Towpath Trail – Stage 3

NEORSD Grant Supplemental Information
Michael Baker International
January 13, 2016

The Towpath Trail, Stage 3, project encompasses over 40 acres of urban land. Modern stormwater quality and quantity treatment is provided to the overall benefit of the region's water quality.

The majority of the project area drains into combined sewers, both in the existing and proposed conditions. Separating the project runoff and constructing new storm-only sewers is unfortunately infeasible for this landlocked project. However, the project provides a significant benefit to NEORSD's combined sewer system through two primary improvements:

1. Overall improvement to project-wide runoff coefficient. The project's new impervious area (trail paving, parking lot, plaza areas, etc.) is offset by the restoration of the former Osborne asphalt plant (approximately half of Drainage Area C in the attached exhibits) to meadow, forest, and wetland. See attached exhibits for additional details.

2. Three proposed BMP systems (a combination of wetland and detention ponds) perform substantial peak flow reduction to the combined sewer system. See the CSO Analysis table on the final page of the attached exhibit for a summary. Given the infeasibility to separate from the combined sewer system, the project reduces 25-year storm runoff volume by approximately 8700 cubic feet (65,000 gallons). A combined (all affected CSOs) 10-year storm peak flow reduction of 43 CFS is provided by the project. This positively affects NEORSD's CSO system by spreading peak flows over longer periods of time, allowing more runoff to reach the water treatment plants, reducing the project area's contribution to CSO overflows.

The EPA Stormwater Calculator was used to prepare the data included with the Towpath Trail, Stage 3, NEORSD grant application. This calculator provides an excellent baseline for comparison between projects. However, the calculator did not appear to take into account the substantial detention (and therefore, peak spreading) benefits of the project.

Please see the attached exhibits for the project-wide runoff calculations. We suggest that these calculations may provide a more complete summary of the project benefits.

PROPOSED DRAINAGE AREAS

CUY-TOWPATH TRAIL, STAGE 3

SGB101PR

$ TOTALS

HORIZONTAL SCALE IN FEET

0 50 100 200

OUTFALL A

OUTFALL B

OUTFALL C

OUTFALL D

OUTFALL K

BEGIN PROJECT STA. 100+00.00

BEGIN CLARK SWITCHBACK STA. 10+00.00

BEGIN W. 11TH CONNECTOR STA. 20+00.00

EX. R/W (TYP.)

PR. R/W (TYP.)

PR. TEMP. R/W (TYP.)

EX. L/A (TYP.)

W. 11TH ST.

BRAINER AVE

ROWLEY AVE

QUIGLEY ROAD

CLARK AVE

CLARK FIELDS DR

℄ TOWPATH TRAIL

℄ CLARK SWITCHBACK

℄ W. 11TH CONNECTOR

℄ CLARK FIELDS DR.

STA. 115+52.63 ℄ TOWPATH TRAIL = STA. 22+16.64 ℄ CLARK SWITCHBACK STA. 200+00.00 ℄ TOWPATH TRAIL

STA. 206+97.02 ℄ TOWPATH TRAIL = STA. 24+39.12 ℄ W. 11TH CONNECTOR

CURVE 1 CURVE 3 CURVE 4 CURVE 5 CURVE 6 CURVE 7 CURVE 8 CURVE 9 CURVE 10 CURVE 11

CURVE C12 CURVE C13 CURVE C14 CURVE C15 CURVE C16 CURVE C17 CURVE C18 CURVE C21 CURVE C22

PC Sta. 100+00.00 PT Sta. 101+67.09 PC Sta. 102+29.86 PT Sta. 102+89.38 PRC Sta. 103+41.29 PT Sta. 105+26.97 PC Sta. 110+93.61 PRC Sta. 113+39.15 PRC Sta. 202+27.61 POT Sta. 22+16.64 PC Sta. 200+00.00 PT Sta. 62+01.72 PRC Sta. 54+17.46 PRC Sta. 60+16.01 PC Sta. 50+00.00 PRC Sta. 209+11.68 PC Sta. 20+09.27 PT Sta. 21+08.07 PT Sta. 24+28.28 POT Sta. 24+39.12 MATCH LINE STA. 217+00.00

Due North

KEY

- DRAINAGE AREA A
- DRAINAGE AREA B
- DRAINAGE AREA C
- DRAINAGE AREA D
- DRAINAGE AREA E
- DRAINAGE AREA K

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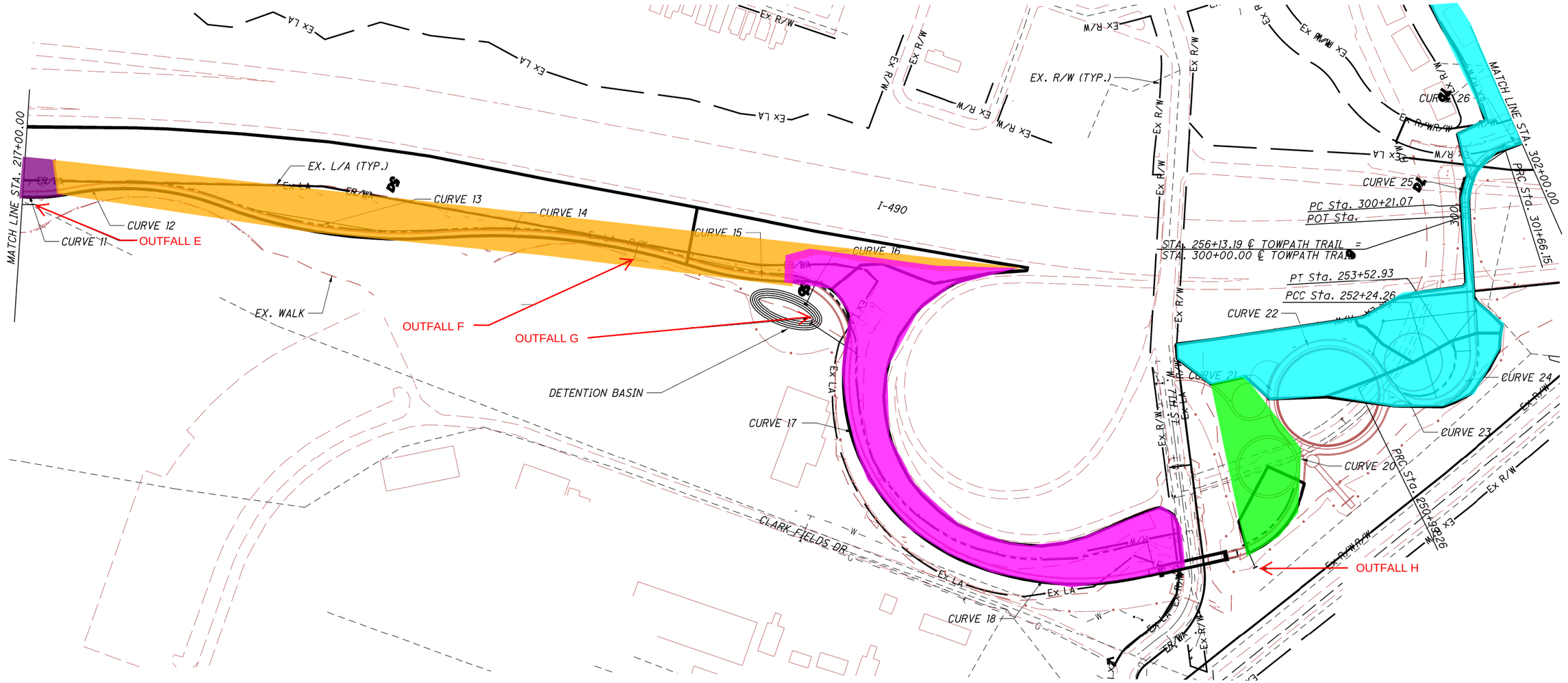

KEY

- DRAINAGE AREA E
- DRAINAGE AREA F
- DRAINAGE AREA G
- DRAINAGE AREA H
- DRAINAGE AREA I

HORIZONTAL SCALE IN FEET
0 50 100 200

PROPOSED DRAINAGE AREAS

CUY-TOWPATH TRAIL, STAGE 3

$GB102$
$TOTALS

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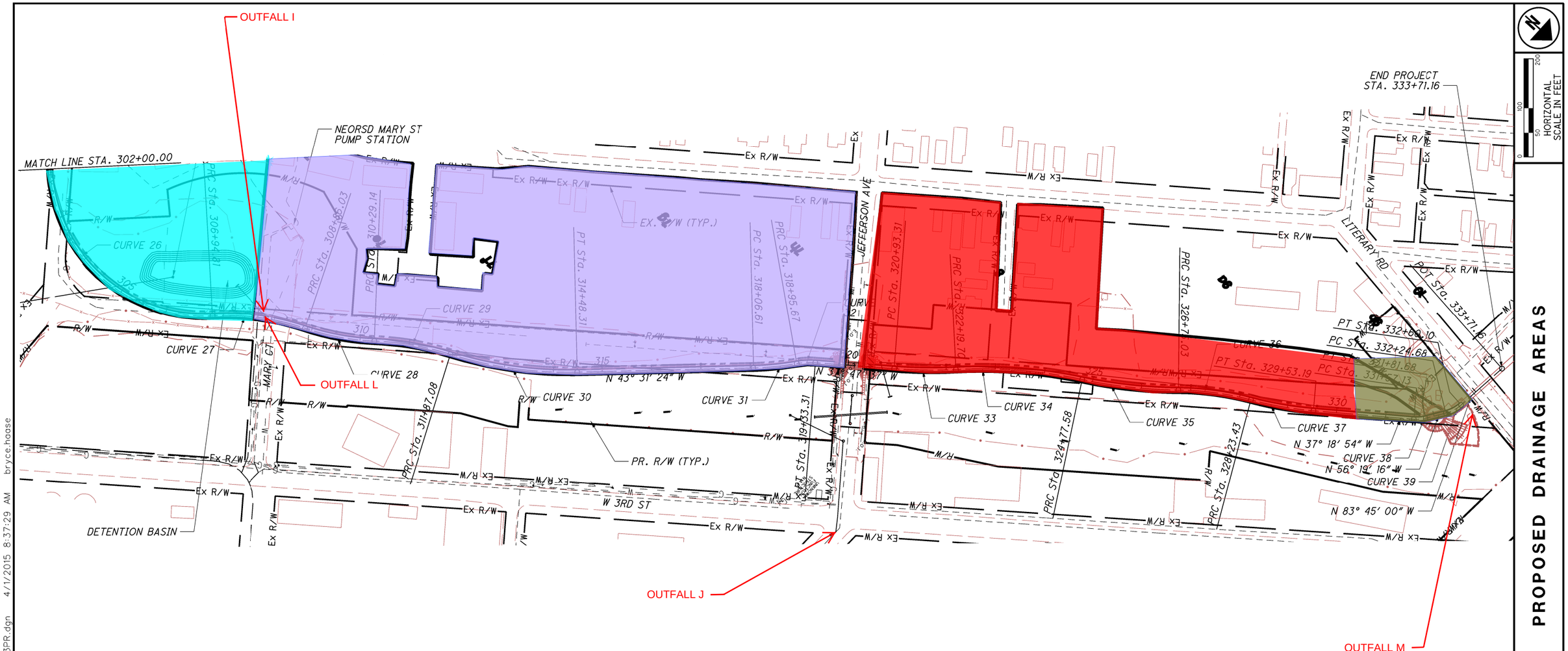

KEY

- DRAINAGE AREA I
- DRAINAGE AREA J
- DRAINAGE AREA L
- DRAINAGE AREA M

PROPOSED DRAINAGE AREAS

CUY-TOWPATH TRAIL, STAGE 3

$GB103$
$TOTALS

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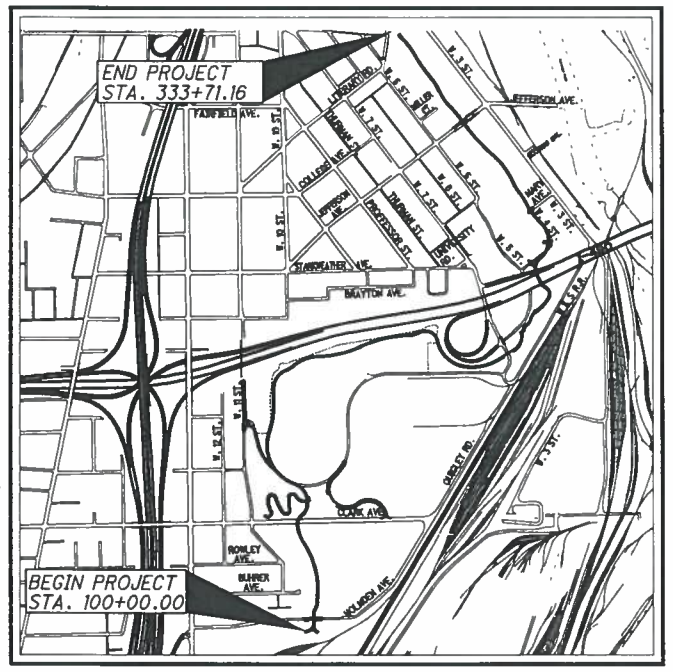
Table 1: Pre-construction vs. Post-construction Hydrologic Analysis (NRCS Method)

Drainage Area	Existing CSO Sewershed	Proposed CSO Sewershed	Upstream/Downstream Of Regulator	Existing Drainage Area (acres)	Proposed Drainage Area (acres)	Curve Number - Existing, CN	Curve Number - Proposed CN	Existing 25 yr Runoff Volume (CF)	Proposed 25 yr Runoff Volume (CF)	Change in Runoff Volume (25 yr) (CF)	Percent Change in Runoff Volume	Existing Time of Conc. (Tc) (mins)	Proposed time of conc. (Tc) (mins)	Peak Flow, Q (cfs)										% WQv Treated
														Rainfall Depth (in)			Existing			Proposed-Via Proposed Detention Basin			Proposed-No Detention Basin			
														5 yr	10 yr	25 yr	5 yr	10 yr	25 yr	5 yr	10 yr	25 yr	5 yr	10 yr	25 yr	
Drainage Area A: Ex. Storm system at Quigley Avenue underpass	86	86	Up	0.35	0.35	79	82	2,615	2,920	305	12%	5	5	2.92	3.4	4.09	0.6	0.8	1.1				0.7	0.9	1.2	0
Drainage Area B: Ex. storm system at Holmden Avenue	86	86	Up	2.65	2.65	83	83	22,785	22,785	0	0%	6.1	5	2.92	3.4	4.09	5.4	7.0	9.3				5.4	7.0	9.3	0
Drainage Area C: Constructed wetland to Quigley Avenue sewer	86	86	Up	19.70	19.70	84	80	175,285	151,765	-23,520	-13%	15.7	305	2.92	3.4	4.09	34.5	44.5	58.9	3.6	8.0	19.3				20
Drainage Area D: Ex. Clark Fields storm system	86	86	Up	6.75	6.75	77	78	46,175	48,135	1,960	4%	5	5	2.92	3.4	4.09	10.0	13.7	19.1				10.6	14.4	19.9	0
Drainage Area E: Ex. Clark Fields storm system	87	87	Down	0.40	0.40	76	79	2,615	2,965	350	13%	5	5	2.92	3.4	4.09	0.6	0.8	1.1				0.7	0.9	1.2	100
Drainage Area F: Ex. Clark Fields storm system	86	86	Up	1.20	1.20	76	83	7,885	10,325	2,440	31%	5	5	2.92	3.4	4.09	1.7	2.3	3.3				2.5	3.2	4.3	100
Drainage Area G: Clark Fields detention pond to ex. storm system	86	86	Up	2.35	2.35	76	78	15,465	16,770	1,305	8%	5	244	2.92	3.4	4.09	3.3	4.5	6.4	0.2	0.5	1.9				100
Drainage Area H: Slope outlet/overland flow to Quigley Ave. sewer	86	86	Up	0.95	0.95	76	77	6,275	6,490	215	3%	5	5	2.92	3.4	4.09	1.3	1.8	2.6				1.4	1.9	2.7	0
Drainage Area I: Mary Court detention pond to CSO-86 outfall	86	86	Up	6.20	6.20	79	81	45,915	46,610	695	2%	10.9	244	2.92	3.4	4.09	6.6	12.4	17.2	0.1	0.15	0.2				100
Drainage Area J: Ex. Jefferson Avenue sewer	82	240	Up	5.10	5.10	82	84	42,255	45,480	3,225	8%	11.3	5	2.92	3.4	4.09	8.8	11.6	15.6				10.9	14.1	18.8	0
Drainage Area K: Ex. Clark Fields storm system	86	86	Up	3.25	3.25	78	79	23,175	24,090	915	4%	5	5	2.92	3.4	4.09	5.1	6.9	9.6				5.3	7.1	9.9	100
Drainage Area L: Proposed storm to CSO-86	86	86	Up	10.20	10.20	81	82	81,460	84,640	3,180	4%	12.5	5	2.92	3.4	4.09	16.1	21.3	29.0				19.9	25.9	34.8	0
Drainage Area M: Slope outlet to CSO-82 outfall	82	82	Up	0.70	0.70	76	79	4,620	5,185	565	12%	5	5	2.92	3.4	4.09	1.0	1.4	1.9				1.2	1.6	2.1	0

CSO ANALYSIS				
	Net change in volume to CSO-82 (25 yr) =		-41,690	CF
	Net change in volume to CSO-86 (25 yr) =		-12,505	CF
	Net change in volume to CSO-87 (25 yr) =		350	CF *
	Net change in volume to CSO-240 (25yr) =		45,480	CF
	Net change in peak flow to CSO-82 (10 yr) =		-11.4	CFS
	Net change in peak flow to CSO-86 (10 yr) =		-46	CFS
	Net change in peak flow to CSO-87 (10 yr) =		0.1	CFS *
	Net change in peak flow to CSO-240 (10 yr) =		14	CFS

* This flow enters the CSO-87 outfall downstream of any regulators.



LOCATION PLAN

1600 0 800 1600 3200 6400
(IN FEET)

271 INTERSTATE · 42 U.S. · 3 STATE · 3 COUNTY

PORTION TO BE IMPROVED

DECEMBER 8, 2015
FINAL DESIGN
REVISED SUBMITTAL

CUYAHOGA COUNTY

CUY-TOWPATH TRAIL, STAGE 3

TOWPATH TRAIL
FROM STEELYARD COMMONS TO LITERARY RD

INDEX OF SHEETS:

NOT USED: 23, 159, 195

PROJECT DESCRIPTION

THIS SEGMENT OF THE TOWPATH TRAIL EXTENSION, STAGE 3, BEGINS AT THE NORTH END OF THE STEELYARD COMMONS DEVELOPMENT SOUTH OF HOLMDEN AVE AND CONTINUES NORTH ALONG A HILLSIDE WITH A RESIDENTIAL NEIGHBORHOOD ABOVE AND A MIX OF INDUSTRY BELOW. THE TRAIL TRAVELS UNDER THE CLARK AVE VIADUCT AND ENTERS THE CLARK TRAILHEAD AREA. THE TRAIL TRAVELS THROUGH CLARK FIELDS AND CROSSES WEST 7TH STREET ON A PROPOSED BRIDGE. THE TRAIL PASSES UNDER THE I-490 BRIDGE AND FOLLOW THE ALIGNMENT OF W. 4TH ST ENDING AT A TRAILHEAD AT LITERARY RD.

EARTH DISTURBED AREA (CONST. LIMITS, APP)

PROJECT EARTH DISTURBED AREA:	42.71 ACRES
ESTIMATED CONTRACTOR EARTH DISTURBED AREA:	4.00 ACRES
NOTICE OF INTENT EARTH DISTURBED AREA:	46.71 ACRES

2013 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL REQUIRE THE CLOSING TO TRAFFIC OF STREETS AS NOTED ON SHEET 18 , AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

APPROVED _____
DATE _____ DAVID E. MARQUARD
DESIGN AND CONSTRUCTION ADMINISTRATOR

APPROVED _____
DATE _____ MICHAEL W. DEVER M.P.A.
DIRECTOR OF PUBLIC WORKS

APPROVED _____
DATE _____ ARMOND BUDISH
CUYAHOGA COUNTY EXECUTIVE

DESIGN DESIGNATION

CURRENT A.D.T.	N/A
DESIGN YEAR	N/A
D.H.V.	N/A
D.	N/A
T.	N/A
DESIGN SPEED	20 M.P.H. (TOWPATH TRAIL)
	14 M.P.H. (CONNECTOR TRAIL)
	25 M.P.H. (STREETS)
DESIGN EXCEPTION	NONE

UNDERGROUND UTILITIES
CONTACT BOTH SERVICES
CALL TWO WORKING DAYS
BEFORE YOU DIG
CALL
1-800-362-2764
(TOLL FREE)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY
OIL & GAS PRODUCERS PROTECTIVE
SERVICE CALL: **1-800-925-0988**

ENGINEERS SEAL:	ENGINEERS SEAL:	ENGINEERS SEAL:	ENGINEERS SEAL:	ENGINEERS SEAL:
MICHAEL BAKER INTERNATIONAL	MICHAEL BAKER INTERNATIONAL	ENVIRONMENTAL DESIGN GROUP	BRANDSTETTER CARROLL, INC.	ISAAC LEWIN & ASSOC.
ROADWAY TRAIL PLANS	STRUCTURAL PLANS	LANDSCAPE PLANS	ARCHITECTURAL PLANS	OVERLOOK STRUCTURE PLANS
SIGNED:	SIGNED:	SIGNED:	SIGNED:	SIGNED:
DATE:	DATE:	DATE:	DATE:	DATE:

CITY OF CLEVELAND STANDARD DRAWINGS			
NUMBER	DATE	NUMBER	DATE
CR-1	04-14-2008	164-ME	07-08-2008
CONC 1	04-14-2008	A-503	06-21-2012
CD-1	04-14-2008	A-605	06-21-2012
MH-1	07-08-2008	A-695	10-01-1997
CB-1	07-08-2008	MB-1C	01-15-1998
PR-1	07-08-2008	146-ME	07-08-2008

STATE OF OHIO STANDARD CONSTRUCTION DRAWINGS					
NUMBER	DATE	NUMBER	DATE	NUMBER	DATE
AS-1-15	01-17-2015	F-1.1	07-19-2013	TC-22.20	01-17-2014
AS-1-81	01-18-2013			TC-41.20	10-18-2013
		HW-2.2	07-17-2015	TC-41.50	10-18-2013
BP-1.1	07-28-2000			TC-42.20	10-18-2013
BP-2.1	07-17-2015	MGS-1.1	07-19-2013	TC-51.11	01-17-2014
BP-2.2	07-18-2008	MGS-4.1	07-19-2013	TC-51.12	01-17-2014
BP-2.5	07-19-2013	MGS-4.2	07-19-2013	TC-52.10	10-18-2013
BP-3.1	07-18-2014			TC-71.10	01-17-2014
BP-5.1	07-19-2013	MH-1.1	01-18-2013		
BP-7.1	07-18-2014	MH-1.2	01-18-2013	WQ-1.1	01-18-2013
		MH-1.3	01-18-2013		
CB-1.1	01-18-2013				
CB-1.2	01-18-2013	MT-101.60	07-19-2013		
DM-1.1	01-18-2013	RM-5.1	07-18-2016		
DM-4.2	07-20-2012	RM-5.2	01-17-2014		

CUYAHOGA COUNTY STANDARD DRAWINGS			
NUMBER	DATE	NUMBER	DATE
BP-2.5C	10-31-2013		
BP-4.1C	10-31-2013		
MH-10.C	10-31-2013		
CB-3C	10-31-2013		
MD-1C	10-31-2013		
MD-6C	10-31-2013		

SPECIAL PROVISIONS	
SEE SECTION 200 OF THE CUYAHOGA COUNTY ENGINEER SPECIFICATION BOOKLET IN THE BID PACKAGE.	
SPECIAL PROVISION	DATE
CELLULAR CONFINEMENT SLOPE STABILIZATION	12-08-2015
WICK DRAINS	12-08-2015

ODOT SUPPLEMENTAL SPECIFICATIONS			
NUMBER	DATE	NUMBER	DATE
832	01-17-2014	1041	01-18-2013
836	01-18-2013	1055	01-18-2013
840	07-17-2015	1073	04-16-2010
863	10-17-2014	1083	10-17-2014
1035	01-18-2013		
EXTENDED PLANT MAINTENANCE			12-08-2015
PIEZOMETER			12-08-2015
INSTRUMENTATION MONITORING			12-08-2015
TEMPORARY EROSION CONTROL			12-08-2015
GEOCOMPOSITE DRAINAGE SYSTEM			12-08-2015
PRE-ENGINEERED BRIDGE			12-08-2015
SP-200 (GEOSYNTHETIC CLAY LINER)			12-08-2015

PLAN PREPARED BY:

Michael Baker INTERNATIONAL
THE HALLE BUILDING
1228 EUCLID AVENUE, SUITE 1050
CLEVELAND, OHIO 44115

Environmental Design Group
450 Grant Street
Phone 330.375.1390
Akron, OH 44311
Fax 330.375.1580
www.envdesigngroup.com

BRANDSTETTER CARROLL INC
ARCHITECTS · ENGINEERS · PLANNERS
1220 West Sixth Street Suite 300 Cleveland, OH 44113
p. 216 241 4460 www.brandstettercarroll.com

FEDERAL PROJECT NO.
PID NO. 84112
CONSTRUCTION PROJECT NO.
RAILROAD INVOLVEMENT N/A
CUY-TOWPATH TRAIL, STAGE 3
1 / 337

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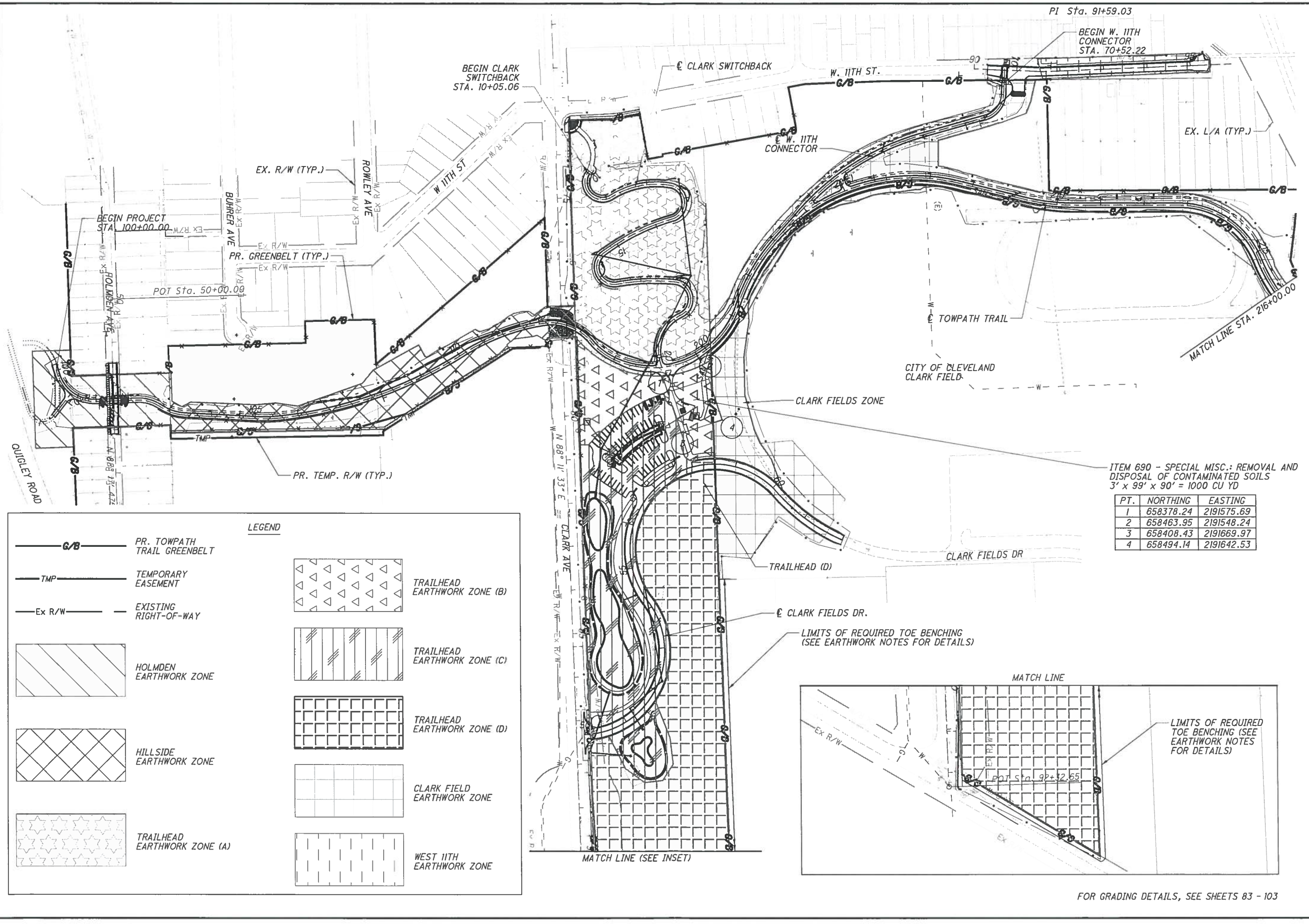

PT.	NORTHING	EASTING
1	658378.24	2191575.69
2	658463.95	2191548.24
3	658408.43	2191669.97
4	658494.14	2191642.53

LEGEND

- PR. TOWPATH TRAIL GREENBELT
- TEMPORARY EASEMENT
- EXISTING RIGHT-OF-WAY
- HOLMDEN EARTHWORK ZONE
- HILLSIDE EARTHWORK ZONE
- TRAILHEAD EARTHWORK ZONE (A)
- TRAILHEAD EARTHWORK ZONE (B)
- TRAILHEAD EARTHWORK ZONE (C)
- TRAILHEAD EARTHWORK ZONE (D)
- CLARK FIELD EARTHWORK ZONE
- WEST 11TH EARTHWORK ZONE

HORIZONTAL SCALE IN FEET: 0, 50, 100, 200

EARTHWORK PLAN

CUY-TOWPATH TRAIL, STAGE 3

80 / 337

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FOR GRADING DETAILS, SEE SHEETS 83 - 103

HORIZONTAL SCALE IN FEET
0 50 100 200

EARTHWORK PLAN

CUY-TOWPATH TRAIL, STAGE 3

MATCHLINE STA. 216+00.00

MATCHLINE STA. 254+00.00

S 37° 41' 29" E

EX. R/W (TYP.)

I-490

W. 7TH ST.

EX. WALK

CLARK FIELDS DR

QUIGLEY RD

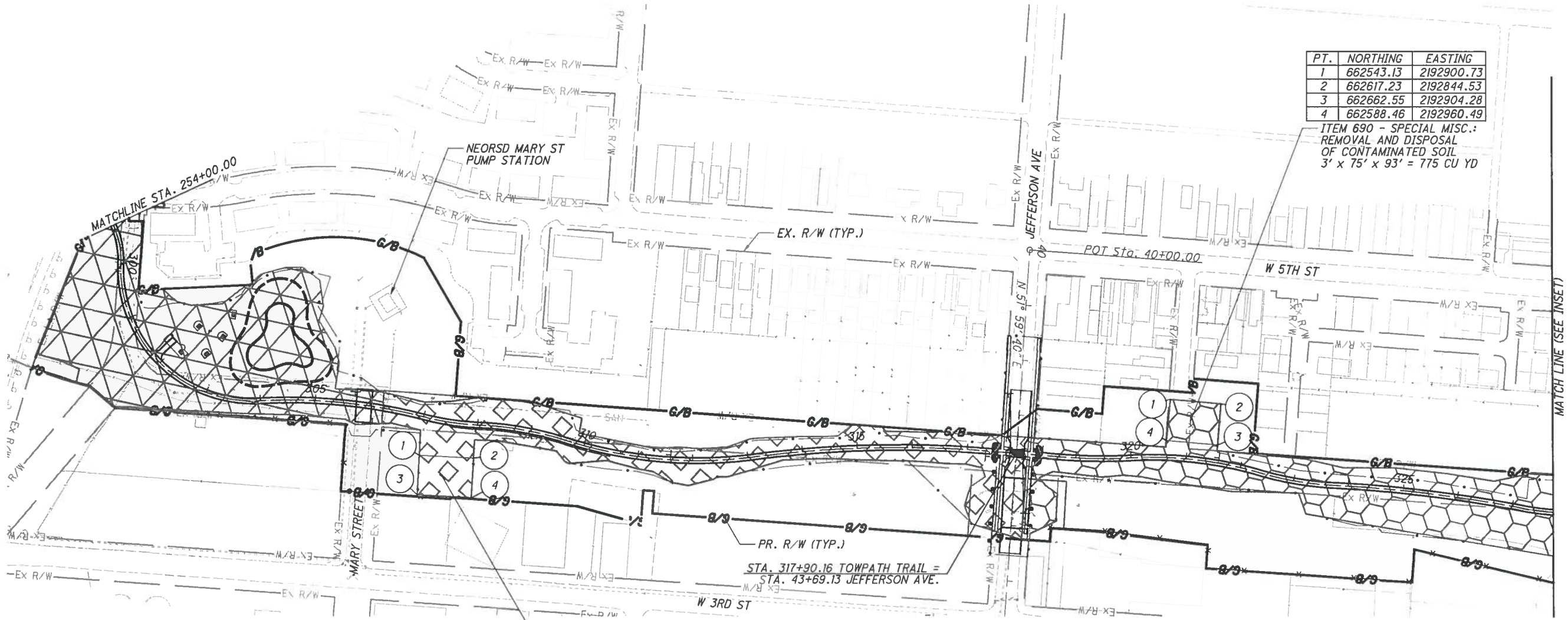
MATCH LINE (SEE INSET)

MATCH LINE

LEGEND

- G/B — PR. TOWPATH TRAIL GREENBELT
- TMP — TEMPORARY EASEMENT
- Ex R/W — EXISTING RIGHT-OF-WAY
- CLARK FIELD EARTHWORK ZONE
- W. 7TH ST. EARTHWORK ZONE
- BLUFFS EARTHWORK ZONE
- MARY EARTHWORK ZONE
- CLARK FIELDS PERMANENT STOCKPILE AREA (SEE EARTHWORK NOTES)

FOR GRADING DETAILS, SEE SHEETS 83 - 103

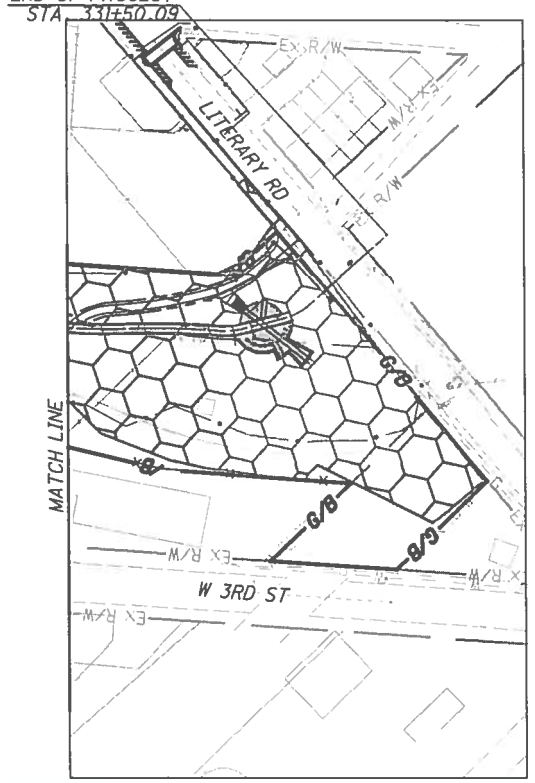


PT.	NORTHING	EASTING
1	662543.13	2192900.73
2	662617.23	2192844.53
3	662662.55	2192904.28
4	662588.46	2192960.49

PT.	NORTHING	EASTING
1	661598.99	2193805.26
2	661675.53	2193832.46
3	661644.66	2193950.92
4	661721.20	2193888.12

LEGEND

- C/B — PR. TOWPATH TRAIL GREENBELT
- TMP — TEMPORARY EASEMENT
- Ex R/W — EXISTING RIGHT-OF-WAY
- MARY EARTHWORK ZONE
- JEFFERSON EARTHWORK ZONE
- LITERARY EARTHWORK ZONE



HORIZONTAL SCALE IN FEET
0 50 100 200

EARTHWORK PLAN

CUY-TOWPATH TRAIL, STAGE 3

82
337

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GRADING PLAN
CLARK AVE TRAILHEAD

CUY-TOWPATH TRAIL, STAGE 3

86
337

NOTES:
1. SEE PLAN & PROFILE SHEETS FOR STORM SEWERS, STRUCTURES, CLARK FIELD DRIVE ALIGNMENT AND TRAIL ALIGNMENT.
2. ALL SPOT ELEVATIONS SHOWN ARE BOTTOM OF CURB PAVEMENT ELEVATION.
3. SEE SHEET 260 FOR MORE INFORMATION ABOUT CROSSWALK RAMPS.
4. SEE SHEETS 233-242 FOR MORE INFORMATION ABOUT LAYOUT AND AMENITIES.

LIMITS OF PROPOSED GEOSYNTHETIC CLAY LINER. SEE DRAINAGE DETAILS AND EARTHWORK NOTES. PAID AS SPECIAL - GEOTEXTILE FABRIC.

CALCULATED TR,CR
CHECKED KL,GN

HORIZONTAL SCALE IN FEET
0 10 20 40

N

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CUY-TOWPATH TRAIL, STAGE 3

GRADING PLAN

CLARK AVE TRAILHEAD AT CLARK FIELDS DRIVE

NOTES:
1. SEE PLAN & PROFILE SHEETS FOR STORM SEWERS, STRUCTURES, CLARK FIELD DRIVE ALIGNMENT AND TRAIL ALIGNMENT.
2. SEE SHEET 260 FOR MORE INFORMATION ABOUT CROSSWALK RAMPS.
3. SEE SHEETS 233–242 FOR MORE INFORMATION ABOUT LAYOUT AND AMENITIES.

LIMITS OF PROPOSED GEOSYNTHETIC CLAY LINER. SEE DRAINAGE DETAILS AND EARTHWORK NOTES. PAD AS SPECIAL – GEOTEXTILE FABRIC.

CALCULATED TR,CR
CHECKED KL,GN

HORIZONTAL SCALE IN FEET
0 10 20 40

N

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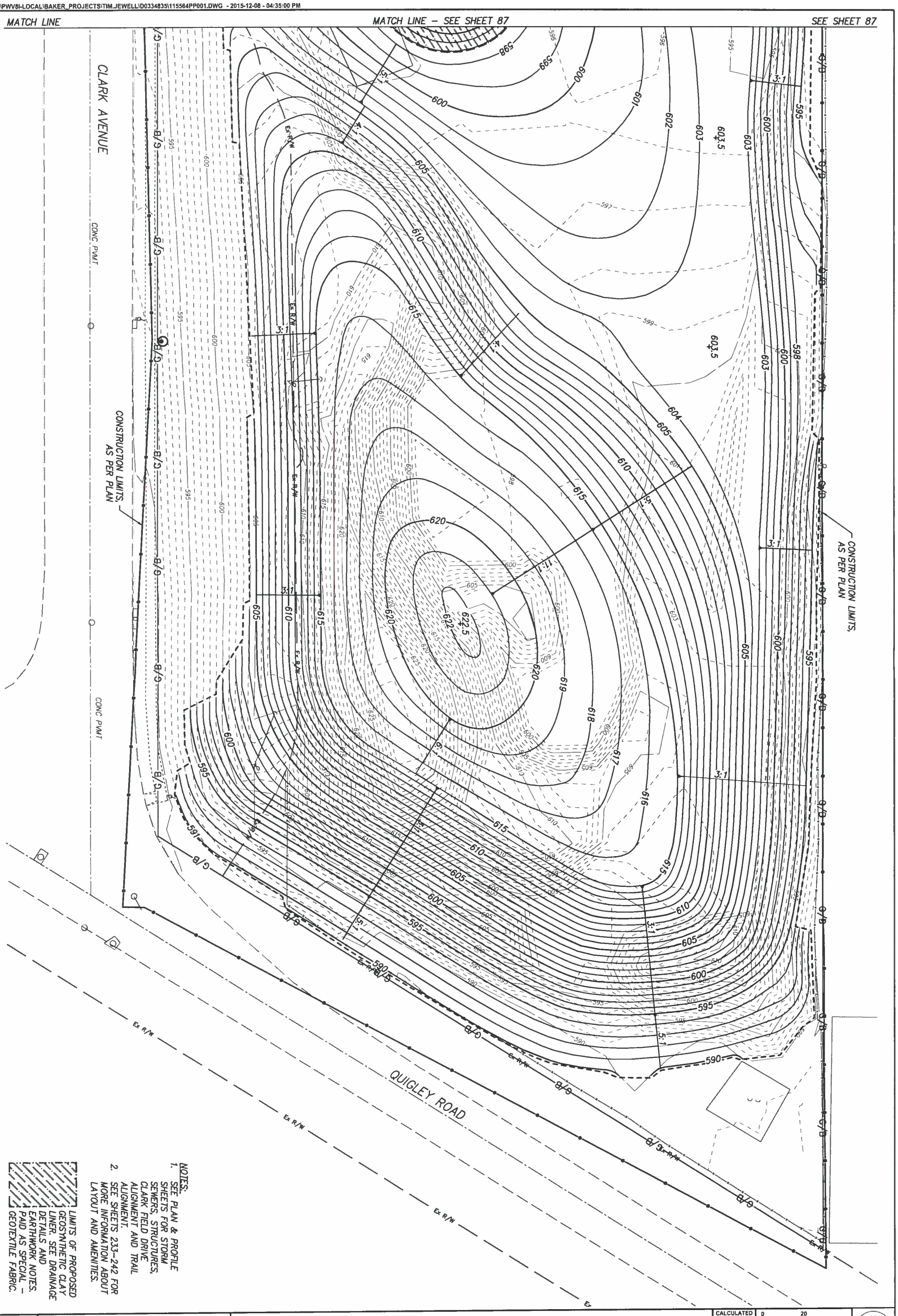


NOTES:

1. SEE PLAN & PROFILE SHEETS FOR STORM SEWERS, STRUCTURES, CLARK FIELD DRIVE ALIGNMENT AND TRAIL ALIGNMENT.
2. SEE SHEETS 233-242 FOR MORE INFORMATION ABOUT LAYOUT AND AMENITIES.

LIMITS OF PROPOSED GEOSYNTHETIC CLAY LINER. SEE DRAINAGE DETAILS AND EARTHWORK NOTES. PAID AS SPECIAL – GEOTEXTILE FABRIC.

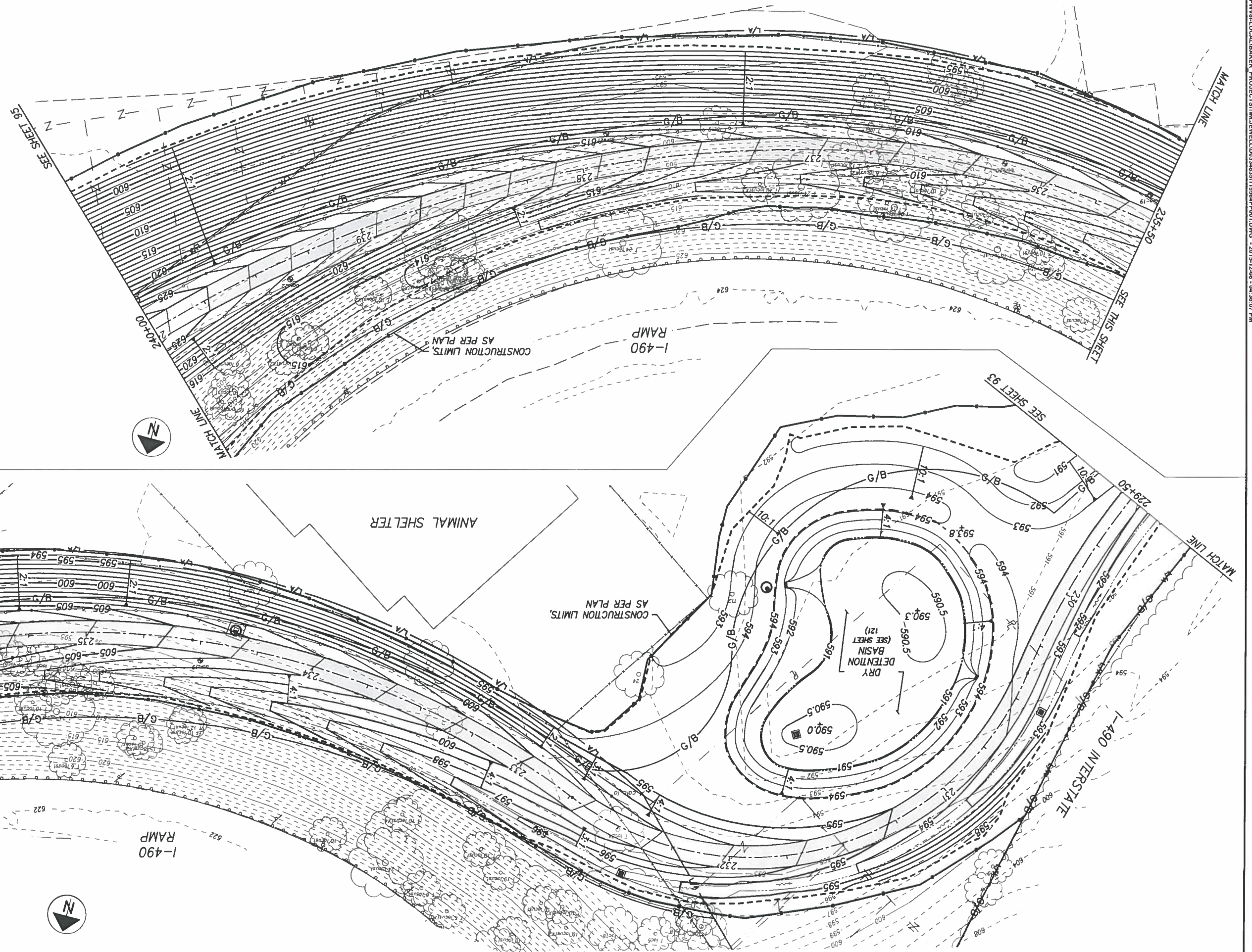
88 / 337	CUY-TOWPATH TRAIL, STAGE 3	GRADING PLAN CLARK AVE TRAILHEAD AT CLARK AVE & QUIGLEY RD	CALCULATED TR,CR CHECKED KL,GN	0 20 40 10 HORIZONTAL SCALE IN FEET

GRADING PLAN
STA 229+50 TO STA 240+00 - CLARK FIELDS

CUY-TOWPATH TRAIL, STAGE 3

94
337

NOTES:
1. SEE PLAN & PROFILE SHEETS FOR STORM SEWERS, STRUCTURES, CLARK FIELD DRIVE ALIGNMENT AND TRAIL ALIGNMENT.
2. SEE SHEETS 233-242 FOR MORE INFORMATION ABOUT LAYOUT AND AMENITIES.



CALCULATED	TR,CR
CHECKED	KL,GN

HORIZONTAL SCALE IN FEET
0 10 20 40

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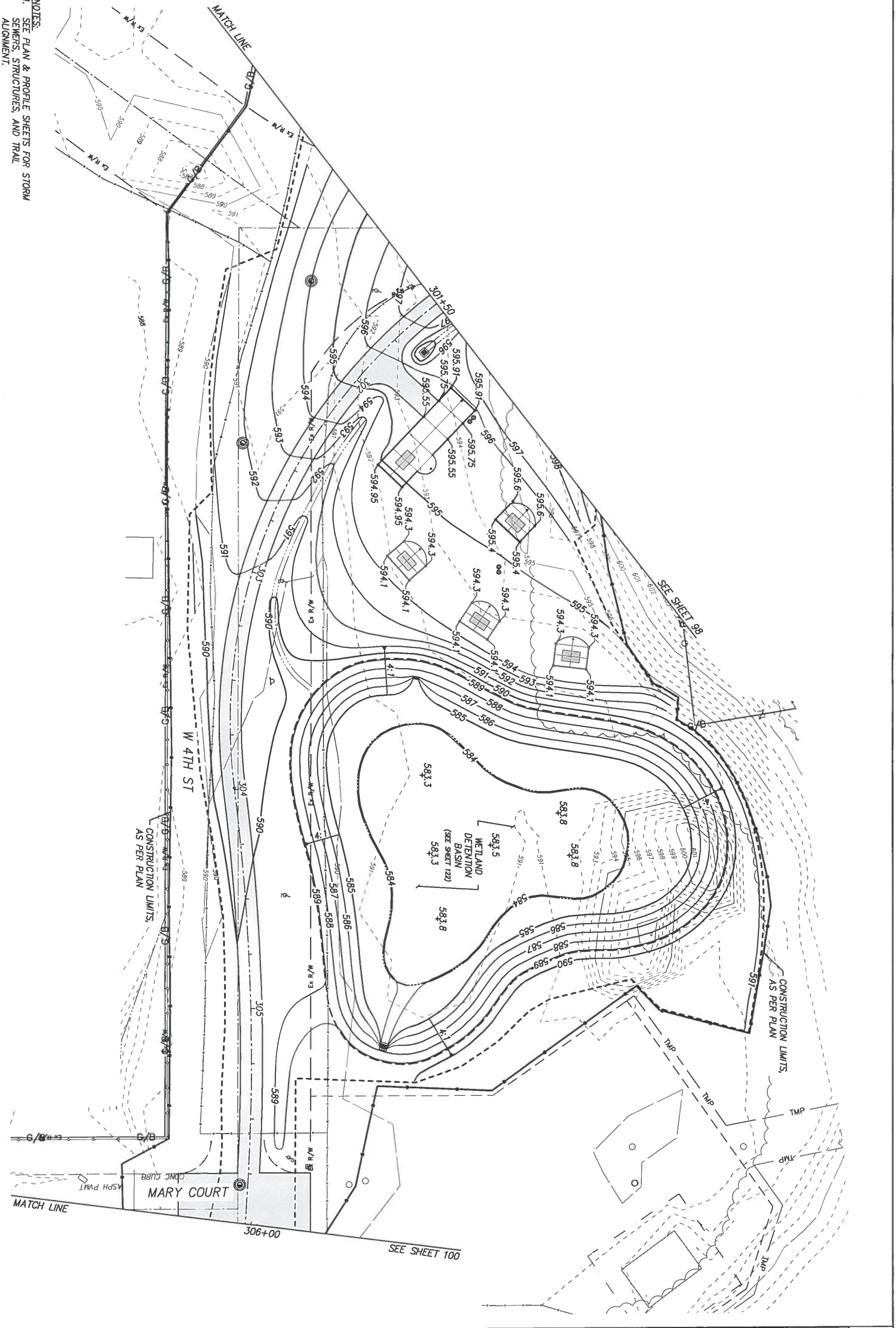
NOTES:
1. SEE PLAN & PROFILE SHEETS FOR STORM SEWERS, STRUCTURES, AND TRAIL ALIGNMENT.
2. SEE SHEETS 233-242 FOR MORE INFORMATION ABOUT LAYOUT AND AMENITIES.



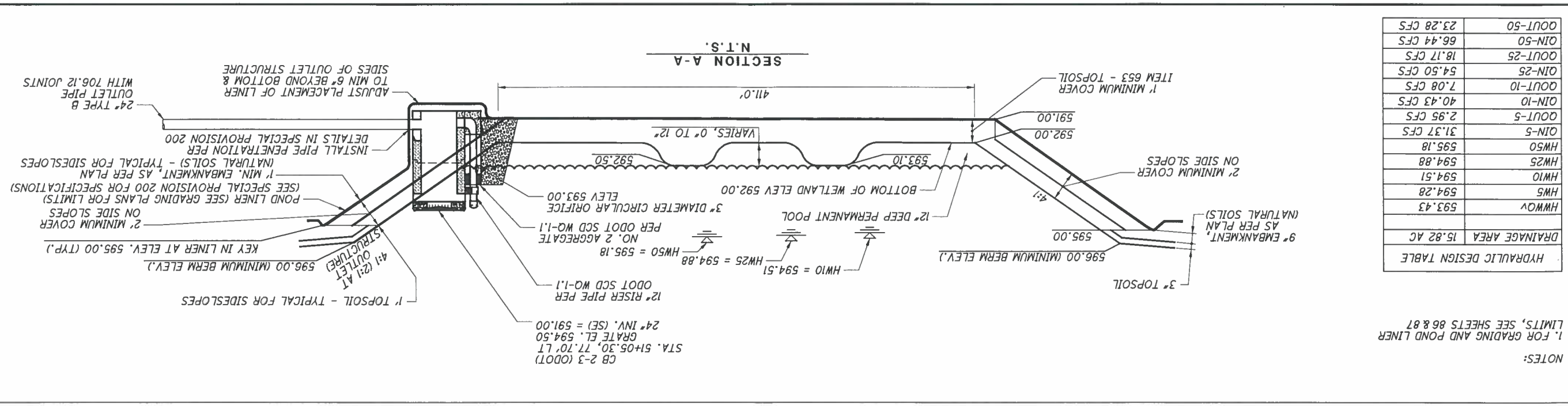
99 / 337	CUY-TOWPATH TRAIL, STAGE 3	GRADING PLAN STA 301+50 TO STA 306+00 - W 4TH ST & MARY CT	CALCULATED TR,CR CHECKED KL,GN	0 20 10 40 HORIZONTAL SCALE IN FEET

CUY-TOWPATH TRAIL, STAGE 3

DRAINAGE DETAILS - WEST WETLAND DETENTION BASIN

CALCULATED AK
CHECKED DAB

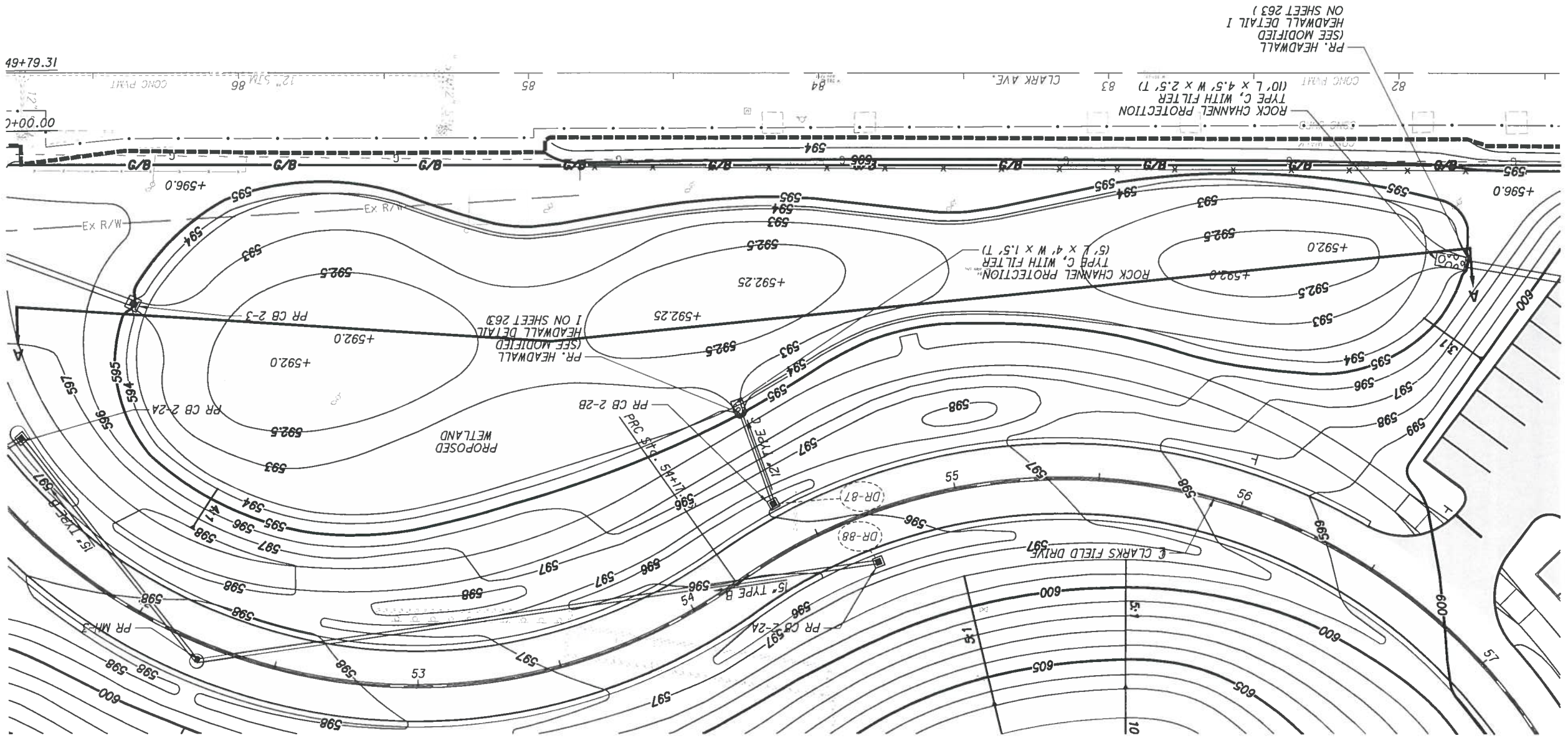
HORIZONTAL SCALE IN FEET
0 10 20 40



NOTES:

1. FOR GRADING AND POND LINER LIMITS, SEE SHEETS 86 & 87

HYDRAULIC DESIGN TABLE	
DRAINAGE AREA	15.82 AC
HWWQV	593.43
HW5	594.28
HW10	594.51
HW25	594.88
HW50	595.18
QIN-5	31.37 CFS
QOUT-5	2.95 CFS
QIN-10	40.43 CFS
QOUT-10	7.08 CFS
QIN-25	54.50 CFS
QOUT-25	18.17 CFS
QIN-50	66.44 CFS
QOUT-50	23.28 CFS



CUY-TOWPATH TRAIL, STAGE 3

DRAINAGE DETAILS - EAST WETLAND DETENSION BASIN - CLARK AVE.

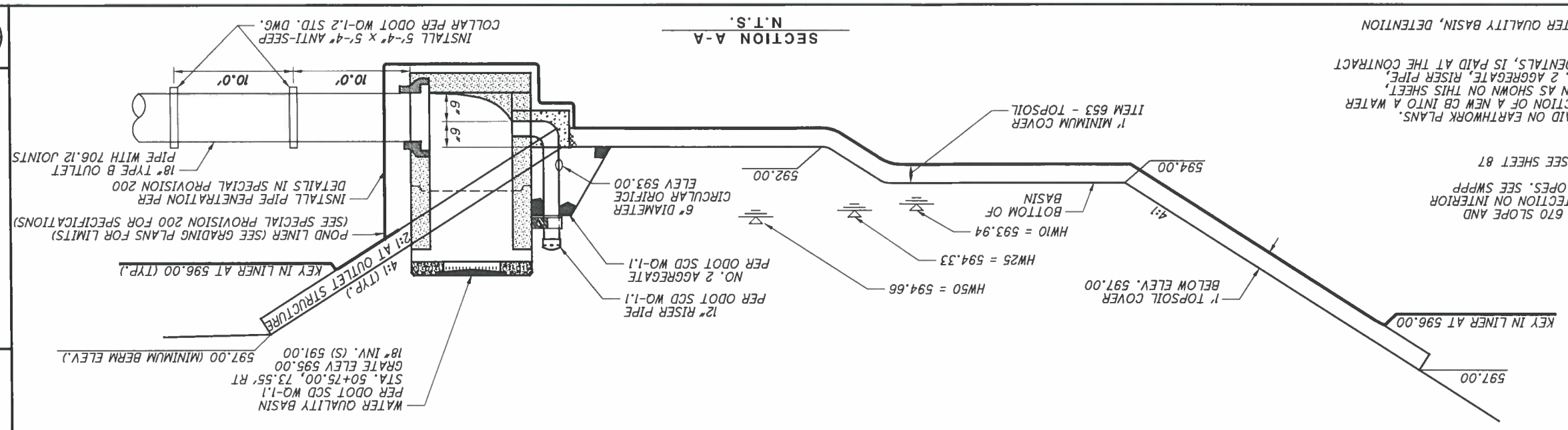
120A
337

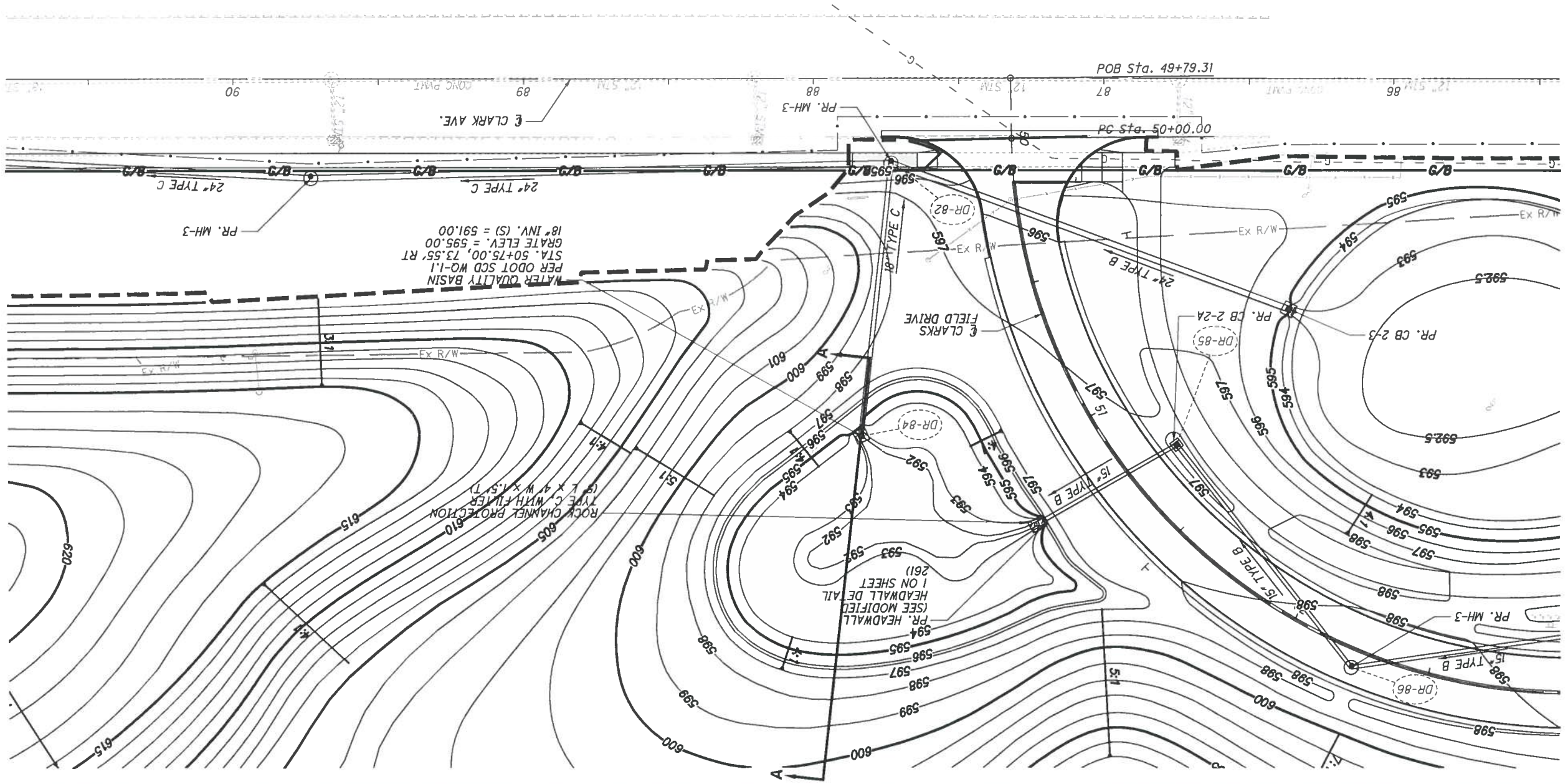
HYDRAULIC DESIGN TABLE	
DRAINAGE AREA	2.24 AC
HW5	593.65
HW10	593.94
HW25	594.33
HW50	594.66
QIN-5	4.01 CFS
QOUT-5	0.65 CFS
QIN-10	5.26 CFS
QOUT-10	0.86 CFS
QIN-25	7.14 CFS
QOUT-25	1.08 CFS
QIN-50	8.79 CFS
QOUT-50	1.23 CFS

NOTE:
PROVIDE ITEM 670 SLOPE AND EROSION PROTECTION ON INTERIOR BASIN SIDE SLOPES. SEE SWPPP FOR GRADING SEE SHEET 87

PAYMENT:
GRADING IS PAID ON EARTHWORK PLANS. THE CONSTRUCTION OF A NEW CB INTO A WATER QUALITY BASIN AS SHOWN ON THIS SHEET, INCLUDING NO. 2 AGGREGATE, RISER PIPE, AND ALL INCIDENTALS, IS PAID AT THE CONTRACT PRICE FOR:
ITEM 611 - WATER QUALITY BASIN, DETENTION

SECTION A-A
N.T.S.





CALCULATED AK
CHECKED DAB

HORIZONTAL SCALE IN FEET
0 10 20 40

N

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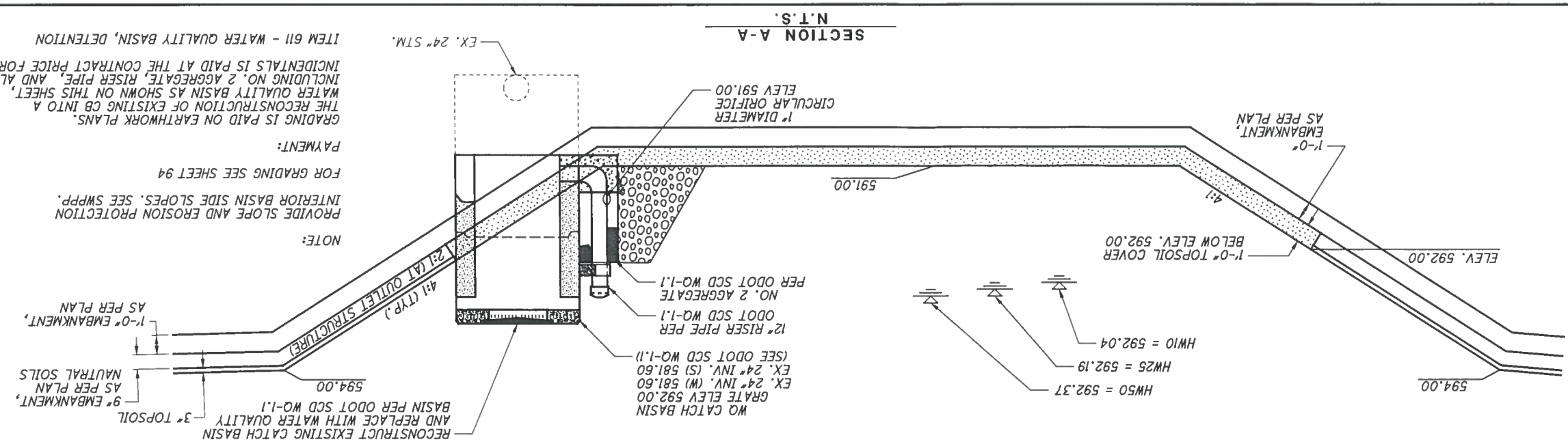
CUY-TOWPATH TRAIL, STAGE 3

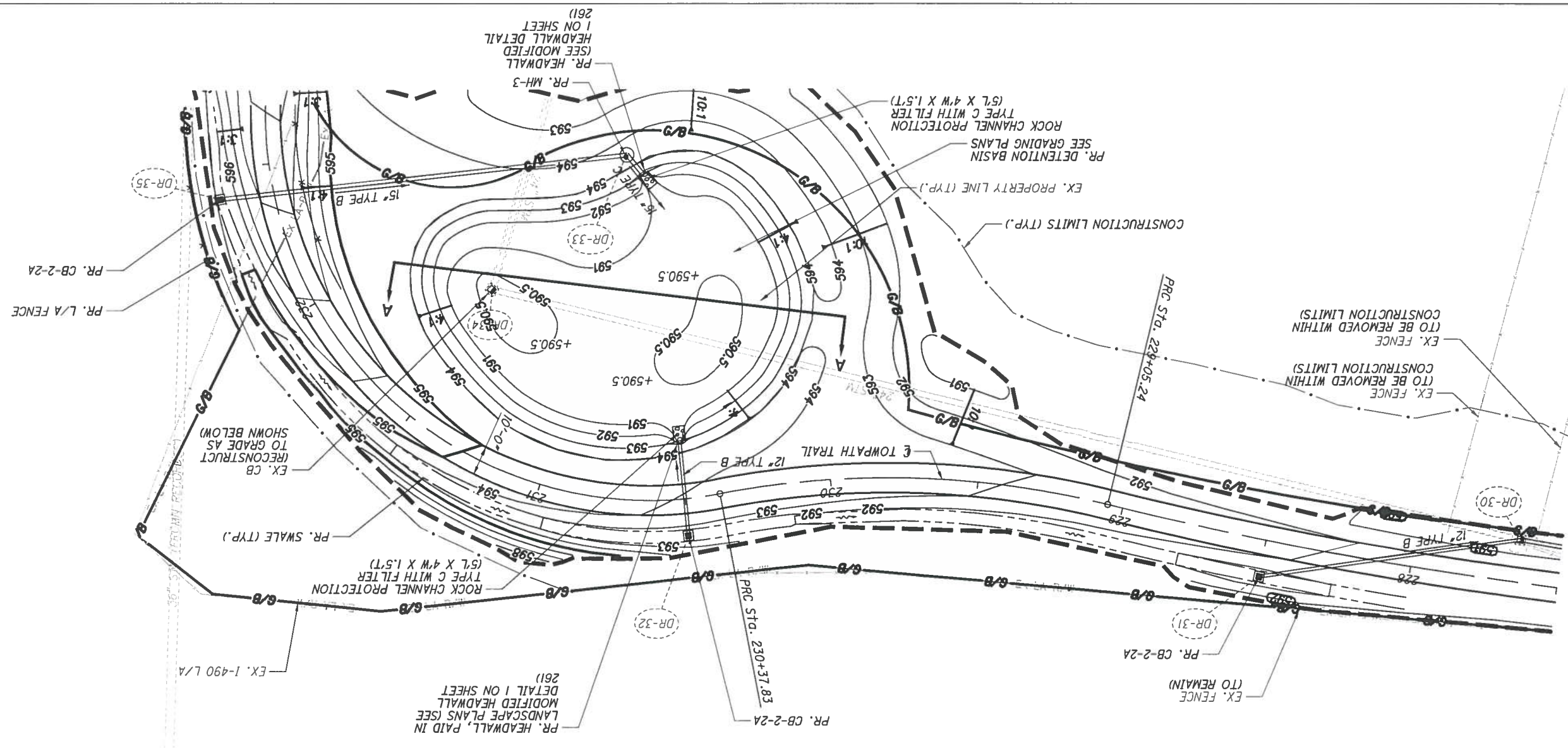
DRAINAGE DETAILS
DRY DETENTION BASIN - TOWPATH TRAIL

CALCULATED AK
CHECKED DAB

HORIZONTAL SCALE IN FEET
0 10 20 40



HYDRAULIC DESIGN TABLE	
DRAINAGE AREA	2.87 AC
HWWQV	591.28
HW5	592.01
HW10	592.04
HW25	592.19
HW50	592.37
QIN-5	4.87 CFS
QOUT-5	0.14 CFS
QIN-10	6.44 CFS
QOUT-10	0.46 CFS
QIN-25	8.79 CFS
QOUT-25	1.92 CFS
QIN-50	10.88 CFS
QOUT-50	4.55 CFS



337
122

CUY-TOWPATH TRAIL, STAGE 3

DRAINAGE DETAILS

WETLAND DETENTION BASIN - TOWPATH TRAIL

CALCULATED AK
CHECKED DAB

HORIZONTAL SCALE IN FEET
0 10 20 40

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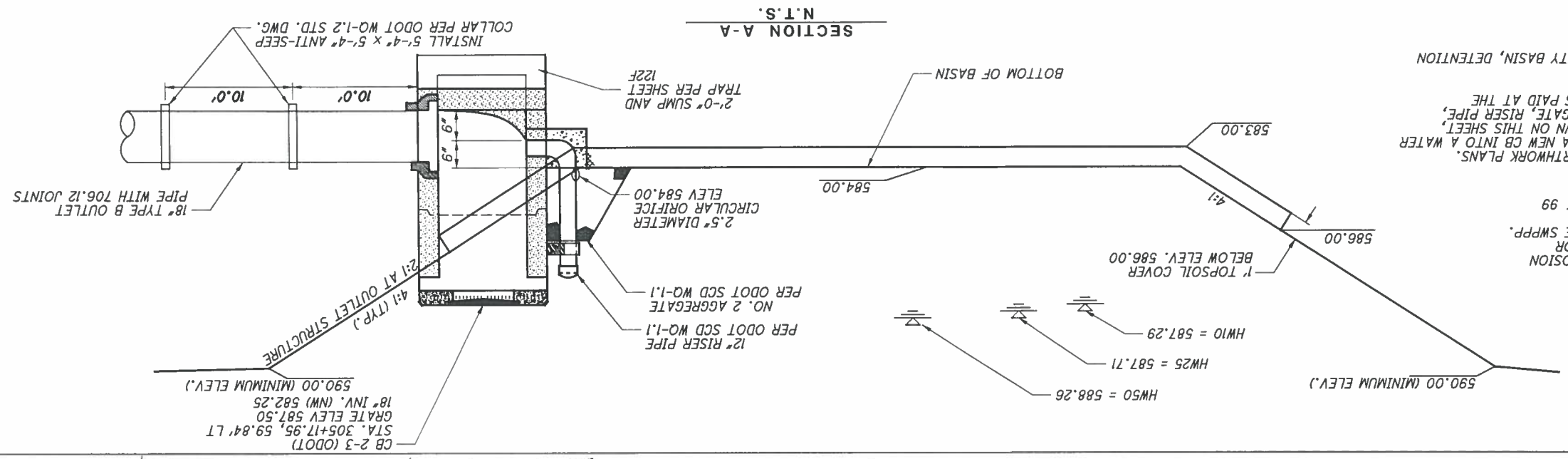
SECTION A-A
N.T.S.



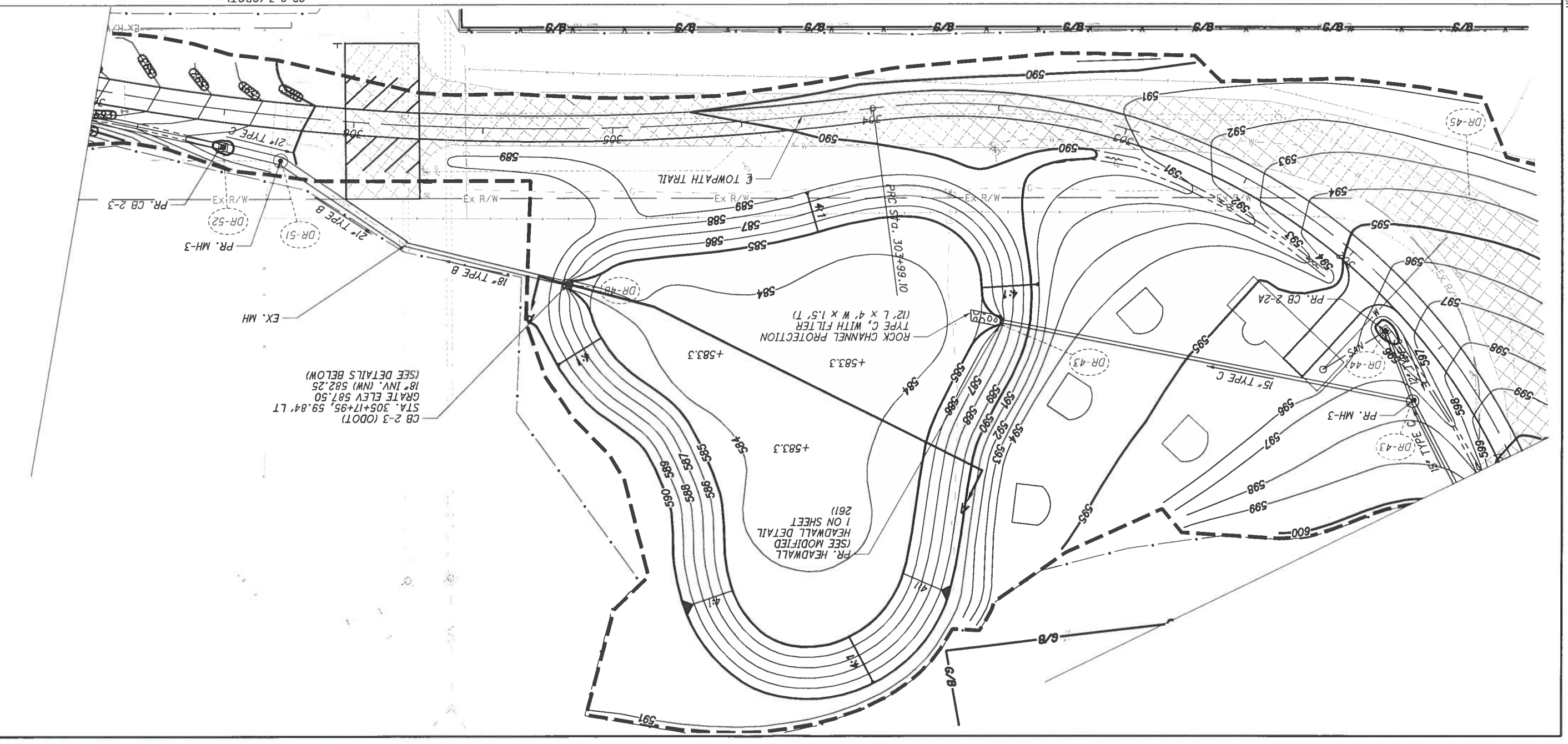
HYDRAULIC DESIGN TABLE	
DRAINAGE AREA	15.47 AC
HWWQv	586.86
HW5	587.09
HW10	587.29
HW25	587.71
HW50	588.26
QIN-S	30.68 CFS
QOUT-S	1.10 CFS
QIN-10	39.53 CFS
QOUT-10	3.10 CFS
QIN-25	53.29 CFS
QOUT-25	12.34 CFS
QIN-50	64.97 CFS
QOUT-50	15.97 CFS

NOTE:
PROVIDE SLOPE AND EROSION PROTECTION ON INTERIOR BASIN SIDE SLOPES. SEE SWPPP.

FOR GRADING SEE SHEET 99

PAYMENT:
GRADING IS PAID ON EARTHWORK PLANS. THE CONSTRUCTION OF A NEW CB INTO A WATER QUALITY BASIN AS SHOWN ON THIS SHEET, INCLUDING NO. 2 AGGREGATE, RISER PIPE, AND ALL INCIDENTALS, IS PAID AT THE CONTRACT PRICE FOR:

ITEM 611 - WATER QUALITY BASIN, DETENTION



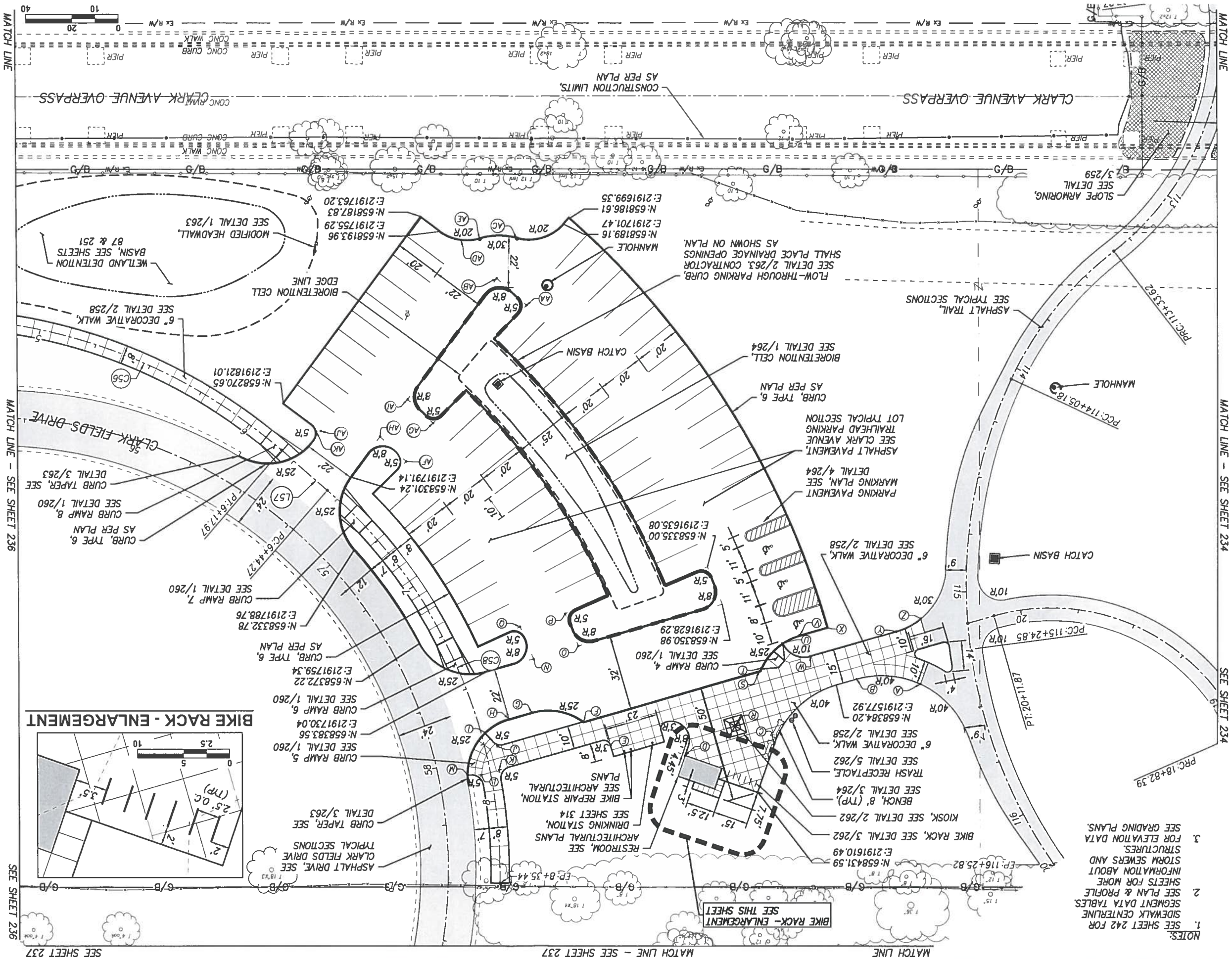
CUY-TOWPATH TRAIL, STAGE 3

LANDSCAPE PLAN - SITE IMPROVEMENTS

CLARK AVE TRAILHEAD

CALCULATED TR.CR
CHECKED KL.GN

POINT TABLE		
MARK	NORTHING EASTING	
A	N: 658382.68 E: 2191541.51	
B	N: 658381.43 E: 2191569.27	
C	N: 658410.44 E: 2191603.93	
D	N: 658416.68 E: 2191642.53	
E	N: 658413.24 E: 2191675.17	
F	N: 658403.39 E: 2191687.03	
G	N: 658400.11 E: 2191709.59	
H	N: 658403.28 E: 2191719.47	
I	N: 658409.66 E: 2191729.78	
J	N: 658415.24 E: 2191724.04	
K	N: 658425.40 E: 2191722.98	
L	N: 658427.77 E: 2191730.65	
M	N: 658427.99 E: 2191736.83	
N	N: 658377.04 E: 2191709.45	
O	N: 658370.85 E: 2191690.36	
P	N: 658357.16 E: 2191696.47	
Q	N: 658363.34 E: 2191715.71	
R	N: 658403.29 E: 2191621.13	
S	N: 658379.05 E: 2191611.01	
T	N: 658378.02 E: 2191610.61	
U	N: 658366.97 E: 2191601.85	
V	N: 658363.27 E: 2191594.54	
W	N: 658372.18 E: 2191589.58	
X	N: 658359.51 E: 2191582.79	
Y	N: 658360.37 E: 2191552.69	
Z	N: 658354.52 E: 2191542.24	
AA	N: 658224.51 E: 2191716.63	
AB	N: 658213.37 E: 2191729.81	
AC	N: 658195.84 E: 2191721.39	
AD	N: 658197.49 E: 2191745.55	
AE	N: 658196.56 E: 2191737.59	
AF	N: 658293.62 E: 2191767.04	
AG	N: 658276.75 E: 2191755.79	
AH	N: 658283.28 E: 2191778.61	
AI	N: 658266.82 E: 2191767.12	
AJ	N: 658281.64 E: 2191804.29	
AK	N: 658282.02 E: 2191806.37	



CUY-TOWPATH TRAIL, STAGE 3

LANDSCAPE PLAN - SITE IMPROVEMENTS

CLARK AVE TRAILHEAD AT CLARK FIELDS DRIVE

NOTES:
1. SEE SHEET 242 FOR SIDEWALK CENTERLINE SEGMENT DATA TABLES.
2. SEE PLAN & PROFILE SHEETS FOR MORE INFORMATION ABOUT STORM SEWERS AND STRUCTURES.
3. FOR ELEVATION DATA SEE GRADING PLANS.

CLARK AVENUE OVERPASS

MATCH LINE

MATCH LINE – SEE SHEET 235

SEE SHEET 235

CLARK AVENUE

CLARK FIELDS DRIVE 51

CONSTRUCTION LIMITS, AS PER PLAN

6" DECORATIVE WALK, SEE DETAIL 2/258

CURB RAMP 9, SEE DETAIL 1/260

MANHOLE

BP: 0+00.00

6" CONCRETE WALK, AS PER PLAN

CURB RAMP 10, SEE DETAIL 1/260

CURB, TYPE 6, AS PER PLAN

CURB TAPER, SEE DETAIL 3/263

PC: 0+31.70

CATCH BASIN

WETLAND DETENTION BASIN, SEE SHEETS 87 & 251

INTERPRETIVE SIGN NPS, SEE STRUCTURAL PLANS

MODIFIED HEADWALL, SEE DETAIL 1/263

N: 658234.02
E: 2192000.01

PCC: 4+76.81

PC: 3+83.39

PI: 3+24.89

PCC: 5+17.46

PCC: 1+93.85

ASPHALT DRIVE, SEE CLARK FIELDS DRIVE TYPICAL SECTIONS

WETLAND DETENTION BASIN, SEE SHEETS 87-88 & 251-252

MODIFIED HEADWALL, SEE DETAIL 1/263

CATCH BASIN

C51 C52 C53 C54 C55

L51 L52 L53 L54

5R 20R 30R 3R

B/G E/R/W

MATCH LINE SEE SHEET 237

CALCULATED TR,CR
CHECKED KL,GN

HORIZONTAL SCALE IN FEET
0 10 20 40

N

240
337

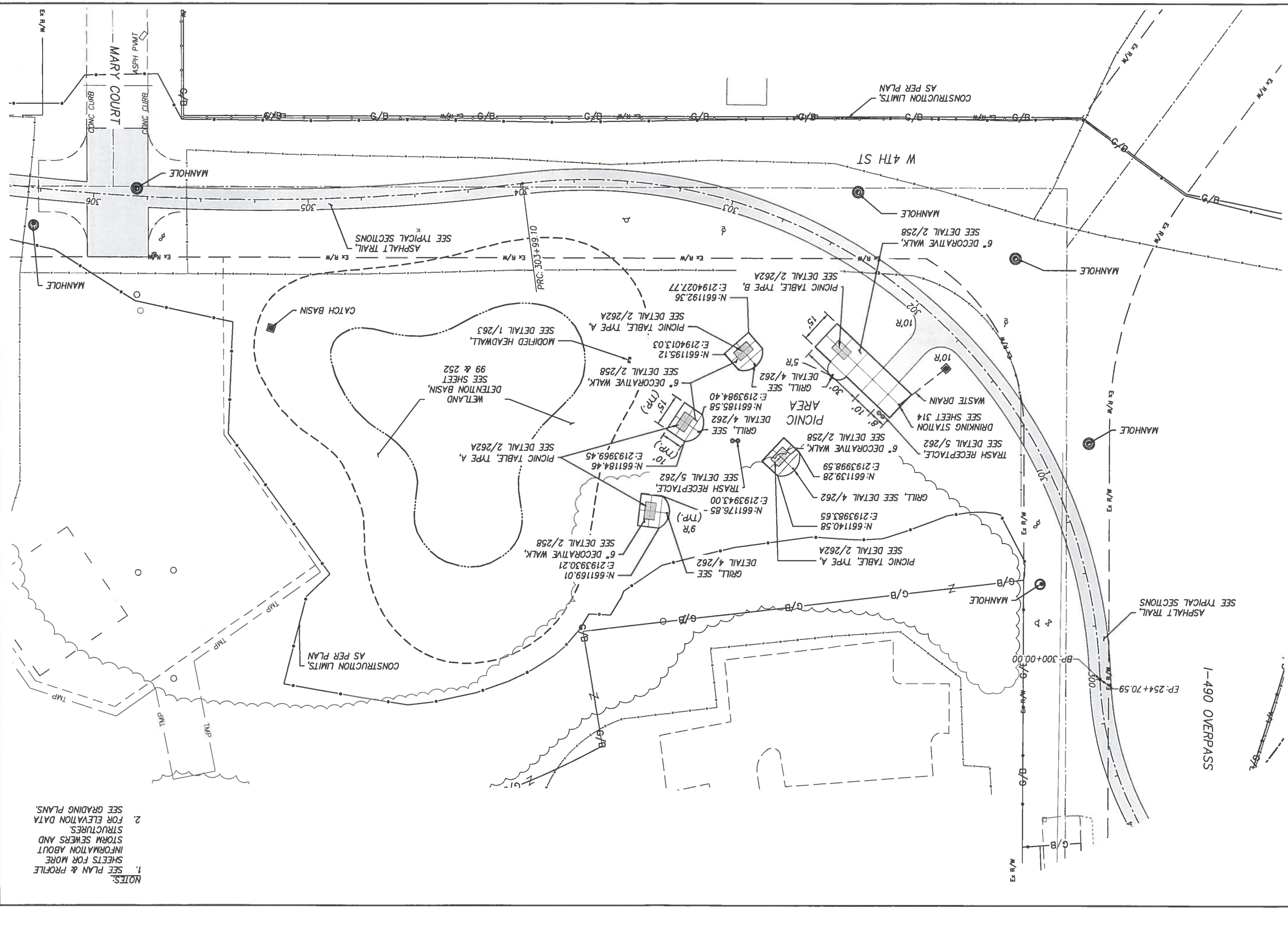
CUY-TOWPATH TRAIL, STAGE 3

LANDSCAPE PLAN - SITE IMPROVEMENTS

MARY COURT WETLAND DETENTION BASIN

CALCULATED TR,CR
CHECKED KL,GN

HORIZONTAL SCALE IN FEET
0 10 20 40



NOTES:
1. SEE PLAN & PROFILE SHEETS FOR MORE INFORMATION ABOUT STORM SEWERS AND STRUCTURES.
2. FOR ELEVATION DATA SEE GRADING PLANS.

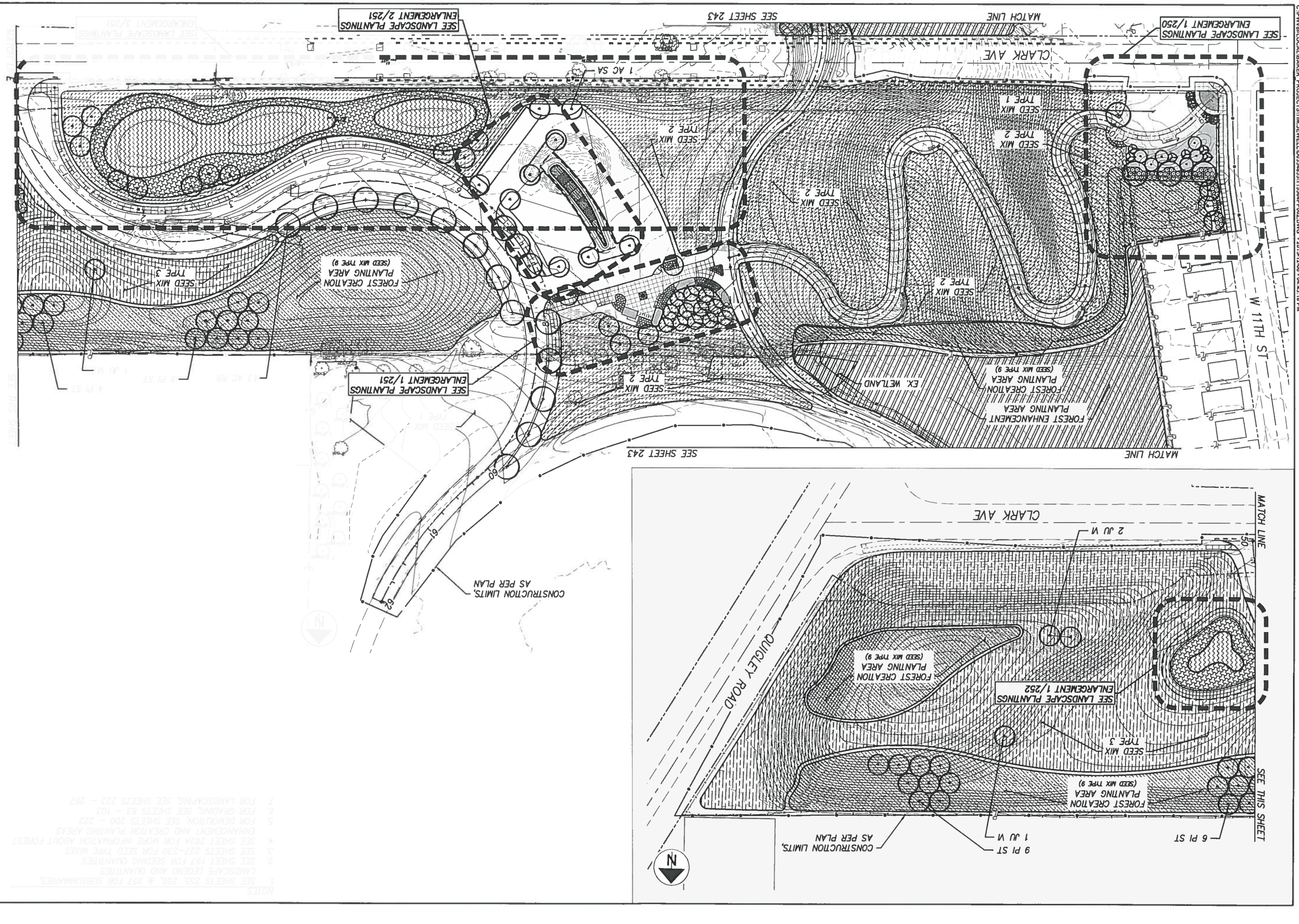
CUY-TOWPATH TRAIL, STAGE 3

LANDSCAPE PLAN - PLANTINGS

W 11TH ST & CLARK AVE - NEIGHBORHOOD CONNECTOR & TRAIL HEAD

CALCULATED TR.CR
CHECKED KL.GN

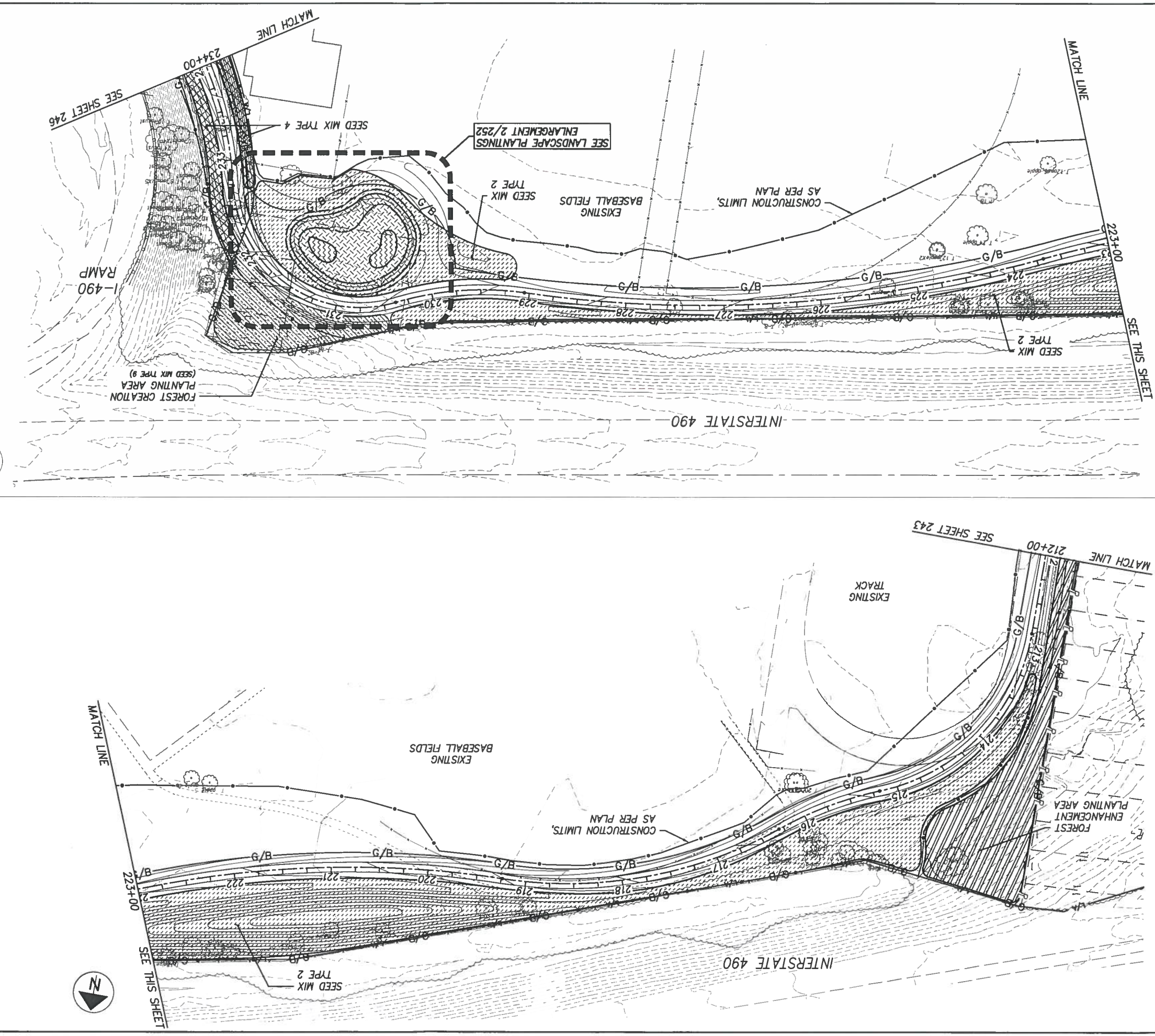
HORIZONTAL SCALE IN FEET
0 25 50 100



CUY-TOWPATH TRAIL, STAGE 3

LANDSCAPE PLAN - PLANTINGS

STA 212+00 TO STA 234+00 - CLARK FIELDS AREA



NOTES

1. SEE SHEETS 255, 256, & 257 FOR SUBSUMMARIES, LANDSCAPE LEGEND AND QUANTITIES
2. SEE SHEET 197 FOR SEEDING QUANTITIES
3. SEE SHEETS 227–230 FOR SEED TYPE MIXES
4. SEE SHEET 262A FOR MORE INFORMATION ABOUT FOREST ENHANCEMENT AND CREATION PLANTING AREAS
5. FOR DEMOLITION, SEE SHEETS 200 – 222
6. FOR GRADING, SEE SHEETS 83 – 103
7. FOR LANDSCAPING, SEE SHEETS 223 – 267

CALCULATED TR.CR
CHECKED KL.GN

HORIZONTAL SCALE IN FEET
0 25 50 100

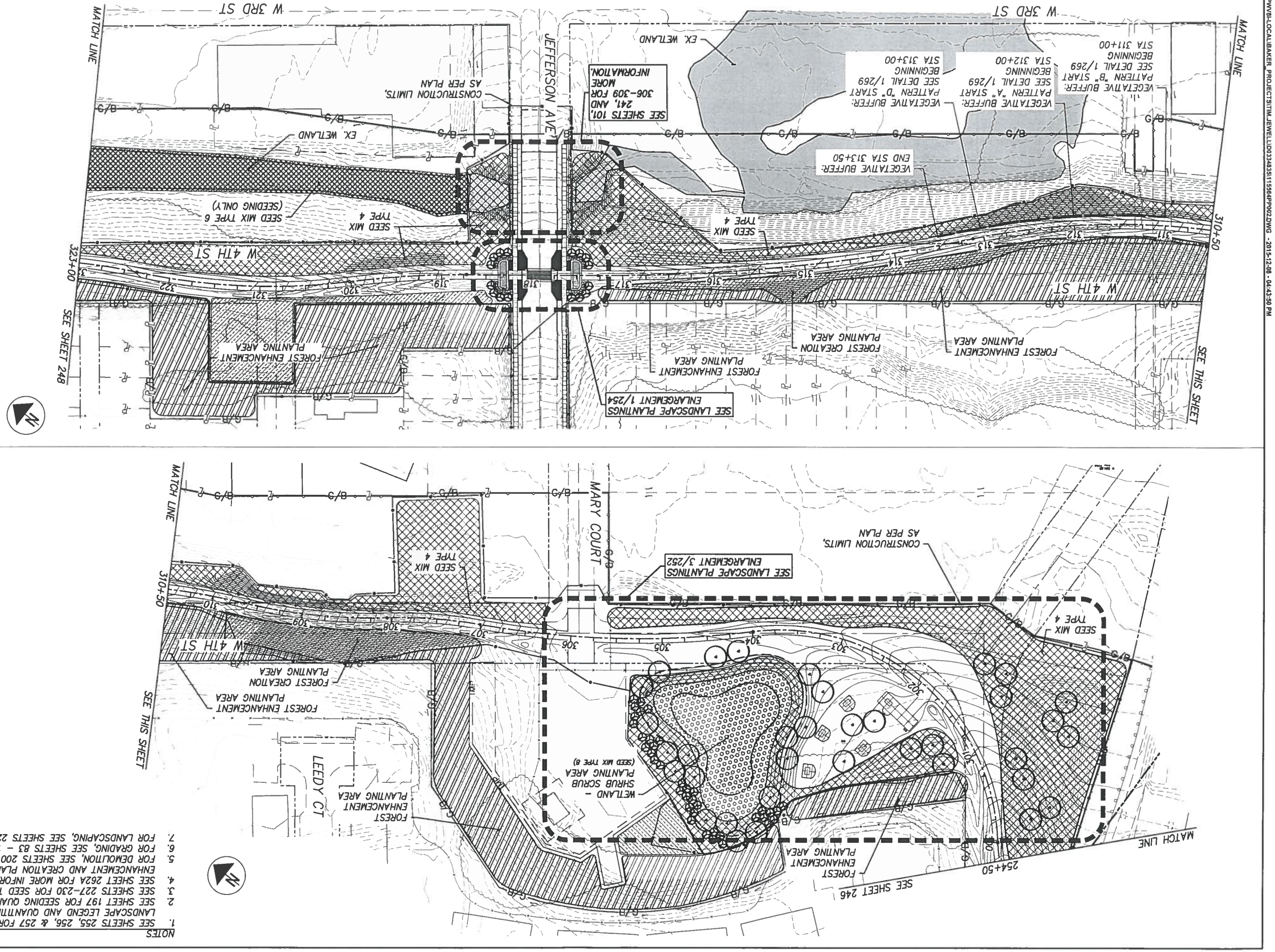
CUY-TOWPATH TRAIL, STAGE 3

LANDSCAPE PLAN - PLANTINGS

STA 254+50 TO STA 323+00 - CHMA HOUSING AREA & W 4TH ST

CALCULATED TR.CR
CHECKED KL.GN

HORIZONTAL SCALE IN FEET
0 25 50 100



NOTES

1. SEE SHEETS 255, 256, & 257 FOR SUBSUMMARIES, LANDSCAPE LEGEND AND QUANTITIES
2. SEE SHEET 197 FOR SEEDING QUANTITIES
3. SEE SHEETS 227-230 FOR SEED TYPE MIXES
4. SEE SHEET 262A FOR MORE INFORMATION ABOUT FOREST ENHANCEMENT AND CREATION PLANTING AREAS
5. FOR DEMOLITION, SEE SHEETS 200 - 222
6. FOR GRADING, SEE SHEETS 83 - 103
7. FOR LANDSCAPING, SEE SHEETS 223 - 267

LANDSCAPE PLAN - PLANTINGS
CUY-TOWPATH TRAIL, STAGE 3
CLARK FIELDS TRAIL HEAD & WETLAND BASIN
ENLARGEMENT - CLARK FIELDS TRAIL HEAD & WETLAND BASIN

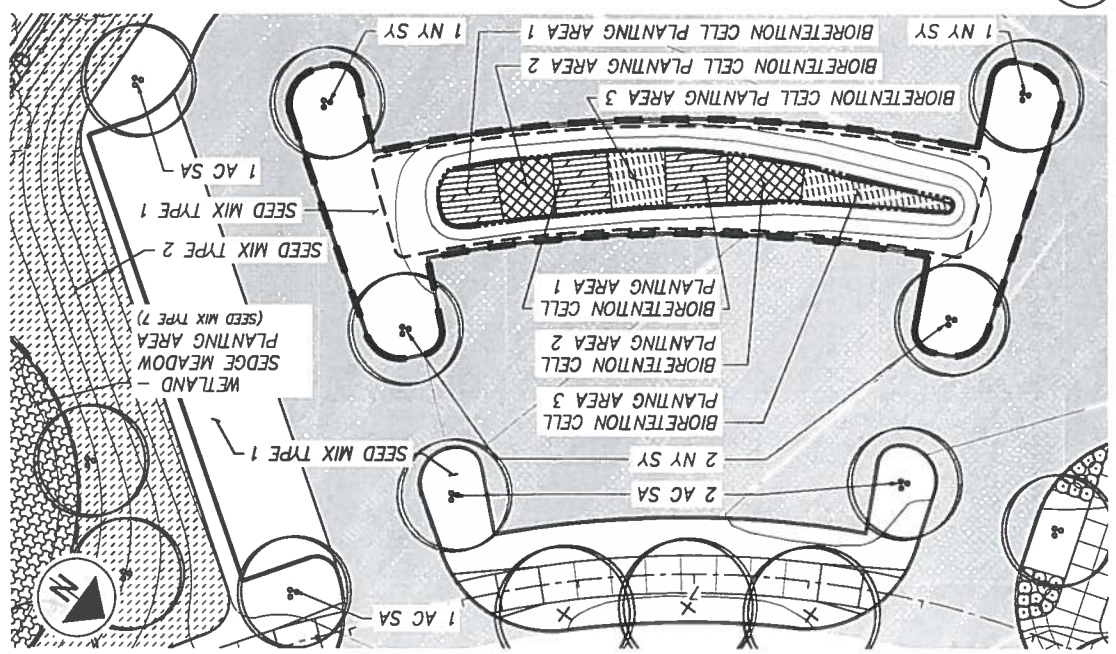
251 / 337

CALCULATED TR,CR
CHECKED KL,GN

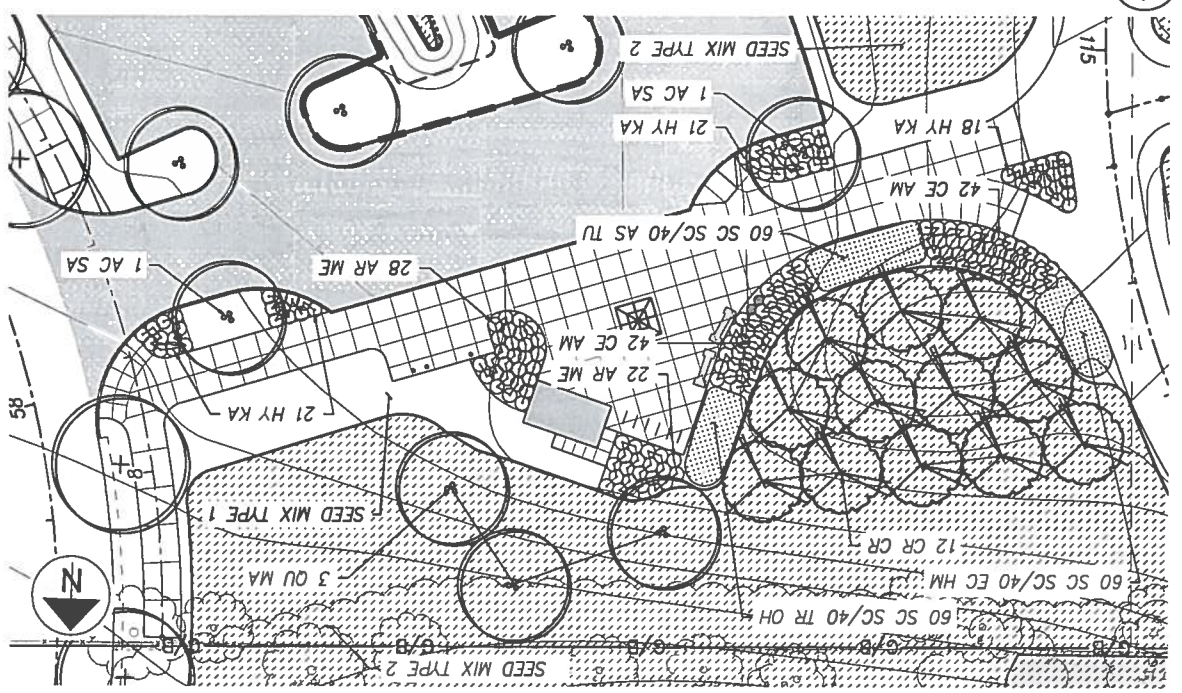
HORIZONTAL SCALE IN FEET
0 10 20 40

NOTES

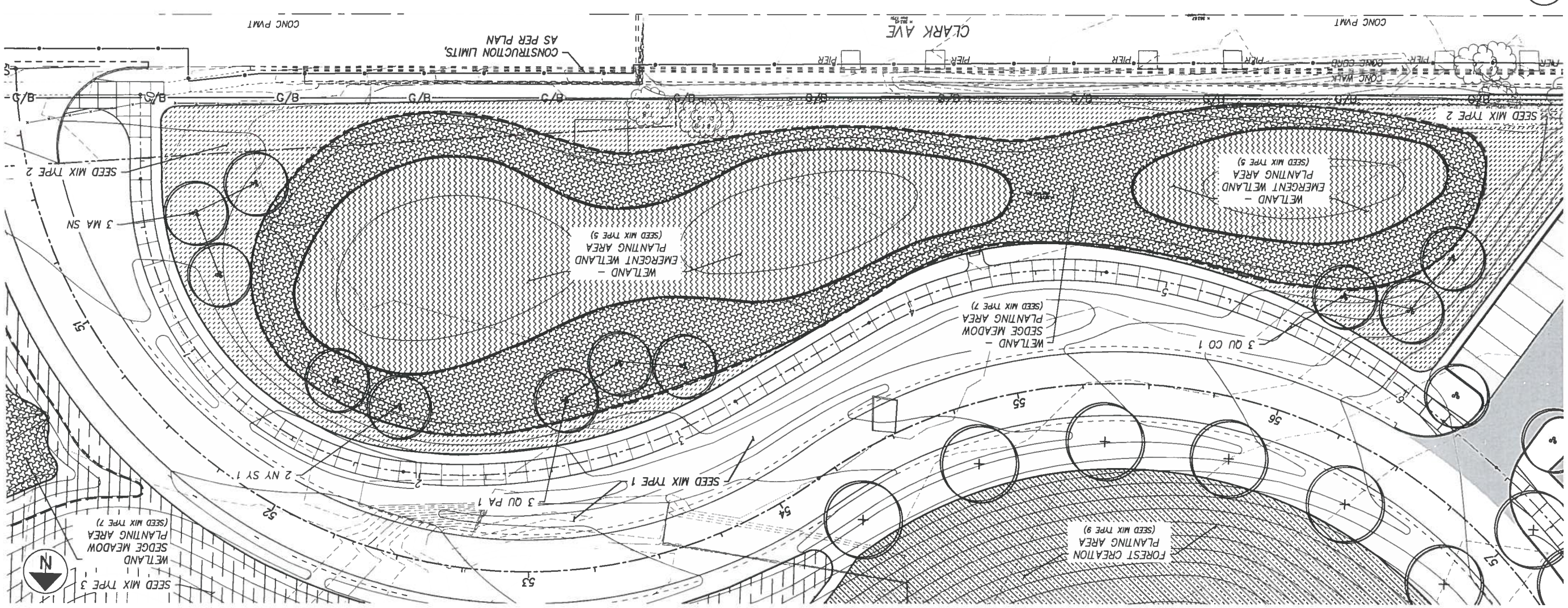
1. SEE SHEETS 255, 256, & 257 FOR SUBSUMMARIES, LANDSCAPE LEGEND AND QUANTITIES
2. SEE SHEET 197 FOR SEEDING QUANTITIES
3. SEE SHEETS 227-230 FOR SEED TYPE MIXES
4. SEE SHEET 262A FOR MORE INFORMATION ABOUT FOREST ENHANCEMENT AND CREATION PLANTING AREAS
5. FOR DEMOLITION, SEE SHEETS 200 – 222
6. FOR GRADING, SEE SHEETS 83 – 103
7. FOR LANDSCAPING, SEE SHEETS 223 – 267
8. CONTRACTOR SHALL NOT DIG DEEPER THAN 18" IN CLARK FIELDS WEST WETLAND BASIN AND ENTRY DRIVE ENLARGEMENT. THIS AREA HAS GEOSYNTHETIC CLAY LINER. SEE GRADING PLAN SHEET 86-88 AND EARTHWORK SHEETS 78-80 FOR MORE INFORMATION.



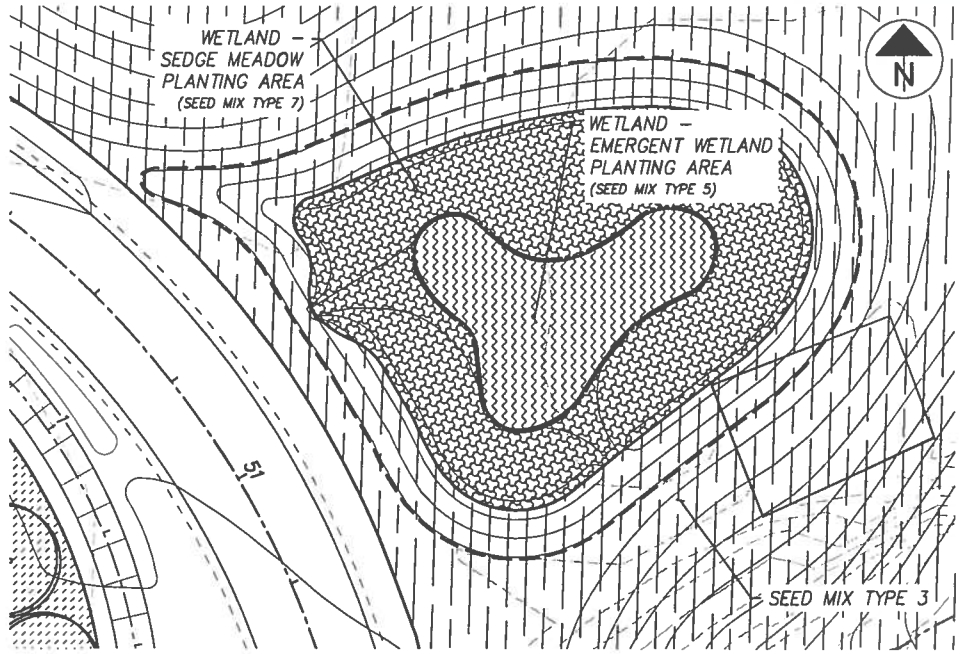
2 / 251 CLARK FIELDS PARKING LOT ENGLARGEMENT



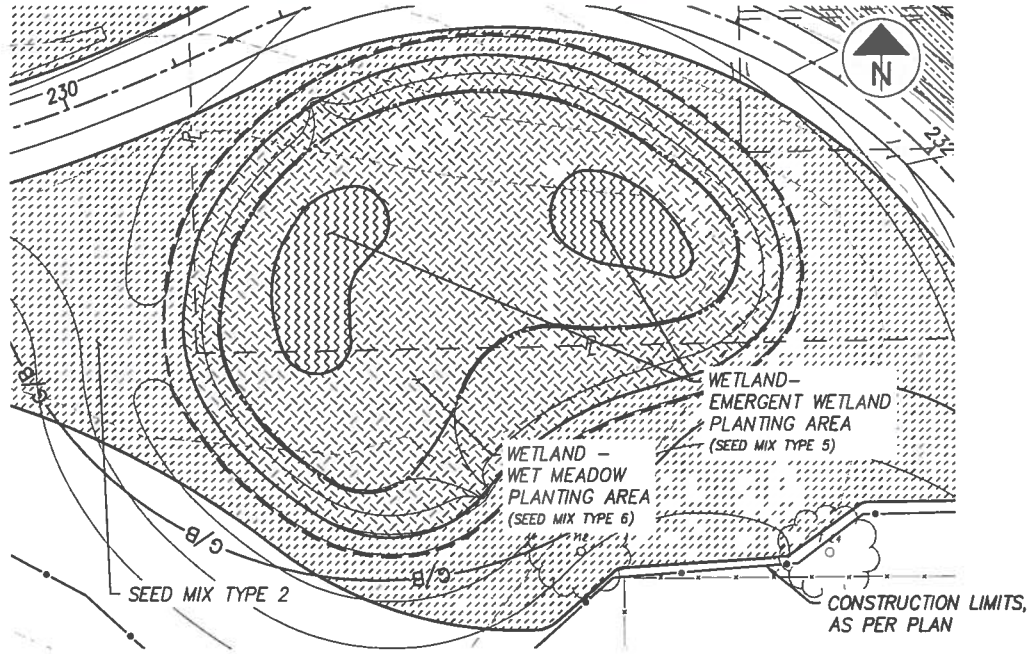
1 / 251 CLARK FIELDS TRAIL HEAD ENLARGEMENT



3 / 251 CLARK FIELDS WEST WETLAND BASIN AND ENTRY DRIVE ENLARGEMENT



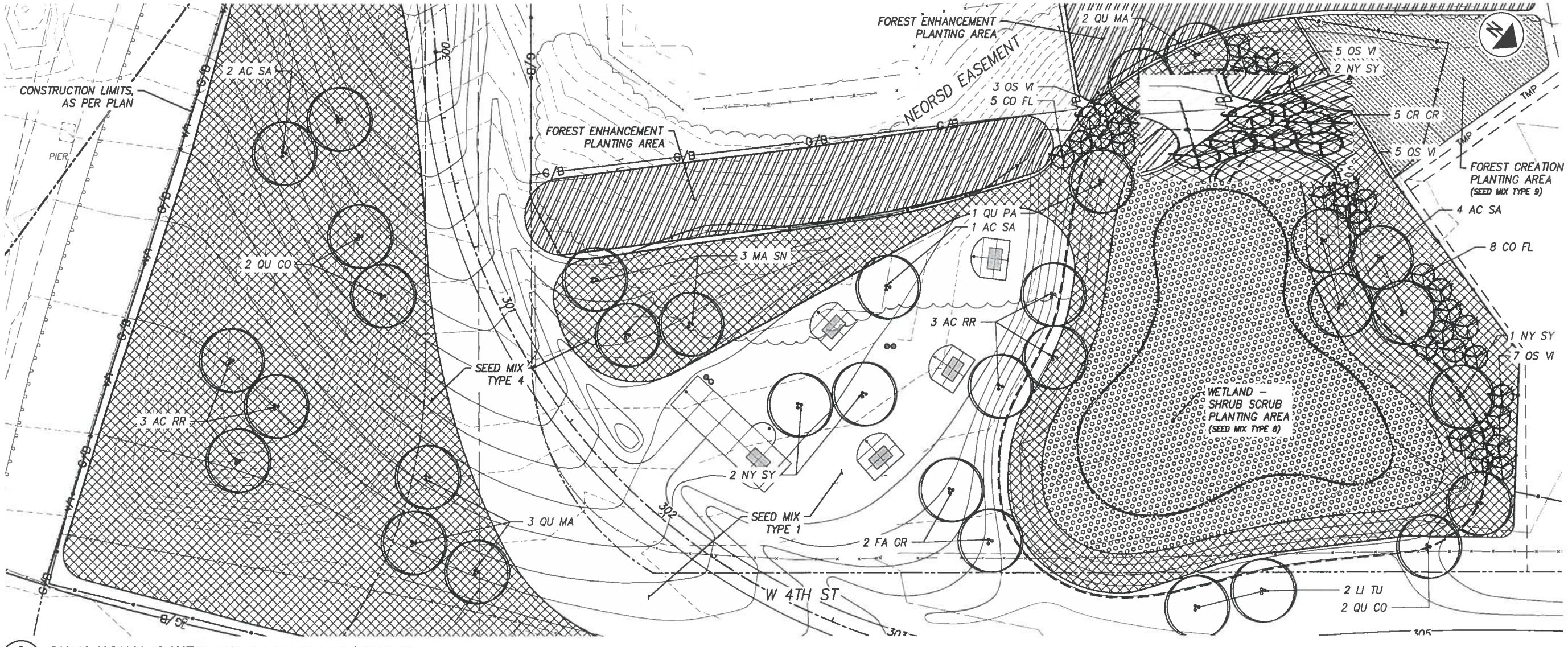
1 252 **CLARK FIELDS EAST WETLAND BASIN ENLARGEMENT**



2 252 **CLARK FIELDS NORTH WETLAND BASIN & STORM WATER BASIN ENLARGEMENT**

NOTES

1. *SEE SHEETS 255, 256, & 257 FOR SUBSUMMARIES, LANDSCAPE LEGEND AND QUANTITIES*
2. *SEE SHEET 197 FOR SEEDING QUANTITIES*
3. *SEE SHEETS 227–230 FOR SEED TYPE MIXES*
4. *SEE SHEET 262A FOR MORE INFORMATION ABOUT FOREST ENHANCEMENT AND CREATION PLANTING AREAS*
5. *FOR DEMOLITION, SEE SHEETS 200 – 222*
6. *FOR GRADING, SEE SHEETS 83 – 103*
7. *FOR LANDSCAPING, SEE SHEETS 223 – 267*



3 252 **CHMA HOUSING WETLAND BASIN ENLARGEMENT**

HORIZONTAL SCALE IN FEET 0 10 20 40

CALCULATED TR,CR | CHECKED KL,GN

LANDSCAPE PLAN - PLANTINGS
ENLARGEMENT - CLARK FIELDS AREA & THE BLUFFS AREA

CUY-TOWPATH TRAIL, STAGE 3

252 / 337

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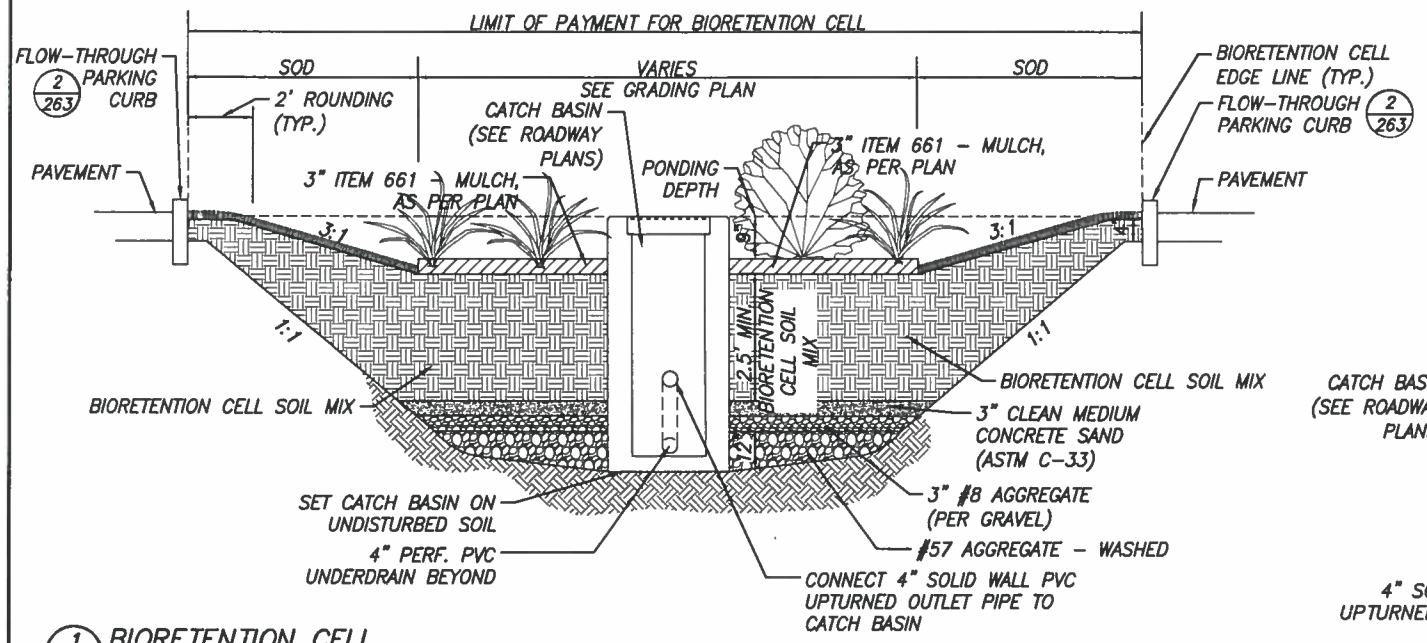
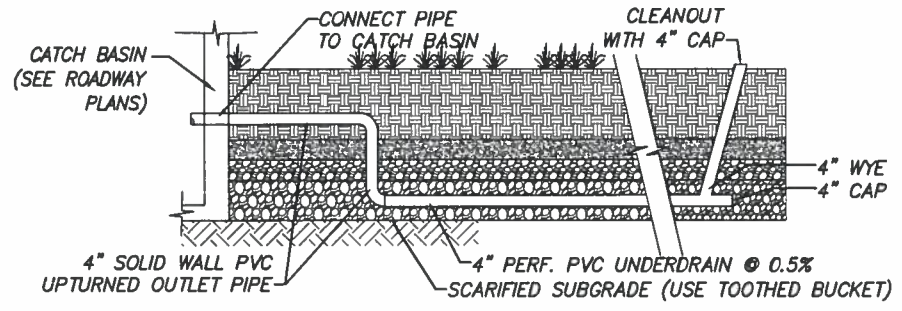


1/264 BIORETENTION CELL
NOT TO SCALE

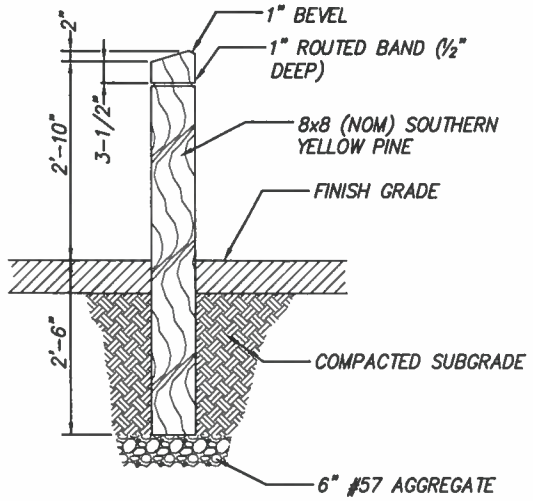
BIORETENTION CELL SOIL MIX:

1. TEXTURE CLASS: SANDY LOAM OR LOAMY SAND, HAVING NO LESS THAN 80% SAND AND NO GREATER THAN 10% CLAY CONSIDERING ONLY THE MINERAL FRACTION OF THE SOIL.
2. pH RANGE: 5.2-8.0
3. DECOMPOSED ORGANIC MATTER: 3%-5% BY WEIGHT
4. PHOSPHORUS: SOIL p-INDEX SHOULD BE BETWEEN 15 AND 60 mg/kg(ppm) AS DETERMINED BY THE MEHLICH III TEST.
5. SOLUBLE SALTS: 500 ppm MAXIMUM.
6. SAND ADDED TO MEET TEXTURAL CLASS OR THE COMPOSITION BELOW SHALL BE CLEAN AND MEET AASHTO M-6 OR ASTM C-33 WITH A GRAIN SIZE OF 0.02-0.04" INCHES
7. SOILS AND SOIL MIXES SHALL BE CERTIFIED BY A QUALIFIED LABORATORY, 1 TEST PER 100 CY OF SOIL



NOTES:
ALL WORK ON THIS DETAIL, INCLUDING BIORETENTION CELL SOIL MIX LAYER, SOD, AGGREGATE LAYERS, AND BIORETENTION UNDERDRAINS, SHALL BE PAID UNDER ITEM 203 - SPECIAL - BIORETENTION CELL, UNLESS OTHERWISE NOTED.

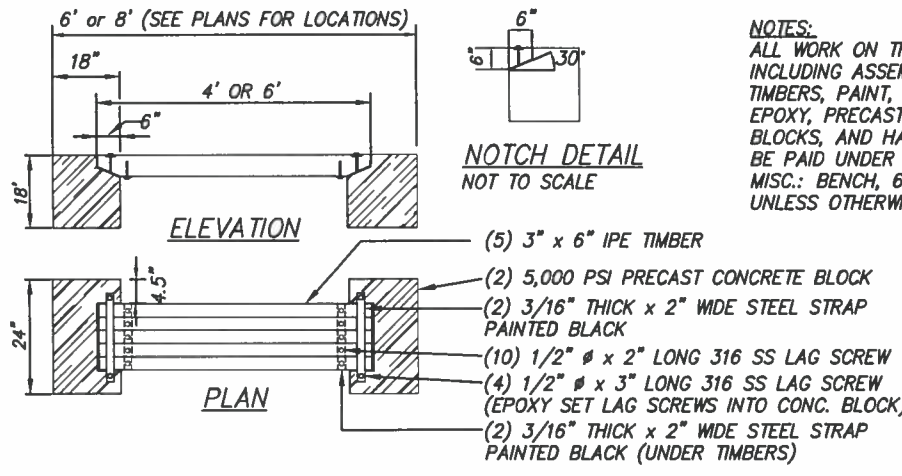
1. SEE SHEETS 251 & 255 FOR BIORETENTION CELL PLANTS.
2. FOR GRADING PLANS, SEE SHEETS 83-103.
2. FOR UTILITY INFORMATION, SEE SHEETS 68-69.
3. PIPES FOR UPTURNED UNDERDRAIN TO BE SOLID WALL PIPE. ENSURE INVERT IS 18" BELOW BIORETENTION CELL SURFACE.
4. CONTRACTOR SHALL USE TOOTHED BUCKET INSTEAD OF SMOOTH BUCKET TO EXCAVATE THE BOTTOM OF BIORETENTION CELL (SCARIFICATION).
5. FLOW-THROUGH PARKING CURB SHALL BE PAID UNDER ITEM 609 - CURB, MISC.: FLOW-THROUGH PARKING CURB.
6. RECYCLED CONCRETE AGGREGATE OR SLAG ARE NOT ACCEPTABLE.
7. FURNISH AND PLACE SOD PER ITEM 660, EXCEPT DO NOT PLACE TOPSOIL OR ANY MATERIAL OTHER THAN BIORETENTION CELL SOIL MIX TO EVEN OR LEVEL SUBSURFACE PRIOR TO SOD PLACEMENT. WHEN TAMPING SOD, DO NOT TO COMPACT BIORETENTION CELL SOIL MIX. PAYMENT FOR SOD SHALL BE PAID UNDER ITEM SPECIAL - BIORETENTION CELL.



2/264 WOOD BOLLARD
NOT TO SCALE

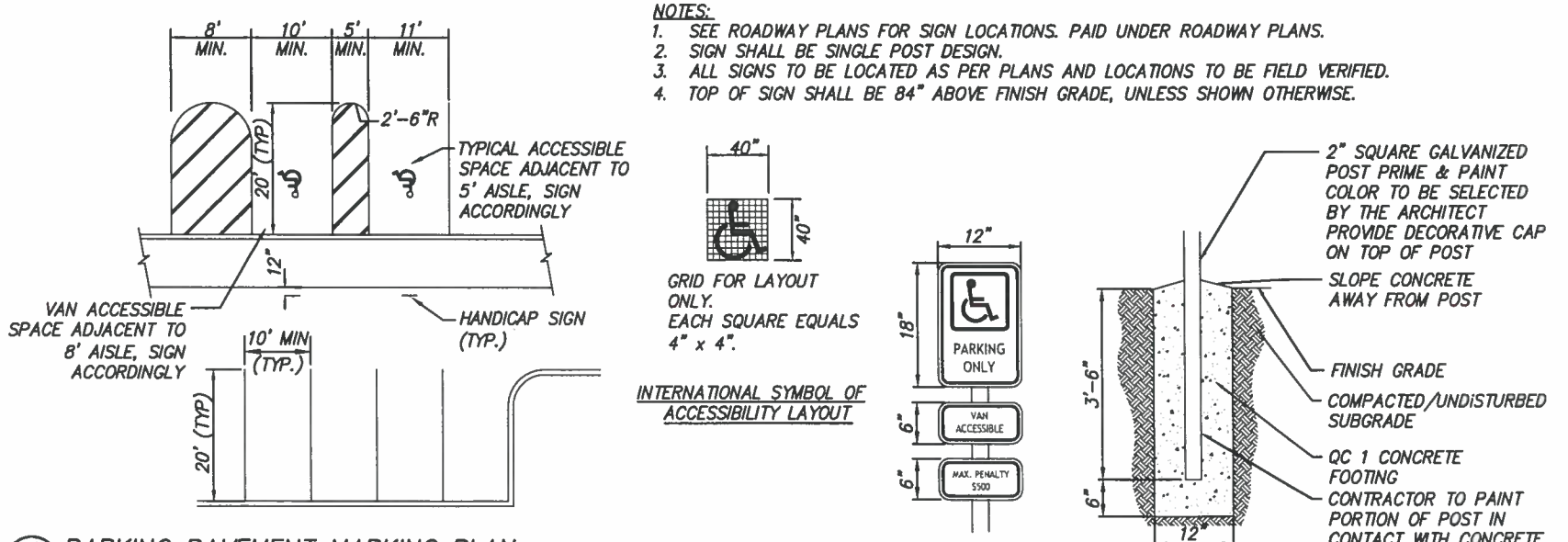
NOTES:
ALL WORK ON THIS DETAIL, INCLUDING #57 AGGREGATE, SHALL BE PAID UNDER ITEM 607 - FENCE, MISC.: WOOD BOLLARD, UNLESS OTHERWISE NOTED.

1. ALL TIMBERS SHALL BE AS SPECIFIED IN ODOT 711.26. TIMBERS SHALL BE TREATED #1 SOUTHERN YELLOW PINE TREATED WITH 0.15#/CF OF CA IN ACCORDANCE WITH THE AMERICAN WOOD PRESERVERS ASSOCIATION, AND DRESSED S4S IN ACCORDANCE WITH THE SOUTHERN FOREST PRODUCTS ASSOCIATION OR WESTERN WOOD PRODUCTS ASSOCIATION.
2. CONTRACTOR SHALL APPLY TWO (2) COATS OF SOLID EXTERIOR WOOD STAIN FOLLOWING THE MANUFACTURER'S REQUIREMENTS FOR APPLICATION TO ALL TIMBER SURFACES. ENGINEER WILL SELECT THE COLOR FROM SAMPLES PROVIDED BY THE CONTRACTOR. ACCEPTABLE MANUFACTURERS: BENJAMIN MOORE, ICI DULUX PAINTS, SHERWIN WILLIAMS, OR APPROVED EQUAL.



3/264 BENCH
NOT TO SCALE

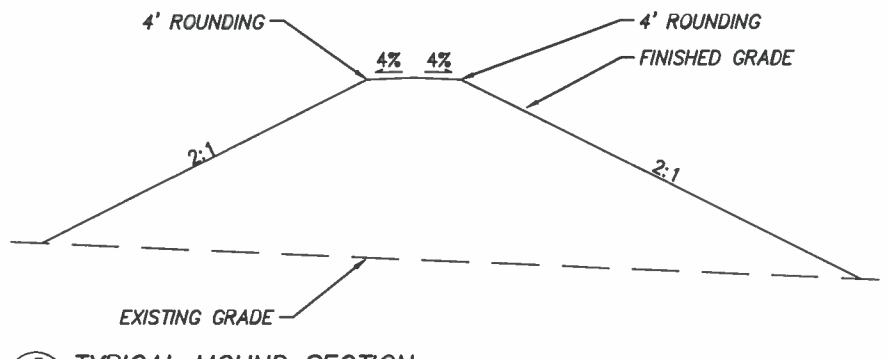
NOTES:
ALL WORK ON THIS DETAIL, INCLUDING ASSEMBLY, IPE TIMBERS, PAINT, STEEL STRAPS, EPOXY, PRECAST CONCRETE BLOCKS, AND HARDWARE, SHALL BE PAID UNDER ITEM SPECIAL - MISC.: BENCH, 6' OR BENCH 8', UNLESS OTHERWISE NOTED.



4/264 PARKING PAVEMENT MARKING PLAN
NOT TO SCALE

NOTES:
1. SEE ROADWAY PLANS FOR SIGN LOCATIONS. PAID UNDER ROADWAY PLANS.
2. SIGN SHALL BE SINGLE POST DESIGN.
3. ALL SIGNS TO BE LOCATED AS PER PLANS AND LOCATIONS TO BE FIELD VERIFIED.
4. TOP OF SIGN SHALL BE 84" ABOVE FINISH GRADE, UNLESS SHOWN OTHERWISE.

NOTES:
1. SEE 2/259 FOR MORE INFORMATION.
2. WIDTH AND HEIGHT OF MOUNDS VARY, FOR GRADING PLANS, SEE SHEETS 83-103.
3. PLACE 4" OF ITEM 653 - TOPSOIL, FURNISHED AND PLACED, FOR MORE INFORMATION SEE EARTHWORK PLANS, SHEETS 77-82.
4. CONTRACTOR SHALL PROVIDE AS-BUILT SURVEY OF ALL MOUNDS FOR REVIEW AND APPROVAL BY ENGINEER PRIOR TO PLANTING.



5/264 TYPICAL MOUND SECTION
NOT TO SCALE

CALCULATED TR,CR
CHECKED KL,GN

LANDSCAPE PLAN - CONSTRUCTION DETAILS

CUY-TOWPATH TRAIL, STAGE 3

264/337

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