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Agenda 2023-05-25

Subsection 7Bii

Billy's Trail Development Plan

High Resolution Graphics
Delivered Herein Under Separate Cover

SITE DEVELOPMENT PLAN

COPY

PD_____

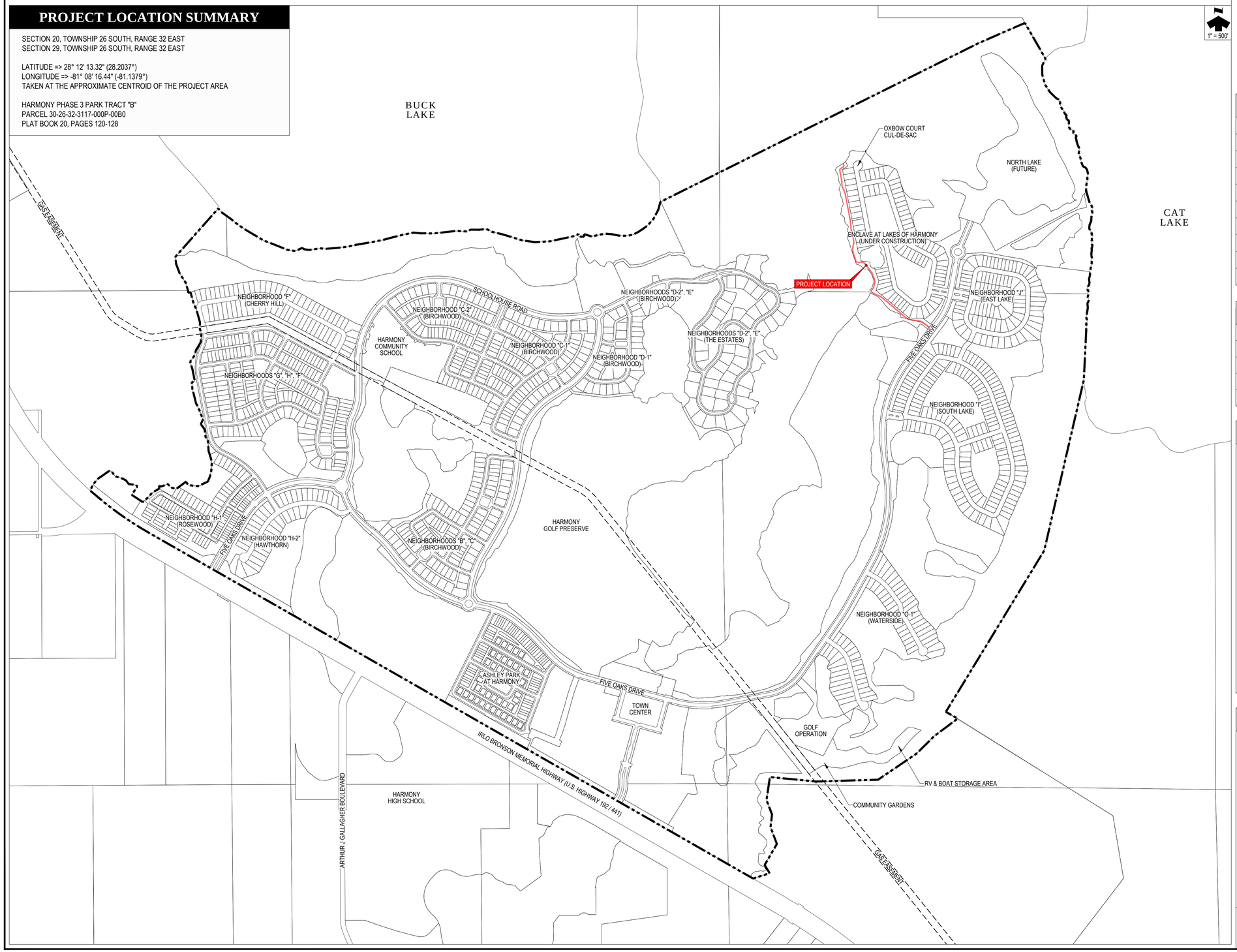
BILLY'S TRAIL RE-ALIGNMENT
FROM FIVE OAKS DRIVE TO THE OXBOW COURT CUL-DE-SAC
HARMONY (ST. CLOUD), FLORIDA

PROJECT LOCATION SUMMARY

SECTION 20, TOWNSHIP 26 SOUTH, RANGE 32 EAST
SECTION 29, TOWNSHIP 26 SOUTH, RANGE 32 EAST

LATITUDE => 28° 12' 13.32" (28.2037°)
LONGITUDE => -81° 08' 16.44" (-81.1379°)
TAKEN AT THE APPROXIMATE CENTROID OF THE PROJECT AREA

HARMONY PHASE 3 PARK TRACT "B"
PARCEL 30-26-32-3117-000P-00B0
PLAT BOOK 20, PAGES 120-128



HARMONY FLORIDA Community Development District

CDD BOARD OF SUPERVISORS

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Daniel Leet	Vice Chairman, Seat 1
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Angel Montagna (InfraMark)	District Manager
David Hamstra (Pegasus Engineering)	District Engineer
Micahel Eckert (Kutak Rock, LLP)	District Legal Counsel
Brett Perez	Area Field Director

DRAWING INDEX

SHEET	DRAWING TITLE
C01	COVER SHEET
C02	HARMONY PHASE 3 PLAT
C03 - C04	SITE PLAN
C05	SITE PLAN DETAILS
C06 - C07	MISCELLANEOUS DETAILS

PLANS SUBMITTAL AND REVISION SUMMARY

NO.	DATE	DESCRIPTION

NOTES

1. GOVERNING SPECIFICATIONS: STATE OF FLORIDA, DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS (LATEST EDITION) AND SUPPLEMENTS THERETO IF NOTED IN THE BID DOCUMENTS FOR THIS PROJECT.
2. ATTENTION IS DIRECTED TO THE FACT THAT THESE PLANS MAY HAVE BEEN CHANGED IN SIZE BY REPRODUCTION. THIS MUST BE CONSIDERED WHEN OBTAINING SCALED DATA.
   - 11" x 17" DRAWINGS ~ NOT TO SCALE
   - 12" x 18" DRAWINGS ~ HALF SIZE
   - 24" x 36" DRAWINGS ~ TO SCALE
3. ELEVATION INFORMATION SHOWN WITHIN THESE PLANS IS REFERENCED TO THE NAVD88 VERTICAL DATUM.
4. DATUM SHIFT FOR THIS PROJECT (SEE PROJECT LOCATION SUMMARY THIS SHEET) WILL BE APPLIED AS A CONSTANT VALUE FOR CONVERTING ELEVATIONS BETWEEN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AND THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29).

COMPUTED DATUM SHIFTS
- NAVD88 + 1.333' = NGVD29
- NGVD29 - 1.333' = NAVD88

CERTIFICATION BY THE ENGINEER OF RECORD

State of Florida Board of Professional Engineers
Certificate of Authorization No. 27770

Pegasus ENGINEERING

PEGASUS ENGINEERING, LLC
310 WEST STATE ROAD 434, SUITE 309
WINTER SPRINGS, FLORIDA 32708
PHONE: 407-992-9160
FAX: 407-358-5155

DAVID WAYNE HAMSTRA LICENSE No. 38652 STATE OF FLORIDA PROFESSIONAL ENGINEER

PRELIMINARY

DAVID W. HAMSTRA
FLORIDA P.E. NUMBER 38652

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY DAVID W. HAMSTRA, P.E. ON APRIL __, 2023 USING A DIGITAL SIGNATURE. PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

THIS CERTIFICATION EXCLUDES CERTAIN INFORMATION THAT WAS PREPARED "BY OTHERS" AND MAY BE INCLUDED IN THE PLANS FOR THE CONTRACTOR'S CONVENIENCE, INCLUDING BUT NOT LIMITED TO THE TOPOGRAPHIC SURVEYS, MANUFACTURER DETAILS, FDOT DETAILS OBTAINED FROM THE DESIGN STANDARDS, AND STANDARD DETAILS PROVIDED BY THE CITY OF ST. CLOUD OR OSCEOLA COUNTY.

BILLY'S TRAIL RE-ALIGNMENT FROM FIVE OAKS BOULEVARD TO THE OXBOW COURT CUL-DE-SAC

COPY

SCALE AS SHOWN

REV.	DATE	DESCRIPTION

HARMONY FLORIDA

90% PLANS

BILLY'S TRAIL RE-ALIGNMENT
FROM FIVE OAKS DRIVE TO THE OXBOW COURT CUL-DE-SAC
HARMONY PHASE 3 PARK TRACT B

HARMONY PHASE 3 PLAT

Pegasus ENGINEERING

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Winter Springs, Florida 32708

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State of Florida Board of Professional Engineers
Certificate of Authorization No. 27770

JOB No.:	MSC-22055
DESIGNED BY:	GAT
DRAWN BY:	CAD
APPROVED BY:	DWH
DATE:	APRIL 2023

SHEET C02 OF C__

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REGISTRATION No. 38652

DATE: April 12, 2023

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MAPPING SOURCES
AERIAL IMAGES DATED 01 / 06 / 2023 PICTOMETRY - EAGLEVIEW TECHNOLOGY CORP.
ROADS AND PARCELS OSCEOLA COUNTY PROPERTY APPRAISER

0' 20'

REV.	DATE	DESCRIPTION

HARMONY FLORIDA

90% PLANS

BILLY'S TRAIL RE-ALIGNMENT
FROM FIVE OAKS DRIVE TO THE OXBOW COURT CUL-DE-SAC
HARMONY PHASE 3 PARK TRACT B

SITE PLAN -
FROM STA. 0+00 TO STA. 12+40

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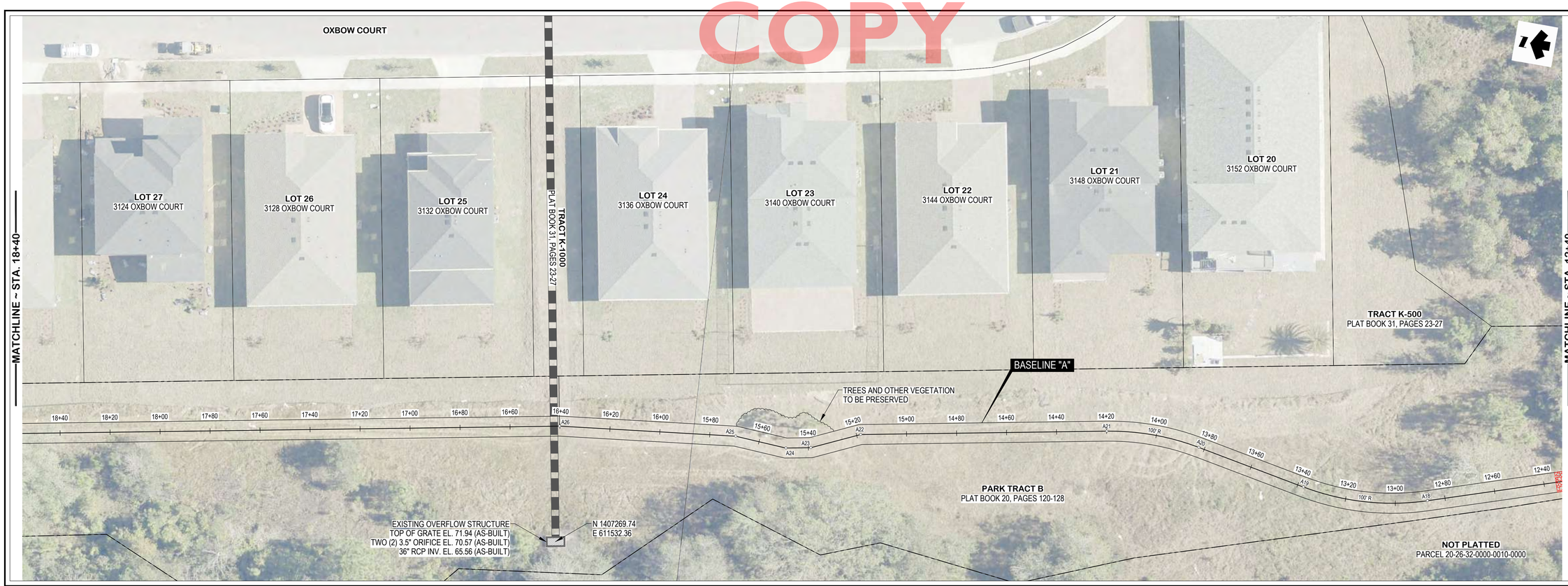

MAPPING SOURCES

AERIAL IMAGES DATED 01 / 06 / 2023
PICTOMETRY - EAGLEVIEW TECHNOLOGY CORP.

ROADS AND PARCELS
OSCEOLA COUNTY PROPERTY APPRAISER

0' 20'

REV.	DATE	DESCRIPTION

HARMONY FLORIDA

90% PLANS

BILLY'S TRAIL RE-ALIGNMENT
FROM FIVE OAKS DRIVE TO THE OXBOW COURT CUL-DE-SAC
HARMONY PHASE 3 PARK TRACT B

SITE PLAN - FROM STA. 12+40 TO STA. 23+00

Pegasus Engineering

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SHEET C04 OF C__

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REGISTRATION No. 38652

DATE: April 12, 2023

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PHOTOGRAPHS OF EXISTING CONDITIONS

PHOTOGRAPH TAKEN ON 10-23-2021

BILLY'S TRAIL SIGNAGE

PHOTOGRAPH TAKEN ON 10-23-2021

EXISTING CONCRETE DRIVEWAY AT FIVE OAKS DRIVE

PHOTOGRAPH TAKEN ON 10-23-2021

VIEW OF THE RE-ALIGNMENT CORRIDOR LOOKING NORTH FROM 3216 / 3220 OXBOW COURT

PHOTOGRAPH TAKEN ON 10-23-2021

VIEW OF THE RE-ALIGNMENT CORRIDOR LOOKING NORTH FROM 3168 OXBOW COURT

PHOTOGRAPH TAKEN ON 10-23-2021

VIEW OF THE RE-ALIGNMENT CORRIDOR LOOKING SOUTH TOWARDS 3168 OXBOW COURT

PHOTOGRAPH TAKEN ON 10-23-2021

EXISTING LOW POINT AND OVERFLOW FOR CONSERVATION TRACT 4 LOOKING NORTH ALONG THE RE-ALIGNMENT CORRIDOR

PHOTOGRAPH TAKEN ON 10-23-2021

EXISTING LOW POINT AND OVERFLOW FOR CONSERVATION TRACT 4 LOOKING SOUTHEAST

PHOTOGRAPH TAKEN ON 10-23-2021

EXISTING OVERFLOW STRUCTURE AND CONCRETE APRON

PHOTOGRAPH TAKEN ON 10-23-2021

EXISTING OVERFLOW STRUCTURE, CONCRETE APRON AND CIRCULAR ORIFICES

PHOTOGRAPH TAKEN ON 11-09-2021

BILLY'S TRAIL AND WATER MAIN EASEMENT LOOKING NORTH FROM PARK TRACT B

COORDINATE GEOMETRY

POINT	DESCRIPTION	NORTHING	EASTING	STATION
A01	BASELINE "A"	X	X	X+XX.X
A02	BASELINE "A"	X	X	X+XX.X
A03	BASELINE "A"	X	X	X+XX.X
A04	BASELINE "A"	X	X	X+XX.X
A06	BASELINE "A"	X	X	X+XX.X
A07	BASELINE "A"	X	X	X+XX.X
A08	BASELINE "A"	X	X	X+XX.X
A09	BASELINE "A"	X	X	X+XX.X
A10	BASELINE "A"	X	X	X+XX.X
A11	BASELINE "A"	X	X	X+XX.X
A12	BASELINE "A"	X	X	X+XX.X
A13	BASELINE "A"	X	X	X+XX.X
A14	BASELINE "A"	X	X	X+XX.X
A15	BASELINE "A"	X	X	X+XX.X
A16	BASELINE "A"	X	X	X+XX.X
A17	BASELINE "A"	X	X	X+XX.X
A18	BASELINE "A"	X	X	X+XX.X
A19	BASELINE "A"	X	X	X+XX.X
A20	BASELINE "A"	X	X	X+XX.X
A21	BASELINE "A"	X	X	X+XX.X
A22	BASELINE "A"	X	X	X+XX.X
A23	BASELINE "A"	X	X	X+XX.X
A24	BASELINE "A"	X	X	X+XX.X
A25	BASELINE "A"	X	X	X+XX.X
A26	BASELINE "A"	X	X	X+XX.X
A27	BASELINE "A"	X	X	X+XX.X
A28	BASELINE "A"	X	X	X+XX.X
A29	BASELINE "A"	X	X	X+XX.X
A30	BASELINE "A"	X	X	X+XX.X
A31	BASELINE "A"	X	X	X+XX.X
A32	BASELINE "A"	X	X	X+XX.X
A33	BASELINE "A"	X	X	X+XX.X
A34	BASELINE "A"	X	X	X+XX.X
A35	BASELINE "A"	X	X	X+XX.X
A36	BASELINE "A"	X	X	X+XX.X
A37	BASELINE "A"	X	X	X+XX.X

<< TO BE COMPLETED >>

PROPOSED FENCE MODIFICATIONS

SCALE AS SHOWN

REV.	DATE	DESCRIPTION

HARMONY FLORIDA

90% PLANS

BILLY'S TRAIL RE-ALIGNMENT
FROM FIVE OAKS DRIVE TO THE OXBOW COURT CUL-DE-SAC
HARMONY PHASE 3 PARK TRACT B

SITE PLAN DETAILS

Pegasus ENGINEERING

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State of Florida Board of Professional Engineers
Certificate of Authorization No. 27770

JOB No.:	MSC-22055
DESIGNED BY:	GAT
DRAWN BY:	CAD
APPROVED BY:	DWH
DATE:	APRIL 2023

SHEET C05 OF C__

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REGISTRATION No. 38652

DATE: April 12, 2023

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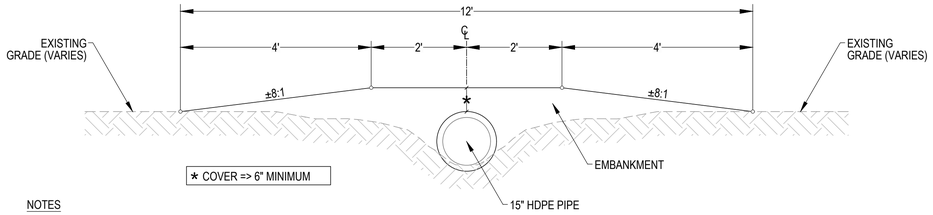
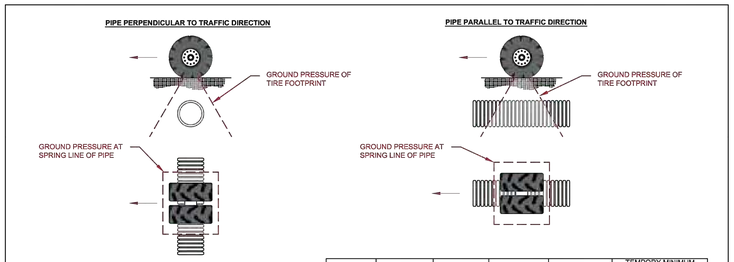


NOTES

1. EMBANKMENT SHALL BE SELECT GRANULAR FILL MATERIAL COMPACTED TO MIN. 95% STANDARD DENSITY.
2. HDPE PIPE SHALL BE ADS N-12 SOIL TIGHT (ST), ADS WATER TIGHT (WT), OR APPROVED EQUIVALENT WITH SMOOTH AND NON-PERFORATED INTERIOR.

TRAIL CULVERT #1

NOT TO SCALE



NOTES:

1. MINIMUM COVER HEIGHTS ARE BASED ON LIVE LOADING CALCULATIONS PER AASHTO LRFD SECTION 12. VEHICLE LOADS ARE BASED UPON DRIVING OVER THE PIPE WHILE NOT PERFORMING OPERATIONAL TASKS.
2. COVER HEIGHTS DO NOT TAKE INTO CONSIDERATION POTENTIAL RUTTING OF DRIVE SURFACE. BACKFILL MATERIAL IS ASSUMED FULLY COMPACTED TO SURFACE.
3. IF MINIMUM COVER CANNOT BE ACHIEVED, IT IS RECOMMENDED TO PERFORM PERIODIC DEFLECTION EVALUATIONS TO ENSURE PIPE ROUNDNESS. THE USE OF STEEL PLATES, MOUNDING, OR TEMPORARY FILL MAY BE REQUIRED TO DISTRIBUTE VEHICLE LOADING.
4. CONTACT YOUR LOCAL ADS REPRESENTATIVE WHEN VEHICLES ENCOUNTERED IN THE FIELD EXCEED THE MAXIMUM LOADINGS INCLUDED IN THE TABLE. VEHICLES LISTED IN THE TABLE ARE FOR REFERENCE AND COMPARISON PURPOSES.
5. REFER TO STANDARD STD-101 & STD-101B FOR RECOMMENDED INSTALLATION PRACTICES.

VECHICLE	VEHICLE DESCRIPTION	MINIMUM TIRE	SINGLE AXLE LOAD lbs.	PIPE DIAMETER	TEMPORY MINIMUM COVER HEIGHTS	
					CLASS I COMPACTED	CLASS II @ 95% SPD
FORD F150	PICKUP TRUCK (GWVR)	P275/55R20	7,450 (3379kg)	12"- 48" * (300mm-1200mm)*	3" (76mm)	3" (76mm)
CHEVY 3500	UTILITY TRUCK (GWVR)	235/80-17	13,200 (5987kg)	12"- 48" (300mm-1200mm)	5" (152mm)	6" (152mm)
CAT CS78B	DRUM ROLLER	84" SMOOTH DRUM ROLLER	29,626 (13438kg)	60" (1500mm)	6" (152mm)	9" (229mm)
				12"- 48" (300mm-1200mm)	9" (229mm)	9" (229mm)
				60" (1500mm)	9" (229mm)	12" (305mm)
CAT 637G	SCRAPER	37.25-35	102,145 (46332kg)	12"- 60" (300mm-1500mm)	12" (305mm)	15" (381mm)
KOMATSU WA800-3	MEDIUM LOADER	45/65-45	158,270 (71790kg)	12"- 60" (300mm-1500mm)	15" (381mm)	18" (457mm)
CAT 993K	LARGE LOADER	50/65-51	276,808 (125558kg)	12"- 15" (300mm-375mm)	21" (533mm)	24" (610mm)
				18"- 60" (450mm-1500mm)	24" (610mm)	27" (686mm)
CAT 789D	MINING TRUCK	37.00-R57	479,050 (217293kg)	12"-18" (300mm-450mm)	27" (686mm)	30" (762mm)
				21"-60" (525mm-1500mm)	30" (762mm)	33" (838mm)

* COVER OVER 60" (1500mm) PIPE SHOULD BE NO LESS THAN 6" (152mm)

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REV.	DESCRIPTION	BY	MM/DD/YY	CH'KD

ADVANCED DRAINAGE SYSTEMS, INC. ("ADS") HAS PREPARED THIS DETAIL BASED ON INFORMATION PROVIDED TO ADS. THIS DRAWING IS INTENDED TO DEPICT THE COMPONENTS AS REQUESTED. ADS HAS NOT PERFORMED ANY ENGINEERING OR DESIGN SERVICES FOR THIS PROJECT, NOR HAS ADS INDEPENDENTLY VERIFIED THE INFORMATION SUPPLIED. THE INSTALLATION DETAILS PROVIDED HEREIN ARE GENERAL RECOMMENDATIONS AND ARE NOT SPECIFIC FOR THIS PROJECT. THE DESIGN ENGINEER SHALL REVIEW THESE DETAILS PRIOR TO CONSTRUCTION. IT IS THE DESIGN ENGINEERS RESPONSIBILITY TO ENSURE THE DETAILS PROVIDED HEREIN MEETS OR EXCEEDS THE APPLICABLE NATIONAL, STATE, OR LOCAL REQUIREMENTS AND TO ENSURE THAT THE DETAILS PROVIDED HEREIN ARE ACCEPTABLE FOR THIS PROJECT.

SINGLE AXLE VEHICLE TEMPORARY MINIMUM COVER (HDPE)

DRAWING NUMBER: STD-111A

ADS Advanced Drainage Systems, Inc. — 4640 TRUEMAN BLVD HILLIARD, OHIO 43026

DRAWN BY: CMF | DATE: 2/19/2016 | REV BY: | REVISION: | SCALE: NTS | SHEET: 1 OF 1

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<< TO BE COMPLETED >>

TRAIL CULVERT #2

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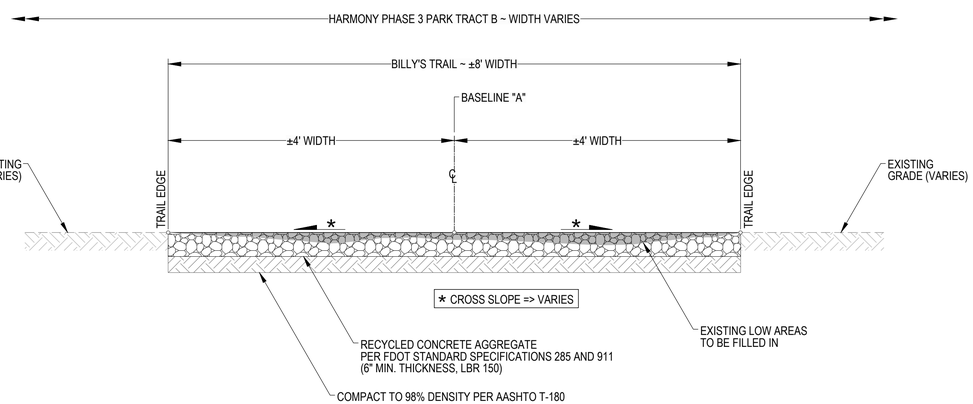

TRAIL STABILIZATION

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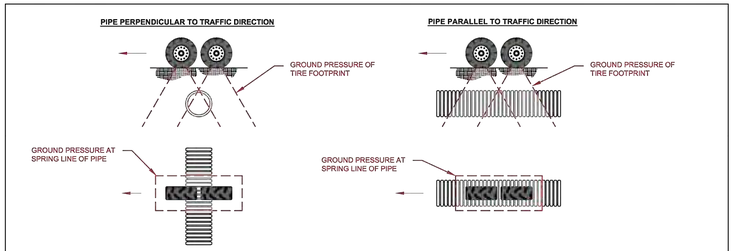

NOTES:

1. MINIMUM COVER HEIGHTS ARE BASED ON LIVE LOADING CALCULATIONS PER AASHTO LRFD SECTION 12. VEHICLE LOADS ARE BASED UPON DRIVING OVER THE PIPE WHILE NOT PERFORMING OPERATIONAL TASKS.
2. COVER HEIGHTS DO NOT TAKE INTO CONSIDERATION POTENTIAL RUTTING OF DRIVE SURFACE. BACKFILL MATERIAL IS ASSUMED FULLY COMPACTED TO SURFACE.
3. IF MINIMUM COVER CANNOT BE ACHIEVED, IT IS RECOMMENDED TO PERFORM PERIODIC DEFLECTION EVALUATIONS TO ENSURE PIPE ROUNDNESS. THE USE OF STEEL PLATES, MOUNDING, OR TEMPORARY FILL MAY BE REQUIRED TO DISTRIBUTE VEHICLE LOADING.
4. CONTACT YOUR LOCAL ADS REPRESENTATIVE WHEN VEHICLES ENCOUNTERED IN THE FIELD EXCEED THE MAXIMUM LOADINGS INCLUDED IN THE TABLE. VEHICLES LISTED IN THE TABLE ARE FOR REFERENCE AND COMPARISON PURPOSES.
5. REFER TO STANDARD STD-101 & STD-101B FOR RECOMMENDED INSTALLATION PRACTICES.

VECHICLE	VEHICLE DESCRIPTION	MINIMUM TIRE	TANDEM AXLE LOAD lbs.	PIPE DIAMETER	TEMPORY MINIMUM COVER HEIGHTS	
					CLASS I COMPACTED	CLASS II @ 95% SPD
BOBCAT S850	SKID-STEER	14-17.5	10,237 (4643kg)	12"- 48" * (300mm-1200mm)*	3" (76mm)	3" (76mm)
ECONOLINE MG0617TE	6-TON TRAILER (GVWR)	235R80-16	13,800 (6260kg)	12"- 48" (300mm-1200mm)	5" (152mm)	6" (152mm)
KOMASTU GD655-6	GRADER	17.5-R25	30,468 (13820kg)	60" (1500mm)	6" (152mm)	9" (229mm)
				12"- 48" (300mm-1200mm)	9" (229mm)	9" (229mm)
				60" (1500mm)	9" (229mm)	12" (305mm)
CAT 16M3	GRADER	23.5-R25	58,753 (26650kg)	12"- 60" (300mm-1500mm)	12" (305mm)	15" (381mm)
CAT 730C	ARTICULATED TRUCK	23.5-R-25	74,538 (33810kg)	12"- 60" (300mm-1500mm)	15" (381mm)	18" (457mm)
KOMATSU HM400-5	ARTICULATED TRUCK	29.5-R-25	115,288 (52294kg)	12"- 15" (300mm-375mm)	18" (457mm)	21" (533mm)
				18"- 60" (450mm-1500mm)	21" (533mm)	24" (610mm)

* COVER OVER 60" (1500mm) PIPE SHOULD BE NO LESS THAN 6" (152mm)

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REV.	DESCRIPTION	BY	MM/DD/YY	CH'KD

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TANDEM AXLE VEHICLE TEMPORARY MINIMUM COVER (HDPE)

DRAWING NUMBER: STD-111B

ADS Advanced Drainage Systems, Inc. — 4640 TRUEMAN BLVD HILLIARD, OHIO 43026

DRAWN BY: CMF | DATE: 2/19/2016 | REV BY: | REVISION: | SCALE: NTS | SHEET: 1 OF 1

THIS DETAIL APPLIES TO HDPE

STORM PIPE BACKFILLING / INSTALLTION DETAIL

REV.	DATE	DESCRIPTION

HARMONY FLORIDA

90% PLANS

BILLY'S TRAIL RE-ALIGNMENT
FROM FIVE OAKS DRIVE TO THE OXBOW COURT CUL-DE-SAC
HARMONY PHASE 3 PARK TRACT B

MISCELLANEOUS DETAILS

Pegasus ENGINEERING

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JOB No.:	MSC-22055
DESIGNED BY:	GAT
DRAWN BY:	CAD
APPROVED BY:	DWH
DATE:	APRIL 2023

SHEET C06 OF C__

NOT A FINAL PLAN UNLESS SIGNED AND SEALED

PRELIMINARY

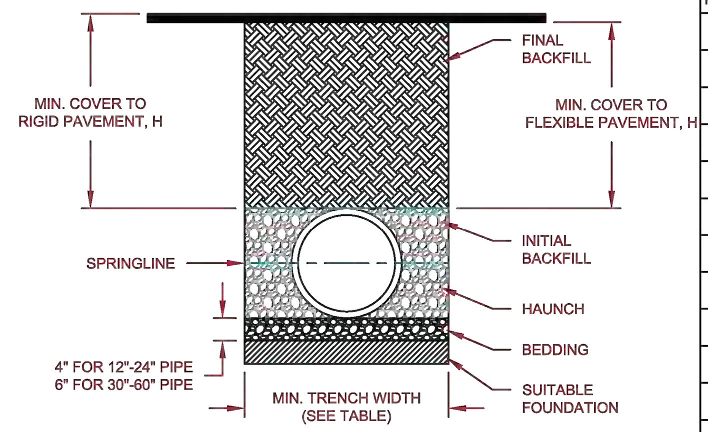
DAVID W. HAMSTRA, P.E.
REGISTRATION No. 38652

DATE: April 12, 2023

COPY

RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
4" (100mm)	21" (533mm)
6" (150mm)	23" (584mm)
8" (200mm)	26" (660mm)
10" (250mm)	28" (711mm)
12" (300mm)	30" (762mm)
15" (375mm)	34" (864mm)
18" (450mm)	39" (991mm)
24" (600mm)	48" (1219mm)
30" (750mm)	56" (1422mm)
36" (900mm)	64" (1626mm)
42" (1050mm)	72" (1829mm)
48" (1200mm)	80" (2032mm)
60" (1500mm)	96" (2438mm)



MINIMUM RECOMMENDED COVER BASED ON VEHICLE LOADING CONDITIONS**

PIPE DIAM.	SURFACE LIVE LOADING CONDITION: H-25	SURFACE LIVE LOADING CONDITION: HEAVY CONSTRUCTION (75T AXLE LAOD) *
12" - 48" (300mm - 1200mm)	12" (305mm)	48" (1219mm)
60" (1500mm)	24" (610mm)	60" (1524mm)

* VEHICLES IN EXCESS OF 75T MAY REQUIRE ADDITIONAL COVER
**SEE BACKFILL REQUIREMENTS IN NOTE 6.

MAXIMUM RECOMMENDED COVER BASED ON VECHICLE LOADING CONDITIONS

PIPE DIAM.	CLASS I		CLASS II		CLASS III
	COMPACTED	DUMPED	95%	90%	95%
4" (100mm)	37 (11.3m)	18 (5.5m)	25 (7.6m)	18 (5.5m)	18 (5.5m)
6" (150mm)	44 (13.4m)	20 (6.1m)	29 (8.8m)	20 (6.1m)	21 (6.4m)
8" (200mm)	32 (9.8m)	15 (4.6m)	22 (6.7m)	15 (4.6m)	16 (4.9m)
10" (250mm)	38 (11.6m)	18 (5.5m)	26 (7.9m)	18 (5.5m)	18 (5.5m)
12" (300mm)	35 (10.7m)	17 (5.2m)	24 (7.3m)	17 (5.2m)	17 (5.2m)
15" (375mm)	38 (11.6m)	17 (5.2m)	25 (7.6m)	17 (5.2m)	18 (5.5m)
18" (450mm)	36 (11.0m)	17 (5.2m)	24 (7.3m)	17 (5.2m)	17 (5.2m)
24" (600mm)	28 (8.5m)	13 (4.0m)	20 (6.1m)	13 (4.0m)	14 (4.3m)
30" (750mm)	28 (8.5m)	13 (4.0m)	20 (6.1m)	13 (4.0m)	14 (4.3m)
36" (900mm)	26 (7.9m)	12 (3.7m)	18 (5.5m)	13 (4.0m)	13 (4.0m)
42" (1050mm)	23 (7.0m)	11 (3.4m)	16 (4.9m)	11 (3.4m)	11 (3.4m)
48" (1200mm)	25 (7.6m)	11 (3.4m)	17 (5.2m)	11 (3.4m)	12 (3.7m)
60" (1500mm)	25 (7.6m)	11 (3.4m)	17 (5.2m)	11 (3.4m)	12 (3.7m)

FILL HEIGHT TABLE GENERATED USING AASHTO SECTION 12, LOAD RESISTANCE FACTOR DESIGN (LRFD) PROCEDURE WITH THE FOLLOWING ASSUMPTIONS:
NO HYDROSTATIC PRESSURE,
UNIT WEIGHT OF SOIL (Ys) = 120 PCF

NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION

2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.

3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.

4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-1500mm).

5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDING TO THE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOTATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT. FOR TRAFFIC APPLICATIONS WITH LESS THAN FOUR FEET OF COVER, EMBEDMENT OF THE PIPE SHALL BE USING ONLY A CLASS I OR CLASS II BACKFILL.

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REV.	DESCRIPTION	BY	MM/DD/YY	CHK'D
6	INITIAL BACKFILL	JAB	04/02/20	

TRENCH INSTALLATION DETAIL (N-12 PER AASHTO)
DRAWING NUMBER: STD-101
ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD HILLIARD, OHIO 43026
DRAWN BY: TJR | DATE: 12/29/16 | CHK'D BY: | SCALE: NTS | SHEET: 1 OF 1

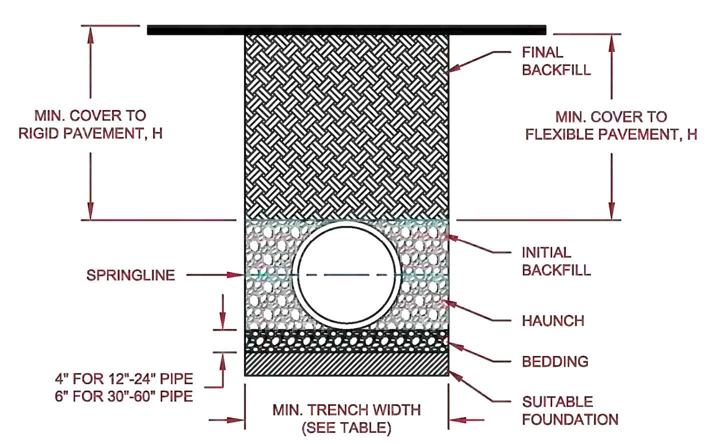
AASHTO

THIS DETAIL APPLIES TO HDPE

STORM PIPE BACKFILLING / INSTALLTION DETAIL

RECOMMENDED MINIMUM TRENCH WIDTHS

PIPE DIAM.	MIN. TRENCH WIDTH
4" (100mm)	21" (533mm)
6" (150mm)	23" (584mm)
8" (200mm)	26" (660mm)
10" (250mm)	28" (711mm)
12" (300mm)	30" (762mm)
15" (375mm)	34" (864mm)
18" (450mm)	39" (991mm)
24" (600mm)	48" (1219mm)
30" (750mm)	56" (1422mm)
36" (900mm)	64" (1626mm)
42" (1050mm)	72" (1829mm)
48" (1200mm)	80" (2032mm)
60" (1500mm)	96" (2438mm)



MINIMUM RECOMMENDED COVER BASED ON VEHICLE LOADING CONDITIONS**

PIPE DIAM.	SURFACE LIVE LOADING CONDITION: H-25	SURFACE LIVE LOADING CONDITION: HEAVY CONSTRUCTION (75T AXLE LAOD) *
12" - 48" (300mm - 1200mm)	12" (305mm)	48" (1219mm)
60" (1500mm)	24" (610mm)	60" (1524mm)

* VEHICLES IN EXCESS OF 75T MAY REQUIRE ADDITIONAL COVER
**SEE BACKFILL REQUIREMENTS IN NOTE 6.

MAXIMUM RECOMMENDED COVER BASED ON VECHICLE LOADING CONDITIONS

PIPE DIAM.	CLASS I		CLASS II		CLASS III
	COMPACTED	DUMPED	95%	90%	95%
4" (100mm)	34 (10.4m)	16 (4.9m)	23 (7.0m)	16 (4.9m)	17 (5.2m)
6" (150mm)	40 (12.2m)	19 (5.8m)	27 (8.2m)	19 (5.8m)	20 (6.1m)
8" (200mm)	30 (9.1m)	14 (4.3m)	21 (6.4m)	14 (4.3m)	15 (4.6m)
10" (250mm)	34 (10.4m)	16 (4.9m)	23 (7.0m)	16 (4.9m)	17 (5.2m)
12" (300mm)	35 (10.7m)	17 (5.2m)	24 (7.3m)	17 (5.2m)	18 (5.5m)
15" (375mm)	37 (11.3m)	18 (5.5m)	25 (7.6m)	18 (5.5m)	19 (5.8m)
18" (450mm)	32 (9.8m)	15 (4.6m)	22 (6.7m)	15 (4.6m)	16 (4.9m)
24" (600mm)	27 (8.2m)	13 (4.0m)	19 (5.8m)	13 (4.0m)	14 (4.3m)
30" (750mm)	22 (6.7m)	11 (3.4m)	16 (4.9m)	11 (3.4m)	11 (3.4m)
36" (900mm)	26 (7.9m)	12 (3.7m)	18 (5.5m)	12 (3.7m)	13 (4.0m)
42" (1050mm)	24 (7.3m)	11 (3.4m)	17 (5.2m)	11 (3.4m)	12 (3.7m)
48" (1200mm)	23 (7.0m)	11 (3.4m)	16 (4.9m)	11 (3.4m)	12 (3.7m)
60" (1500mm)	26 (7.9m)	12 (3.7m)	18 (5.5m)	12 (3.7m)	13 (4.0m)

FILL HEIGHT TABLE GENERATED USING AASHTO SECTION 12, LOAD RESISTANCE FACTOR DESIGN (LRFD) PROCEDURE WITH THE FOLLOWING ASSUMPTIONS:
NO HYDROSTATIC PRESSURE,
UNIT WEIGHT OF SOIL (Ys) = 120 PCF

NOTES:

1. ALL PIPE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321, "STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY FLOW APPLICATIONS", LATEST ADDITION

2. MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.

3. FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.

4. BEDDING: SUITABLE MATERIAL SHALL BE CLASS I, II OR III. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. UNLESS OTHERWISE NOTED BY THE ENGINEER, MINIMUM BEDDING THICKNESS SHALL BE 4" (100mm) FOR 4"-24" (100mm-600mm); 6" (150mm) FOR 30"-60" (750mm-1500mm).

5. INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III IN THE PIPE ZONE EXTENDINGTO THE CROWN OF PIPE. THE CONTRACTOR SHALL PROVIDE DOCUMENTATION FOR MATERIAL SPECIFICATION TO ENGINEER. MATERIAL SHALL BE INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.

6. MINIMUM COVER: MINIMUM COVER, H, IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE. ADDITIONAL COVER MAY BE REQUIRED TO PREVENT FLOTATION. FOR TRAFFIC APPLICATIONS, MINIMUM COVER, H, IS 12" UP TO 48" DIAMETER PIPE AND 24" OF COVER FOR 60" DIAMETER PIPE, MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT. FOR TRAFFIC APPLICATIONS WITH LESS THAN FOUR FEET OF COVER, EMBEDMENT OF THE PIPE SHALL BE USING ONLY A CLASS I OR CLASS II BACKFILL.

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REV.	DESCRIPTION	BY	MM/DD/YY	CHK'D
5	INITIAL BACKFILL	JAB	04/02/20	

TRENCH INSTALLATION DETAIL (ASTM F2648)
DRAWING NUMBER: STD-101A
ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD HILLIARD, OHIO 43026
DRAWN BY: JLE | DATE: 8/15/13 | CHK'D BY: | SCALE: NTS | SHEET: 1 OF 1

ASTM

THIS DETAIL APPLIES TO HDPE

STORM PIPE BACKFILLING / INSTALLTION DETAIL

CLASSES OF EMBEDMENT AND BACKFILL MATERIALS

ASTM D2321 (1) (CSA B182.11) CLASS DESCRIPTION		ASTM D2487 NOTATION	ASTM D2487 DESCRIPTION	AASHTO M43 NOTATION	AASHTO M145 NOTATION	BNQ 2560	ASTM D2321 (1) (CSA B182.11): PERCENTAGE PASSING SIEVE SIZES: 1 1/2 IN. (40mm)	3/8" (9.5mm)	No. 4 (4.75mm)	NO. 200 (0.075mm)	ATTERBERG LIMITS: LL	PI	COEFFICIENTS: Cu	Cc
I (2)	CRUSHED ROCK, ANGULAR 3	N/A	ANGULAR CRUSHED STONE OR ROCK, CRUSHED GRAVEL, CRUSHED SLAG; LARGE VOIDS WITH LITTLE OR NO FINES	5, 56, 57 (4) 6, 67 (4)	N/A		100%	<25%	<15%	<12%	NON PLASTIC		N/A	
II	CLEAN, COARSE-GRAINED SOILS	GW	WELL-GRADED GRAVEL, GRAVEL-SAND MIXTURES; LITTLE OR NO FINES	5, 6	A1, A3	CG-14, MG-20	100%		<50% of "COARSE FRACTION"	<5%	NON PLASTIC		>4	1 to 3
		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES; LITTLE OR NO FINES	56, 57, 67									4	<1 or >3
		SW	WELL-GRADED SANDS, GRAVELLY SANDS; LITTLE OR NO FINES						>50% of "COARSE FRACTION"				>6	1 to 3
		SP 6	POORLY-GRADED SANDS, GRAVELLY SAND; LITTLE OR NO FINES										<6	<1 or >3
	COARSE-GRAINED SOILS, BODERLINE CLEAN TO W/FINES	GW-GC, SP-SM	SANDS AND GRAVELS WHICH ARE BORDERLINE BETWEEN CLEAN AND WITH FINES	N/A			100%		VARIES	5% TO 12%	NON PLASTIC		SAME AS FOR GW, GP, SW AND SP	
III	COURSE-GRAINED SOILS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	GRAVEL & SAND WITH <10% FINES	A-2-4, A-2-5, A-2-6, OR A-4 OR A-6 SOILS WITH MORE THAN 30% RETAINED ON #200 SIEVE		100%		<50% of "COARSE FRACTION"	12% TO 50%	N/A	<4 OR <"A" LINE	N/A	
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES									<7 & >"A" LINE		
		SM	SILTY SANDS, SAND-CLAY MIXTURES						>50% of "COARSE FRACTION"			>4 OR <"A" LINE		
		SC	CLAYEY SANDS, SAND-CLAY MIXTURES									>7 & >"A" LINE		
	INORGANIC FINE-GRAINED SOILS	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY						100%	> 30% (RETAINED)	<50	<4 OR <"A" LINE		
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY; GRAVELLY, SANDY, OR SILTY CLAYS; LEAN CLAYS							> 30% (RETAINED)		>7 & >"A" LINE		
IV (5)	INORGANICS FINE-GRAINED SOILS	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY	N/A	A-2-7 OR A-4 OR A-6 SOILS WITH 30% OR LESS RETAINED ON #200 SIEVE		100%		100%	< 30% (Retained)	<50	<4 or <"A" LINE	N/A	
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY; GRAVELLY, SANDY, OR SILTY CLAYS; LEAN CLAYS	N/A								>7 & >"A" LINE		
V (7)	INORGANIC FINE-GRAINED SOILS	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	N/A	A5, A7		100%		100%	>50%	>50	<"A" LINE	N/A	
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	N/A								>"A" LINE		
	ORGANIC SOILS OR HIGHLY ORGANIC SOILS	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	N/A			100%		100%	>50%	<50	<4 OR <"A" LINE	N/A	
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	N/A							>50	<"A" LINE		
		PT	PEAT AND OTHER HIGH ORGANIC SOILS	N/A										

NOTES:
1. REFER TO ASTM D2321 / CSA B182.11 / BNQ 2560 FOR MORE COMPLETE SOIL DESCRIPTIONS.
2. CLASS I MATERIALS ALLOW FOR A BROADER RANGE OF FINES THAN PREVIOUS VERSIONS OF D2321 / B182.11. WHEN SPECIFYING CLASS I MATERIAL FOR INFILTRATION SYSTEMS, THE ENGINEERING SHALL INCLUDE A REQUIREMENT FOR AN ACCEPTABLE LEVEL OF FINES.
3. ALL PARTICLE FACES SHALL BE FRACTURED.
4. ASSUMES LESS THAN 25% PASSES THE 3/8" SIEVE.
5. CLASS IV MATERIALS REQUIRE A GEOTECHNICAL EVALUATION PRIOR TO USE AND SHOULD ONLY BE USED AS BACKFILL UNDER THE GUIDANCE OF A QUALIFIED ENGINEER.
6. UNIFORM FINE SANDS (SP) WITH MORE THAN 50% PASSING A 100 SIEVE BEHAVE LIKE SILTS AND SHOULD BE TREATED AS CLASS III SOILS IF ALLOWED.
7. CLASS V MATERIALS SHALL NOT BE PERMITTED AS BEDDING AND BACKFILL MATERIAL.

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REV.	DESCRIPTION	BY	MM/DD/YY	CHK'D
2	REV. DRAWING NAME OR NUMBER	TJR	01/28/16	

CLASSES OF EMBEDMENT AND AND BACKFILL MATERIALS
DRAWING NUMBER: STD-109
ADVANCED DRAINAGE SYSTEMS, INC. 4640 TRUEMAN BLVD HILLIARD, OHIO 43026
DRAWN BY: TJR | DATE: 06/01/15 | CHK'D BY: | SCALE: NTS | SHEET: 1 OF 1

THIS DETAIL APPLIES TO HDPE

STORM PIPE BACKFILL MATERIAL DETAIL

REV.	DATE	DESCRIPTION

HARMONY FLORIDA

90% PLANS

BILLY'S TRAIL RE-ALIGNMENT
FROM FIVE OAKS DRIVE TO THE OXBOW COURT CUL-DE-SAC
HARMONY PHASE 3 PARK TRACT B

MISCELLANEOUS DETAILS

Pegasus ENGINEERING
Pegasus Engineering, LLC
301 West SR 434, Suite 309
Winter Springs, Florida 32708
Office 407-992-9160
Fax. 407-358-5155
State of Florida Board of Professional Engineers
Certificate of Authorization No. 27770

JOB No.:	MSC-22055
DESIGNED BY:	GAT
DRAWN BY:	CAD
APPROVED BY:	DWH
DATE:	APRIL 2023

SHEET C07 OF C__

NOT A FINAL PLAN UNLESS SIGNED AND SEALED

PRELIMINARY
DAVID W. HAMSTRA, P.E.
REGISTRATION No. 38652
DATE: April 12, 2023