



BENSALEM TOWNSHIP

Building and Planning Department
Office 215-633-3644 • Fax 215-633-3753
2400 Byberry Road • Bensalem, PA 19020

RECEIVED

AUG 26 2020

SUBMISSION OF REVISED PLANS APPLICATION

BENSALEM TOWNSHIP
BUILDING AND PLANNING

- | | |
|--|--|
| <input type="checkbox"/> MINOR SUBDIVISION | <input type="checkbox"/> PRELIMINARY LAND DEVELOPMENT |
| <input type="checkbox"/> MINOR LAND DEVELOPMENT | <input checked="" type="checkbox"/> FINAL LAND DEVELOPMENT |
| <input type="checkbox"/> PRELIMINARY SUBDIVISION | <input type="checkbox"/> FINAL SUBDIVISION |

Application is hereby made for revising the plan(s) for: WATERSIDE PHASE III

Applicant's Name: LENNAR MPA, LLC

Owner: LENNAR MPA, LLC

Location: STATE ROAD

Tax Parcel No: 02-065-022, 02-064-138, 02-064-139

Date of Original Submission: FEBRUARY 18, 2020

THE CHANGES MADE TO THE PLAN(S) ARE AS FOLLOWS:

PLEASE REFER TO THE COVER LETTER FOR ITEMIZED RESPONSES TO COMMENTS FROM THE TOWNSHIP ENGINEER

- MINOR GRADING REVISIONS TO ADDRESS COMMENTS FROM TOWNSHIP ENGINEER

- STORM PIPE REVISIONS TO ADDRESS COMMENTS FROM TOWNSHIP ENGINEER

- STORM SEWER CALCULATIONS FOR TEMPORARY STORM SEWER PIPES PER TOWNSHIP ENGINEER

Whereas the Pennsylvania Municipalities Planning Code (Act 247 of 1968) requires the Bensalem Township to render a decision and to communicate it to the applicant no later than 90 days after an application for Subdivision or Land Development has been filed.

I, Anand Bhatt (Agent), (owner, agent) regarding the above application hereby request an extension of time beyond the aforesaid 90 day limitation. I waive any and all rights under any Act of Assembly or Ordinance of Bensalem Township, having to do with the aforesaid time limitations.

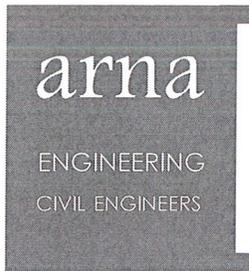
Signature of Applicant, Owner or Agent

August 25, 2020

Date

A SIGNED COPY OF THIS APPLICATION IS REQUIRED AT TIME OF PERMIT ISSUANCE

Comments or Notes:



ARNA Engineering Inc.
1456 Ferry Road, Suite 603
Doylestown, PA 18901
T: 215.766.8280
F: 215.434.5280
www.arnaengineering.com

PRINCIPALS
Anand A. Bhatt, P.E., LEED AP
Chirag V. Thakkar, P.E., LEED AP

Revised August 26, 2020
August 21, 2020

Ms. Loretta Alston
Bensalem Township
Building and Planning Department
2400 Byberry Road
Bensalem, PA 19020

RECEIVED

AUG 26 2020

BENSALEM TOWNSHIP
BUILDING AND PLANNING

**RE: Waterside – Phase III
 Amended Record Plans
 Bensalem Township, Bucks County, Pennsylvania
 ARNA Project No. 23000803**

Dear Loretta:

Enclosed please find the following documents for Amended Final Record Plans for Phase III of the above referenced project.

- Fifteen (15) paper copies and one (1) Compact Disc containing PDFs for the following:
 - Drawing No. 20.00 titled “Amended Final Master Site Plan (Record Plan)” last revised August 17, 2020;
 - Drawing No. 20.03 titled “Final Site Plan – Phase III” last revised August 17, 2020;
 - Drawing No. 21.03 titled “Final Grading Plan – Phase III” last revised August 17, 2020;
 - Drawing No. 21.06 titled “Final Drainage Plan – Phase III” last revised August 17, 2020;
 - Drawing No. 23.03 titled “Final Sanitary Plan – Phase III” dated last revised August 17, 2020;
 - Storm Sewer Calculations For Phase III Temporary Pipes dated August 17, 2020.
- One (1) copy of the certification from Erosion & Sediment Control Certification from BCCD.

The above documents have been revised based on comments received in email correspondences on July 24 and August 18, 2020 from the township engineer, Russell Benner, P.E.:

Grading Plan

1. There are two locations where the plans show proposed features that tie into improvements outside of phase 3 that are proposed to be completed by others. Please clarify where their final limit of proposed improvements will be? Clearly define the limits of construction for Phase 3 improvements adjacent to the work to be done by others.

Response: As per the comment, the limits of construction for Phase III improvements have been clearly noted on the revised plans.

2. There are some grading issues throughout the site
 - a. A proposed driveway east of Annapolis has a crown that is offset from the centerline of the road.

Response: The proposed driveway ease of Annapolis Road is not crowned, but had been graded with lower central area to convey water along the centerline.

- b. Unit L4C1 has a driveway slope of 8.60%.

Response: As per the comment, the slope for the driveway and grading has been adjusted.

- c. Units K271 & K281 have proposed spot elevations that are inconsistent with the contour lines.

Response: As per the comment, grading around Units K271 and K281 has been revised.

- d. Intersection of East Strand Road and King Street / Dock Street North – there is proposed curbing and no curb returns in portions of the intersection. How is this intersection proposed to function? Will be accessible for vehicles?

Response: The plans have been revised to clearly depict depressed curb at the intersection of East Strand Road and King Street /Dock Street North per the comment. With depressed curb, this intersection is proposed to be accessible for vehicles.

- e. There are a couple spots where drainage is directed towards a building(s), but the spot elevations show that it will drain along the base of the building to the opposite side and then have positive drainage away from the building.

Response: As per the comment, the grading has been clarified/revised to provide positive drainage away from the building.

Drainage Plan

- 1. There are several items that were approved under the master plan that we would like to see revised, if possible.

- a. Minimum 2" drop in all inlets to the maximum extent feasible.

Response: As per the comment, wherever feasible without impacting the cover over the pipe and the utility crossings, a drop of 2" has been proposed in inlets.

- b. Match pipe crown for differing pipe sizes to the maximum extent feasible.

Response: As per the comment, wherever feasible without impacting the cover over the pipe and the utility crossings, crown match has been proposed in few inlets.

- c. CM-137 & CM-111 are located within the intersection.

Response: As shown on the plan, these inlets are located at the entrance to the alleyway and not at the intersection of the street. Also, due to location of the property lines for future development by others, relocation of CM-111 is not feasible. Inlet CM-137 cannot be relocated due to the other utility conflicts (sanitary and water) in this area.

- 2. Missing labels/ features

- a. Show storm structure annotations for the phase 2 inlet adjacent to L211-2 on Gas

Light Alley to verify proper tie-in of the storm sewer from CB-97.

Response: As per the comment, the drainage plan has been revised.

- b. MH-101 – missing invert annotations.

Response: As per the comment, the drainage plan has been revised.

- c. CB-119 – show the INV IN pipe in plan view.

Response: As per the comment, the drainage plan has been revised.

- 3. Drainage Concerns – The temporary storm sewer run appears to have issues including minimum cover, hydraulic capacity, etc.

Response: The temporary storm sewer system has been revised per the storm sewer calculations (included with this submission) per the comment.

Erosion & Sediment Control

- 1. Was the phase 3 E&S plan approved by BCCD or just the Master E&S plan?
- 2. Missing inlet filter bags throughout phase 3.
- 3. The proposed sediment basins are significantly different in both size and shape. They need to provide additional information to validate the redesign.

Response: Response: Phase III E&S plan and calculations for sediment traps have been approved by BCCD. A copy of the E&S certification has been included with this submission.

Sheet 20.03 – Final Site Plan – Phase III

- 1. The provide zoning table must be revised to reference the correct ordinance sections.

Response: The zoning table has been revised to reference the correct ordinance sections per the comment.

- 2. Remove the duplicate Engineer's Certification signature block

Response: As per the comment, the duplicate Engineer's Certification signature block has been removed.

If you have any questions, please do not hesitate to call us at (267) 733-7847.

Very truly yours,
ARNA Engineering Inc.



Anand A. Bhatt
Principal

Cc: Russell Benner, P.E., T&M Associates (Via Email)
Daniel Stewart, LENNAR (Via Email)

- SITE PLAN NOTES:**
- THIS PLAN IS AN AMENDED FINAL MASTER SITE PLAN FOR PHASE II OF THE "WATERSIDE" DEVELOPMENT. THE ORIGINAL MASTER SITE PLAN WAS DESIGNED BY ADVANCE GEOSERVICES DATED NOVEMBER 17, 2006 AND LAST REVISED FEBRUARY 12, 2014.
 - ROADS AND ALLEYS SHOWN ON THIS PLAN HAVE NOT BEEN CHANGED FROM THE PREVIOUSLY APPROVED MASTER SITE PLAN.
 - EXISTING BOUNDARY AND UTILITY INFORMATION OBTAINED FROM SURVEY PERFORMED BY LANGAN ENGINEERING AND ENVIRONMENTAL SERVICES, INC.
 - TOPOGRAPHY WAS PREPARED BY ADVANCE GEOSERVICES CORP. IN CONJUNCTION WITH NOR EAST MAPPING INC. JOB NO. NEM05379-1. DATE OF PHOTOGRAPHY OCTOBER 14, 2008.
 - WETLANDS AND WATER OF U.S. DELINEATION PERFORMED BY DEL VAL SOIL & ENVIRONMENTAL CONSULTANTS, INC.
 - THE ZONING DISTRICT OF THE SUBJECT SITE IS MXD "MIXED USE WATERFRONT DEVELOPMENT," RESIDENTIAL AS WELL AS NON-RESIDENTIAL USES ARE PERMITTED AS "BY-RIGHT" USES. REFER TO TABLE 2 FOR PROPOSED USES.
 - THE ORIGINAL TAX MAP PARCEL # FOR THIS PROPERTY ARE AS FOLLOWS:
 - 02-065-022
 - 02-064-139
 - 02-064-138
 - LOT AREA OF THE SUBJECT (3 PARCELS) IS 44.45 ACRES.
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 - PROPOSED BUILDINGS ARE SETBACK A MINIMUM OF 20 FEET FROM ANY WETLANDS LINE PER MXD ORDINANCE, SECTION 232-293(b)(7).
 - ANY LOTS/PARCELS WITHIN THE PROPERTY THAT DO NOT MEET THE MINIMUM ACREAGE REQUIREMENT UNDER MXD ORDINANCE SHALL BE CONSIDERED LOTS/PARCELS WITHIN THE ENTIRETY AND CANNOT BE DEVELOPED SEPARATELY FROM ENTIRETY.

The following plans and references were used in preparation of this plan:

- TITLE REPORT BY: FIRST AMERICAN TITLE INSURANCE COMPANY
COMMITMENT NO.: 05093998CHTF. (PARCEL # 02-064-139)
DATED: EFFECTIVE DATE AUGUST 10, 2005
- TITLE REPORT BY: FIRST AMERICAN TITLE INSURANCE COMPANY
COMMITMENT NO.: 04063641F. (PARCEL # 02-065-022)
DATED: EFFECTIVE DATE MARCH 18, 2005
- TITLE REPORT BY: STEWART TITLE GUARANTY COMPANY
COMMITMENT NO.: 0604111CHTS. (PARCEL # 02-064-138)
DATED: EFFECTIVE DATE MARCH 10, 2006
- A PLAN ENTITLED "SITE PLAN" BY HAGEN CONSTRUCTION, INC., DATED 2/29/04 AND LAST REVISED 4/05/04.
- A PLAN ENTITLED "PLAN OF TITLE SURVEY" BY EZRA GOLUB ASSOCIATES, DATED DEC. 22, 1999.
- A PLAN ENTITLED "42" PARALLEL FORCE MAIN" BY CARROLL ENGINEERING CORPORATION, DATED 1/9/1995.

OVERALL SITE DATA	
Lot Area	44.45 Acre
Legal R.O.W	1.05 Acre
Ultimate R.O.W	1.69 Acre
Net Lot Area	42.76 Acre

NON-RESIDENTIAL BUILDING SUMMARY TABLE		
Type	Location	Area
Office	Units O111, A511	25,200 SF
Club	Units A511	6,400 SF
Commercial	Units F211-5, M211	12,000 SF
Spa Services	Units B22-2, B23-2	4,000 SF
Restaurant	Unit M111	6,000 SF
Total		53,600 SF

BENSALEM TOWNSHIP ZONING TABLE ZONING DISTRICT - MIXED USE WATERFRONT DEVELOPMENT (MXD)			
ITEM	REQUIRED PER MXD Mixed Use Bldgs /Office/Restaurant /Residential Clubhouse/Marina/Commercial-Retail use/Recreational	PROPOSED Mixed Use Bldgs /Office/Restaurant /Residential Clubhouse/Marina/Commercial-Retail use/Recreational	ORDINANCE SECTION 232-292
Lot Requirements:			
Min. Lot Area	30 Ac	44.45 Ac	232-293(a)(1)
Max. Residential Density	14 Residential Dwelling Unit/ Ac. of Lot Area (1)	14 Residential Dwelling Unit/ Ac. of Lot Area	232-293(a)(2)
Principal Building Setbacks and Height:			
From State Road:			
Min. Front Yard	20 FT from Ult. R.O.W.	20 FT from Ult. R.O.W.	232-293(b)(1)
From Tract Boundary			
For Residential Buildings	50 FT	50 FT	232-293(b)(1)(a)
For Non-Residential Buildings	20 FT	20 FT	232-293(b)(1)(b)
Min. Separation Between Buildings	10 FT	10 FT	232-293(b)(6)
Min. Bldg Setback from Street R.O.W.	0 FT	0 FT	232-293(b)(3)
Min. Bldg Setback from Sidewalk	0 FT	0 FT	232-293(b)(4)
Min. Bldg Setback from Curb line	6 FT	6 FT	232-293(b)(5)
Max. Site Impervious Surface Ratio	70% of Net Lot Area	< 70% of Net Lot Area (55.3% /23.68 Ac.)	232-293(a)(3)
Max. Building Height	145 FT	< 145 FT	232-293(a)(5)
Min. Open Space	25% of Net Lot Area	> 25% of Net Lot Area	232-293(a)(4)
Parking:			
Min. Perpendicular Parking Space	9.0 FT X 18.0 FT	9.0 FT X 18.0 FT	232-293(c)(2)(a)
Min. Handicap Parking Stall	12.0 FT X 18.0 FT	12.0 FT X 18.0 FT	232-293(c)(2)(d)
Min. Parallel Parking space	7.0 FT X 18.0 FT	7.0 FT X 18.0 FT	232-293(c)(2)(b)
Min. Angled Parking space	9.0 FT X 18.0 FT	9.0 FT X 18.0 FT	232-293(c)(2)(c)
Parking Requirements (2)			
Residential	2.5 Spaces/Dwelling Unit	2.5 Spaces/Dwelling Unit	232-293(c)(1)(a)
Office	3.0 spaces/ 1,000 sq. ft. of GLA during weekdays 0.5 spaces/ 1,000 sq. ft. of GLA during weekends	3.0 spaces/ 1,000 sq. ft. of GLA during weekdays 0.5 spaces/ 1,000 sq. ft. of GLA during weekends	232-293(c)(1)(b) 232-293(c)(1)(b)
Commercial-retail	3.8 spaces/ 1,000 sq. ft. of GLA during weekdays 4.0 spaces/ 1,000 sq. ft. of GLA during weekends	3.8 spaces/ 1,000 sq. ft. of GLA during weekdays 4.0 spaces/ 1,000 sq. ft. of GLA during weekends	232-293(c)(1)(c) 232-293(c)(1)(c)
Restaurants	12 spaces/ 1,000 sq. ft. of GLA during weekdays 15 spaces/ 1,000 sq. ft. of GLA during weekends	12 spaces/ 1,000 sq. ft. of GLA during weekdays 15 spaces/ 1,000 sq. ft. of GLA during weekends	232-293(c)(1)(d) 232-293(c)(1)(d)
Marina	0.25 spaces/ boat slip during weekdays 0.50 spaces/ boat slip during weekends	0.25 spaces/ boat slip during weekdays 0.50 spaces/ boat slip during weekends	232-293(c)(1)(e) 232-293(c)(1)(e)

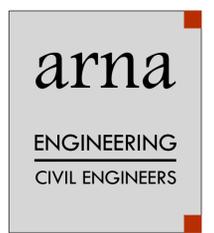
(1) For purposes of calculating allowable residential density within the MXD, the lot area shall be reduced for each square foot of non-residential gross floor area within buildings.
(2) These numbers shall include garage spaces, tandem spaces, spaces provided in driveways and parking provided on-street, parking lots or parking garages.
Shared parking is permitted per Section 232-293(c)(3). Refer to Parking Management Plan for details.



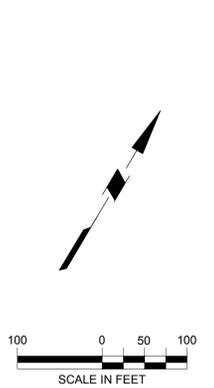
PHASE	TOTAL SINGLE FAMILY/TOWNHOUSE RESIDENTIAL UNITS	TOTAL MULTIFAMILY RESIDENTIAL UNITS
1	179	4
2	106	—
3	165	—
TOTAL	450	4

RESIDENTIAL UNITS		
UNIT TYPE	APPROVED	AMENDED
SINGLE FAMILY / TOWNHOUSE	457	450
MULTIFAMILY (CONSTRUCTED)	4	4
MULTIFAMILY (BY OTHERS)	144	144
TOTAL	605	598

LEGEND	
---	PROPERTY LINE / RIGHT-OF-WAY LINE
---	SETBACK LINE
---	BUILDING
---	CURB LINE
---	DEPRESSED CURB LINE
---	TRAFFIC SIGN
---	CURB RAMP
---	PARKING COUNT FOR EACH AREA
---	PHASE LINE



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Project
WATERSIDE
TMP # 02-065-022, 02-064-138, 02-064-139

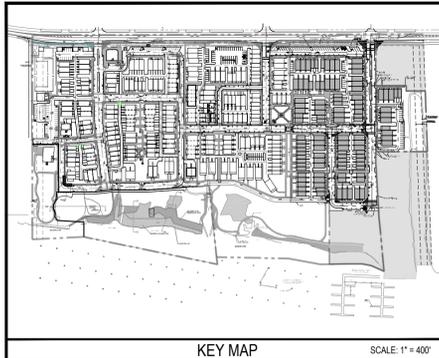
TOWNSHIP OF BENSALEM
BUCKS COUNTY
PENNSYLVANIA

Drawing Title
FINAL MASTER SITE PLAN (RECORD PLAN) - AMENDED



DATE	COMMENTS	NO.
8-17-20	REVISED PER TOWNSHIP COMMENTS	3.
02-14-20	REVISED FOR PHASE III	2.
05-09-19	REVISED PER TOWNSHIP ENGINEER'S COMMENTS	1.

REVISIONS	
Project No.	230000801
Date	11-30-2018
Scale	1" = 100'
Drawn By	AKG / JEM
Checked By	AAB / CT
Drawing No.	20.00



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PHASE	TOTAL TOWNHOUSE RESIDENTIAL UNITS
3	165

OVERALL SITE DATA	
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BENSALEM TOWNSHIP ZONING TABLE ZONING DISTRICT - MIXED USE WATERFRONT DEVELOPMENT (MXD)			
ITEM Use	REQUIRED PER MXD Mixed Use Bldgs /Office/Restaurant /Residential Clubhouse/Marina/Commercial-Retail use/Recreational	PROPOSED Mixed Use Bldgs /Office/Restaurant /Residential Clubhouse/Marina/Commercial-Retail use/Recreational	ORDINANCE SECTION 232-310.2
Lot Requirements:	30 Ac	44.45 Ac	232-310.3(a)(1)
Min. Lot Area	14 Residential Dwelling Unit/ Ac. of Lot Area (1)	14 Residential Dwelling Unit/ Ac. of Lot Area	232-310.3(a)(2)
Max. Residential Density	57	57	
Principal Building Setbacks and Height:			
From State Road:			
Min. Front Yard	20 FT from Util. R.O.W.	20 FT from Util. R.O.W.	232-310.3(b)(1)
From Tract Boundary			
For Residential Buildings	50 FT	50 FT	232-310.3(b)(1)(a)
For Non-Residential Buildings	20 FT	20 FT	232-310.3(b)(1)(b)
Min. Separation Between Buildings	10 FT	10 FT	232-310.3(b)(6)
Min. Bldg Setback from Street R.O.W.	0 FT	0 FT	232-310.3(b)(3)
Min. Bldg Setback from Sidewalk	0 FT	0 FT	232-310.3(b)(4)
Min. Bldg Setback from Curb line	6 FT	6 FT	232-310.3(b)(5)
Max. Site Impervious Surface Ratio	70% of Net Lot Area	< 70% of Net Lot Area (55.3% /23.68 Ac.)	232-310.3(a)(3)
Max. Building Height	145 FT	< 145 FT	232-310.3(a)(5)
Min. Open Space	25% of Net Lot Area	> 25% of Net Lot Area	232-310.3(a)(4)
Parking:			
Min. Perpendicular parking Space	9.0 FT X 18.0 FT	9.0 FT X 18.0 FT	232-310.3(c)(2)(a)
Min. Handicap Parking Stall	12.0 FT X 18.0 FT	12.0 FT X 18.0 FT	232-310.3(c)(2)(d)
Min. Parallel Parking space	7.0 FT X 18.0 FT	7.0 FT X 18.0 FT	232-310.3(c)(2)(b)
Min. Angled Parking space	9.0 FT X 18.0 FT	9.0 FT X 18.0 FT	232-310.3(c)(2)(c)
Parking Requirements (2)	2.5 Spaces/Dwelling Unit	2.5 Spaces/Dwelling Unit	232-310.3(c)(1)(a)
Residential			
Office	3.0 spaces/ 1,000 sq. ft. of GLA during weekdays 0.5 spaces/ 1,000 sq. ft. of GLA during weekends	3.0 spaces/ 1,000 sq. ft. of GLA during weekdays 0.5 spaces/ 1,000 sq. ft. of GLA during weekends	232-310.3(c)(1)(b) 232-310.3(c)(1)(b)
Commercial-retail	3.8 spaces/ 1,000 sq. ft. of GLA during weekdays 4.0 spaces/ 1,000 sq. ft. of GLA during weekends	3.8 spaces/ 1,000 sq. ft. of GLA during weekdays 4.0 spaces/ 1,000 sq. ft. of GLA during weekends	232-310.3(c)(1)(c) 232-310.3(c)(1)(c)
Restaurants	12 spaces/ 1,000 sq. ft. of GLA during weekdays 15 spaces/ 1,000 sq. ft. of GLA during weekends	12 spaces/ 1,000 sq. ft. of GLA during weekdays 15 spaces/ 1,000 sq. ft. of GLA during weekends	232-310.3(c)(1)(d) 232-310.3(c)(1)(d)
Marina	0.25 spaces/ boat slip during weekdays 0.50 spaces/ boat slip during weekends	0.25 spaces/ boat slip during weekdays 0.50 spaces/ boat slip during weekends	232-310.3(c)(1)(e) 232-310.3(c)(1)(e)

(1) For purposes of calculating allowable residential density within the MXD, the lot area shall be reduced for each square foot of non-residential gross floor area within buildings.
 (2) These numbers shall include garage spaces, tandem spaces, spaces provided in driveways and parking provided on-street, parking lots or parking garages.
 Shared parking is permitted per Section 232-293(c)(3). Refer to Parking Management Plan for details.

THE ZONING TABLE IS BASED ON THE OVERALL WATERSIDE PROJECT AND HAS NOT BEEN BROKEN DOWN BY PHASES.

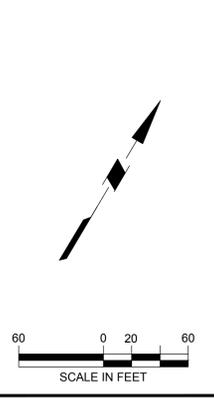


LEGEND

- PROPERTY LINE / RIGHT-OF-WAY LINE
- SETBACK LINE
- BUILDING
- CURB LINE
- DEPRESSED CURB LINE
- TEMPORARY ASPHALT CURB
- TRAFFIC SIGN
- CURB RAMP
- PARKING COUNT FOR EACH AREA
- PHASE LINE

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CIVIL ENGINEERS

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Project
WATERSIDE
TMP # 02-065-022, 02-064-138, 02-064-139

TOWNSHIP OF BENSALEM
BUCKS COUNTY
PENNSYLVANIA

Drawing Title
FINAL MASTER SITE PLAN - PHASE III (RECORD PLAN)

REGISTERED PROFESSIONAL ENGINEER
CHIRAG V. THAKKAR
No. 075153
PENNSYLVANIA
CHIRAG V. THAKKAR
PROFESSIONAL ENGINEER
PALL. No. PE 075153

DATE	REVISIONS	COMMENTS	NO.
8-17-20	REVISED PER TOWNSHIP COMMENTS		1.

Project No.	230000801
Date	2-14-2020
Scale	1" = 60'
Drawn By	AG / JEM
Checked By	AAB / CT
Drawing No.	

OWNER CERTIFICATION
THIS IS TO CERTIFY THESE PLANS DATED _____ HAVE BEEN APPROVED BY THE RECORD OWNER _____
NAME _____ DATE _____
SIGNATURE _____

NOTARY PUBLIC CERTIFICATION
THIS IS TO CERTIFY THESE PLANS DATED _____ HAVE BEEN APPROVED BY THE NOTARY PUBLIC _____
NAME _____ DATE _____
SIGNATURE _____

BENSALEM TOWNSHIP COUNCIL
THIS IS TO CERTIFY THESE PLANS DATED _____ HAVE BEEN APPROVED BY THE TOWNSHIP COUNCIL _____
NAME _____ DATE _____
SIGNATURE _____
NAME _____ DATE _____
SIGNATURE _____
NAME _____ DATE _____
SIGNATURE _____

BENSALEM TOWNSHIP PLANNING COMMISSION
THIS IS TO CERTIFY THESE PLANS DATED _____ HAVE BEEN APPROVED BY THE PLANNING COMMISSION CHAIRMAN _____
NAME _____ DATE _____
SIGNATURE _____
NAME _____ DATE _____
SIGNATURE _____
NAME _____ DATE _____
SIGNATURE _____

WETLANDS/SOIL SCIENTIST CERTIFICATION
THIS IS TO CERTIFY THESE PLANS DATED _____ HAVE BEEN APPROVED BY THE WETLAND SPECIALIST/SOIL SCIENTIST _____
NAME _____ DATE _____
SIGNATURE _____

BUCKS COUNTY RECORDER OF DEEDS
THIS IS TO CERTIFY THESE PLANS DATED _____ HAVE BEEN APPROVED BY THE BUCKS COUNTY RECORDER OF DEEDS _____
NAME _____ DATE _____
SIGNATURE _____

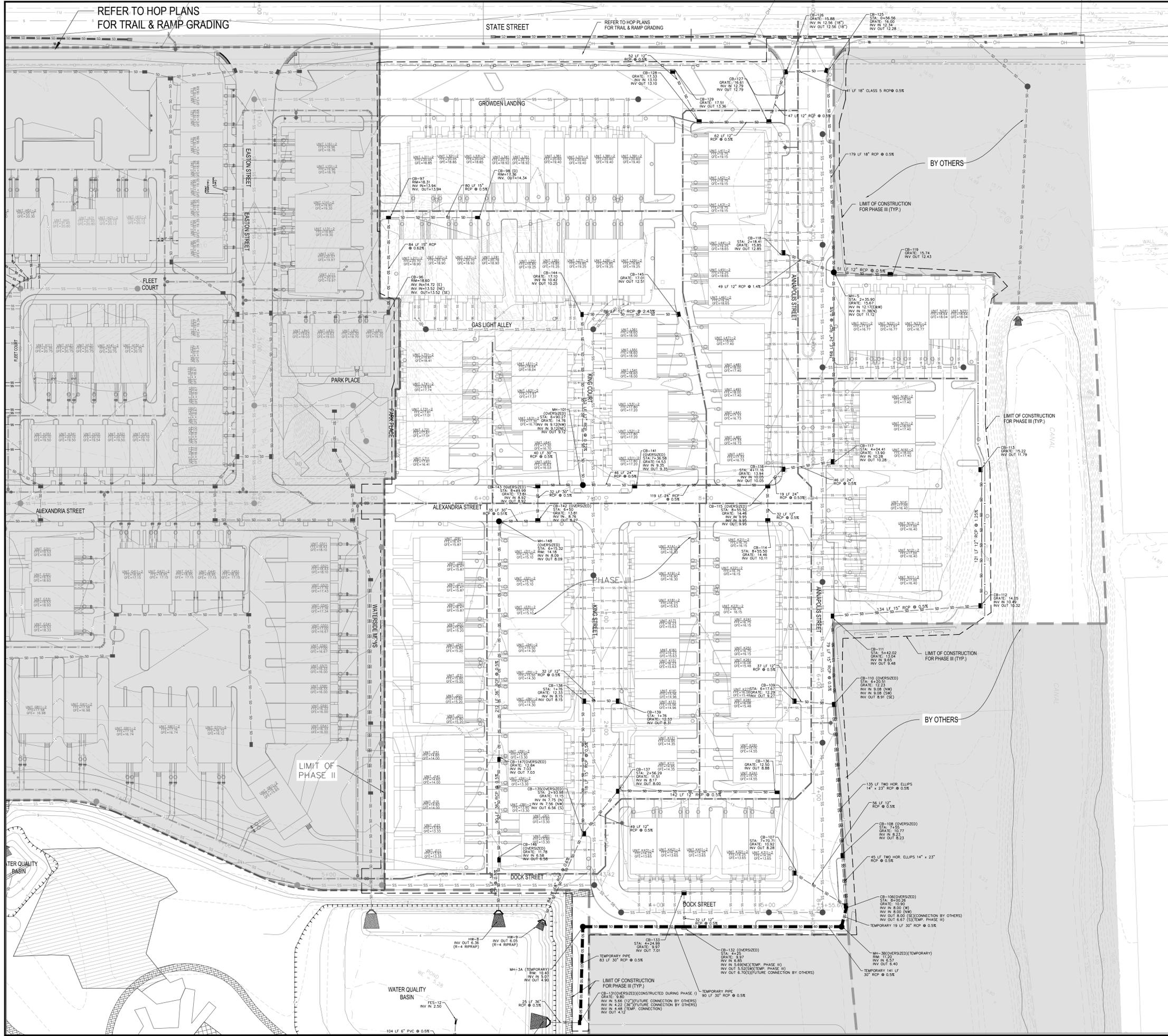
BUCKS COUNTY PLANNING COMMISSION
THIS IS TO CERTIFY THESE PLANS DATED _____ HAVE BEEN APPROVED BY THE BUCKS COUNTY PLANNING COMMISSION _____
NAME _____ DATE _____
SIGNATURE _____

SURVEYOR'S CERTIFICATION
THIS IS TO CERTIFY THESE PLANS DATED _____ HAVE BEEN SURVEYED BY THE SURVEYOR NAMED BELOW AND HAVE BEEN APPROVED BY THE SURVEYOR. ALL MONUMENTS AND PROPERTY CORNER MARKERS WILL BE INSTALLED TO THESE HUNDRETHS (0.01) OF A FOOT ACCURACY BY THE SURVEYOR AT THE TIME OF FINAL GRADING.
NAME _____ DATE _____
SIGNATURE _____

DEVELOPER'S CERTIFICATION
THIS IS TO CERTIFY THESE PLANS DATED _____ HAVE BEEN APPROVED BY THE DEVELOPER _____
NAME _____ DATE _____
SIGNATURE _____

ENGINEER'S CERTIFICATION
THIS IS TO CERTIFY THESE PLANS DATED _____ HAVE BEEN APPROVED BY THE ENGINEER _____
NAME _____ DATE _____
SIGNATURE _____

20.03



REFER TO HOP PLANS FOR TRAIL & RAMP GRADING

REFER TO HOP PLANS FOR TRAIL & RAMP GRADING

GRADING AND DRAINAGE NOTES:

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 48 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES, WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.

CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND SPECIFICATIONS FOR ACTUAL LOCATIONS OF ALL UTILITY ENTRANCES TO INCLUDE SANITARY SEWER LATERALS, DOMESTIC WATER SERVICE, ELECTRICAL, TELEPHONE AND GAS SERVICE. CONTRACTOR SHALL COORDINATE INSTALLATION OF UTILITIES IN SUCH A MANNER AS TO AVOID CONFLICTS AND TO ENSURE PROPER DEPTHS ARE ACHIEVED AS WELL AS COORDINATING WITH THE UTILITY COMPANIES AS TO LOCATION AND SCHEDULING OF CONNECTIONS TO THEIR FACILITIES.

HOPE = HIGH DENSITY POLYETHYLENE PIPE
 RCP = REINFORCED CEMENT CONCRETE PIPE
 PVC = POLYVINYL CHLORIDE PIPE
 DIP = DUCTILE IRON PIPE

STORM DRAINAGE PIPING TO UTILIZE WATER TIGHT JOINTS.

CONTRACTOR MUST PROVIDE SHOP DRAWINGS OF THE OVER SIZE STORM STRUCTURES TO OWNER'S ENGINEER FOR REVIEW PRIOR TO CONSTRUCTION OR ORDERING.

THE SITE IS LOCATED WITH 100 YEAR FLOOD PLAN OF DELAWARE RIVER. THE REPORTED FLOOD ELEVATION IS 11.0.

TOPOGRAPHIC DATA IN AREA SHOWN AS SOLID LINES ON THE EXISTING SURVEY REFLECTS ANTICIPATED GRADES FOLLOWING SITE REMEDIATION. TOPOGRAPHY IN THIS AREA NOT ACCESSIBLE AS OF THE DATE OF THIS SURVEY DUE TO REMEDIATION ACTIVITIES TAKING PLACE.

SEE DRAWINGS NO. 28.02.28.03 FOR ALL PROPOSED STORM STRUCTURE DETAILS.

ALL STORM DRAINAGE FACILITIES AND CONSTRUCTION PROCEDURES SHALL CONFORM TO THE PAOBT STANDARDS AND WHERE APPLICABLE, MANUFACTURER'S SPECIFICATIONS.

COMPACTION CRITERIA FOR FILL PLACEMENT IN THE FOLLOWING AREAS SHALL MEET OR EXCEED THE FOLLOWING MINIMUM PERCENTAGE OF MAXIMUM MODIFIED PROCTOR DRY DENSITY AS DETERMINED BY ASTM D-1557 USED ON REPRESENTATIVE SOIL SAMPLES, UNLESS MORE STRINGENT CRITERIA GIVEN ELSEWHERE OR RECOMMENDED BY THE GEOTECHNICAL ENGINEER.

FILL AREA	PERCENT OF MAXIMUM MODIFIED PROCTOR DRY DENSITY
BUILDING FOOTPRINT	95% OR AS RECOMMENDED BY GEOTECH ENGINEER
PAVEMENT AND ROADWAYS	95% OR AS RECOMMENDED BY GEOTECH ENGINEER
SIDEWALKS	95% OR AS RECOMMENDED BY GEOTECH ENGINEER
LANDSCAPE AREAS	92% OR AS RECOMMENDED BY GEOTECH ENGINEER
DETENTION BASIN	92% OR AS RECOMMENDED BY GEOTECH ENGINEER
FLOOD STORAGE EMBANKMENTS	92% OR AS RECOMMENDED BY GEOTECH ENGINEER
TRENCH BACKFILL	95% OR AS RECOMMENDED BY GEOTECH ENGINEER

PROTECT SUBGRADE FROM EXCESSIVE WHEEL LOADING DURING CONSTRUCTION, INCLUDING CONCRETE TRUCKS AND DUMP TRUCKS.

REMOVE AREAS OF FINISHED SUBGRADE FOUND TO HAVE INSUFFICIENT COMPACTION DENSITY TO DEPTH NECESSARY AND REPLACE IN A MANNER THAT WILL COMPLY WITH COMPACTION REQUIREMENTS BY USE OF MATERIAL EQUAL TO OR BETTER THAN BEST SUBGRADE MATERIAL ON SITE. SURFACE OF SUBGRADE AFTER COMPACTION SHALL BE HARD, UNIFORM, SMOOTH, STABLE, AND TRUE TO GRADE AND CROSS SECTION.

ALL CONCRETE, UNLESS OTHERWISE NOTED OR SPECIFIED BY REGULATORY AUTHORITIES, SHALL BE A MINIMUM OF 4,000 PSI.

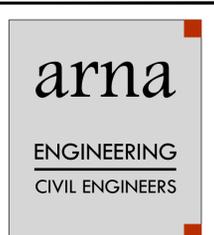
CONTRACTOR MUST REFER TO ARCHITECTURAL DRAWINGS FOR ROOF DRAIN SIZES AND LOCATIONS, BUILDING FOUNDATION DETAILS, WINDOW LOCATIONS, STOODS AND ALL OTHER APPURTENANCES TO THE BUILDINGS.

RETAINING WALLS, RETAINING WALL REINFORCEMENT, MARINA FEATURES, MOORINGS AND ALL ASSOCIATED SITE IMPROVEMENTS BELOW ELEVATION 11.0 SHALL BE SELECTED, DESIGNED AND CONSTRUCTED TO SAFELY FUNCTION DURING MINORATION WITH WATER. THE CONTRACTOR SHALL PROVIDE A RETAINING WALL DESIGN FOR EACH PROPOSED WALL PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF PENNSYLVANIA FOR REVIEW BY THE OWNER'S ENGINEER AND THE TOWNSHIP PRIOR TO INSTALLATION.

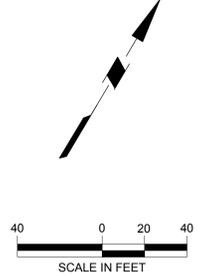
WATER QUALITY BASINS AND CONVEYANCE NETWORK TO BE OWNED AND MAINTAINED BY NEIGHBORHOOD ASSOCIATION.

WETLANDS AND WATERS OF U.S. DELINEATED BY DEL VAL SOIL AND ENVIRONMENTAL CONSULTANTS, INC.

AS DEED RESTRICTIONS MAY REQUIRE, PROPOSED DWELLINGS SHALL BE CONSTRUCTED WITH A VAPOR BARRIER OR SIMILAR PROTECTIVE BARRIER BELOW THE FOUNDATION.



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Project

WATERSIDE
 TMP # 02-065-022, 02-064-138, 02-064-139

TOWNSHIP OF BENSALEM
 BUCKS COUNTY
 PENNSYLVANIA

Drawing Title

FINAL DRAINAGE PLAN - PHASE III

ACCESSIBLE PLAN NOTES:

- CONTRACTOR SHALL REFER TO THE LATEST ADA ACCESSIBILITY GUIDELINES AND ANSI A117.1-2003 FOR BUILDINGS AND FACILITIES (ADAG) TO ENSURE THAT ADA DETAILS ARE CURRENT AT THE TIME OF CONSTRUCTION. CONTRACTOR SHALL CONSTRUCT AREAS DESIGNATED FOR ACCESSIBLE ROUTES (INCLUDING CURB RAMPS, SIDEWALKS, HANDICAP PARKING STALLS, CROSSWALKS AND INLETS) BY FOLLOWING THE MOST CURRENT ADA ACCESSIBILITY GUIDELINES AND ANSI A117.1-2003.
- ALL ACCESSIBLE PARKING SPACES AREA SHALL NOT EXCEED 2% IN ALL DIRECTIONS.
- ALL ACCESSIBLE ROUTES AND RAMP CROSS SLOPES SHALL NOT EXCEED 2%.
- ALL ACCESSIBLE ROUTES SHALL HAVE A MAXIMUM RUNNING SLOPE OF 5%, IF ANY PART OF THE ACCESSIBLE ROUTE HAS A RUNNING SLOPE EXCEEDING 5%, IT IS CONSIDERED A RAMP.
- RAMPS SHALL HAVE A MAXIMUM RUNNING SLOPE OF 8.33% (1:12 SLOPE) AND A MAXIMUM CROSS SLOPE OF 2%. SEE SHEET CONSTRUCTION DETAIL SHEET FOR RAMP DETAILS.
- CONTRACTOR SHALL FIELD VERIFY THAT THE EXISTING LONGITUDINAL SLOPE (ALONG THE DIRECTION OF TRAVEL) DOES NOT EXCEED 5% AND CROSS SLOPE DOES NOT EXCEED 2% FOR ACCESSIBLE ROUTES (TYP.). CONTRACTOR SHALL NOTIFY THE OWNER AND OWNER'S ENGINEER IF ANY ACCESSIBLE ROUTES (I.E. SIDEWALK, PAVED AREAS, ETC.) DOES NOT COMPLY WITH THE ABOVE ADA REQUIREMENTS.

GENERAL NOTES:

- THIS PLAN IS AN AMENDED FINAL GRADING PLAN FOR PHASE III OF THE "WATERSIDE" DEVELOPMENT. THE ORIGINAL FINAL GRADING PLAN WAS DESIGNED BY ADVANCE GEOSERVICES DATED NOVEMBER 17, 2006 AND LAST REVISED FEBRUARY 12, 2014.
- THE GRADES WERE CHECKED AGAINST THE FINAL GRADING PLANS WITHIN THE "FINAL SUBDIVISION AND LAND DEVELOPMENT" PLAN SET PREPARED BY ADVANCE GEOSERVICES, DATED NOVEMBER 17, 2006 AND LAST REVISED FEBRUARY 12, 2014.
- GRADES FOR ROADS AND ALLEYS SHOWN ON THIS PLAN HAVE NOT BEEN CHANGED FROM THE PREVIOUSLY APPROVED MASTER SITE PLAN. ALL PROPOSED ROAD PROFILES AND CONSTRUCTION DETAILS REMAINED UNCHANGED FROM APPROVED PLANS PREPARED BY ADVANCE GEOSERVICES (AS LISTED ABOVE). CONTRACTOR IS SPECIFICALLY INFORMED TO USE THE APPROVED DRAWINGS FOR THIS INFORMATION.
- REFER TO ARCHITECTURAL PLANS FOR DETAILS OF PROPOSED BUILDINGS, ACCESS LOCATIONS, AND ALL FEATURES ACCESSORY TO BUILDINGS.
- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATIONS OF BENSALEM TOWNSHIP AND APPLICABLE PENNDOT FORM 408 AND RC STANDARDS, AQUA PA AND BUCKS COUNTY WATER AND SEWER AUTHORITY AS APPLICABLE, EXCEPT WHERE STANDARDS DO NOT EXIST FOR CERTAIN MATERIALS SPECIFIED ON PLANS.

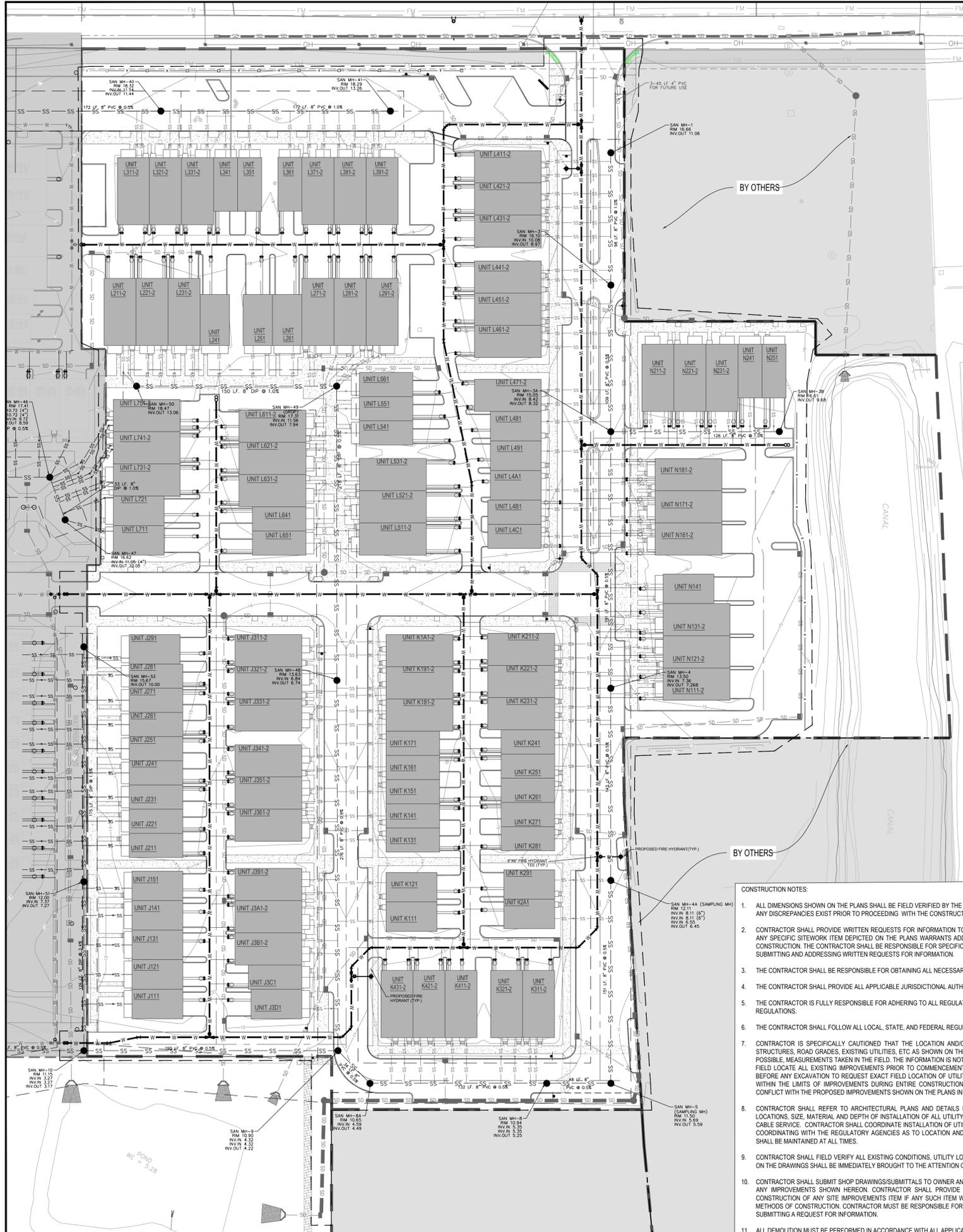
LEGEND	
EXISTING SYMBOLS & LINES	PROPOSED SYMBOLS & LINES
STORM DRAIN	PROPERTY LINE
SANITARY LINE	SETBACK LINE
GAS LINE	BUILDING
WATER LINE	CURB LINE
ELECTRIC LINE	FUTURE CURB LINE
OVERHEAD WIRE	DEPRESSED CURB LINE
FENCE (TYPE AS NOTED)	TRAFFIC SIGN
TIE LINE	CURB RAMP
PROPERTY RIGHT-OF-WAY LINE	NEW PARKING ROW COUNT
UTILITY EASEMENT	PARKING COUNT FOR EACH AREA
CONTOUR LINE	BUILDING DOOR
HYDRANT	STORMWATER FACILITY
STREET LIGHT	POLE
AREA LIGHT	ANCHOR POLE
SIGNAL POLE	MANHOLE (TYPE AS LABELED)
POLE	WATER VALVE
GRADING AND DRAINAGE	GAS VALVE
STORM PIPE	UNKNOWN VALVE
CATCH BASIN	CATCH BASIN
STORM MANHOLE	CONTOUR
SPOT GRADE	SPOT GRADE
TOP OF CURB ELEVATION	SPOT ELEVATION
BOTTOM OF CURB ELEVATION	CLEAN-OUT
FLOW ARROW	TREE
HEADLAND (FLARED END SECTION)	BENCH MARK
RIP-RAP	SOIL
UTILITY	BOLLARD
WATER LINE	METAL COVER
GAS LINE	ELECTRIC BOX
DOUBLE LINE	DOOR
TELEPHONE & ELECTRIC LINE	DOUBLE DOOR
HYDRANT	VALVE
CLEAN-OUT	CLEAN-OUT
SANITARY MANHOLE	SANITARY MANHOLE
PROPOSED SANITARY PIPE	PROPOSED SANITARY PIPE
PROPOSED ELECTRIC TRANSFORMER	PROPOSED ELECTRIC TRANSFORMER
PROPOSED ELECTRIC JUNCTION BOX	PROPOSED ELECTRIC JUNCTION BOX



CHIRAG V. THAKKAR
 PROFESSIONAL ENGINEER
 PA Lic. No. PE 075153

DATE	REVISIONS	COMMENTS	NO.
8-17-2020	REVISED PER TOWNSHIP COMMENTS		1.

Project No.	23000801
Date	2-14-2020
Scale	1" = 40'
Drawn By	JEM
Checked By	AAB / CT
Drawing No.	21.06



- GENERAL NOTES:**
1. THIS PLAN IS AN AMENDED FINAL MASTER SANITARY PLAN FOR PHASE III OF THE "WATERSIDE" DEVELOPMENT. THE ORIGINAL MASTER SANITARY PLAN WAS DESIGNED BY ADVANCE GEOSERVICES DATED NOVEMBER 17, 2006 AND LAST REVISED FEBRUARY 12, 2014.
 2. THE SANITARY SEWER WAS CHECKED AGAINST THE SANITARY SEWER PLAN SET PREPARED BY ADVANCE GEOSERVICES, DATED OCTOBER 20, 2013 AND LAST REVISED MAY 5, 2014.
 3. REFER TO ARCHITECTURAL PLANS FOR DETAILS OF PROPOSED BUILDINGS, ACCESS LOCATIONS, AND ALL FEATURES ACCESSORY TO BUILDINGS.
 4. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATIONS OF BENSALEM TOWNSHIP AND APPLICABLE PENNDOT FORM 408 AND RC STANDARDS, AQUA PA AND BUCKS COUNTY WATER AND SEWER AUTHORITY AS APPLICABLE, EXCEPT WHERE STANDARDS DO NOT EXIST FOR CERTAIN MATERIALS SPECIFIED ON PLANS.

Phase 3

Unit	Inv at Main	Length	Slope	Inv at Bldg	FF	Diff	Connection Type
J311	7.97	26.30	8.00%	10.07	15.70	5.63	SHALLOW
J312	7.92	26.30	8.00%	10.02	15.70	5.68	SHALLOW
J321	7.87	26.30	10.00%	10.50	15.70	5.21	SHALLOW
J322	7.87	26.30	10.00%	10.30	15.70	5.40	SHALLOW
J331	7.57	26.30	10.00%	10.20	15.70	5.50	SHALLOW
J332	7.49	26.30	10.00%	10.12	15.70	5.58	SHALLOW
J341	7.25	26.30	12.00%	10.41	15.50	5.09	SHALLOW
J342	7.16	26.30	12.00%	10.31	15.50	5.19	SHALLOW
J351	7.04	26.30	12.00%	10.19	15.50	5.31	SHALLOW
J352	6.95	26.30	12.00%	10.11	15.50	5.39	SHALLOW
J361	6.84	26.30	12.00%	10.00	15.50	5.50	SHALLOW
J362	6.82	26.30	12.00%	9.98	15.50	5.52	SHALLOW
J391	6.44	26.7	4.00%	7.51	13.90	6.39	SHALLOW
J392	6.35	26.7	4.00%	7.42	13.90	6.48	SHALLOW
J3A1	6.25	26.7	4.00%	7.32	13.90	6.58	SHALLOW
J3A2	6.14	26.7	4.00%	7.21	13.90	6.69	SHALLOW
J3B1	6.04	26.7	4.00%	7.11	13.90	6.79	SHALLOW
J3B2	5.96	26.7	4.00%	7.02	13.90	6.88	SHALLOW
J3C1	5.80	26.7	6.00%	7.40	13.90	6.50	SHALLOW
J3D1	5.60	26.88	2.00%	8.89	13.90	5.01	DEEP
K111	6.17	36.35	8.00%	9.08	14.95	5.87	SHALLOW
K121	6.42	36.35	8.00%	9.33	14.95	5.62	SHALLOW
K131	6.70	36.80	8.00%	9.64	15.56	5.92	SHALLOW
K141	6.86	36.80	8.00%	9.80	15.56	5.76	SHALLOW
K151	7.02	36.80	10.00%	10.70	16.23	5.53	SHALLOW
K161	7.18	36.80	10.00%	10.86	16.23	5.37	SHALLOW
K171	7.33	36.80	10.00%	11.01	16.23	5.22	SHALLOW
K181	7.46	36.80	10.00%	11.14	16.23	5.09	SHALLOW
K182	7.55	36.80	10.00%	11.23	16.23	5.00	SHALLOW
K191	7.65	36.80	10.00%	11.33	16.90	5.57	SHALLOW
K192	7.69	36.80	10.00%	11.37	16.90	5.53	SHALLOW
K1A1	7.93	36.80	10.00%	11.61	16.90	5.29	SHALLOW
K1A2	7.98	36.80	10.00%	11.66	16.90	5.24	SHALLOW
K211	8.53	41.93	6.00%	11.04	16.75	5.71	SHALLOW
K212	8.47	41.93	6.00%	10.99	16.75	5.76	SHALLOW
K221	8.42	41.93	6.00%	10.93	16.75	5.82	SHALLOW
K222	8.36	41.93	6.00%	10.88	16.75	5.87	SHALLOW
K231	8.20	41.93	8.00%	11.55	16.75	5.20	SHALLOW
K232	8.15	41.93	8.00%	11.50	16.75	5.25	SHALLOW
K241	8.06	41.93	8.00%	11.41	16.75	5.34	SHALLOW
K251	7.98	41.93	8.00%	11.33	16.75	5.42	SHALLOW
K261	7.89	41.93	8.00%	11.24	16.08	5.68	SHALLOW
K271	7.80	41.93	6.00%	11.14	16.08	5.77	SHALLOW
K281	7.71	41.93	6.00%	11.04	16.08	5.86	SHALLOW
K291	8.11	41.93	4.00%	9.79	15.15	5.36	SHALLOW
K2A1	7.30	41.93	6.00%	9.82	15.15	5.33	SHALLOW
K311	6.21	34	8.00%	8.93	14.25	5.32	SHALLOW
K312	6.19	34	8.00%	8.91	14.25	5.34	SHALLOW
K321	6.13	34	8.00%	8.85	14.25	5.40	SHALLOW
K322	6.08	34	8.00%	8.80	14.25	5.45	SHALLOW
K411	5.95	34	8.00%	8.67	14.25	5.58	SHALLOW
K412	5.90	34	8.00%	8.62	14.25	5.63	SHALLOW
K421	5.83	34	8.00%	8.55	14.25	5.70	SHALLOW
K422	5.78	34	8.00%	8.50	14.25	5.75	SHALLOW
K431	5.72	34	8.00%	8.44	14.25	5.81	SHALLOW
K432	5.67	34	8.00%	8.39	14.25	5.86	SHALLOW
L211	14.06	34.17	4.00%	15.43	20.70	5.27	SHALLOW
L212	14.06	32	4.00%	15.34	20.70	5.36	SHALLOW
L221	13.98	30.15	4.00%	15.18	20.70	5.52	SHALLOW
L222	13.88	30.15	4.00%	15.08	20.70	5.62	SHALLOW
L231	13.77	30.15	4.00%	14.98	20.70	5.72	SHALLOW
L232	13.64	30.15	4.00%	14.84	20.70	5.86	SHALLOW
L241	13.44	30.15	6.00%	15.25	20.70	5.45	SHALLOW
L251	13.19	30.15	4.00%	14.39	19.85	5.46	SHALLOW
L261	12.89	30.15	4.00%	14.09	19.85	5.76	SHALLOW
L271	12.76	30.15	6.00%	14.57	19.85	5.28	SHALLOW
L272	12.73	30.15	6.00%	14.54	19.85	5.31	SHALLOW
L281	12.64	31.69	6.00%	14.54	19.85	5.31	SHALLOW
L282	12.61	37.35	4.00%	14.10	19.85	5.75	SHALLOW
L291	12.56	43.71	4.00%	14.31	19.85	5.54	SHALLOW
L292	12.56	46.8	4.00%	14.43	19.85	5.42	SHALLOW
L311	12.35	34.5	6.00%	14.42	20.05	5.63	SHALLOW
L312	12.37	34.5	6.00%	14.44	20.05	5.61	SHALLOW
L321	12.61	34.5	6.00%	14.68	20.05	5.37	SHALLOW
L322	12.68	34.5	6.00%	14.75	20.05	5.30	SHALLOW
L331	12.76	34.5	6.00%	14.83	20.05	5.22	SHALLOW
L332	12.89	34.5	6.00%	14.96	20.05	5.09	SHALLOW
L341	13.02	34.5	6.00%	15.09	20.72	5.63	SHALLOW
L351	13.20	34.5	6.00%	15.27	20.72	5.45	SHALLOW
L361	13.51	34.5	4.00%	14.89	20.60	5.71	SHALLOW
L371	13.65	34.5	4.00%	15.03	20.60	5.57	SHALLOW
L372	13.76	34.5	4.00%	15.14	20.60	5.46	SHALLOW
L381	13.87	34.5	4.00%	15.25	20.60	5.35	SHALLOW
L382	13.99	34.5	4.00%	15.37	20.60	5.23	SHALLOW
L391	14.13	34.5	2.00%	14.82	20.60	5.78	SHALLOW
L392	14.17	34.5	2.00%	14.86	20.60	5.74	SHALLOW

Phase 3

Unit	Inv at Main	Length	Slope	Inv at Bldg	FF	Diff	Connection Type
L411	12.00	52	4.00%	14.08	19.75	5.67	SHALLOW
L412	11.90	52	4.00%	13.98	19.75	5.77	SHALLOW
L421	11.76	52	4.00%	13.84	19.75	5.91	SHALLOW
L422	11.66	52	4.00%	13.74	19.75	6.01	SHALLOW
L431	11.54	52	4.00%	13.62	19.75	6.13	SHALLOW
L432	11.44	52	4.00%	13.52	19.75	6.23	SHALLOW
L441	11.19	52	4.00%	13.27	19.25	5.98	SHALLOW
L442	11.12	52	4.00%	13.20	19.25	6.05	SHALLOW
L451	9.89	52	8.00%	14.05	19.25	5.20	SHALLOW
L452	9.84	52	8.00%	14.00	19.25	5.25	SHALLOW
L461	9.79	52	8.00%	13.95	19.25	5.30	SHALLOW
L462	9.73	52	8.00%	13.89	19.25	5.36	SHALLOW
L471	9.57	52	6.00%	12.69	18.00	5.31	SHALLOW
L472	9.52	52	6.00%	12.64	18.00	5.36	SHALLOW
L481	9.46	52	6.00%	12.58	18.00	5.42	SHALLOW
L491	9.24	52	6.00%	12.36	18.00	5.64	SHALLOW
L4A1	9.10	52	6.00%	12.22	17.33	5.11	SHALLOW
L4B1	9.03	52	6.00%	12.15	17.33	5.18	SHALLOW
L4C1	8.93	52	6.00%	12.05	17.33	5.28	SHALLOW
L511	8.33	17	15.00%	10.88	17.80	6.92	SHALLOW
L512	8.40	17	15.00%	10.95	17.80	6.85	SHALLOW
L521	8.45	17	15.00%	11.00	17.80	6.80	SHALLOW
L522	8.52	17	15.00%	11.07	17.80	6.73	SHALLOW
L531	8.58	17	15.00%	11.13	17.80	6.67	SHALLOW
L532	8.64	17	15.00%	11.19	17.80	6.61	SHALLOW
L541	8.76	17	15.00%	11.31	18.60	7.29	SHALLOW
L551	8.85	17	15.00%	11.40	18.60	7.20	SHALLOW
L561	8.92	17	15.00%	11.47	18.60	7.13	SHALLOW
L611	8.82	23	2.00%	12.04	18.64	6.60	DEEP
L612	8.75	23	2.00%	11.97	18.64	6.67	DEEP
L621	8.70	23	2.00%	11.92	17.97	6.05	DEEP
L622	8.63	23	2.00%	11.85	17.97	6.12	DEEP
L631	8.57	23	2.00%	11.79	17.30	5.51	DEEP
L632	8.51	23	2.00%	11.73	17.30	5.57	DEEP
L641	8.44	23	2.00%	11.66	17.30	5.64	DEEP
L651	8.35	23	2.00%	11.57	16.63	5.06	DEEP
N111	8.25	39.08	8.00%	11.37	17.00	5.63	SHALLOW
N112	8.39	39.08	8.00%	11.51	17.00	5.49	SHALLOW
N121	8.46	39.08	8.00%	11.59	17.00	5.41	SHALLOW
N122	8.51	39.08	8.00%	11.64	17.00	5.36	SHALLOW
N131	8.58	39.08	8.00%	11.70	17.00	5.30	SHALLOW
N132	8.63	39.08	8.00%	11.75	17.00	5.25	SHALLOW
N141	8.75	39.08	6.00%	11.09	17.00	5.91	SHALLOW
N161	8.88	33.04	10.00%	12.18	18.00	5.82	SHALLOW
N162	8.95	33.04	4.00%	10.27	18.00	7.73	SHALLOW
N171	9.00	33.04	4.00%	10.32	18.00	7.68	SHALLOW
N172	9.05	33.04	4.00%	10.37	18.00	7.63	SHALLOW
N181	9.12	33.04	4.00%	10.45	18.00	7.55	SHALLOW
N182	9.19	33.04	4.00%	10.51	18.00	7.49	SHALLOW
N211	9.72	15	15.00%	11.97	17.97	6.00	SHALLOW
N212	9.82	15	15.00%	12.07	17.97	5.90	SHALLOW
N221	9.96	15	15.00%	12.21	17.97	5.76	SHALLOW
N222	10.06	15	15.00%	12.31	17.97	5.66	SHALLOW
N231	10.20	15	15.00%	12.45	17.97	5.52	SHALLOW
N232	10.30	15	15.00%	12.55	17.97	5.42	SHALLOW
N241	10.46	25.04	10.00%	12.96	18.64	5.68	SHALLOW
N251	10.64	25.04	10.00%	13.14	18.64	5.50	SHALLOW

Phase 3 - Installed During Phase 2

Unit	Inv at Main	Length	Slope	Inv at Bldg	FF	Diff	Connection Type
J111	5.30	36	6.00%	7.26	13.93	6.67	SHALLOW
J121	5.63	36	6.00%	7.79	13.93	6.14	SHALLOW
J131	6.16	36	6.00%	8.32	14.60	6.28	SHALLOW
J141	6.69	36	6.00%	8.85	14.60	5.75	SHALLOW
J151	7.17	36	6.00%	9.33	14.60	5.27	SHALLOW
J211	8.78	34	4.00%	10.14	15.80	5.66	SHALLOW
J221	9.05	34	4.00%	10.41	15.80	5.39	SHALLOW
J231	9.32	34	4.00%	10.68	15.80	5.12	SHALLOW
J241	9.59	34	4.00%	10.95	15.80	4.85	SHALLOW



Project

WATERSIDE

TMP # 02-065-022, 02-064-138, 02-064-139

TOWNSHIP OF BENSALEM
BUCKS COUNTY
PENNSYLVANIA

Drawing Title

**LANDSCAPE
PLAN - PHASE III**



CHIRAG V. THAKKAR
PROFESSIONAL ENGINEER
PA Lic. No. PE 075153

DATE	REVISED PER TOWNSHIP COMMENTS	NO.
8-17-2020	REVISED PER TOWNSHIP COMMENTS	1.

REVISIONS

Project No. 23000801

Date 2-14-2020

Scale 1" = 40'

Drawn By AG

Checked By AAB / CT

Drawing No.

24.03

PLANT SCHEDULE

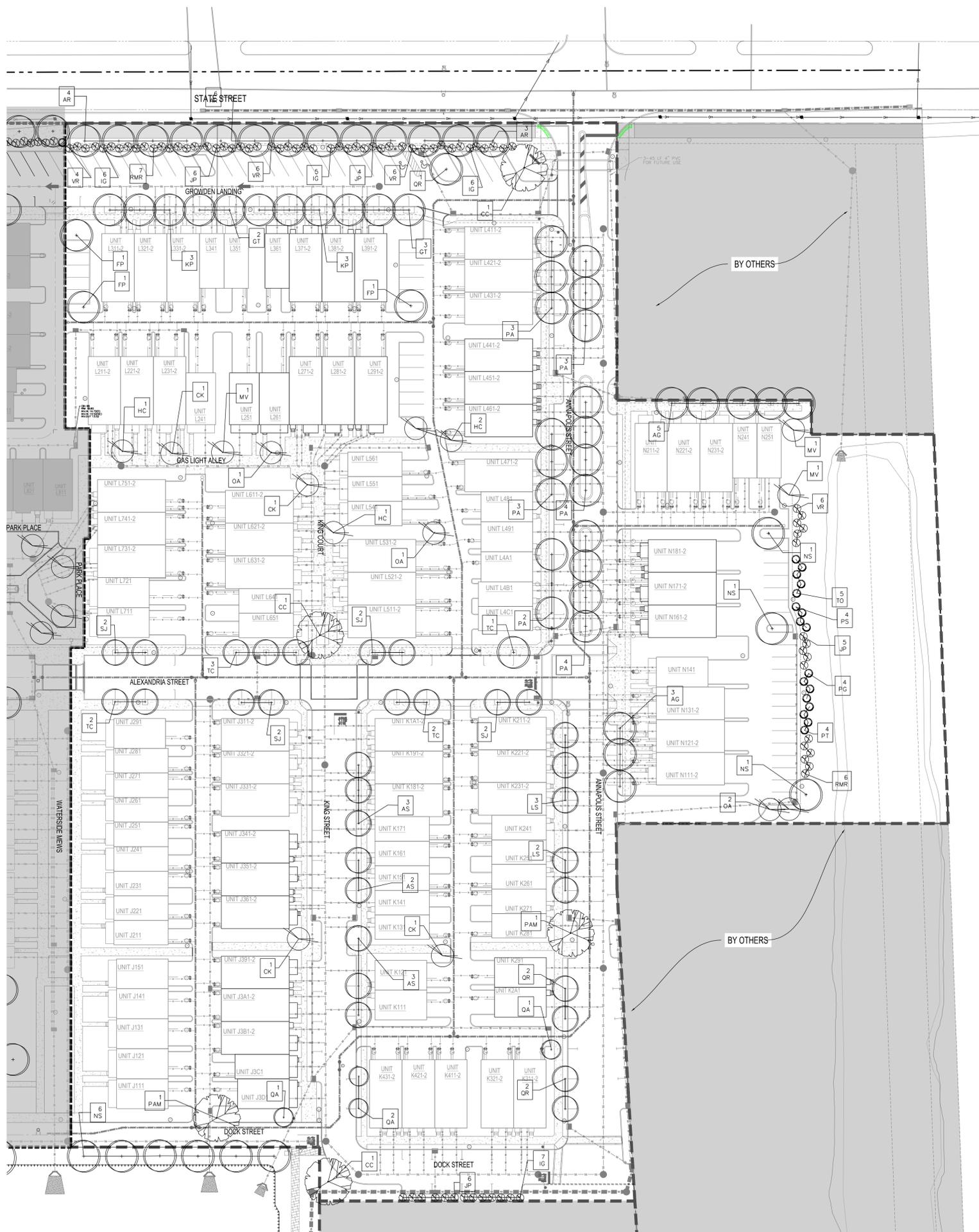
KEY	QTY.	BOTANICAL NAME	COMMON NAME	CAULPER	HEIGHT
A. DECIDUOUS TREES					
AG	8	Acer Ginnala	Amur Maple	2.5 - 3"	12 - 14'
AR	13	Acer Rubram "Red Sunset"	Red Maple	2.5 - 3"	12 - 14'
AS	8	Acer Saccharum	Sugar Maple	2.5 - 3"	12 - 14'
FP	3	Fraxinus Pennsylvania	Green Ash	2.5 - 3"	12 - 14'
GT	5	Gleditsia Tricanthos "Skyline"	Honey Locust	2.5 - 3"	12 - 14'
KP	6	Koeleruteria Paniculata	Golden Rain Tree	2.5 - 3"	12 - 14'
LS	5	Liquidambar Styraciflua	Sweetgum	2.5 - 3"	12 - 14'
NS	9	Nyssa Sylvatica	Sourgum	2.5 - 3"	12 - 14'
PA	19	Platanus x Acerifolia "Bloodgood"	London Planetree	2.5 - 3"	12 - 14'
QA	4	Quercus Acutissima	Sawtooth Oak	2.5 - 3"	12 - 14'
QR	5	Quercus Rubra	Red Oak	2.5 - 3"	12 - 14'
SJ	8	Sophora Japonica	Scholar tree	2.5 - 3"	12 - 14'
TC	8	Tilia Cordata "Greenspire"	Greenspire Linden	2.5 - 3"	12 - 14'
	101				
B. EVERGREEN TREES					
PG	4	Picea Abies	Japanese Norway Spruce	6 - 8'	
PS	4	Pinus Strobus	White Pine	6 - 8'	
TO	5	Thuja Occidentalis "Emerald"	Emerald Arborvitae	6 - 8'	
PT	4	Pseudotsuga Taxifolia (Douglas)	Douglas Fir	6 - 8'	
	17				
C. ORNAMENTAL TREES					
CK	4	Cornus Kousa	Kousa Dogwood	2.5 - 3"	6 - 8'
HC	4	Halesia Carolina	Carolina Silverbell	2.5 - 3"	6 - 8'
MV	3	Magnolia Virginiana	Sweetbay Magnolia	2.5 - 3"	6 - 8'
OA	4	Oxydendrum Aboreum	Sorrel Tree	2.5 - 3"	6 - 8'
	15				
D. SPECIMEN TREES					
CC	3	Carpinus Caroliniana	American Hornbeam	2.5 - 3"	
PAM	2	Phellodendron Amurense	Amuk Cork Tree	2.5 - 3"	
	5				
E. SHRUBS					
IG	24	Ilex Glabra Compacta	Compact Inkberry	2.5 - 3'	
JP	21	Juniperus Chinensis	Chinese Juniper	2.5 - 3'	
RMR	13	Rhododendron Maximum Roseum	Rosebay Rhododendron	2.5 - 3'	
VR	22	Viburnum Rhytidophyllum	Leatherwood Viburnum	2.5 - 3'	
	80				

NOTES:

- 1) THE PLAN IS FOR PHASE III LANDSCAPE ONLY.
- 2) PLANT QUANTITIES SHOWN IN THE PLANT SCHEDULE ABOVE CORRESPOND ONLY TO LANDSCAPING ON PHASE III.
- 3) ALL STREETS AND ROADWAYS SHALL BE PRIVATE AND NOT DEDICATED TO TOWNSHIP.
- 4) ALL PLANT MATERIAL TO BE NURSERY STOCK, SHALL HAVE SYMMETRICAL GROWTH, BE FREE OF PESTS AND DISEASE AND GUARANTEED FOR TWO YEARS.
- 5) PLAN INDICATES PROPOSED PLANT LOCATIONS AND SPECIES. OWNER/DEVELOPER RESERVES RIGHT TO REVISE PLANT SPECIES OR LOCATIONS DUE TO POTENTIAL CHANGES, I.E., AVAILABILITY.

LEGEND

EXISTING SYMBOLS & LINES	PROPOSED SYMBOLS & LINES
<p>EXISTING SYMBOLS & LINES</p> <p>STORM DRAIN</p> <p>SANITARY LINE</p> <p>GAS LINE</p> <p>WATER LINE</p> <p>ELECTRIC LINE</p> <p>OVERHEAD WIRE</p> <p>FENCE (TYPE AS NOTED)</p> <p>PROPERTY/RIGHT-OF-WAY LINE</p> <p>UTILITY EASEMENT</p> <p>CONTOUR LINE</p> <p>HYDRANT</p> <p>STREET LIGHT</p> <p>AREA LIGHT</p> <p>SIGNAL POLE</p> <p>POLE</p> <p>ANCHOR POLE</p> <p>MANHOLE (TYPE AS LABELED)</p> <p>WATER VALVE</p> <p>GAS VALVE</p> <p>UNKNOWN VALVE</p> <p>CATCH BASIN</p> <p>SPOT ELEVATION</p> <p>CLEAN-OUT</p> <p>TREE</p> <p>BENCH MARK</p> <p>SIGN</p> <p>SOIL/LAND</p> <p>METAL COVER</p> <p>ELECTRIC BOX</p> <p>DOOR</p> <p>DOUBLE DOOR</p> <p>GARAGE DOOR</p>	<p>PROPOSED SYMBOLS & LINES</p> <p>SITE</p> <p>PROPERTY LINE</p> <p>SETBACK LINE</p> <p>BUILDING</p> <p>CURB LINE</p> <p>FUTURE CURB LINE</p> <p>DEPRESSED CURB LINE</p> <p>TRAFFIC SIGN</p> <p>CURB RAMP</p> <p>NEW PARKING ROW COUNT</p> <p>PARKING COUNT FOR EACH AREA</p> <p>BUILDING DOOR</p> <p>STORMWATER FACILITY</p> <p>PHASE LINE</p> <p>GRADING AND DRAINAGE</p> <p>STORM PIPE</p> <p>CATCH BASIN</p> <p>STORM MANHOLE</p> <p>CONTOUR</p> <p>SPOT GRADE</p> <p>TOP OF CURB ELEVATION</p> <p>BOTTOM OF CURB ELEVATION</p> <p>FLOW ARROW</p> <p>HEADWALL / FLARED END SECTION</p> <p>RIP-RAP</p> <p>UTILITY</p> <p>WATER LINE</p> <p>GAS LINE</p> <p>TELEPHONE & ELECTRIC LINE</p> <p>HYDRANT</p> <p>VALVE</p> <p>CLEANOUT</p> <p>SANITARY MANHOLE</p> <p>PROPOSED SANITARY PIPE</p> <p>PROPOSED ELECTRIC TRANSFORMER</p> <p>PROPOSED ELECTRIC JUNCTION BOX</p>



STORM SEWER CALCULATIONS FOR PHASE III TEMPORARY PIPES

WATERSIDE - PHASE III

2375 State Road
TMP # 02-065-022, 02-064-138, 02-064-139
Bensalem Township, Bucks County, Pennsylvania

Prepared For:

Lennar MPA, LLC
2465 Kuser Road, 3rd Floor
Hamilton, NJ 08690

Prepared By:

arna Engineering Inc.

1456 Ferry Road, Suite 603
Doylestown, PA 18901

Chirag V. Thakkar

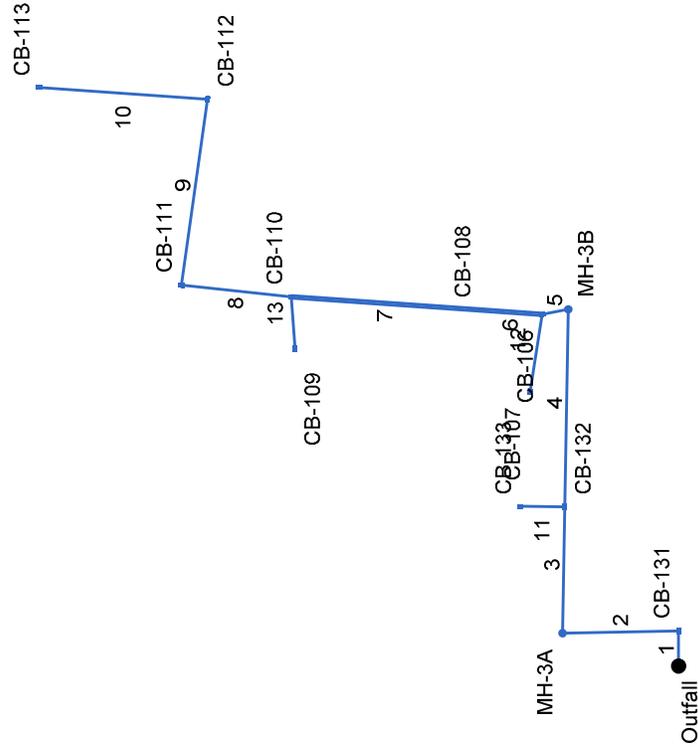


Chirag V. Thakkar, P.E.
PA License No. PE 075153

August 17, 2020
ARNA Project No. 230000803

HEADWALL 10

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	HW-10 TO CB-131	20.08	36	Cir	25.000	4.00	4.12	0.480	5.43	5.56	n/a	5.56	End	Combination
2	CB-131 TO MH-3A	19.55	30	Cir	83.000	4.48	4.90	0.506	5.98	6.40	n/a	6.40	1	Manhole
3	CB-MH-3A TO CB-132	16.95	30	Cir	90.000	5.07	5.52	0.500	6.44	6.91	n/a	6.91	2	Combination
4	CB-132 TO MH-3B	13.88	30	Cir	141.000	5.69	6.40	0.504	6.91	7.65	n/a	7.65	3	Manhole
5	CB-MH-3B TO CB--106	11.12	30	Cir	19.000	6.57	6.67	0.526	7.65	7.79	n/a	7.79	4	Combination
6	CB-106 TO CB-108	9.73	14x23	Ell(2b)	45.000	8.00	8.23	0.511	8.48	9.07	0.09	9.07	5	Combination
7	CB-108 TO CB-110	7.03	14x23	Ell(2b)	135.000	8.23	8.91	0.504	9.26	9.66	0.19	9.66	6	Combination
8	CB-110 TO CB-111	4.16	15	Cir	79.000	9.08	9.48	0.506	10.01	10.41	0.42	10.83	7	Combination
9	CB-111 TO CB-112	2.69	15	Cir	134.000	9.65	10.32	0.500	10.83	11.08	0.28	11.36	8	Combination
10	CB-112 TO CB-113	1.58	12	Cir	121.000	10.49	11.79	1.074	11.36	12.32	n/a	12.32 j	9	Combination
11	CB-132 TO CB133	0.83	12	Cir	32.000	6.85	7.01	0.500	7.24	7.40	0.13	7.53	3	Combination
12	CB-106 TO CB-107	1.17	12	Cir	56.000	8.00	8.28	0.500	8.48	8.76	0.16	8.91	5	Combination
13	CB-110 TO CB-109	1.47	12	Cir	37.000	9.08	9.27	0.514	9.66	9.81	0.18	9.99	7	Combination

Project File: HW-10_revised_Phase III.stm
 Number of lines: 13
 Run Date: 8/19/2020

NOTES: Return period = 100 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station	Line	To Line	Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
				Incr (ac)	Total (ac)		Incr (min)	Syst (min)	Incr (ft)	Slope (%)					Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End		25.000	0.10	3.20	0.90	0.09	2.74	5.0	8.3	7.3	20.08	46.21	6.02	36	0.48	4.00	4.12	5.43	5.56	0.00	9.80	HW-10 TO CB-13
2	1		83.000	0.41	3.10	0.90	0.37	2.65	5.0	8.1	7.4	19.55	29.17	6.37	30	0.51	4.48	4.90	5.98	6.40	9.80	10.40	CB-131 TO MH-3
3	2		90.000	0.38	2.69	0.88	0.33	2.28	5.0	7.9	7.4	16.95	29.00	6.09	30	0.50	5.07	5.52	6.44	6.91	10.40	9.97	CB-MH-3A TO CB
4	3		141.000	0.41	2.09	0.90	0.37	1.84	5.0	7.5	7.5	13.88	29.10	5.73	30	0.50	5.69	6.40	6.91	7.65	9.97	11.20	CB-132 TO MH-3
5	4		19.000	0.07	1.68	0.67	0.05	1.47	5.0	7.4	7.5	11.12	29.75	5.35	30	0.53	6.57	6.67	7.65	7.79	11.20	10.90	CB-MH-3B TO CB
6	5		45.000	0.41	1.45	0.90	0.37	1.28	5.0	7.3	7.6	9.73	14.59	5.08	14(2b) x 23 e	0.51	8.00	8.23	8.48	9.07	10.90	10.77	CB-106 TO CB-10
7	6		135.000	0.23	1.04	0.86	0.20	0.91	5.0	6.8	7.7	7.03	14.49	4.77	14(2b) x 23 e	0.50	8.23	8.91	9.26	9.66	10.77	12.23	CB-108 TO CB-11
8	7		79.000	0.22	0.60	0.90	0.20	0.54	5.0	6.5	7.8	4.16	4.59	4.24	15	0.51	9.08	9.48	10.01	10.41	12.23	13.04	CB-110 TO CB-11
9	8		134.000	0.16	0.38	0.90	0.14	0.34	5.0	5.7	8.0	2.69	4.57	2.85	15	0.50	9.65	10.32	10.83	11.08	13.04	14.05	CB-111 TO CB-11
10	9		121.000	0.22	0.22	0.88	0.19	0.19	5.0	5.0	8.2	1.58	3.69	2.95	12	1.07	10.49	11.79	11.36	12.32	14.05	15.22	CB-112 TO CB-11
11	3		32.000	0.22	0.22	0.46	0.10	0.10	5.0	5.0	8.2	0.83	2.52	2.87	12	0.50	6.85	7.01	7.24	7.40	9.97	9.97	CB-132 TO CB13
12	5		56.000	0.16	0.16	0.90	0.14	0.14	5.0	5.0	8.2	1.17	2.52	3.15	12	0.50	8.00	8.28	8.48	8.76	10.90	10.92	CB-106 TO CB-10
13	7		37.000	0.21	0.21	0.86	0.18	0.18	5.0	5.0	8.2	1.47	2.55	3.29	12	0.51	9.08	9.27	9.66	9.81	12.23	12.29	CB-110 TO CB-10

Project File: HW-10_revised_Phase III.stm

Number of lines: 13

Run Date: 8/19/2020

NOTES: Intensity = 158.38 / (Inlet time + 21.80) ^ 0.90; Return period = Yrs. 100 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter						Inlet		Byp Line No								
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)		Spread (ft)	Depth (ft)	Spread (ft)					
1	CB-131	0.73	0.00	0.73	0.00	Comb	6.0	4.00	1.40	8.00	2.00	Sag	2.00	0.020	0.020	0.000	0.09	4.74	0.09	4.74	0.09	4.74	0.09	0.00	4.74	0.00	0.00	Off
2	MH-3A	3.01	0.00	0.00	3.01	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Off
3	CB-132	2.73	0.00	2.73	0.00	Comb	6.0	4.00	0.66	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.21	10.61	0.21	10.61	0.21	10.61	0.21	0.00	10.61	0.00	0.00	Off
4	MH-3B	3.01	0.00	0.00	3.01	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Off
5	CB-106	0.38	0.20	0.58	0.00	Comb	6.0	4.00	8.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.10	5.19	0.10	5.19	0.10	5.19	0.10	0.00	5.19	0.00	0.00	Off
6	CB-108	3.01	0.00	3.01	0.00	Comb	6.0	4.00	8.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.27	13.53	0.27	13.53	0.27	13.53	0.27	0.00	13.53	0.00	0.00	Off
7	CB-110	1.61	0.87	2.48	0.00	Comb	6.0	4.00	0.79	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.20	9.85	0.20	9.85	0.20	9.85	0.20	0.00	9.85	0.00	0.00	Off
8	CB-111	1.61	0.00	1.15	0.46	Comb	6.0	4.00	0.00	4.00	2.00	0.010	2.00	0.020	0.020	0.013	0.16	7.99	0.16	7.99	0.16	7.99	0.16	0.00	7.99	0.00	0.00	7
9	CB-112	1.17	0.45	1.62	0.00	Comb	6.0	4.00	8.00	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.19	9.31	0.19	9.31	0.19	9.31	0.19	0.00	9.31	0.00	0.00	Off
10	CB-113	1.58	0.00	1.13	0.45	Comb	6.0	4.00	0.00	4.00	2.00	0.010	2.00	0.020	0.020	0.013	0.16	7.92	0.16	7.92	0.16	7.92	0.16	0.00	7.92	0.00	0.00	9
11	CB-133	0.83	0.00	0.83	0.00	Comb	6.0	4.00	0.24	4.00	2.00	Sag	2.00	0.020	0.020	0.000	0.11	5.51	0.11	5.51	0.11	5.51	0.11	0.00	5.51	0.00	0.00	Off
12	CB-107	1.17	0.00	0.98	0.20	Comb	6.0	4.00	0.00	4.00	2.00	0.010	2.00	0.050	0.020	0.013	0.19	6.35	0.19	6.35	0.19	6.35	0.19	0.00	6.35	0.00	0.00	5
13	CB-109	1.47	0.00	1.07	0.41	Comb	6.0	4.00	0.00	4.00	2.00	0.010	2.00	0.020	0.020	0.013	0.15	7.71	0.15	7.71	0.15	7.71	0.15	0.00	7.71	0.00	0.00	7

Project File: HW-10_revised_Phase III.stm

Number of lines: 13

Run Date: 8/19/2020

NOTES: Inlet N-Values = 0.016; Intensity = 158.38 / (Inlet time + 21.80) ^ 0.90; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.