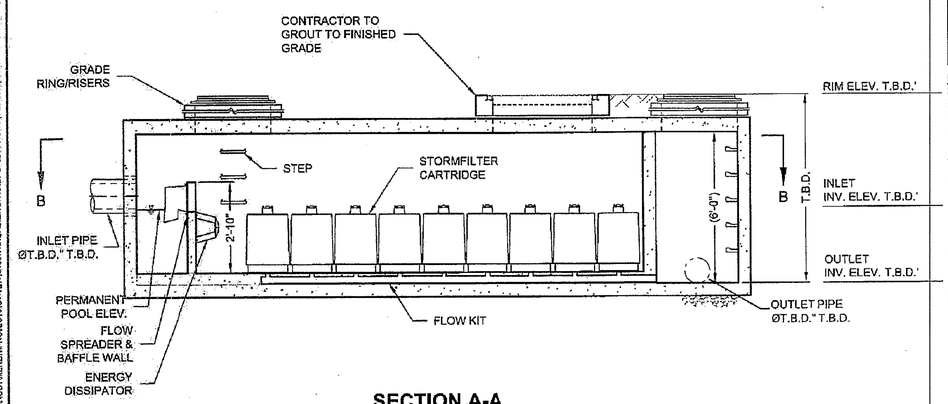
INSTALLATION NOTES

1. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING CLUTCHES PROVIDED).
3. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE.
4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
5. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

STRUCTURE WEIGHT

APPROXIMATE HEAVIEST PICK = T.B.D. LBS.

CONTECH
PROPOSAL
DRAWING



SECTION A-A

STORM FILTER #1

NOT TO SCALE

MARK	DATE	REVISION DESCRIPTION	BY

8' x 24' STORMFILTER - 418127-01
WMATA - CINDER BED ROAD BUS FACILITY
FAIRFAX COUNTY, VA
SITE DESIGNATION: #1

CONTECH® CONSTRUCTION PRODUCTS INC.
contech-cpi.com
3660 Dorwood Pkwy Blvd. Suite 450, Englewood, CO 80113
800-338-1759 303-790-2273 303-790-2279 FAX
We Stormwater Management StormFilter

DATE: 5/20/2010
DESIGNED: AML
DRAWN: AML
CHECKED:
APPROVED:
PROJECT NUMBER: 418127
SHEET: 1 OF 1
CE/RS

PROGRESS PRINT
12/01/10
NOT FOR CONSTRUCTION

Application No. SE 2010-LE-017 Staff S.W.

APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011

Sheet 14 of 27

CONTRACT NO. 439601

			REFERENCE DRAWINGS		REVISIONS		
			NUMBER	DESCRIPTION	DATE	BY	DESCRIPTION
DESIGNED	WD-AE	01/22/10 DATE			12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION
DRAWN	CC1	06/01/10 DATE					
CHECKED	SMR	06/01/10 DATE					
APPROVED	DCD	07/15/10 DATE					

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Lic. No. 19020
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
www.wd-ae.com

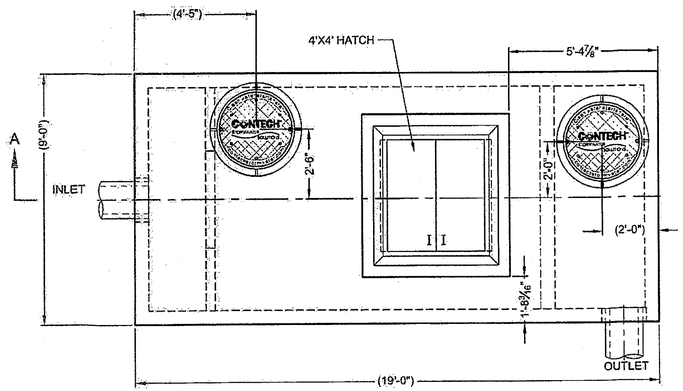
metro

DIVISION
CINDER BED ROAD LORTON, VA
PRELIMINARY STORMWATER DETAILS
STORM FILTER #1

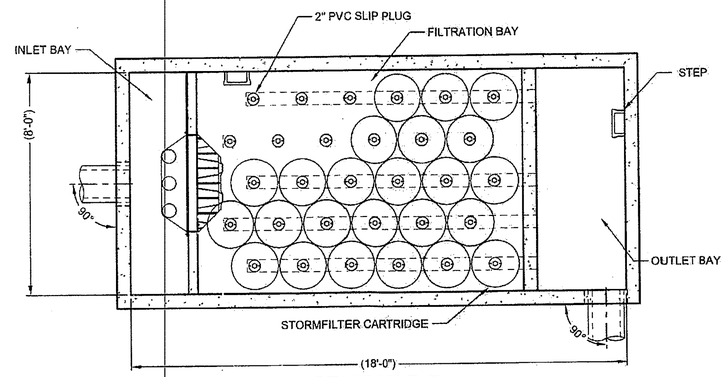
SCALE: AS SHOWN
DRAWING NO. 14 OF 27
C-208

PRINT DATE: Jul 13, 2010 09:31 AM USER: RJF
FILE NAME: E:\439601 Cinder Bed Road\Dwg\Civil\Composite\C-208, C-209.dwg

\\WAD.CONTECH-CPI.COM\ROOT\MERLIN\PROJECTVAULT\ENV181\05\418127\SIGNDATA\18127-SFS24-PRO.H (5/20/2010) DWG 6/20/2010 9:52 AM



PLAN VIEW



SECTION B-B

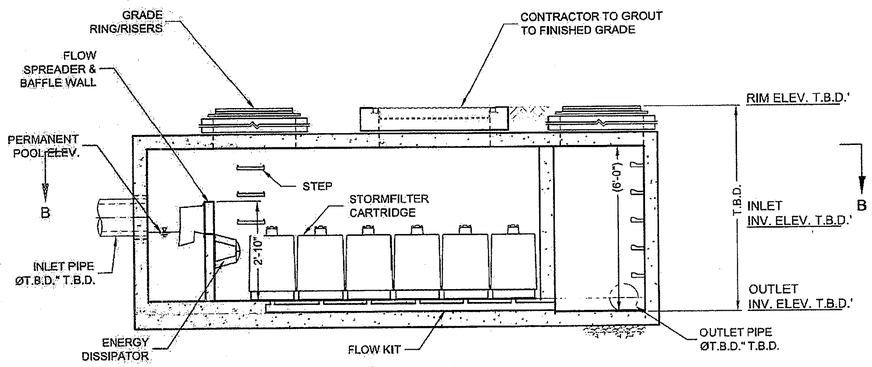
VAULT STYLE: 13I INLET BAY - FULL HEIGHT BAFFLE WALL

MATERIAL LIST - PROVIDED BY CONTECH

COUNT	DESCRIPTION	INSTALLED BY
24	27", 22.5 GPM, ZPG CARTRIDGE (GLD)	CONTECH
6	2" PVC SLIP PLUG	CONTECH
1	FLOW KIT	CONTECH
1	ENERGY DISSIPATOR	CONTECH
1	FLOW SPREADER	CONTECH
1	4'X4' ACCESS HATCH	
1	JOINT SEALANT (BY PRECASTER)	CONTRACTOR
3 PLCS	GRADE RINGS/RISERS	CONTRACTOR
2	Ø30" x 4" FRAME AND COVER	CONTRACTOR

SITE DESIGN DATA

WATER QUALITY FLOW RATE	1.20 CFS
PEAK FLOW RATE	T.B.D. CFS
RETURN PERIOD OF PEAK FLOW	T.B.D. YRS
FILTER MEDIA TYPE	ZPG



SECTION A-A

PERFORMANCE SPECIFICATION

FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. **RADIAL MEDIA DEPTH SHALL BE 7-INCHES**. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST **37 SECONDS.** SPECIFIC FLOW RATE SHALL BE **2 GPM/SF (MAXIMUM).** SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE **6 GPM/CF OF MEDIA (MAXIMUM).**

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
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5. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

STRUCTURE WEIGHT

APPROXIMATE HEAVIEST PICK = T.B.D. LBS.

CONTECH
PROPOSAL
DRAWING

STORM FILTER #3

NOT TO SCALE

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MARK	DATE	REVISION DESCRIPTION	BY

8' x 18' STORMFILTER - 418127-003
WMATA - CINDER BED ROAD BUS FACILITY
FAIRFAX COUNTY, VA
SITE DESIGNATION: #3

CONTECH CONSTRUCTION PRODUCTS INC.
contech-cpi.com
5055 Centennial Plaza Blvd., Suite 100, Maumee, OH 43537
800/338-1122 513/645-7000 513/645-7993 FAX
The Stormwater Management StormFilter®
CONTECH CONSTRUCTION PRODUCTS INC. IS NOT RESPONSIBLE FOR ACCURACY OF DESIGN INFORMATION PROVIDED BY OTHERS.

DATE: 5/20/2010	
DESIGNED: AML	DRAWN: AML
CHECKED:	APPROVED:
PROJECT NUMBER: 418127	
SHEET: 1 OF 1	

CE/RS

Application No. SE 2010-LE-017 Staff S.W.

APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011

Sheet 15 of 27

PROGRESS PRINT
12/01/10
NOT FOR CONSTRUCTION

CONTRACT NO.
439601

		DATE
DESIGNED	WD-AE	01/22/10
DRAWN	CC1	06/01/10
CHECKED	SMR	06/01/10
APPROVED	DCD	07/15/10

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Lic. No. 15029
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
www.wd-ae.com

metro

CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA
PRELIMINARY STORMWATER DETAILS
STORM FILTER #3

SCALE: AS SHOWN

DRAWING NO. 15 OF 27

C-209

PRINT DATE: Jul 13, 2010 09:31 AM USER: RJF
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Stormwater Management Narrative

THE EXISTING 17.37-ACRE SITE IS THE LOCATION OF A FORMER CONCRETE PLANT. THE CONCRETE FACILITY HAS BEEN CLOSED AND THE SITE HAS BEEN REMEDIATED/RESTORED TO GRAVEL AND LIMITED VEGETATION. LONG BRANCH RUNS FROM NORTH TO SOUTH THROUGH THE SITE. A FLOODPLAIN AND RPA ASSOCIATED WITH LONG BRANCH COVER MORE THAN 50% OF THE SITE.

EXISTING CONDITIONS

APPROXIMATELY 14.51 ACRES OF THE SITE DRAINS BY OVERLAND FLOW FROM WEST TO EAST, THROUGH THE FLOODPLAIN/RPA AND INTO LONG BRANCH. ADDITIONAL OFFSITE AREA WEST OF THE SITE DRAINS TO TWO CULVERTS THAT PASS BENEATH RAILROAD TRACKS AND OUTLET ONTO THE WESTERN LIMITS OF THE SITE. FLOW FROM THESE CULVERTS RUNS ACROSS THE PREVIOUSLY DEVELOPED PORTION OF THE SITE IN RIP RAP CHANNELS TO THE APPROXIMATE EDGE OF THE FLOODPLAIN/RPA. THE SOUTHERNMOST CHANNEL DISSIPATES (NO DEFINED CHANNEL) AND CONTINUES TO FLOW OVERLAND THROUGH THE FLOODPLAIN/RPA AND INTO LONG BRANCH. THE NORTHERNMOST RIP RAP CHANNEL TRANSITIONS TO A DEFINED, VEGETATED CHANNEL AT THE EDGE OF THE FLOODPLAIN/RPA AND CONTINUES TO FLOW THROUGH THE FLOODPLAIN/RPA AND INTO LONG BRANCH.

THE REMAINING 3.51 ACRES (EAST SIDE OF THE SITE PLUS RUNOFF FROM CINDER BED ROAD) DRAINS OVERLAND FROM EAST TO WEST, THROUGH THE FLOODPLAIN/RPA AND INTO LONG BRANCH. ADDITIONAL OFFSITE AREA EAST OF THE SITE DRAINS TO TWO CULVERTS THAT PASS BENEATH CINDER BED ROAD AND OUTLET AT THE EASTERN LIMITS OF THE SITE. FLOW FROM THE SOUTHERNMOST CULVERT OUTLETS DIRECTLY TO THE LONG BRANCH MAIN CHANNEL. FLOW FROM THE NORTHERNMOST CULVERT OUTLETS ONTO THE SITE WHERE IT DISSIPATES (NO DEFINED CHANNEL) AND CONTINUES TO FLOW OVERLAND THROUGH THE FLOODPLAIN/RPA AND INTO LONG BRANCH.

THE POINT OF ANALYSIS USED FOR COMPARING EXISTING PEAK DISCHARGE RATES TO PROPOSED PEAK DISCHARGE RATES IS LONG BRANCH WHERE IT CROSSES THE SOUTHERN BOUNDARY OF THE SITE. THE EXISTING PEAK RUNOFF RATES (MODELED AS A GOOD, WOODED CONDITION) ARE ESTIMATED AS FOLLOWS:

EXISTING CONDITIONS	2-YEAR	10-YEAR
POINT OF ANALYSIS - P1	19.73 CFS	46.97 CFS

PROPOSED CONDITIONS

THE PROJECT PROPOSES THE CONSTRUCTION OF A BUS MAINTENANCE FACILITY WITH SEPARATE PARKING AREAS FOR BUSES AND AUTOMOBILES. THE SITE WILL CONTAIN EQUIPMENT TO SUPPORT THE FACILITY INCLUDING A DIESEL FUELING STATION FOR BUSES, A GASOLINE FUELING STATION FOR AUTOMOBILES, A BUS WASH, AND A GUARD HOUSE AT THE MAIN ENTRANCE. THE SITE WILL BE SERVICED BY APPROPRIATELY SIZED UTILITIES (DOMESTIC WATER, FIRE PROTECTION WATER, SANITARY SEWER, GAS, ELECTRIC AND TELEPHONE, ETC.).

RUNOFF FROM THE MAJORITY OF THE PROPOSED DEVELOPMENT WILL BE COLLECTED BY ONSITE STORM SEWERS AND DIRECTED TO THREE SEPARATE UNDERGROUND DETENTION VAULTS. THE MAIN ENTRANCE ROAD AND GUARD HOUSE AREA CANNOT BE GRADED TO ANY OF THE DETENTION VAULTS AND WILL THEREFORE DRAIN UNDETAINED DIRECTLY INTO LONG BRANCH. HOWEVER, THE VAULTS ARE SIZED SO THAT THE COMBINED DISCHARGE FROM THE SITE (DETAINED AND UNDETAINED AREAS) AT THE POINT OF ANALYSIS IS LESS THAN EXISTING CONDITIONS. THESE RATES ARE SUMMARIZED IN THE TABLE BELOW:

DEVELOPED CONDITIONS	2-YEAR	10-YEAR
VAULT 1	1.66 CFS	4.22 CFS
VAULT 2	1.64 CFS	4.17 CFS
VAULT 3	1.72 CFS	5.00 CFS
POINT OF ANALYSIS - P1	16.72 CFS	39.06 CFS
OVERALL REDUCTION	15%	17%

OFFSITE DRAINAGE FROM THE WEST WILL BE INTERCEPTED BY ONSITE STORM PIPES, CONVEYED THROUGH THE SITE, AND DISCHARGED INTO THE FLOODPLAIN/RPA. THE SOUTHERNMOST CONVEYANCE WILL COMBINE WITH THE OUTLET FLOWS FROM VAULT 1 AND VAULT 2 AND WILL DISCHARGE TO A NEW GRASSED CHANNEL NEAR THE FLOODPLAIN/RPA BOUNDARY. THIS GRASSED CHANNEL WILL FOLLOW THE ALIGNMENT OF AN ABANDONED ACCESS ROAD, RETURNING PREVIOUSLY DISTURBED FLOODPLAIN/RPA TO PERVIOUS AREA. THE GRASSED CHANNEL WILL OUTLET DIRECTLY TO LONG BRANCH (OUTFALL 1). THE NORTHERNMOST CONVEYANCE WILL COMBINE WITH THE OUTLET FLOW FROM VAULT 3 AND OUTLET TO AN EXISTING VEGETATED CHANNEL WHERE IT WILL CONTINUE TO FLOW THROUGH THE FLOODPLAIN/RPA AND INTO LONG BRANCH
(OUTFALL 2).

OFFSITE DRAINAGE FROM THE EAST WILL NOT BE IMPACTED BY THE PROJECT AND WILL CONTINUE TO DISCHARGE TO LONG BRANCH AS IT DOES UNDER EXISTING CONDITIONS.

Existing Conditions Model_05-26-10 *Type II 24-hr 2-yr Rainfall=3.20"*
Prepared by Wendel Duchscherer Page 2
HydroCAD® 8.00 s/n 000557 © 2006 HydroCAD Software Solutions LLC 6/1/2010

Time span=1.00-40.00 hrs, dt=0.05 hrs, 781 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Onsite (West of Long Branch) Runoff Area=14.510 ac Runoff Depth=1.21"
Flow Length=1,350' Tc=21.7 min CN=77 Runoff=18.04 cfs 1.465 af

Subcatchment 2S: Onsite + Road (East of Long Branch) Runoff Area=3.510 ac Runoff Depth=1.27"
Flow Length=970' Tc=43.1 min CN=78 Runoff=2.91 cfs 0.372 af

Subcatchment 9S: Offsite Area (Soutwest) Runoff Area=15.320 ac Runoff Depth=2.08"
Flow Length=900' Tc=25.6 min CN=89 Runoff=30.41 cfs 2.657 af

Subcatchment 10S: Offsite Area B (Northwest) Runoff Area=20.730 ac Runoff Depth=2.26"
Flow Length=1,558' Tc=5.4 min CN=91 Runoff=79.43 cfs 3.901 af

Link 1L: Point of Analysis - P1 Inflow=19.73 cfs 1.838 af
Primary=19.73 cfs 1.838 af

Total Runoff Area = 54.070 ac Runoff Volume = 8.396 af Average Runoff Depth = 1.85"
60.44% Pervious Area = 32.680 ac 39.56% Impervious Area = 21.390 ac

Existing Conditions Model_05-26-10 *Type II 24-hr 10-yr Rainfall=5.20"*
Prepared by Wendel Duchscherer Page 3
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Time span=1.00-40.00 hrs, dt=0.05 hrs, 781 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Onsite (West of Long Branch) Runoff Area=14.510 ac Runoff Depth=2.79"
Flow Length=1,350' Tc=21.7 min CN=77 Runoff=42.78 cfs 3.375 af

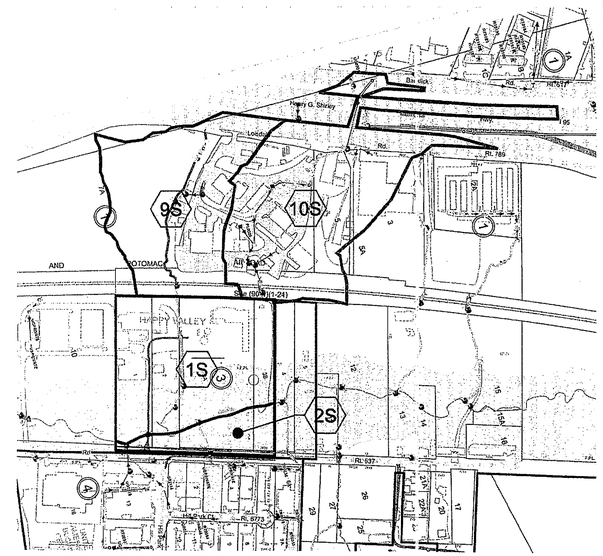
Subcatchment 2S: Onsite + Road (East of Long Branch) Runoff Area=3.510 ac Runoff Depth=2.88"
Flow Length=970' Tc=43.1 min CN=78 Runoff=6.85 cfs 0.843 af

Subcatchment 9S: Offsite Area (Soutwest) Runoff Area=15.320 ac Runoff Depth=3.96"
Flow Length=900' Tc=25.6 min CN=89 Runoff=56.77 cfs 5.060 af

Subcatchment 10S: Offsite Area B (Northwest) Runoff Area=20.730 ac Runoff Depth=4.18"
Flow Length=1,558' Tc=5.4 min CN=91 Runoff=141.45 cfs 7.215 af

Link 1L: Point of Analysis - P1 Inflow=46.97 cfs 4.218 af
Primary=46.97 cfs 4.218 af

Total Runoff Area = 54.070 ac Runoff Volume = 16.493 af Average Runoff Depth = 3.66"
60.44% Pervious Area = 32.680 ac 39.56% Impervious Area = 21.390 ac



EXISTING DRAINAGE AREA MAP 0 200' 400' 800' 1"=400'

Proposed Conditions Model IV_05-26-10 *Type II 24-hr 2-yr Rainfall=3.20"*
Prepared by Wendel Duchscherer Page 3
HydroCAD® 8.00 s/n 000557 © 2006 HydroCAD Software Solutions LLC 5/27/2010

Time span=1.00-40.00 hrs, dt=0.05 hrs, 781 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Onsite (Southwest_Bus Parking) Runoff Area=4.440 ac Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=20.30 cfs 1.098 af

Subcatchment 2S: Onsite (West, Roof) Runoff Area=1.970 ac Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=9.01 cfs 0.487 af

Subcatchment 3S: Onsite (Northwest_Employee Parking) Runoff Area=2.310 ac Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=10.56 cfs 0.571 af

Subcatchment 4S: Onsite (Access Road) Runoff Area=0.630 ac Runoff Depth=2.97"
Tc=5.0 min CN=98 Runoff=2.88 cfs 0.156 af

Subcatchment 5S: Onsite (Northwest _RPA Area) Runoff Area=0.720 ac Runoff Depth=1.21"
Flow Length=250' Tc=15.0 min CN=77 Runoff=1.10 cfs 0.073 af

Subcatchment 6S: Onsite (Northeast_RPA Area) Runoff Area=0.600 ac Runoff Depth=1.40"
Flow Length=285' Tc=22.5 min CN=80 Runoff=0.86 cfs 0.070 af

Subcatchment 7S: Onsite (Southwest_RPA Area) Runoff Area=4.910 ac Runoff Depth=1.21"
Flow Length=700' Tc=23.0 min CN=77 Runoff=5.89 cfs 0.496 af

Subcatchment 8S: Onsite (Southeast_RPA) Runoff Area=2.440 ac Runoff Depth=1.40"
Flow Length=600' Tc=28.1 min CN=80 Runoff=3.03 cfs 0.285 af

Reach 1R: Proposed Channel Avg. Depth=0.35' Max Vel=1.55 fps Inflow=3.28 cfs 1.580 af
n=0.030 L=320.0' S=0.0050 '/' Capacity=213.78 cfs Outflow=3.27 cfs 1.580 af

Reach 2R: Long Branch Avg. Depth=0.30' Max Vel=1.44 fps Inflow=5.40 cfs 0.870 af
n=0.040 L=600.0' S=0.0083 '/' Capacity=303.50 cfs Outflow=4.72 cfs 0.870 af

Pond 1P: Vault 1 Peak Elev=101.33' Storage=0.535 af Inflow=20.30 cfs 1.098 af
Outflow=1.66 cfs 1.093 af

Pond 2P: Vault 2 Peak Elev=106.27' Storage=0.180 af Inflow=9.01 cfs 0.487 af
Outflow=1.64 cfs 0.487 af

Pond 3P: Vault 3 Peak Elev=111.53' Storage=0.219 af Inflow=10.56 cfs 0.571 af
Outflow=1.72 cfs 0.571 af

Link 1L: Point of Analysis - P1 Inflow=16.72 cfs 3.231 af
Primary=16.72 cfs 3.231 af

Total Runoff Area = 18.020 ac Runoff Volume = 3.236 af Average Runoff Depth = 2.15"
45.56% Pervious Area = 8.210 ac 54.44% Impervious Area = 9.810 ac

Proposed Conditions Model IV_05-26-10 *Type II 24-hr 10-yr Rainfall=5.20"*
Prepared by Wendel Duchscherer Page 4
HydroCAD® 8.00 s/n 000557 © 2006 HydroCAD Software Solutions LLC 5/27/2010

Time span=1.00-40.00 hrs, dt=0.05 hrs, 781 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Onsite (Southwest_Bus Parking) Runoff Area=4.440 ac Runoff Depth>4.96"
Tc=5.0 min CN=98 Runoff=33.23 cfs 1.836 af

Subcatchment 2S: Onsite (West, Roof) Runoff Area=1.970 ac Runoff Depth>4.96"
Tc=5.0 min CN=98 Runoff=14.74 cfs 0.815 af

Subcatchment 3S: Onsite (Northwest_Employee Parking) Runoff Area=2.310 ac Runoff Depth>4.96"
Tc=5.0 min CN=98 Runoff=17.29 cfs 0.955 af

Subcatchment 4S: Onsite (Access Road) Runoff Area=0.630 ac Runoff Depth>4.96"
Tc=5.0 min CN=98 Runoff=4.71 cfs 0.261 af

Subcatchment 5S: Onsite (Northwest _RPA Area) Runoff Area=0.720 ac Runoff Depth=2.79"
Flow Length=250' Tc=15.0 min CN=77 Runoff=2.58 cfs 0.167 af

Subcatchment 6S: Onsite (Northeast_RPA Area) Runoff Area=0.600 ac Runoff Depth=3.07"
Flow Length=285' Tc=22.5 min CN=80 Runoff=1.91 cfs 0.153 af

Subcatchment 7S: Onsite (Southwest_RPA Area) Runoff Area=4.910 ac Runoff Depth=2.79"
Flow Length=700' Tc=23.0 min CN=77 Runoff=13.99 cfs 1.142 af

Subcatchment 8S: Onsite (Southeast_RPA) Runoff Area=2.440 ac Runoff Depth=3.07"
Flow Length=600' Tc=28.1 min CN=80 Runoff=6.77 cfs 0.624 af

Reach 1R: Proposed Channel Avg. Depth=0.59' Max Vel=2.08 fps Inflow=8.35 cfs 2.646 af
n=0.030 L=320.0' S=0.0050 '/' Capacity=213.78 cfs Outflow=8.29 cfs 2.646 af

Reach 2R: Long Branch Avg. Depth=0.48' Max Vel=1.90 fps Inflow=11.21 cfs 1.537 af
n=0.040 L=600.0' S=0.0083 '/' Capacity=303.50 cfs Outflow=10.29 cfs 1.537 af

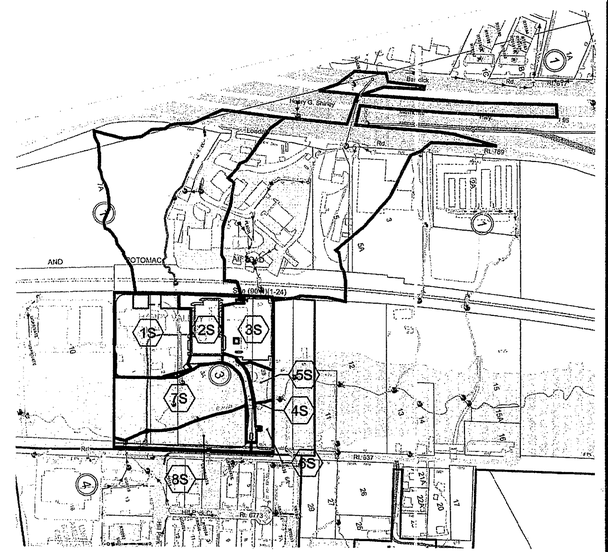
Pond 1P: Vault 1 Peak Elev=103.29' Storage=0.851 af Inflow=33.23 cfs 1.836 af
Outflow=4.22 cfs 1.831 af

Pond 2P: Vault 2 Peak Elev=108.16' Storage=0.284 af Inflow=14.74 cfs 0.815 af
Outflow=4.17 cfs 0.815 af

Pond 3P: Vault 3 Peak Elev=113.58' Storage=0.346 af Inflow=17.29 cfs 0.955 af
Outflow=5.00 cfs 0.955 af

Link 1L: Point of Analysis - P1 Inflow=39.06 cfs 5.948 af
Primary=39.06 cfs 5.948 af

Total Runoff Area = 18.020 ac Runoff Volume = 5.953 af Average Runoff Depth = 3.96"
45.56% Pervious Area = 8.210 ac 54.44% Impervious Area = 9.810 ac



PROPOSED DRAINAGE AREA MAP 0 200' 400' 800' 1"=400'

Application No. SE 2010-LE-017 Staff S.W.

APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011

Sheet 16 of 27

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DESIGNED	WD-AE	01/22/10 DATE
DRAWN	CC1	05/20/10 DATE
CHECKED	TJZ	06/01/10 DATE
APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA DAVID C. DUCHSCHERER Lic. No. 15029 PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

metro

CONTRACT NO. 439601

CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

STORMWATER MANAGEMENT NARRATIVE

SCALE: AS SHOWN | DRAWING NO. 16 OF 27 | C-210

Outfall Analysis

THE EXTENT OF ANALYSIS FOR THE FOUR OUTFALLS FROM THE SITE IS THE POINT AT WHICH THEY OUTLET TO THE LONG BRANCH CHANNEL.

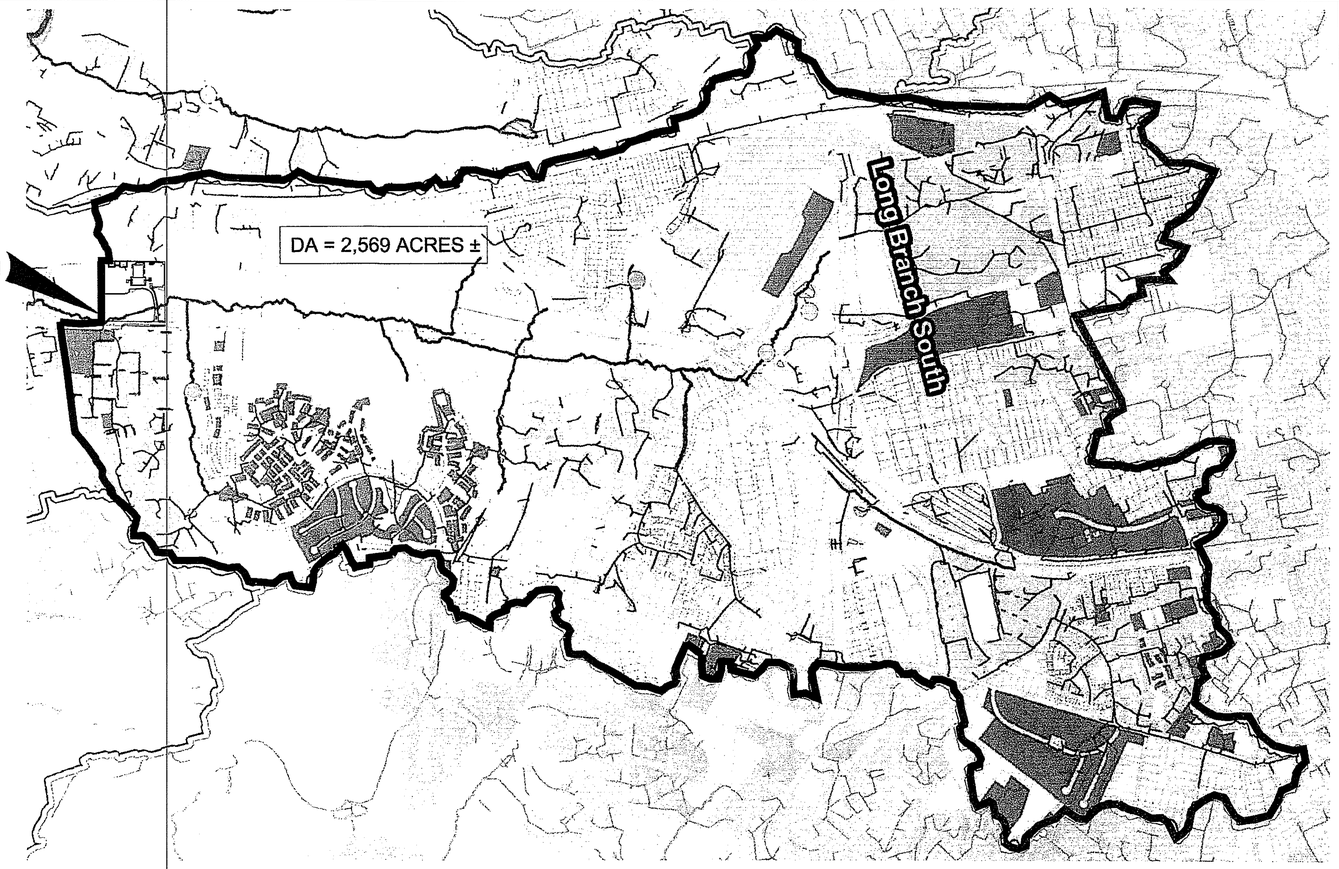
OUTFALL 1:
APPROXIMATELY 15.32 ACRES OF OFFSITE DRAINAGE AREA COMBINES WITH 6.41 ACRES OF ONSITE DRAINAGE AREA FOR A TOTAL OF 21.73 ACRES. THIS 21.73 ACRES WILL OUTLET TO THE LONG BRANCH FLOODPLAIN THROUGH A 36-INCH RCP PIPE WHICH HAS ADEQUATE CAPACITY TO CONVEY THE PROPOSED FLOW (SEE D-1 TO OUTFALL #1 IN DRAINAGE TABLE). AT THE FLOODPLAIN, THE TOTAL DRAINAGE AREA (2,569 AC) IS GREATER THAN 100 TIMES THE CONTRIBUTING SITE AREA (21.73 AC). A GRASSED CHANNEL WILL CONVEY RUNOFF FROM THIS POINT TO THE LONG BRANCH CHANNEL. 10-YEAR FLOWS DO NOT OVERTOP THE PROPOSED CHANNEL BANK AND THE 2-YEAR VELOCITY REMAINS BELOW 6 FPS.

OUTFALL 2:
APPROXIMATELY 20.73 ACRES OF OFFSITE DRAINAGE AREA COMBINES WITH 2.31 ACRES OF ONSITE DRAINAGE AREA FOR A TOTAL OF 23.04 ACRES. THIS 23.04 ACRES WILL OUTLET TO THE LONG BRANCH FLOODPLAIN THROUGH A 48-INCH RCP PIPE WHICH HAS ADEQUATE CAPACITY TO CONVEY THE PROPOSED FLOW (SEE D-23 TO OUTFALL #2 IN DRAINAGE TABLE). AT THE FLOODPLAIN, THE TOTAL DRAINAGE AREA (2,569 AC) IS GREATER THAN 100 TIMES THE CONTRIBUTING SITE AREA (23.04 AC). A GRASSED CHANNEL WILL CONVEY RUNOFF FROM THIS POINT TO THE LONG BRANCH CHANNEL. 10-YEAR FLOWS DO NOT OVERTOP THE PROPOSED CHANNEL BANK AND THE 2-YEAR VELOCIY REMAINS BELOW 6 FPS.

OUTLET 3:
APPROXIMATELY 0.28 ACRES FROM THE NEW SITE ACCESS ROAD DRAINS TO OUTFALL 3. THE PIPE HAS ADEQUATE CAPACITY TO CONVEY THE PROPOSED FLOW (SEE D-33 TO OUTFALL #3 IN DRAINAGE TABLE) AND OUTLETS DIRECTLY INTO THE LONG BRANCH CHANNEL. AT THE OUTLET, THE TOTAL DRAINAGE AREA (2,569 AC) IS GREATER THAN 100 TIMES THE CONTRIBUTING SITE AREA (0.28 AC).

OUTFALL 4:
APPROXIMATELY 0.33 ACRES FROM THE NEW SITE ACCESS ROAD AND GUARD HOUSE AREA DRAINS TO OUTFALL 4. THE PIPE HAS ADEQUATE CAPACITY TO CONVEY THE PROPOSED FLOW (SEE D-30 TO OUTFALL #4 IN DRAINAGE TABLE) AND OUTLETS DIRECTLY INTO THE LONG BRANCH CHANNEL. AT THE OUTLET, THE TOTAL DRAINAGE AREA (2,569 AC) IS GREATER THAN 100 TIMES THE CONTRIBUTING SITE AREA (0.33 AC).

BASED ON THE DESIGN OF THE GRASSED CHANNELS OUTLETTING DIRECTLY TO THE LONG BRANCH CHANNEL, OUTFALLS 1 AND 2 WILL BE ADEQUATE. BASED ON THE DESIGN OF THE PROPOSED PIPES OUTLETTING DIRECTLY TO THE LONG BRANCH CHANNEL, OUTFALLS 3 AND 4 WILL BE ADEQUATE.



DRAINAGE AREA MAP

0 500' 1000' 2000'
1"=1000'

Channel to Outfall 1, 2-yr

Trapezoidal		Highlighted	
Bottom Width (ft)	= 3.00	Depth (ft)	= 1.45
Side Slopes (z:1)	= 3.00, 3.00	Q (cfs)	= 33.71
Total Depth (ft)	= 3.00	Area (sqft)	= 10.66
Invert Elev (ft)	= 94.00	Velocity (ft/s)	= 3.16
Slope (%)	= 0.50	Wetted Perim (ft)	= 12.17
N-Value	= 0.030	Crit Depth, Yc (ft)	= 1.11
		Top Width (ft)	= 11.70
		EGL (ft)	= 1.61

Calculations
Compute by: Known Q
Known Q (cfs) = 33.71

Channel to Outfall 2, 2-yr

Trapezoidal		Highlighted	
Bottom Width (ft)	= 8.00	Depth (ft)	= 1.10
Side Slopes (z:1)	= 4.00, 4.00	Q (cfs)	= 81.15
Total Depth (ft)	= 2.00	Area (sqft)	= 13.64
Invert Elev (ft)	= 103.58	Velocity (ft/s)	= 5.95
Slope (%)	= 2.00	Wetted Perim (ft)	= 17.07
N-Value	= 0.030	Crit Depth, Yc (ft)	= 1.20
		Top Width (ft)	= 16.80
		EGL (ft)	= 1.65

Calculations
Compute by: Known Q
Known Q (cfs) = 81.15

Channel to Outfall 1, 10-yr

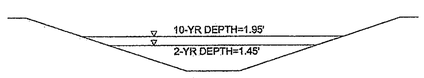
Trapezoidal		Highlighted	
Bottom Width (ft)	= 3.00	Depth (ft)	= 1.95
Side Slopes (z:1)	= 3.00, 3.00	Q (cfs)	= 65.17
Total Depth (ft)	= 3.00	Area (sqft)	= 17.26
Invert Elev (ft)	= 94.00	Velocity (ft/s)	= 3.78
Slope (%)	= 0.50	Wetted Perim (ft)	= 15.33
N-Value	= 0.030	Crit Depth, Yc (ft)	= 1.55
		Top Width (ft)	= 14.70
		EGL (ft)	= 2.17

Calculations
Compute by: Known Q
Known Q (cfs) = 65.17

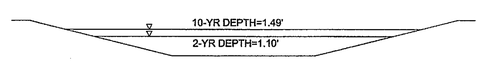
Channel to Outfall 2, 10-yr

Trapezoidal		Highlighted	
Bottom Width (ft)	= 8.00	Depth (ft)	= 1.49
Side Slopes (z:1)	= 4.00, 4.00	Q (cfs)	= 146.45
Total Depth (ft)	= 2.00	Area (sqft)	= 20.80
Invert Elev (ft)	= 103.58	Velocity (ft/s)	= 7.04
Slope (%)	= 2.00	Wetted Perim (ft)	= 20.29
N-Value	= 0.030	Crit Depth, Yc (ft)	= 1.66
		Top Width (ft)	= 19.92
		EGL (ft)	= 2.26

Calculations
Compute by: Known Q
Known Q (cfs) = 146.45



OUTFALL 1



OUTFALL 2

Application No. SE 2010-LE-017 Staff S.W.
APPROVED (SE) SP PLAN
SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011
Sheet 17 of 27

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CONTRACT NO. 439601

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APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Lic. No. 16029
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
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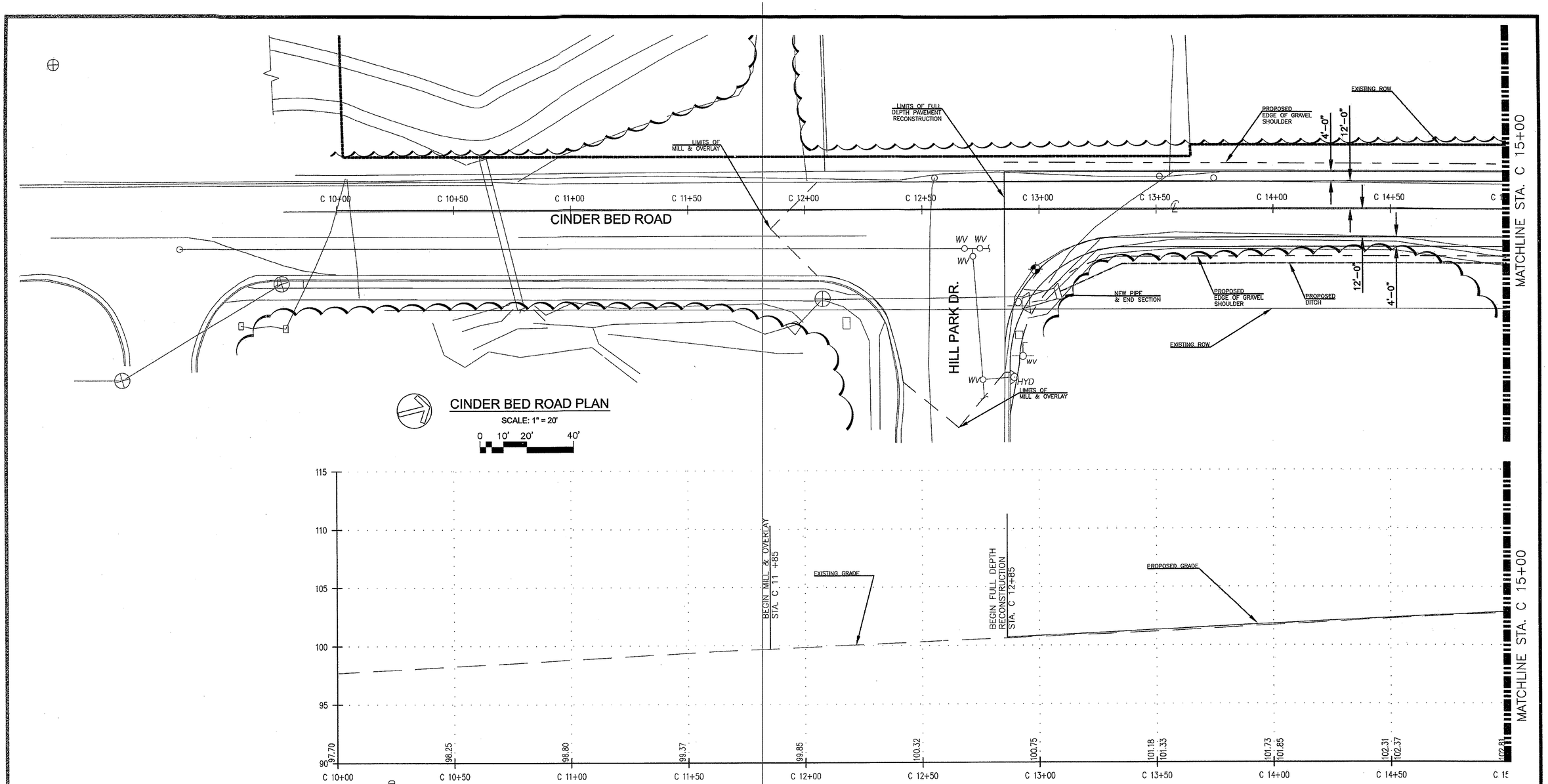
CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

PRELIMINARY OUTFALL ANALYSIS

SCALE: AS SHOWN
DRAWING NO. 17 OF 27
C-211

PLOT DATE: Jul 13, 2010 04:45 PM USER: rzh
FILE NAME: E:\15604 Cinder Bed Road Center\Civil\Concept\C-211.dwg



CINDER BED ROAD PROFILE

0 10' 20' 40'

Application No. SE 2010-LE-017 Staff S.W.

APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011

Date of (BOS) (BZA) approval March 8, 2011

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APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
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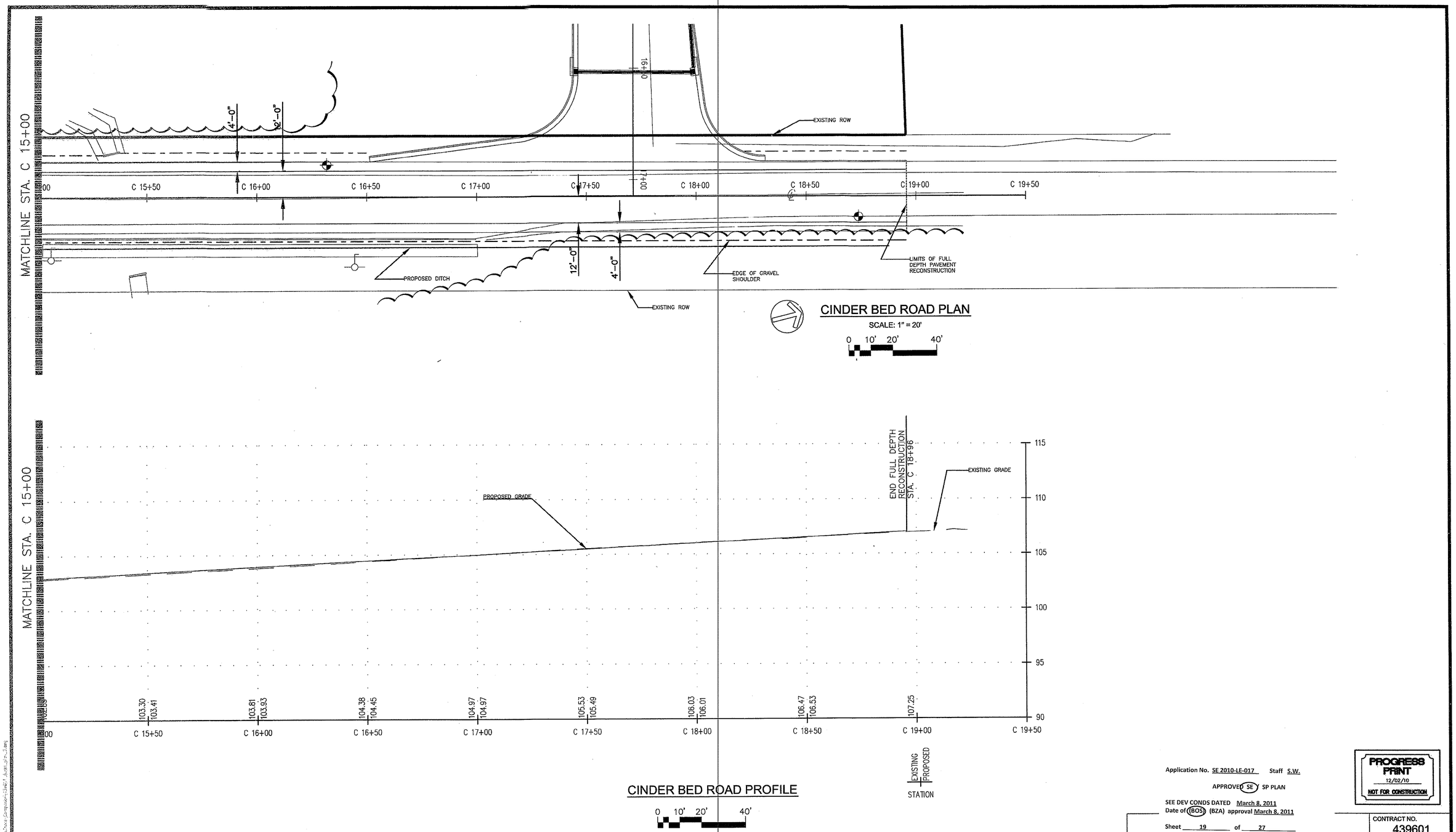
CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA
ROAD PROFILE

SCALE: AS SHOWN

DRAWING NO. 18 OF 27

T-300



Application No. SE 2010-LE-017 Staff S.W.

APPROVED SE SP PLAN

SEE DEV CONDS DATED March 8, 2011

Date of (BOS) (BZA) approval March 8, 2011

Sheet 19 of 27

PROGRESS PRINT 12/02/10 NOT FOR CONSTRUCTION

CONTRACT NO. 439601

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REFERENCE DRAWINGS

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DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

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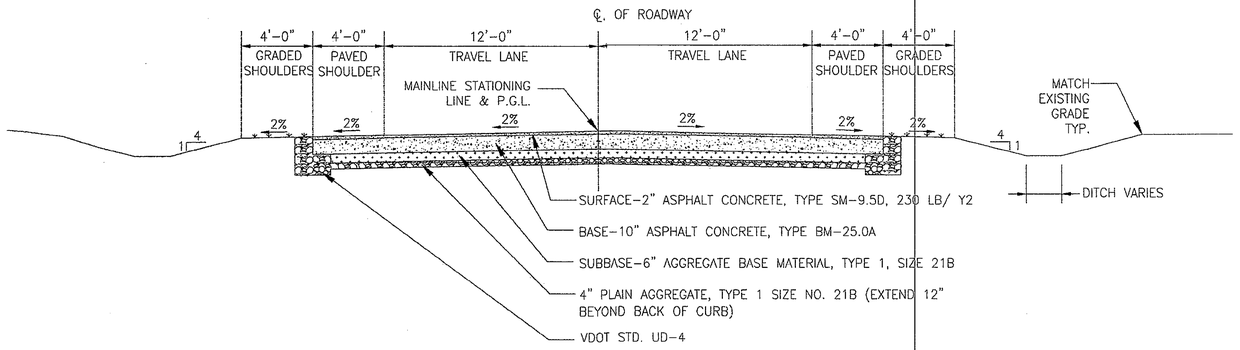
CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA
ROAD PROFILE

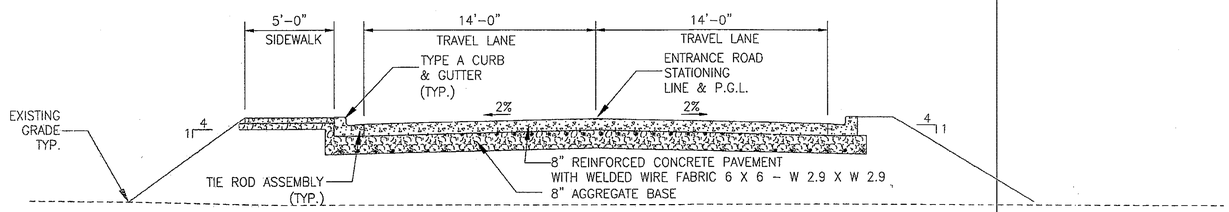
SCALE: AS SHOWN

DRAWING NO. 19 OF 27

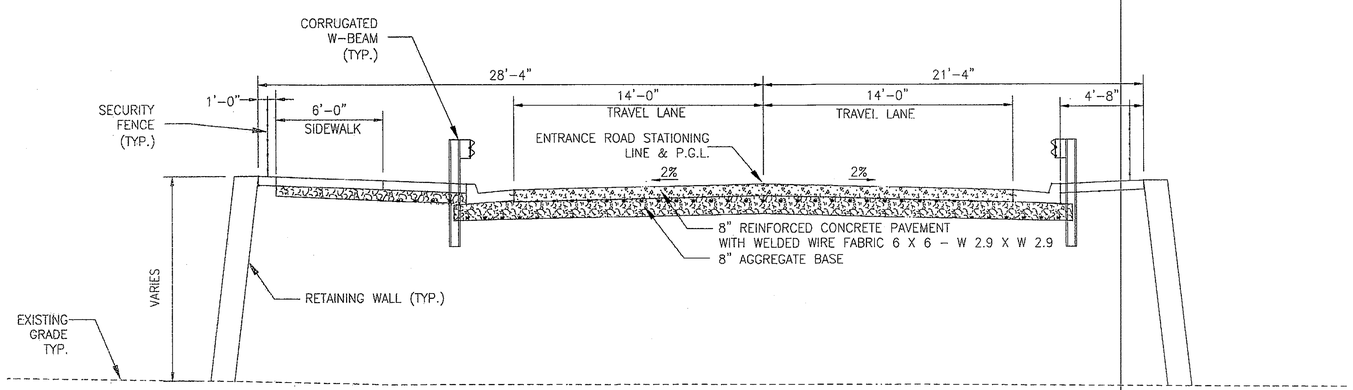
T-301



CINDERBED ROAD
TYPICAL SECTION
FULL DEPTH CONSTRUCTION
LOOKING NORTH



TYPICAL PAVEMENT - SECTION A
ENTRANCE ROADWAYS IN FILL AREA
LOOKING WEST



TYPICAL PAVEMENT - SECTION
ENTRANCE ROADWAYS WITH RETAINING WALL
LOOKING WEST

Application No. SE 2010-LE-017 Staff S.W.

APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011
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CONTRACT NO.
439601

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APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
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PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA
PRELIMINARY CROSS SECTIONS

SCALE: AS SHOWN

DRAWING NO. 20 OF 27

T-302

PRINT DATE: Jul 13, 2010 09:35 AM USER: RJF
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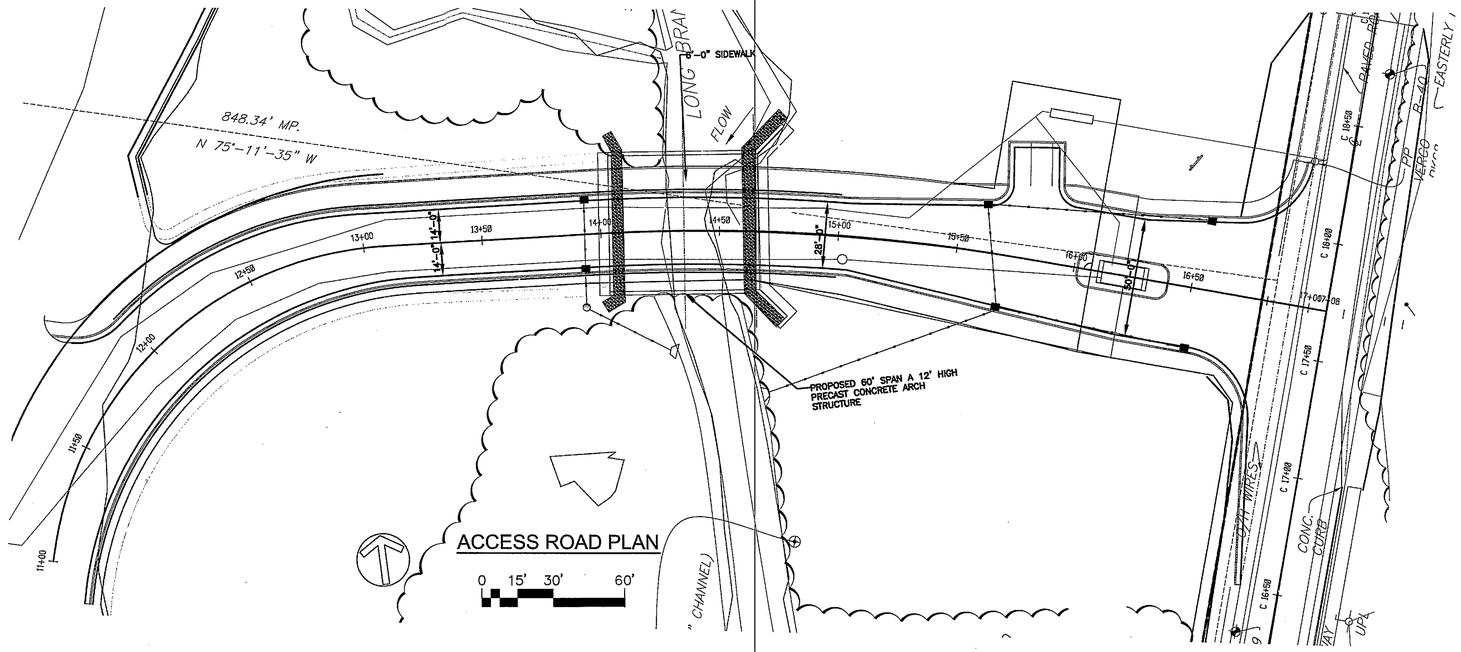

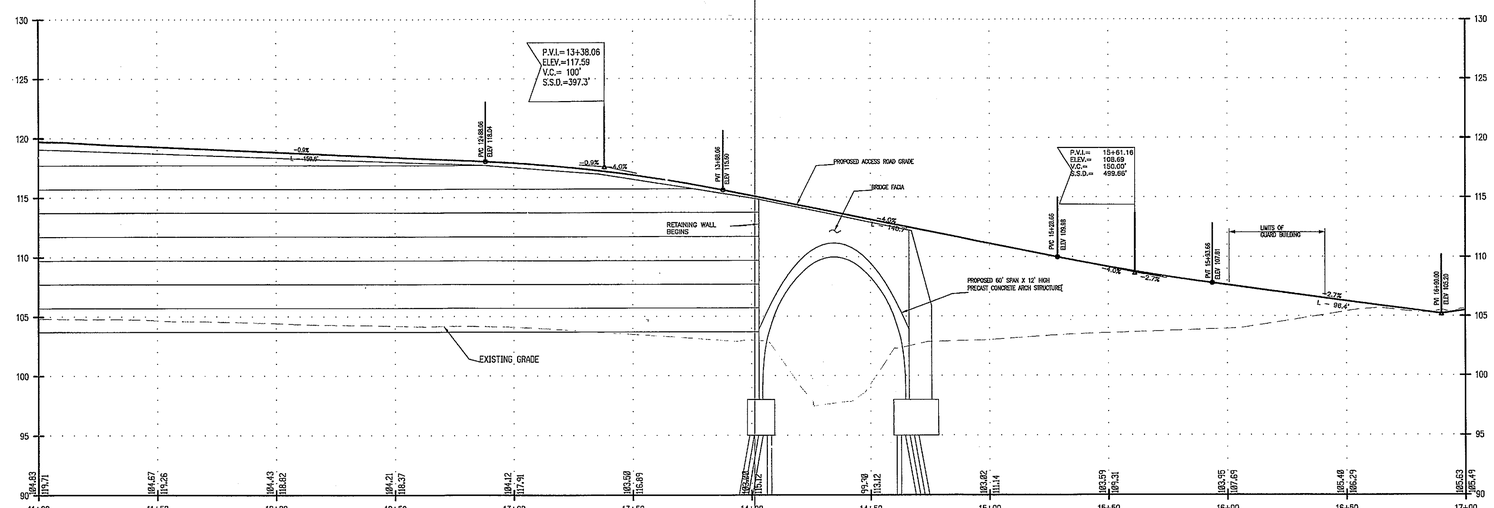

ACCESS ROAD PROFILE

0 15' 30' 60'

Application No. SE 2010-LE-017 Staff S.W.

APPROVED SE SP PLAN

SEE DEV CONDS DATED March 8, 2011

Date of BOS (BZA) approval March 8, 2011

Sheet 21 of 27

PROGRESS PRINT 12/01/10 NOT FOR CONSTRUCTION

CONTRACT NO. 439601

DESIGNED	WD-AE	01/22/10 DATE
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APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

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DATE	BY	DESCRIPTION
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COMMONWEALTH OF VIRGINIA DAVID C. DUCHSCHERER L.C. No. 19020 PROFESSIONAL ENGINEER

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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA
ACCESS ROAD PROFILE

SCALE: AS SHOWN

DRAWING NO. 21 OF 27

T-303

PRINT DATE: Dec 3, 2010 09:53 AM USER: RJF
FILE NAME: E:\439601 Cinder Bed Road\Dwg\Trans\Composite\439601_Access_Road_plan_1.dwg

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EXISTING VEGETATION MAP INFORMATION

LEGEND	COVER TYPE	PRIMARY SPECIES	SUCCESSIONAL STAGE	CONDITION	ACREAGE	COMMENTS
	OPEN FIELD	NO TREES PRESENT	EARLY SUCCESSIONAL	POOR	519,040 SF 11.92 AC	LOW GRASSES & WEEDS MIXED WITH GRAVEL AND CONSTRUCTION DEBRIS FROM PREVIOUS USES.
	UPLAND FOREST COMMUNITY	OAK, HICKORY, ASH, MAPLE, & YELLOW POPLAR.	CLIMAX FOREST COMMUNITY	FAIR TO GOOD	237,597 SF 5.45 AC	MATURE FOREST COMMUNITY WITHIN RPA ZONE.

TOTAL: 756,637 SF (17.37 AC)

Application No. SE 2010-LE-017 Staff S.W.

APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011

Sheet 22 of 27

CONTRACT NO. 439601

DESIGNED	WD-AE	01/22/10 DATE
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CHECKED	RJF	06/01/10 DATE
APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

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12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
No. 4000
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER
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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

EXISTING VEGETATION MAP

SCALE: AS SHOWN

DRAWING NO. 22 OF 27

L-400

PRINT DATE: Jul 13, 2010 12:17 PM USER: RJF
FILE NAME: G:\439601 Cinder Bed Road\Dwg\LA\Composite\Special Exception\SIM.dwg

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12/01/10
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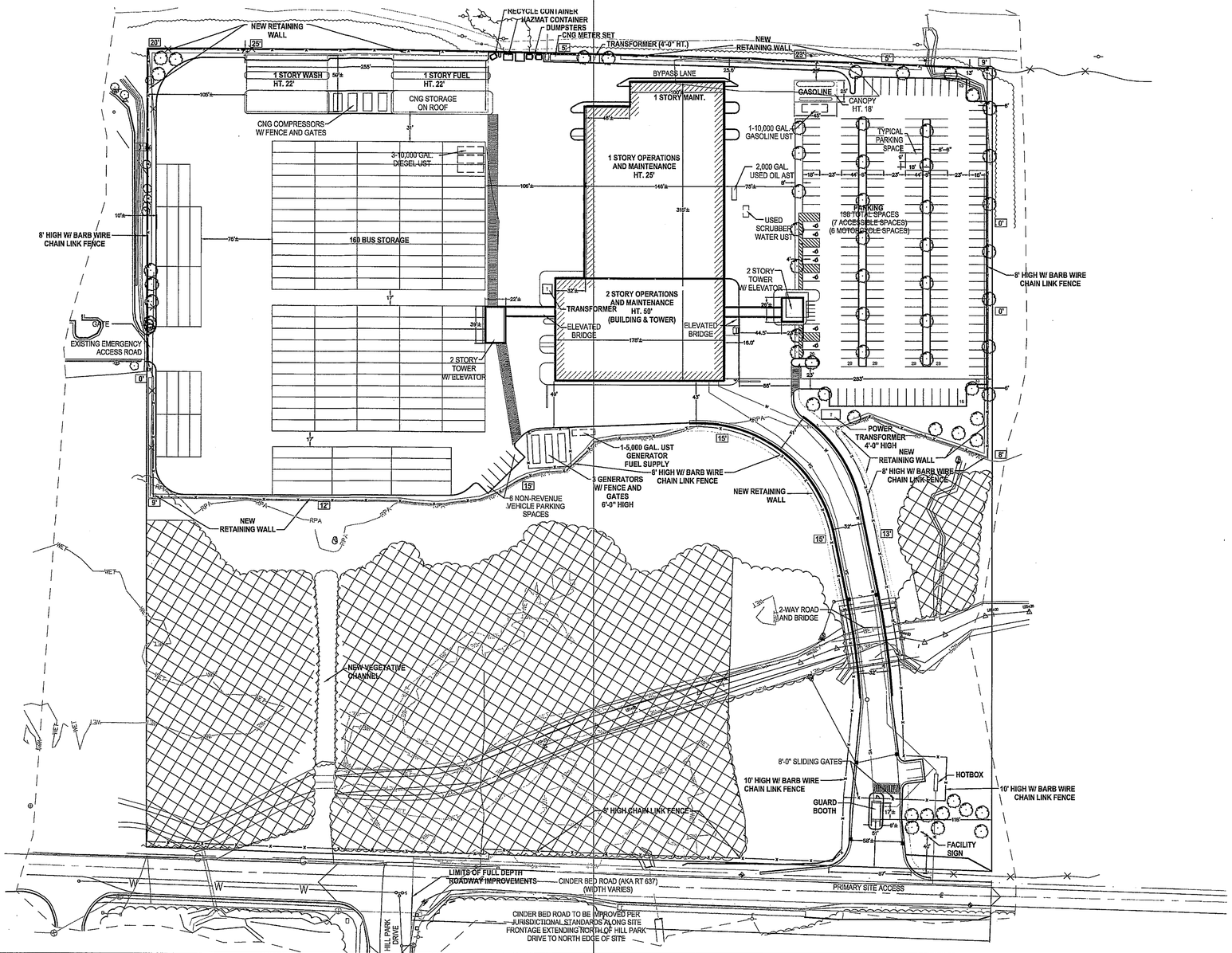

Application No. SE 2010-LE-017 Staff S.W.

APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011

Sheet 23 of 27

0 30' 60' 120'

LEGEND

- EXISTING TREE MASSES
- EXISTING TREES TO BE SAVED AND COUNTED TOWARDS CANOPY COVERAGE REQUIREMENTS. SEE TABLES 12.12 & 12.3, TREE PRESERVATION CALCULATIONS SHEET (L-500).
- PROPOSED CHANNEL REVEGETATION
- PROPOSED CANOPY TREES CATEGORY IV
- PROPOSED INTERIOR PARKING LOT TREES CATEGORY IV

TREE COVER CALCS.

TOTAL SITE AREA	756,637 SF
ADJUSTED SITE AREA PERCENTAGE REQUIRED	10%
TREE COVER REQUIRED	75,663 SF
TREE CANOPY PROVIDED (PRESERVATION)	198,683 SF

13-202 INTERIOR PARKING LOT CALCS.

TOTAL PARKING AREA	N/A
PERCENT REQUIRED	N/A
REQUIRED	N/A

NOTE: REQUEST DIRECTOR'S WAIVER, DUE TO SPECIAL EXCEPTION CATEGORY #4 AND #6. THE AREA IS SCREENED FROM NEIGHBORING USES BY THE RPA, TOPOGRAPHY, RETAINING WALLS & LANDSCAPING.

13-203 PERIPHERAL PARKING LOT LANDSCAPING

NOTE: 4' OF PLANTINGS WILL BE PROVIDED TO TRANSITION FROM PARKING TO THE PROPERTY LINE.

13-300 TRANSITIONAL SCREENING & BARRIERS

ADJACENT TO I-5 & I-6 DISTRICTS. BARRIERS D, E OR F MAY BE REQUIRED. REQUIREMENT IS MET WITH THE USE OF FENCING ALONG THE PERIMETER OF THE PROPERTY.

DESIGNED	WD-AE	01/22/10 DATE
DRAWN	CML	05/18/10 DATE
CHECKED	RJF	06/01/10 DATE
APPROVED	DCD	07/15/10 DATE

REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
10/06/10	RJF	1 TREE PRESERVATION AREA
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Lic. No. 19025
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
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CONTRACT NO. 439601

CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

CONCEPTUAL LANDSCAPE PLAN

SCALE: AS SHOWN

DRAWING NO. 23 OF 27

L-401

PRINT DATE: Dec 2, 2010 02:39 PM USER: TZ
FILE NAME: F:\439601_Cinder Bed Road\Dwg\LA\Composite\Special Exception\CLP.dwg

TABLE 12.12 10-YEAR CANOPY CALCULATION WORKSHEET

STEP	DESCRIPTION	TOTALS	REFERENCE
A. TREE PRESERVATION TARGET AND STATEMENT			
A1	PLACE THE TREE PRESERVATION TARGET CALCULATIONS AND STATEMENT HERE PRECEDING THE 10-YEAR TREE CANOPY CALCULATIONS	SEE TABLE 12.3	SEE 12-0507.2 FOR LIST OF REQUIRED ELEMENTS AND WORKSHEET
B. TREE CANOPY REQUIREMENT			
B1	IDENTIFY GROSS SITE AREA =	756,637 SF	12-0510.1A
B2	SUBTRACT AREA DEDICATED TO PARKS, ROAD FRONTAGE AND =		12-0510.1B
B3	SUBTRACT AREA OF EXEMPTIONS =		12-0510.1C(6) THROUGH 12-0510.1C(6)
B4	ADJUSTED GROSS SITE AREA (B1-B2) =	756,637 SF	
B5	IDENTIFY SITE'S ZONING AND/ OR USE =	I-6 & R-1	
B6	PERCENTAGE OF 10-YEAR TREE CANOPY REQUIRED =	10%	12-509.1 AND TABLE 12.4
B7	AREA OF 10-YEAR TREE CANOPY REQUIRED (B4 x B5) =	75,663 SF	
B8	MODIFICATION OF 10-YEAR TREE CANOPY REQUESTED?	NO	YES OR NO
B9	IF B8 IS YES, THEN LIST PLAN SHEET WHERE MODIFICATION REQUEST IS LOCATED	N/A	SHEET NUMBER
C. TREE PRESERVATION			
C1	TREE PRESERVATION TARGET AREA =	23,456 SF	SEE TABLE 12.3 THIS SHEET
C2	TOTAL CANOPY AREA MEETING STANDARDS OF 12-0200 =	148,352 SF	
C3	C2 x 1.25 = NO MULTIPLIER TAKEN	198,683 SF	12-0509.3B
C4	TOTAL CANOPY AREA PROVIDED BY UNIQUE OR WOODLAND COMMUNITIES =		
C5	C4 x 1.5 =		12-0509.3B(1)
C6	TOTAL OF CANOPY AREA PROVIDED BY "HERITAGE," "MEMORIAL," OR "STREET" TREES =		
C7	C6 x 1.5 TO 3.0 =		12-0509.3B(2)
C8	CANOPY AREA OF TREES WITHIN RESOURCE PROTECTION AREAS AND 100-YEAR FLOODPLAINS =	198,683 SF	
C9	C8 x 10=	198,683 SF	12-0509.3C(1)
C10	TOTAL OF C3, C5, C7 AND C9 =	198,683 SF	IF AREA OF C10 IS LESS THAN REMAINDER OF REQUIREMENT MUST BE MET THROUGH TREE PLANTING – GO TO D

STEP	DESCRIPTION	TOTALS	REFERENCE
D. TREE PLANTING			
D1	AREA OF CANOPY TO BE MET THROUGH TREE PLANTING (B7-C10) =		
D2	AREA OF CANOPY PLANTED FOR AIR QUALITY BENEFITS =		
D3	x 1.5 =		12-0509.4B(1)
D4	AREA OF CANOPY PLANTED FOR ENERGY CONSERVATION =		
D5	x 1.5 =		12-0509.4B(2)
D6	AREA OF CANOPY PLANTED FOR WATER QUALITY BENEFITS =		
D7	x 1.25 =		12-0509.4B(3)
D8	AREA OF CANOPY PLANTED FOR WILDLIFE BENEFITS =		
D9	x 1.5 =		12-0509.4B(4)
D10	AREA OF CANOPY PROVIDED BY NATIVE TREES =		
D11	x 1.5 =		12-0509.4B(5)
D12	AREA OF CANOPY PROVIDED BY IMPROVED CULTIVARS AND VARIETIES =		
D13	x 1.25 =		12-0509.4B(6)
D14	AREA OF CANOPY PROVIDED THROUGH TREE SEEDLINGS =		12-0509.4D(1)
	x 1.0 =		
D15	AREA OF CANOPY PROVIDED THROUGH NATIVE SHRUBS OR WOODY SEED MIX		12-0509.4D (1)(a)
	x 1.0 =		12-0509.4D (1)(a)
D16	PERCENTAGE OF D14 REPRESENTED BY D15 =		MUST NOT EXCEED 33% OF D14
D17	TOTAL OF CANOPY AREA PROVIDED THROUGH TREE PLANTING =		
D18	IS AN OFFSITE PLANTING RELIEF REQUEST?	NO	YES OR NO
D19	TREE BANK OR TREE FUND?	NO	12-0511
D20	CANOPY AREA REQUESTED TO BE PROVIDED THROUGH OFFSITE BANKING OR TREE FUND		
D21	AMOUNT TO BE DEPOSITED INTO THE TREE PRESERVATION AND PLANTING FUND		
E. TOTAL OF 10-YEAR TREE CANOPY PROVIDED			
E1	TOTAL OF CANOPY AREA PROVIDED THROUGH TREE PRESERVATION (C10) =	198,683 SF	
E2	TOTAL OF CANOPY AREA PROVIDED THROUGH TREE PLANTING (D17) =		
E3	TOTAL OF CANOPY AREA PROVIDED THROUGH OFFSITE MECHANISM (D19) =		
E4	TOTAL OF 10-YEAR TREE CANOPY PROVIDED =	198,683 SF	TOTAL OF E1 THROUGH E3. AREA SHOULD MEET OR EXCEED ARE IN B6.

TABLE 12.3 TREE PRESERVATION TARGET CALCULATIONS AND STATEMENT

A.	PRE-DEVELOPMENT AREA OF EXISTING TREE CANOPY (FROM EXISTING VEGETATION MAP)	198,683 SF 4.56 AC	
B.	PERCENTAGE OF GROSS SITE AREA COVERED BY EXISTING TREE CANOPY	26%	
C.	PERCENTAGE OF THE 10-YEAR TREE CANOPY REQUIRED FOR SITE (GROSS SITE AREA: 756,637 SF)	10% 75,663 SF	
D.	PERCENTAGE OF THE 10-YEAR TREE CANOPY REQUIREMENT THAT SHOULD BE MET THROUGH TREE PRESERVATION	26% 19,672 SF	
E.	PROPOSED PERCENTAGE OF CANOPY REQUIREMENT THAT WILL BE MET THROUGH TREE PRESERVATION	100%	
F.	HAS THE TREE PRESERVATION TARGET BEEN MET?	YES	
G.	DEVIATION REQUEST? DESCRIPTION	N/A	

TOTAL SITE AREA	756,637 SF
R.O.W DEDICATION	- N/A
ADJUSTED SITE AREA	756,637 SF

Application No. SE 2010-LE-017 Staff S.W.

APPROVED (SE) SP PLAN

SEE DEV CONDS DATED March 8, 2011

Date of (BOS) (BZA) approval March 8, 2011

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CONTRACT NO. 439601

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REFERENCE DRAWINGS

NUMBER	DESCRIPTION

REVISIONS

DATE	BY	DESCRIPTION
10/06/10	RJF	1 TREE PRESERVATION AREA
12/03/10	RJF	RESUBMITTAL FOR SPECIAL EXCEPTION

COMMONWEALTH OF VIRGINIA DAVID C. DUCHSCHERER Lic. No. 19029 PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

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TREE PRESERVATION CALCULATIONS

SCALE: AS SHOWN

DRAWING NO. 24 OF 27

L-500

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TREE PROTECTION DURING CONSTRUCTION

A. CRITICAL ROOT ZONE

TREE PRESERVATION AREAS SHALL BE IDENTIFIED ON THE SITE PLAN OR CONSTRUCTION PLANS AND PROFILES. "CRITICAL ROOT ZONE" (CRZ) SHALL BE CLEARLY DELINEATED ON THE PLANS AND MARKED AND PROTECTED IN THE FIELD PRIOR TO ANY LAND DISTURBANCE ACTIVITIES. THE CRZ SHALL BE DETERMINED AS FOLLOWS:

1. FOR INDIVIDUAL TREES, THE CRZ SHALL BE REPRESENTED BY A CONCENTRIC CIRCLE CENTERED ON THE TRUNK THAT REPRESENTS THE DRIPLINE.

2. FOR GROUPS OF TREES, THE CRZ SHALL FOLLOW THE CONTINUOUS DRIPLINE AROUND THE ENTIRE MASS WITHOUT INTERRUPTION.

B. GENERAL REQUIREMENTS

1. PRIOR TO ANY LAND DISTURBANCE, SUITABLE PROTECTIVE BARRIERS, SUCH AS SAFETY FENCING AND SILT FENCING, SHALL BE ERECTED OUTSIDE OF THE CRZ OF ANY TREE OR STAND OF TREES TO BE PRESERVED. PROTECTIVE BARRIERS SHALL REMAIN ERECTED THROUGHOUT ALL PHASES OF CONSTRUCTION. NO GRADE CHANGES, STORAGE OF EQUIPMENT, MATERIALS, DEBRIS OR FILL SHALL BE ALLOWED WITHIN THE PROTECTED BARRIER. CONSTRUCTION TRAFFIC, VEHICLES, AND DISPOSAL OF LIQUIDS SHALL BE PROHIBITED WITHIN THE CRZ.

2. TREE ROOTS WHICH MUST BE SEVERED SHALL BE CUT BY A TRENCHER OR SIMILAR EQUIPMENT, ALIGNED RADIAL TO THE TREE. THIS METHOD REDUCES THE LATERAL MOVEMENT OF ROOTS AND SUBSTANTIALLY REDUCES SEVERING OF ROOTS BY OTHER MEANS DURING EXCAVATION. THIS IS PARTICULARLY EFFECTIVE WHERE MULTIPLE TREES HAVE INTERTWINING ROOTS. THIS EFFORT SHALL TAKE PLACE PRIOR TO ANY LAND DISTURBANCE ACTIVITY.

3. WITHIN FOUR HOURS OF SEVERANCE, ALL TREES ROOTS THAT HAVE BEEN EXPOSED AND/OR DAMAGED SHALL BE TRIMMED CLEANLY AND COVERED TEMPORARILY WITH MOIST PEAT MOSS, BURLAP, OR OTHER BIO-DEGRADABLE MATERIAL TO PREVENT DESICCATION BEFORE PERMANENT COVER CAN BE INSTALLED.

4. TREES LIKELY TO DIE AS A RESULT OF SITE DISTURBANCE ACTIVITIES WITHIN 25 FEET OF THE SAFETY FENCE, AS IDENTIFIED IN THE TREE PROTECTION PLAN, SHALL BE REMOVED.

5. GRADE CHANGES AND EXCAVATIONS SHALL NOT ENCROACH UPON THE CRZ UNLESS ABSOLUTELY NECESSARY. IF DISTURBANCE MUST OCCUR WITHIN THE CRZ, SEE "SPECIAL PROTECTION MEASURES," THIS PAGE.

6. NO TOXIC MATERIALS, INCLUDING PETROLEUM PRODUCTS, HERBICIDES, ETC. SHALL BE STORED WITHIN 100' OF THE CRZ.

7. SEDIMENT, RETENTION, AND DETENTION BASINS SHALL NOT BE LOCATED WITHIN THE CRZ ZONE. THESE BASINS SHALL NOT DISCHARGE DIRECTLY INTO CRZ ZONES, UNLESS TRANSITIONED BACK INTO SHEET FLOW PRIOR TO ENTERING SAID ZONES OR ADEQUATE NATURAL CHANNEL.

8. CONTRACTOR SHALL USE DISCRETION AS TO WHERE TO USE APPLICABLE TREE PROTECTION DETAILS AND ASSUMES FULL RESPONSIBILITY FOR REPLACING DAMAGED SPECIMEN TREES.

C. PRUNING METHODS

ALL FINAL CUTS SHALL BE MADE SUFFICIENTLY CLOSE TO THE TRUNK OR PARENT LIMB BUT WITHOUT CUTTING INTO THE BRANCH COLLAR OR LEAVING A PROTRUDING STUB, ACCORDING TO ANSI STANDARDS. ALL NECESSARY PRUNING CUTS MUST BE MADE TO PREVENT BARK FROM BEING TORN FROM THE TREE AND TO FACILITATE RAPID HEALING. FLUSH CUTS ARE UNACCEPTABLE.

GUIDELINES FOR TREE PROTECTION AREAS (TPA'S)

THE FOLLOWING GENERAL GUIDELINES SHOULD BE IMPLEMENTED FOR ALL COVER TYPES THROUGHOUT THE DEVELOPMENT PROCESS AND AS PART OF THE FUTURE MAINTENANCE OF THE TPA. THESE GUIDELINES PROVIDE FOR THE MAINTENANCE, OVERALL HEALTH, AND SUSTAINABILITY OF TPA'S.

1. TREES ALONG THE PROPOSED LIMITS OF DISTURBANCE THAT POSE POTENTIAL HAZARD HAVE BEEN IDENTIFIED ON THE TREE PROTECTION PLAN AND SHALL BE REMOVED DURING THE DEVELOPMENT PROCESS.

2. INVASIVE SPECIES SHOULD BE IDENTIFIED AND TREATED DURING THE DEVELOPMENT PROCESS AS PART OF A LONG TERM MANAGEMENT PROGRAM. CONTROL TECHNIQUES MAY INCLUDE MECHANICAL REMOVAL, HERBICIDE, OR NATURAL CONTROL METHODS BASED ON THE SPECIES, SEVERITY OF INVASION, AND LOCATION RELATIVE TO SENSITIVE PLANTS OR AREAS.

3. THE SITE SHOULD BE MONITORED THROUGHOUT THE DEVELOPMENT PROCESS AND AS PART OF A LONG TERM MANAGEMENT FOR OUTBREAKS OF POTENTIALLY SERIOUS INSECTS AND DISEASE INCLUDING: GYPSY MOTHS, CANKER WORM, WOOD BORING INSECTS, AND OTHER POTENTIALLY DEVASTATING OUTBREAKS. FREQUENT MONITORING THAT IDENTIFIES POPULATIONS AT LOW LEVELS CAN PREVENT THE NEED FOR LARGE SCALE, EXPENSIVE TREATMENTS.

4. ANY HAZARDOUS TREES WILL BE IDENTIFIED FOR REMOVAL BY THE PROJECT ARBORIST PRIOR TO SITE DEVELOPMENT.

5. DISTURBED EDGES SHOULD BE MULCHED TO REDUCE THE POTENTIAL FOR INVASION BY UNDESIRABLE SPECIES.

6. THINNING AND REMOVAL OF POOR QUALITY TREES MAY BE NECESSARY TO IMPROVE OVERALL HEALTH. THIS ITEM SHOULD BE A PART OF LONG TERM MANAGEMENT FOR ANY COVER TYPE.

7. PEST MONITORING AND CONTROL IS CRITICALLY IMPORTANT TO PREVENT SECONDARY AND TERTIARY STRESS FACTORS.

SPECIAL PROTECTION MEASURES

IF MORE THEN 40% OF THE CRITICAL ROOT ZONE (CRZ) IS DAMAGED OR DISTURBED, THE CONTRACTOR SHALL REMOVE THE TREE. HOWEVER, IF LESS THEN 40% OF THE CRZ IS DISTURBED, THE CONTRACTOR SHALL UTILIZE THE FOLLOWING METHODS TO PRESERVE THE TREE.

1.TREE PROTECTION FENCE: BEFORE WORK BEGINS CONTRACTOR SHALL INSTALL TREE PROTECTION FENCING AROUND EXISTING TREE CRITICAL ROOT ZONES TO DISCOURAGE UNNECESSARY COMPACTION. NO STAGING OF MATERIALS OR EQUIPMENT SHALL BE ALLOWED IN THIS ZONE, UNLESS ABSOLUTELY NECESSARY. SEE DETAILS 8,9, &10.

2.ROOT PRUNING: SHALL TAKE PLACE WHERE UTILITY TRENCHING OR OTHER DISTURBANCE NECESSITATES THE CUTTING OF ROOTS WITHIN THE CRZ. CONTRACTOR SHALL SETUP A TREE PROTECTION FENCE AT THE LIMIT OF CLEARING AND GRADING PRIOR TO INITIAL PRUNING AND SUBSEQUENT TRENCHING. CARE MUST BE TAKEN AS TO WHICH ROOTS ARE CUT AS THIS AFFECTS HEALTH AND STABILITY OF THE TREE. SEE DETAIL 6.

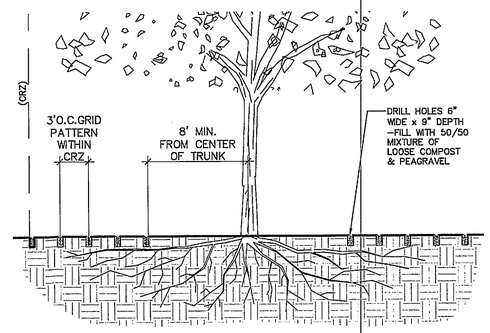
3.VERTICAL MULCHING: SHALL BE PERFORMED FOR ALL CANOPY TREES OVER 15" D.B.H. IN WHICH HEAVY DISTURBANCE OR COMPACTION HAS OCCURRED WITHIN THE CRZ. HOLES ARE TO BE DRILLED 3' O.C. WHERE COMPACTION HAS OCCURRED. SHOULD THE CONTRACTOR ENCOUNTER LARGE ROOTS WHILE AUGURING, THEY SHALL DISCONTINUE DRILLING IN THAT LOCATION. (SEE DETAILS 1 & 2).

4.ADD SOIL TO CRITICAL ROOT ZONE: PER GRADING PLANS, 6" OR LESS OF TOPSOIL MAY BE ADDED, COVERING UP TO 40% OF THE CRZ. CONTRACTOR SHALL SCARIFY EXISTING SOIL SURFACE AND ADD SANDY LOAM TOPSOIL. (SEE DETAIL 4)

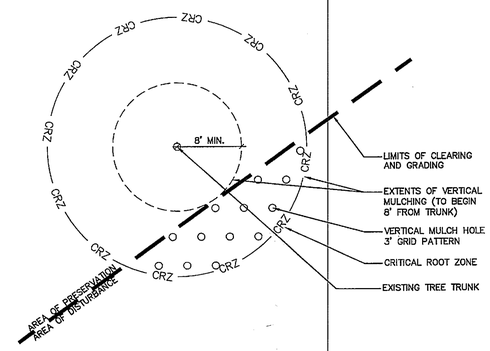
5. TREE PROTECTION FOR UTILITY EXCAVATIONS: WHERE EXCAVATIONS MUST CROSS THE CRZ ZONES OF EXISTING TREES, A 6" LAYER OF WOOD BARK MULCH SHALL BE LAID DIRECTLY ON FINISHED GRADE. A 1/2" THICK TREE PROTECTION MAT SHALL BE PLACED ON TOP OF THE MULCH TO PREVENT RUTTING AND SUBSEQUENT COMPACTION. (SEE DETAIL 3)

6. ROOT AERATION MATTING: AERATION MATTING SHALL BE PLACED WHERE PROPOSED CONCRETE SIDEWALKS CROSS THE CRZ ZONES OF EXISTING TREES. CONTRACTOR SHALL PLACE MATTING ON TOP OF EXISTING GRADE, WHILE ADDING SUBSEQUENT FILL LAYERS & SIDEWALK ABOVE. COMPACTION OF EXISTING GRADE BELOW SHALL BE AVOIDED. (SEE DETAIL 5)

TEMPORARY ROOT PROTECTION MATTING: SHALL BE PLACED WHERE HEAVY EQUIPMENT MUST CROSS THE CRITICAL ROOT ZONE OF EXISTING TREES. CONTRACTOR WILL INSTALL A 6" LAYER OF BARK MULCH AND 1/2" THICK MAT ON TOP TO DISCOURAGE COMPACTION AND CRUSHING OF ROOTS. UPON COMPLETION OF WORK, CONTRACTOR SHALL REMOVE MATTING PROMPTLY AND SCARIFY THE TOP 4" OF TOPSOIL. (SEE DETAIL 5)



1 VERTICAL MULCHING: SECTION
SCALE: NTS



2 VERTICAL MULCHING: PLAN VIEW
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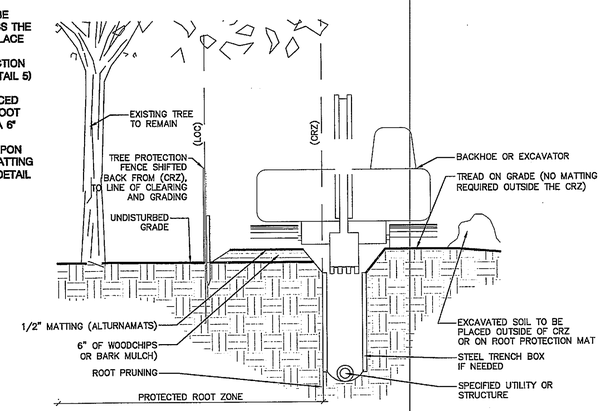
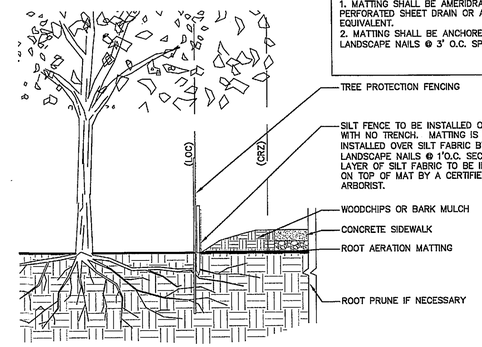
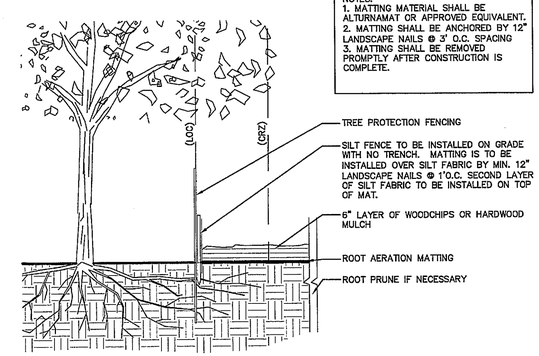


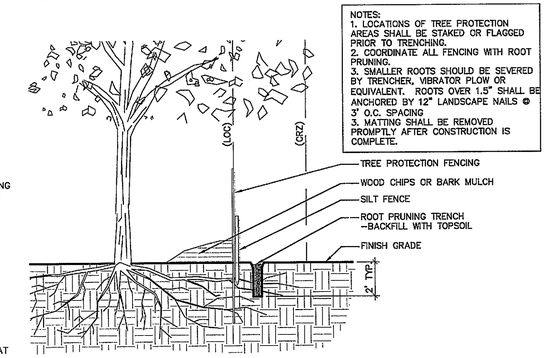
3 TREE PROTECTION FOR EXCAVATIONS
SCALE: NTS



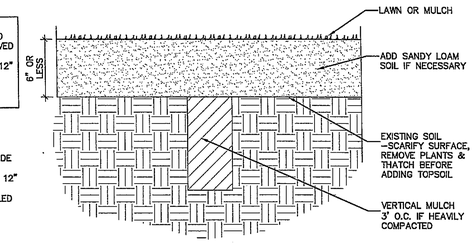
4 ROOT AERATION MATTING
SCALE: NTS



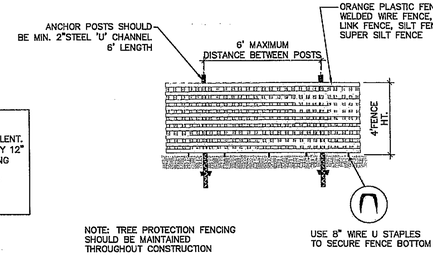
5 TEMP. ROOT PROTECTION MATTING
SCALE: NTS



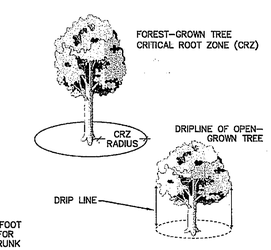
6 ROOT PRUNING
SCALE: NTS



7 ADD SOIL TO CRITICAL ROOT ZONE
SCALE: NTS

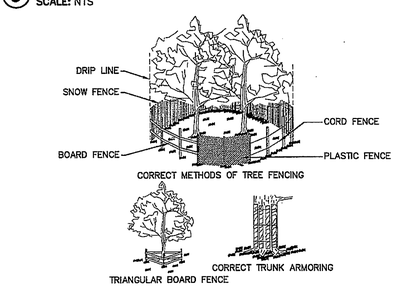


8 TREE PROTECTION FENCE
SCALE: NTS



NOTE:
CRZ FORMULA 1 FOOT OF CRZ RADIUS FOR EACH INCH OF TRUNK DIAMETER

9 CRITICAL ROOT ZONES & DRIP LINES
SCALE: NTS



10 TREE PROTECTION DEVICES
SCALE: NTS

Application No. SE 2010-LE-017 Staff S.W.

APPROVED SE SP PLAN

SEE DEV CONDS DATED March 8, 2011
Date of (BOS) (BZA) approval March 8, 2011

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REFERENCE DRAWINGS

NUMBER	DESCRIPTION

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COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
LIC. NO. 19039
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS
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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

TREE PROTECTION NOTES & DETAILS

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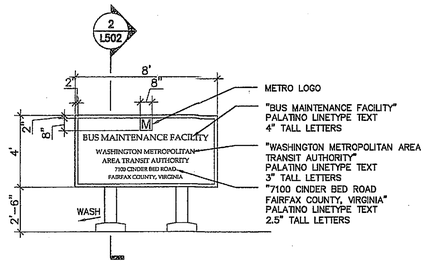

1 ENTRANCE SIGN - ELEVATION
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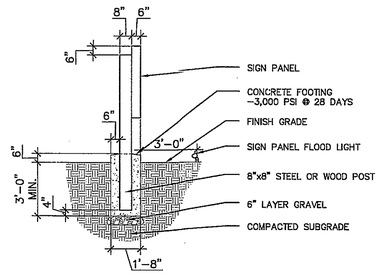

2 ENTRANCE SIGN - SECTION
SCALE: 1/4"= 1'-0"

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COMMONWEALTH OF VIRGINIA
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CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

SITE DETAILS & ENLARGEMENTS

SCALE: AS SHOWN

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L-502

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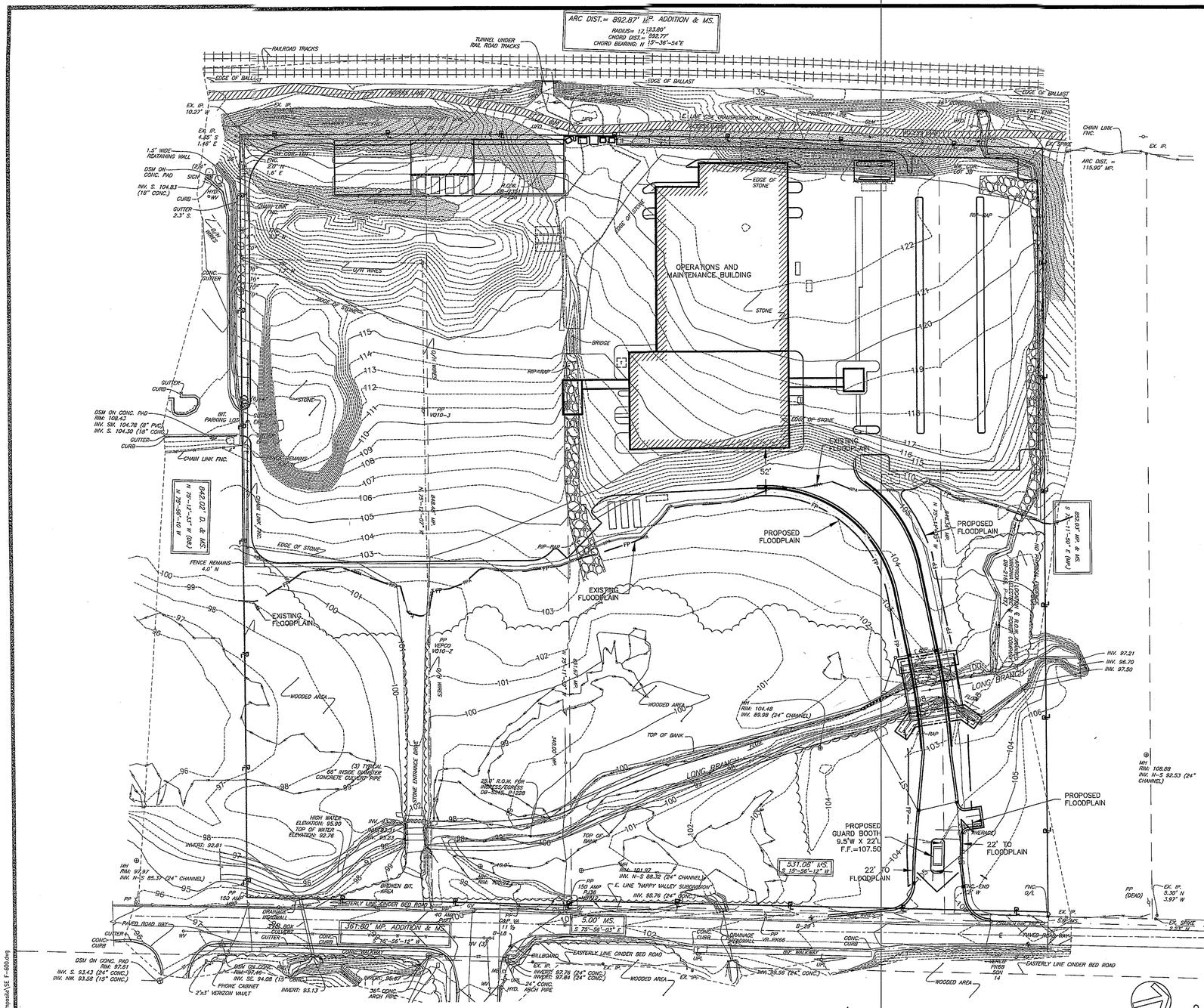

FLOODPLAIN NOTES

1. INFORMATION ON THIS SHEET WAS DERIVED FROM THE FLOODPLAIN STUDY OF LONG BRANCH FROM BASELINE STATIONS 90+44 TO 106+50. THIS FLOODPLAIN STUDY IS INCLUDED IN THIS SUBMISSION AS A REFERENCE.

2. THE FLOODPLAIN WAS DEVELOPED FROM A USGS REPORT, DELINEATION OF FLOOD AREAS MAP FOR ACCOTINK CREEK BASIN – LONG BRANCH. THIS DELINEATION WAS APPROVED BY FAIRFAX COUNTY ON JULY 10, 1972. IN 2007, THIS FLOODPLAIN WAS FIELD VERIFIED BY VIKA, INC.

3. DATA SHOWN ON THIS MAP WAS COLLECTED AS FIELD RUN SURVEY BY WENDEL DUCHSCHERER ARCHITECTS & ENGINEERS ON DECEMBER 18, 2009. ADDITIONAL TOPOGRAPHY FOR PARTS OF THE EASTERN PORTION OF THE SITE WERE PROVIDED BY VIKA, INC. CONTOUR INTERVAL IS ONE FOOT.

4. EMERGENCY ACCESS TO THIS PROPERTY IS PROVIDED BY A TRAIL ADJACENT TO THE WESTERN EDGE OF THE PROPERTY. THIS TRAIL CONNECTS TO NEWINGTON ROAD AND THE ENTIRE ROUTE IS COMPLETELY OUTSIDE OF THE FLOODPLAIN. THE EXACT LOCATION OF THE EMERGENCY ACCESS IS SHOWN IN THE REFERENCED FLOODPLAIN STUDY.

5. FILL WILL BE ADDED TO THE FLOODPLAIN TO BUILD THE PROPOSED ENTRANCE DRIVEWAY. THE AMOUNT OF FILL ANTICIPATED FOR THIS ACTIVITY IS 8,600 C.Y.

6. LOWEST FLOOR ELEVATIONS OF ALL PROPOSED BUILDINGS IS ABOVE THE 100 YEAR FLOODPLAIN ELEVATION. THEREFORE, NO FLOODPROOFING IS REQUIRED.

7. THERE ARE NO KNOWN PROBLEMS WITH FLOODING OR EROSION AT OR NEAR THIS SITE UNDER EXISTING CONDITIONS, AS SHOWN IN THE FLOODPLAIN STUDY. CONSTRUCTION OF THE ENTRANCE ROAD AND GUARD BOOTH WITHIN THE EXISTING FLOODPLAIN WILL NOT INCREASE FLOODING OR EROSION ON THE SITE OR UPSTREAM AND DOWNSTREAM OF THE PROPOSED IMPROVEMENT.

8. FEDERAL AND STATE PERMITS WILL BE REQUIRED FOR CONSTRUCTION OF THE CULVERT OVER LONG BRANCH. A JOINT APPLICANT FOR PERMIT WILL BE SUBMITTED TO THE US ARMY CORPS OF ENGINEERS, THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY, AND THE VIRGINIA MARINE RESOURCES COMMISSION. SUBMISSIONS TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY WILL ALSO BE NEEDED FOR WORK IN THE FLOODPLAIN.

9. EXCEPT AS SHOWN NEAR PROPOSED DRIVEWAY, PROPOSED & EXISTING FLOODPLAIN ARE COINCIDENT.

10. FLOODPLAIN ELEVATION VARIES FROM 99' TO 109'. THESE ELEVATIONS ARE SHOWN IN DETAIL IN THE FLOODPLAIN STUDY.

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ISKALO CBR LLC ACKNOWLEDGES THAT STRUCTURES LOCATED WITHIN A SPECIAL FLOOD HAZARD AREA MAY BE SUBJECT TO A REQUIREMENT FOR FLOOD INSURANCE BY A FEDERALLY INSURED LENDING INSTITUTION.

BY: _____
DAVID CHIAZZA, EXECUTIVE V.P.
ISKALO DEVELOPMENT CORP., ITS MANAGER

DESIGNED	WD-AE	01/22/10 DATE
DRAWN	CC1	07/15/10 DATE
CHECKED	SMR	06/01/10 DATE
APPROVED	DCD	07/15/10 DATE

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NUMBER	DESCRIPTION

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COMMONWEALTH OF VIRGINIA
DAVID C. DUCHSCHERER
Reg. No. 19029
PROFESSIONAL ENGINEER

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

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CONTRACT NO. 439601

CINDER BED ROAD BUS DIVISION
CINDER BED ROAD LORTON, VA

FLOODPLAIN MAP

SCALE: AS SHOWN

DRAWING NO. 27 OF 27

F-600

PRINT DATE: Dec. 3, 2010 09:17 AM USER: RJF
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