TRIDENT
ENVIRONMENTAL
Site Remediation, Land Use & Ecology

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1423.0016
August 21, 2018

RECEIVED
AUG 23 2018
MANCHESTER TOWNSHIP
MUNICIPAL CLERK

New Jersey Department of Environmental Protection
Division of Land Use Regulation
P.O. Box 420, Code 501-02A
Trenton, NJ 08625-0420
Attn: Application Support

Re: CAFRA Individual Permit & Freshwater Wetlands General Permit No. 6 & 7
Block 44 * Lot 15.01
2065 Highway 37
Manchester Township, Ocean County, New Jersey

Dear Sir/Madam:

On behalf of our client, Harvey Karen (the "Applicant") we are submitting an application for a CAFRA Individual Permit and Freshwater Wetlands General Permits No. 6 & 7 to allow for the development of 216 residential units, one (1) 22,650 sf commercial pad, one (1) 7,225 sf commercial pad and a Wawa with 16 fueling stations and a 5,525 sf market on the above-referenced property. A pre-application meeting to discuss the project was previously held on March 9, 2017, with Deputy Chief of Staff John Gray, Assistant Commission Ginger Kopkash, and Assistant Commissioner Mark Pederson. The items discussed during the pre-application meeting, including the manner in which the Applicant could address the property being mapped as habitat for the Northern Pine Snake, were summarized in a letter sent to John Gay dated March 15, 2017, prepared by Chad Warken from Archer & Greiner. A copy of the letter has been enclosed for your review.

Pursuant to the CAFRA Individual Permit and Freshwater Wetlands General Permit Authorization Checklist for Administrative Completeness, the following information is being submitted in in support of the application:

1. One (1) copy Completed DLUR Application Form

2. One (1) The application fee in the form of a check made payable to the "Treasurer, State of New Jersey" in the amount of $17,333.33. Note that we are submitting one-third of the total application fee of $52,000.00.

3. One (1) copy Documentation in the form of a copy of the certified United States Postal Service white mailing receipt that a copy of the entire application, as submitted to the Department, has been provided to the Manchester Township Clerk

4. One (1) copy D of the certified United States Postal Service white mailing receipt or other written copy of the notice letter that notice of the application has been provided to the entities listed at (A) through (E) below:

A. The Manchester Township Environmental Commission
B. The Manchester Township Planning Board
C. The Manchester Township Construction Official
D. The Ocean County Planning Board
E. Local Soil Conservation District if the project will disturb 5,000 square feet or more of land
F. Pineland Commission

5. One (1) copy Certified list of landowners within 200 feet of the site obtained from the municipality

6. Affidavit of Newspaper Notice- To be submitted.

7. Site figures and photographs which include, but is not limited to, the following:
   A. U.S.G.S. Quadrangle Map
   B. New Jersey Roads Map
   C. Tax Map
   D. Color Photographs of the Site

8. Three (3) copies of the Environmental Impact Statement for the CAFRA Individual Permit

9. One (1) copy of the Compliance Statement for the Freshwater Wetlands General Permit No. 6 & 7

10. Three (3) copies of the site plans

11. One (1) copy A statement certifying the proposed activities will not result in adverse impacts to swamp pink or bog turtles

12. Natural Heritage Database.

13. One (1) copy of the Stormwater Report and Operations and Maintenance Manual prepared by FWH Associates

Should you have any questions or require additional information, please do not hesitate to contact this office.

Sincerely,

Kyle Weise

215046271v1

ARCHER
ATTORNEYS AT LAW

Chad Warnken

cwarnken@archerlaw.com
732-268-8011 Direct
732-345-8420 Direct Fax

Archer & Greiner, P.C.
Riverview Plaza
10 Highway 35
Red Bank, NJ 07701-5902
732-268-8000 Main
732-345-8420 Fax
www.archerlaw.com

March 15, 2017

John Gray, Deputy Chief of Staff
401 East State St.
Mail code: 401-07J
P.O. Box 420
Trenton, NJ 08625

Re: NJDEP Meeting- March 9, 2017
Block 44, Lot 15.01, Manchester NJ

Dear Mr. Gray:

On behalf of TDKY Ventures, LLC (the "Applicant"), I would like to thank you and the Department for taking the time to meet with us and discuss the above referenced property. I would also like to use this letter to summarize our understandings from that meeting.

Specifically, Assistant Commissioner Pederson while acknowledging the ongoing cleanup on the site and the outstanding lien on the property, was very clear that the lien and the proposed development of the property were separate items. Any proposed development would be looked at independently and will need to comply with and be developed in accordance with the applicable regulations.

Assistant Commissioner Kopkash, reiterated that sentiment although she indicated she believed there was a path forward for the project to be approved under the current rules. When the Applicant suggested the possibility of an amendment to the landscape plan, which we understand is due to be revised in the near future, she as well as director Kokus, indicated an amendment would not be possible and the Applicant would instead be required to move forward with a site specific amendment to the Wasterwater Quality Management Plans ("WQMP"). It was suggested that the Applicant coordinate that request with its CAFRA application and coordinate the submission of both with the Office of Permit Coordination.

As to the specifics of a WQMP amendment procedures it is our understanding such a process usually takes between 6 month to a year to get approved. We discussed our position that the front portion of the site, nearest Route 37 should not be considered habitat. The initial response of the Department based upon previous studies and information on the property, was that the wooded portion of the front of the site was most likely going to be found to be habitat. However,

the Department was open to a portion of that front wooded area being developed if the Applicant prepared a Habitat Impact Assessment which demonstrated how the Applicant would mitigate for the proposed development so there was no net loss of critical habitat. Furthermore, the Department indicated that the Applicant would be permitted to take credit for the habitat it is proposing to save at the back 300 feet of the site, when doing its mitigation calculations.

As to that rear 300 feet of the property, it is our understanding based upon the comments by Assistant Commissioner Kopkash, as well as Larry Torok of the Department's Threatened and Endangered Species group, that the Department will most likely consider the rear 300 feet of the property along the railroad lines a no build zone. The Department also relayed that it did not want homes adjacent to that no build area, however, it did confirm that it would be inclined to permit the development of the site, if a stormwater basin was proposed between the no- build area and any development. The Department referred to a prior concept plan previously submitted by the Davies in 2013 as an example of such a buffer and suggested the Applicant include some level of separation between the "300 foot line" and residential use.

Lastly, the issue of stomwater infiltration was discussed and the Applicant's engineer explained that currently all stormwater is infiltrated on site. Although not part of the larger discussion, at the conclusion of the meeting, the Applicant's engineer spoke with Dhruv Patel to discuss those issues in greater detail. At the end of the conversation Mr. Patel asked that our engineer email him the site information so that it could be discussed with Vince Mazzaei for further review. In addition, Mr. Steven Ewing discussed the need to coordinate the stormwater design with Site Remediation given the groundwater contamination on the site and that all stromwater must be recharged. Although not part of the larger discussion, at the conclusion of the meeting, Assistant Commissioner Kopkash spoke to Mr. Ewing and indicated that she was aware of other projects that have overcome this issue and she would forward the file number of another project to Mr. Ewing so that a FOIA request could be submitted to review the details of that project design.

Based upon this feedback, the Applicant is providing the requested site information to Mr. Patel for review with Mr. Mazzaei. Furthermore, the Applicant is reviewing its proposed concept plan to determine if the plan can be revised pursuant to the Department's direction and still be viable. Once that review is complete, I will reach out with you to discuss our next steps.

If you have any questions concerning the foregoing, please do not hesitate to contact me.

ARCHER & GREINER
A Professional Corporation

BY:_____
Chad Warnken

CW:tmt

Cc: TDKY Ventures, LLC
Assistant Commissioner Mark Pederson
Assistant Commissioner Ginger Kopkash
Director Colleen Kokus
Jessica L. Staszewski
Bryon Dubois
Steve Ewing

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DLUR APPLICATION

State of New Jersey
Department of Environmental Protection
Division of Land Use Regulation
Application Form for Permit(s)/Authorization(s)
501 E. State Street Mail Code 501-02A P.O. Box 420
Trenton, NJ 08625-0420
Phone #: (609) 777-0454 Web: www.nj.gov/dep/landuse

Please print legibly or type the following: Complete all sections and pages unless otherwise noted. **Is this project Superstorm Sandy Related** Yes ☐ No ☑

1. **Applicant Name:** Mr./Ms./Mrs Harvey Karen — E-Mail: hnkrg@aol.com
   Address: 150 Tennis Ct — Daytime Phone: 732-619-9696 Ext.
   City/State: Wall/NJ — Zip Code 07719 Cell Phone:
2. **Agent Name:** Mr./Ms./Mrs Kyle Weise
   Firm Name: Trident Environmental — E-Mail: kweise@tridentenviro.com
   Address: 1856 Route 9 — Daytime Phone: 732-818-8699 Ext.
   City/State: Toms River/NJ — Zip Code 08755 Cell Phone:
3. **Property Owner:** Mr./Ms./Mrs Davies Consultants — E-mail:
   Address: 28510 Sombrero Drive — Daytime Phone: Ext.
   City/State: Bonita Springs/Fl — Zip Code 34135 Cell Phone:
4. **Project Name:** Block 44, Lot 15.01 — Address/Location: 2065 Highway Route 37
   Municipality: Manchester — County: Ocean Zip Code 08759
   Block(s): 44 — Lot(s): 15.01
   N.A.D. 1983 State Plane Coordinates (feet) E (x): 553,283 N(y): 422,935 ***Not** Longitude/Latitude*
   Watershed: Toms River (below Oak Ridge Parkway) — Subwatershed: Wrangel Brook (below Michaels Branch)
   Nearest Waterway: Sunken Branch UNT
5. **Project Description:** CAFRA Individual Permit & Freshwater Wetlands General Permit No. 6

Provide if applicable: Previous LUR File # (s): 1518-07-0003.1 Waiver request ID # (s):

A. SIGNATURE OF APPLICANT (required):

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining and preparing the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment. If the applicant is an organization such as a corporation, municipal entity, home-owners association etc., the party responsible for the application shall sign on behalf of the organization.

Signature of Applicant

Date 8/21/18

Print Name Harvey Karen

Signature of Applicant

Date

Print Name

B. PROPERTY OWNER'S CERTIFICATION

I hereby certify that the undersigned is the **owner of the property** upon which the proposed work is to be done. This endorsement is certification that the owner/easement holder grants permission for the conduct of the proposed activity. In addition, written consent is hereby giver to allow access to the site by representatives or agents of the Department for the purpose of conducting a site inspection(s) or survey(s) of the property in question.

In addition, the undersigned property owner hereby certifies:

1. Whether any work is to be done within an easement? Yes ☐ No ☑
   (If answer is "Yes" – Signature/title of resonsible party is required below)
2. Whether any part of the entire project will be located within property belonging to the State of New Jersey? Yes ☐ No ☑
3. Whether any work is to be done on any property owned by any public agency that would be encumbered by Green Acres? Yes ☐ No ☑
4. Whether this project requires a Section 106 (National Register of Historic Places) Determination as part of a federal approval? Yes ☐ No ☑

Signature of Owner

August 17, 2018
Date

John W. Davies
Print Name Vice President

Signature of Owner/Easement Holder

Date

Print Name/Title

C. APPLICANT'S AGENT

I Harvey Karen, the Applicant/Owner and _____, co-Applicant/Owner authorize to act as my agent/representative in all matters pertaining to my application the following person:

Kyle Weise
Name of Agent

Environmental Consultant
Occupation/Profession of Agent

Signature of Applicant/Owner

Signature of co-Applicant/Owner

AGENT'S CERTIFICATION:

I agree to serve as agent for the above-referenced applicant:

Signature of Agent

Trident Environmental
Name of Firm

D. STATEMENT OF PREPARER OF PLANS, SPECIFICATIONS, SURVEYOR'S OR ENGINEER'S REPORT

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining and preparing the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment.

Signature

Print Name

Position & Name of Firm

Professional License # Date

E. STATEMENT OF PREPARER OF APPLICATION, REPORTS AND/OR SUPPORTING DOCUMENTS (other than engineering)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining and preparing the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fine and imprisonment.

Signature

Print Name

Position & Name of Firm

Professional License # (If Applicable) Date

F. APPLICATION(S) FOR: (Check all that apply – Fee calculations and directions on pages 6, 7, & 8)

	Coastal General Permits	Fee Amount	Fee Paid
☐	CZMGP1 Amusement Pier Expansion	$1,000.00	
☐	CZMGP2 Beach/Dune Activities	$1,000.00	
☐	CZMGP3 Voluntary Reconstruction Certain Residential/Commercial Dev.	$1,000.00	
☐	CZMGP4 Development of one or two SFH or Duplexes	$1,000.00	
☐	CZMGP5 Expansion or Reconstruction SFH/Duplex	$1,000.00	
☐	CZMGP6 New Bulkhead/Fill Lagoon	$1,000.00	
☐	CZMGP7 Revetment at SFH/Duplex	$1,000.00	
☐	CZMGP8 Gabions at SFH/Duplex	$1,000.00	
☐	CZMGP9 Support Facilities at a Marina	$1,000.00	
☐	CZMGP10 Reconstruction of Existing Bulkhead	$1,000.00	
☐	CZMGP11 Hazard Waste Clean-up	$1,000.00	
☐	CZMGP12 Landfall of Utilities	$1,000.00	
☐	CZMGP13 Recreation Facility at Public Park	$1,000.00	
☐	CZMGP14 Bulkhead Construction & Fill Placement	$1,000.00	
☐	CZMGP15 Construction of Piers/Docks/Ramps in Lagoons	$1,000.00	
☐	CZMGP16 Minor Maintenance Dredging in Lagoons	$1,000.00	
☐	CZMGP17 Eroded Shoreline Stabilization	$1,000.00	
☐	CZMGP18 Avian Nesting Structures	$1,000.00	
☐	CZMGP19 Modification of Electrical Substations	$1,000.00	
☐	CZMGP20 Legalization of the Filling of Tidelands	$1,000.00	
☐	CZMGP21 Construction of Telecommunication Towers	$1,000.00	
☐	CZMGP22 Construction of Tourism Structures	$1,000.00	
☐	CZMGP23 Geotechnical Survey Borings	$1,000.00	
☐	CZMGP24 Habitat Creation/Restoration/Enhancement/Living Shorelines	No Fee	No Fee
☐	CZMGP25 1 to 3 Turbines < 200 Feet	$1,000.00	
☐	CZMGP26 Wind Turbines < 250 Feet	$1,000.00	
☐	CZMGP27 Dredge Lagoon (post storm event)	$1,000.00	
☐	CZMGP28 Dredge post Bulkhead Failure	$1,000.00	
☐	CZMGP29 Dredge Marina (post storm event)	$1,000.00	
☐	CZMGP30 Aquaculture Activities	$1,000.00	
☐	CZMGP31 Placement of Shell (shellfish areas)	$1,000.00	
☐	CZMGP32 Application of Pesticides in Coastal Wetlands	$1,000.00	
☐	CZM General Permit Extension	$240.00	
☐	CZM Permit-by-Certification *(On-line application ONLY)*	$1000.00	

	CAFRA and Waterfront Development Permits	Fee Amount	Fee Paid
☑	CAFRA Individual Permit	$30,000.00	
☐	CAFRA Exemption Request	$500.00	
☐	Waterfront Development Individual Permit/Upland		
☐	Waterfront Development Individual Permit/In-water		
☐	Modification of a Coastal GP	$500.00	
☐	Minor Technical Modification of a CAFRA IP	$500.00	
☐	Minor Technical Modification of a Waterfront IP	$500.00	
☐	Major Technical Modification of a CAFRA IP		
☐	Major Technical Modification of a Waterfront IP		
☐	Zane Letter	$500.00	
☐	Waterfront Development Individual Permit - Extension		
☐	Individual Permit Equivalency/CERCLA	No Fee	No Fee

	Flood Hazard Area General Permits	Fee Amount	Fee Paid
☐	FHAGP1 Channel Clean w/o Sediment Removal	No Fee	No Fee
☐	FHAGP1 Channel Clean w/Sediment Removal	No Fee	No Fee
☐	FHAGP2 Mosquito Control	$1,000.00	
☐	FHAGP3 Scour Protection Bridges/Culverts	$1,000.00	
☐	FHAGP4 Creation/Restoration/Enhancement of Habitat and Water Quality Values and Functions	No Fee	No Fee
☐	FHAGP5 Reconstruction and/or Elevation of Building in a Floodway	No Fee	No Fee
☐	FHAGP6 Construction of One SFH/Duplex and Driveway	$1,000.00	
☐	FHAGP7 Relocation of Manmade Roadside Ditches for Public Roadway Improvements	$1,000.00	
☐	FHAGP8 Placement of Storage Tanks	$1,000.00	
☐	FHAGP9 Construction/Reconstruction of Bride/Culvert Across Water < 50 Acres	$1,000.00	
☐	FHAGP10 Construction/Reconstruction of Bride/Culvert Across Water ≥ 50 Acres	$1,000.00	
☐	FHAGP11 Stormwater Outfall Along Regulated Water <50 Acres	$1,000.00	
☐	FHAGP12 Construction of Footbridges	$1,000.00	
☐	FHAGP13 Construction of Trails and Boardwalks	$1,000.00	
☐	FHA General Permit Extension	$240.00	
☐	FHA Permit-by-Certification (Except PBC 4 & 5) *(On-line application ONLY)*	$1,000.00	

	Flood Hazard Area		
☐	FHA Individual Permit		
☐	FHA Verification		
☐	FHA Hardship Exception (Must be submitted with a paid FHA IP)	$4,000.00	
☐	FHA Minor Technical Modification of a GP, IP or Verification		
☐	FHA Major Technical Modification of a GP, IP or Verification		
☐	FHA Extension of an IP or Verification		
☐	FHA Individual Permit Equivalency/CERCLA	No Fee	No Fee

	Applicability Determination	Fee Amount	Fee Paid
☐	Coastal Applicability Determination	No Fee	No Fee
☐	Flood Hazard Applicability Determination	No Fee	No Fee
☐	Highlands Jurisdictional Determination	No Fee	No Fee
☐	Executive Order 215	No Fee	No Fee

	Highlands	Fee Amount	Fee Paid
☐	Emergency Permit		
☐	Pre-application Meeting	$500.00	
☐	Resource Area Determination Presence/Absence	$500.00	
☐	Resource Area Determination ≤ one acre	$500.00	
☐	Resource Area Determination > one acre		
☐	HPAAGP 1/ Habitat Creation/Enhance	No Fee	No Fee
☐	HPAAGP 2 Bank Stabilization	$500.00	
☐	Preservation Area Approval (PAA)		
☐	PAA with Waiver (Specify type below)		

	Coastal Wetlands	Fee Amount	Fee Paid
☐	Coastal/Tidal Wetlands Permit		
☐	Coastal Wetland Permit Modification		

	Freshwater Wetlands	Fee Amount	Fee Paid
☐	FWGP1 Main. & Repair Exist Feature	$1,000.00	
☐	FWGP2 Underground Utility Lines	$1,000.00	
☐	FWGP3 Discharge of Return Water	$1,000.00	
☐	FWGP4 Hazard Site Invest/Cleanup	$1,000.00	
☐	FWGP5 Landfill Closures	$1,000.00	
☑	FWGP6 Filling of Non-Tributary Wetlands	$1,000.00	
☐	FWGP6A TA Adj. to Non-Tributary Wetlands	$1,000.00	
☑	FWGP7 Human-made Ditches/Swales in Headwaters	$1,000.00	
☐	FWGP8 House Additions	$1,000.00	
☐	FWGP9 Airport Sight-line Clearing	$1,000.00	
☐	FWGP10A Very Minor Road Crossings	$1,000.00	
☐	FWGP10B Minor Road Crossings	$1,000.00	
☐	FWGP11 Outfalls / Intakes Structures	$1,000.00	
☐	FWGP12 Surveying and Investigating	$1,000.00	
☐	FWGP13 Lake Dredging	$1,000.00	
☐	FWGP14 Water Monitoring Devices	$1,000.00	
☐	FWGP15 Mosquito Control Activities	$1,000.00	
☐	FWGP16 Creation/Restoration/Enhancement Habitat	No Fee	No Fee
☐	FWGP17 Trails / Boardwalks	$1,000.00	
☐	FWGP17A Non-Motorized Multi-Use Paths	$1,000.00	
☐	FWGP18 Dam Repairs	$1,000.00	
☐	FWGP19 Docks and Piers	$1,000.00	
☐	FWGP20 Bank Stabilization	$1,000.00	
☐	FWGP21 Above Ground Utility Lines	$1,000.00	
☐	FWGP22 Expansion Cranberry Growing (Pinelands)	No Fee	No Fee
☐	FWGP23 Spring Developments	$1,000.00	
☐	FWGP24 Malfunctioning Individual Septic Systems	No Fee	No Fee
☐	FWGP25 Minor Channel / Stream Cleaning	$1,000.00	
☐	FWGP26 Redevelop Previously Disturbed Site	$1,000.00	
☐	FWGP Administrative Modification	No fee	No Fee
☐	FWGP Minor technical modification	$500.00	
☐	FWGP Major technical modification	$500.00	
☐	FWGP Extension	$500.00	

	Stormwater Review Fees	Fee Amount	Fee Paid
☐	Fee for all Stormwater Reviews		

	Freshwater Wetlands	Fee Amount	Fee Paid
☐	Individual Wetlands Permit		
☐	Individual Open Water Permit		
☐	Individual Permit Administrative Modification	No Fee	No Fee
☐	Individual Permit Minor Technical Modification	$500.00	
☐	Individual Permit Major Technical Modification		
☐	Individual Permit Extension		
☐	Wetlands Exemption	$500.00	
☐	Permit Equivalency/CERCLA	No Fee	No Fee

	Transition Area Waiver	Fee Amount	Fee Paid
☐	Averaging Plan		
☐	Hardship Reduction		
☐	Special Activity Stormwater		
☐	Special Activity Linear Development		
☐	Special Activity Redevelopment		
☐	Reduction Waiver per N.J.A.C. 7:7A-8.1(d)		
☐	Special Activity Individual Permit		
☐	Exemption	$500.00	
☐	Administrative Modification	No Fee	No Fee
☐	Minor Technical Modification	$500.00	
☐	Major Technical Modification		
☐	Extension	$500.00	

	Letter of Interpretation	Fee Amount	Fee Paid
☐	Presence Absence	$1,000.00	
☐	Presence Absence Footprint	$1,000.00	
☐	Delineation ≤ 1.00 Acres	$1,000.00	
☐	Partial LOI		
☐	Verification		
☐	Extension		

	Consistency Determination	Fee Amount	Fee Paid
☐	Water Quality Certificate		
☐	Federal Consistency	No Fee	No Fee
☐	HMC Water Quality Certificate		

Please note: If no fee amount is specified in the "Fee Amount" column, please refer to the Regulatory Fee Schedule which can be found at www.nj.gov/dep/landuse/forms.html. The following types of applications DO NOT require a fee submittal:

Coastal Permitting
- General Permit # 24 - Habitat creation, restoration, enhancement and living shoreline activities
- Individual Permit Equivalency – CERCLA
- Administrative Modifications

Flood Hazard Area
- General Permit #1 – Channel cleaning under the Stream Cleaning Act
- General Permit #4 – Creation, restoration, and enhancement of habitat and water quality values and functions
- General Permit #5 – Reconstruction and/or elevation of a building in a floodway
- Transfer of Approval
- Administative Modifications
- Individual Permit Equivalency – CERCLA

Highlands
- General Permit #1 - Habitat Creation, Restoration, Enhancement

Freshwater Wetlands
- General Permit #16 - Habitat creation and enhancement activities
- General Permit #17 - Trails and Boardwalks (NO FEE when the activity is proposed on publicly owned lands)
- General Permit #22 – Expansion of cranberry growing operations in the Pinelands
- General Permit #24 – Malfunctioning individual subsurface sewage disposal (septic) systems
- Individual Permit Equivalency – CERCLA

NOTE: Electronic permitting and/or application submittal is available for specific applications. Please see the Division website at www.nj.gov/dep/landuse/epermit.html for more information.

APPLICANT NAME: HARVEY KAREN FILE # (if known): 1518-07-0003.1

APPLICATION FORM - APPENDIX I

Section 1: Please provide the following information for the overall project site. All area measurements shall be recorded **in acres to the nearest thousandth** (0.001 acres).

PROPOSED:	*PRESERVED*	*UNDISTURBED*	*DISTURBED*
RIPARIAN ZONE			
CZMRA FORESTED *(CZMRA IP – Only)*	11.98 Ac.		11.79 Ac.
E & T HABITAT *Endangered and/or Threatened*	9.6 Ac.		
FRESHWATER WETLANDS	0.01 Ac.		0.41 Ac.

Section 2: Please provide the following information for each permit/authorization requested pursuant to the Freshwater Wetlands Protection Act. All area measurements shall be recorded **in acres to the nearest thousandth** (0.001 acres). Use additional sheets if necessary

PERMIT TYPE GP# 6 WETLAND TYPE *Emergent, Forest, Shrub, Etc.* FORESTED RESOURCE CLASSIFICATION *Ordinary, Intermediate, Exceptional, EPA, Etc.* Intermediate

PROPOSED DISTURBANCE:	*WETLANDS*	*TRANSITION AREA*	*SOW*
FILLED	0.24 Ac.		
EXCAVATED			
CLEARED			
TEMPORARY DISTURBANCE			

PERMIT TYPE GP#7 WETLAND TYPE *Emergent, Forest, Shrub, Etc.* DITCH RESOURCE CLASSIFICATION *Ordinary, Intermediate, Exceptional, EPA, Etc.* Ordinary

PROPOSED DISTURBANCE:	*WETLANDS*	*TRANSITION AREA*	*SOW*
FILLED	0.16 Ac.		
EXCAVATED			
CLEARED			
TEMPORARY DISTURBANCE			

Appendix II - Fee Calculation Sheet (Required)

Directions:

The Fee Calculation sheet is broken down by the types of programs administered by the Division of Land Use Regulation: Coastal, Flood Hazard Area, Freshwater Wetlands, Stormwater Review.

Use the abbreviation key below in order to identify the type(s) of applications that you need to submit for your project. Once you find your application type(s) work through the **calculation column** and place the figure on the **fee amount** line. Do this for each application type and subtotal each section. In section 5 – enter the subtotals as indicated and add the fee figures to find your total fee.

- Whenever the calcuation requires an acreage figure, you will need to round UP to the nearest whole number, for example: 0.25 acres gets rounded up to one (1) acre or 2.61 acres gets rounded up to three (3) acres.
- The maximum fee for a CAFRA Individual permit, an Upland Waterfront Development permit, or an In-Water Waterfront Development permit is $30,000 per permit type. For example: if you are applying for both an upland and an in-water Waterfront Development the maximum fee is applied to each permit for a maximum total of $60,000 plus any applicable stromwater review fee.
- The stormwater review fee is applied only one time per project, maximum of $20,000, regardless of multiple applications.

Abbreviation KEY

CAFRA = CZM	General Permit = GP	Single Family Home = SFH
Coastal (Tidal) Wetlands = CSW	Individual Permit = IP	Transion Area Waiver = TAW
Extension = EXT	Letter of Interpretation = LOI	Verification = VER
Flood Hazard Area = FHA	Mean High Water Line = MHWL	Waterfront Development = WD
Freshwater Wetlands = FWW	Modification = MOD	Water Quality Certificate = WQC

Section 1 - Coastal Application Type	Calculation	Fee Amount
All General Permits (Except for Coastal GP #4)	$1,000 x _____# of GPs requested	
CZM – IP SFH or Duplex	$2,000	
CZM – IP Residential other than SFH/duplex	$3,000 x __216__ # of units	$648,000.00
CZM – IP Commercial, Industrial or Public	$3,000 x _45.63_ acres of the site	$136,890.00
CSW – IP SFH or Duplex	$2,000	
CSW – IP All Development other than SFH/duplex	$3,000 x _____acres of wetlands disturbed	
WD - IP SFH or Duplex (Landward of MHWL)	$2,000	
WD – IP Residential other than SFH/duplex (Landward of MHWL)	$3,000 x _____# of units	
WD – IP Commercial, Industrial or Public Development	$3,000 x _____acres of the site	
WD - IP SFH or Duplex (Waterward of MHWL)	$2,000	
WD – IP All Development other than SFH/duplex (Waterward of MHWL)	$3,000 x _____acres of water area impacted	
CZM, CSW, WD – Minor Technical Modification (GP/IP)	$500 x _____# of items to be revised	
CZM, CSW, WD – Major Technical Modification (GP/IP)	0.30 x _____original fee = Fee (Minimum $500)	
General Permit Extension	$240 x _____# of GPs to be extended	
WD – IP Permit Extension	0.25 x _____original fee = Fee (Maximum $3,000)	
CZM, CSW, WD – Exemption Request	$500 x _____# of exemptions requested	
	Subtotal for Coastal Applications	$784,890.00

Section 2 - Freshwater Wetlands Application Type	Calculation	Fee Amount
All General Permits (Except those listed in notes on Page 4)	$1,000 x __2__ # of GPs requested	$2,000.00
FWW – LOI Presence/Absence, Footprint, Delineation < 1 acre	$1,000	
FWW – LOI Line Verification	$1,000 + ($100 x _____# of acres of the site)	
FWW – TAW with valid LOI	$1,000 + ($100 x _____# acres FWW disturbed)	
FWW – TAW without valid LOI	$1000 + ($100 x _____acres TAW disturbed)+ LOI Fee	
FWW – IP or Open Water Fill SFH or Duplex	$2,000	
FWW – IP or Open Water Fill other than SFH or Duplex	$5,000 + ($2,500 x _____# acres FWW disturbed)	
FWW – GP, TAW, IP, Open Water Fill Minor Technical Modification	$500	
FWW – GP, TAW, IP, Open Water Fill Major Technical Modification	0.30 x _____original fee (Minimum $500)	
FWW – EXT LOI Presence/Absence, Footprint, Delineation < 1 acre	$500	
FWW – EXT LOI Line Verification	0.50 x _____original fee (Minimum $500)	
FWW – EXT GP or TAW	$500 x _____# of items to be extended	
FWW – EXT IP or Open Water Fill	0.50 x _____original fee (Minimum $500)	
	Subtotal for Freshwater Welands Applications	$2,000.00

Appendix II - Fee Calculation Sheet - Continued

Section 3 - Flood Hazard Area Application Type	Calculation	Fee Amount
All General Permits (Except for FHAGP 1, 4, 5)	$1,000 x _____# of GPs requested	_____
FHA – VER Methods 1, 2, 3, 5 (Fee not applicable to one (1) SFH)	$1,000	_____
FHA – VER Method 4 or 6	$4,000 + ($400 x _____per 100 linear feet)	_____
FHA – Delineation of Riparian Zone Only	$1,000	_____
FHA – IP SFH and/or Accessory Structures	$2,000	_____
FHA – IP * Fee not applicable to one (1) SFH	$3,000 base	_____
*Bank/Channel (stabilization, reestablishment, etc.) No Calculation Review –	+ $1,000	_____
*Bank/Channel (stabilization, reestablishment, etc.) With Calculation Review-	+ ($4,000 + ($400 x _____per 100 linear ft.))	_____
*Bridge, Culvert, Footbridge, Low Dam, etc. No Calculation Review--	+ $1,000 x _____ # of structures	_____
*Bridge, Culvert, Footbridge, Low Dam, etc. With Calculation Review-	+ $4,000 x _____ # of structures	_____
*Review of Flood Storage Displacement (net fill) Calculations----------	+ $4,000	_____
Review of Hardship Exception Request----------	+ $4,000	_____
*Utility Line----------	+ $1,000 x_____# of water crossings	_____
FHA – VER, IP, GP Minor Technical Modification	$500 x _____# of proejct elements to be revised	_____
FHA – VER, IP, GP Major Technical Modification	0.30 x _____original fee (Minimum $500)	_____
FHA – Extension of Verification - Method 1, 2, 3, 5, Riparian Zone	$240.00	_____
FHA - Extension of Verification - Method 4 or 6	0.25 x _____original fee	_____
FHA – Extension of a General Permit	$240.00 x _____# of GPs to be extended	_____
FHA – Extension of an Individual Permit	0.25 x _____original fee	_____
FHA – Department Delineation Minor Revision	$500	_____
FHA – Department Delineation Major Revision	$4,000 + ($400 x _____per 100 linear feet)	
	Subtotal for Flood Hazard Area Applications	_____

Section 4 – Individual Water Quality Certificate	Calculation	Fee Amount
WQC (NOTE: No fee required under the coastal program)	$5,000 + ($2,500 x _____ # acres regulated area disturbed)	_____

Section 5 - Additional Stormwater Review Fee	Calculation	Fee Amount
Stormwater Review	$3,000 base	$3,000.00
Review of Groundwater Recharge Calculations----------	+ $250 x __32__# acres disturbed	$8,000.00
Review of Runoff Quantity Calculations----------	+ $250 x __32__# acres disturbed	$8,000.00
Review of Water Quality Calculations----------	+ $250 x __14__# acres impervious surface	$3,500.00
	Subtotal of Stormwater Review Fee	$22,500.00

Section 6 – Total of Application Fees

Subtotal of Section 1 - Coastal Applications	$30,000.00
Subtotal of Section 2 - Freshwater Wetlands Applications	$ 2,000.00
Subtotal of Section 3 - Flood Hazard Area Applications	_____
Subtotal of Section 4 – Individual Water Quality Certificate	_____
Subtotal of Section 5 - Additional Stormwater Review	$20,000.00
Total Application Fee	$52,000.00

Total Fee: $52,000.00 **Check #:** _____

Instructions for completing the Application Form for Permits/Authorizations from the Division of Land Use Regulation
(Please print clearly or type all information in every section)

Please Note: The following permits and authorizations are available as on-line applications at http://www.nj.gov/dep/landuse under "Electronic Services":

Coastal General Permits-by-Certification #10 and #15

Flood Hazard Area Permits-by-Certification #1 thru #15

Freshwater Wetlands General Permits #8 and #24

Freshwater Wetlands E-LOI (submittal only)

Section 1. **Applicant Information**
- ✓ Please check off whether the project is Superstorm Sandy related.
- ✓ Make sure all applicant information is correct and up to date.
- ✓ Do not provide telephone numbers with call intercept.
- ✓ Must include correct E-mail address.

Section 2. **Agent Information**
- ✓ Make sure all agent information is correct and up to date.
- ✓ Do not provide telephone numbers with call intercept.
- ✓ If you do not have an agent, leave this section blank.
- ✓ Must include correct E-mail address.

Section 3. **Property Owner Information**
- ✓ Identify the property owner if different from applicant.

Section 4. **Project Site Information/Fees and Costs**
- ✓ List the street address if known (or nearest crossroads) along with the correct zip code for the property.
- ✓ List all blocks and lots if more space is needed please attach a list to the application form.
- ✓ Make sure the state plane coordinates are given and that they are 1983 datum otherwise the application will be rejected.
  - o Applicants can find state plane coordinates on USGS maps or by going to the NJDEP website and using the GeoWeb feature to find the location of property and the exact state plane coordinates

Section 5. **Project Description**
- ✓ Briefly describe what you are proposing to construct within regulated areas. In addition, list any previous LUR file number(s) and if a Waiver Request has been submitted to the Office of Permit Coordination and Environmental Review please list the Waiver Request ID number(s) on the line provided.

Section A. **Applicant's Signature**
- ✓ The person or responsible party representative applying for this permit and to whom the permit will be issued must sign here.

Section B. **Property Owner's Signature**
- ✓ The legal owner of the property on which the regulated activities are proposed must sign here and certify items one through four in this section. In additional, all easement owners on the project site are also required to sign the cerification.

Section C. **Applicant's Agent Authorization**
- ✓ If the applicant is represented by a consultant or engineer, that individual shall fill out this section.

Section D. **Statement of the Preparer of Plans, Specifications, Surveyor's of Engineer's Report**
- ✓ All Flood Hazard Area and Waterfront Development applications require that the person preparing the plans and reports fill out this section

Section E. **Statement of the Preparer of Application, Reports and Supporting Documents**
- ✓ Anyone who prepares and is the responsible person for part of the application, reports or supporting documents must fill out this section

Section F. **Type of Application you are submitting**
- ✓ Place a check mark next to each type of activity you are requesting in this application package. Please fill in the amount of fee required for each permit and the amount of fees paid for each permit. The fee paid may be different from the amount required for each permit since the amount required may differ due the three payment plan for fees in excess of $1,000. A Fee Calculation Sheet is now included to allow an applicant to determine the fee for applications where the fee will vary due to size of site, impacts, etc.

Appendices **Please follow the directions as outlined for each Appendix.**
- ✓ Both Appendix I and II are required to be filled-out and submitted in order for the application form to be considered completed

Note *In addition to the standard paper submission, an electronic copy of the entire application, including plans, may be submitted on CD-ROM to assist the Department in the review this application.*

CERTIFIED LIST OF ADJOINERS
AND
CERTIFIED RECIEPTS

1423.0016

MANCHESTER TOWNSHIP

1 COLONIAL DRIVE • MANCHESTER, NJ 08759 • (732) 657-8121
OFFICE OF THE TAX ASSESSOR

MARTIN LYNCH, CTA
TAX ASSESSOR

KENNETH T. PALMER
MAYOR

July 27, 2018

FWH Associates
Attn.: Rose Sweeney
1856 Route 9
Toms River, NJ 08755

Ms. Sweeney:

The attached is a certified list of properties within 200 feet of:

Block 44 Lot 15.02

I hereby certify the attached information to be true and correct according to the records of the Manchester Township Tax Assessors Office.

Martin W. Lynch
Tax Assessor

Utilities located in and around Manchester Township to be notified are as follows:

Comcast 830 Route 37 West Toms River, NJ 08755	Verizon, Eng Dept PO Box 152206 Irving, TX 75015	GPU 400 Lincoln Street Phillipsburg, NJ 08865
Manchester Township Clerk's Office 1 Colonial Drive Manchester, NJ 08759	NJ DEP CN 401 Trenton, NJ 08625	NJ DOT Route 79 & Daniels Way Freehold, NJ 07728
NJ Natural Gas PO Box 1464 Wall, NJ 07719	Ocean County MUA PO Box P Bayville, NJ 08721	Ocean County Road Dept 119 Hooper Avenue Toms River, NJ 08753

ADJACENT PROPERTY LISTING APPLICANT: FWH B 44 L 15.02 200ft 072718 PA

TAXING DISTRICT 19 MANCHESTER TWP COUNTY 15 OCEAN

PROPERTY ID	PROPERTY LOCATION	CLASS	OWNERS NAME & ADDRESS	
41.01 1	1924 HWY 37 TTL-90-0168	1	ANGSTER EDWARD F 29 CENTRAL AVE TOMS RIVER NJ	08757
42.01 12	1940 HWY 37	1	KRUPNICK, FELDMAN & IZBIKY ET ALS PO BOX 109 LAKEWOOD NJ	08701
42.05 8	1980 HWY 37 9-11,13	4A	1980 ROUTE 37, LLC 90 W SYLVANIA AVE NEPTUNE CITY NJ	07753
44 10	1881 HWY 37	4A	PINE ACRES LLC 1881 HWY 37 TOMS RIVER NJ	08757
44 11	1917 HWY 37 HILLTOP NURSERY	4A	BAY RUM LLC C/O HILLTOP NURSERY SCL 1917 HWY 37 TOMS RIVER NJ	08757
44 14	1965 HWY 37	1	PINE ACRES LLC 1881 HWY 37 TOMS RIVER NJ	08757
44 15.01	2065 HWY 37 FILE 23	4B	DAVIES CONSULTANTS INC 28510 SOMBRERO DR BONITA SPRINGS FL	34135
44 15.02	1975 HWY 37	4A	PINE ACRES MOBILE HOME PARK 157 70TH ST AVALON NJ	08202
75.01 1	500 HWY 70 SEE QFARM	4B	HERITAGE MINERALS INC/HOVSONS INC 4000 RT 66 HOVCHILD PLAZA TINTON FALLS NJ	07753
200 1	RAILROAD TRACKS L 2,BL 201 L1	15F	CONSOLIDATED RAIL CORP 6 PENN CENTER PLAZA PHILADELPHIA PA	19103

TRIDENT
ENVIRONMENTAL
Site Remediation, Land Use & Ecology

P/ 732.818.8699 F 732.818.3744
E info@tridentenviro.com

1423.0016
August 21, 2018

To: Adjacent Property Owners

Re: **Block 44 * Lot 15.01**
2065 Highway 37
Manchester Township, Ocean County, New Jersey

Dear Sir/Madam:

Take notice that an application has been submitted to the New Jersey Department of Environmental Protection, Land Use Regulation Program for a CAFRA Individual Permit and a Freshwater Wetlands General Permit No. 6 and 7 on the above referenced property. The site is located within the Manchester Township, Ocean County, New Jersey.

The complete permit application package can be reviewed at either the municipal clerk's office in the municipality in which the site subject to the application is located, or by appointment at the Department's Trenton Office. Either a 30-day public comment period or public hearing will be held on the application in the future. Individuals may request a public hearing on the application within 15 calendar days of the date of receiving this letter. Requests for a public hearing shall be sent to the Department at the address below and shall state the specific nature of the issues to be raised at the hearing:

New Jersey Department of Environmental Protection
Division of Land Use Regulation
P.O. Box 420
Trenton, New Jersey 08625
Attn: Ocean County Section Chief

Should you have any questions or require additional information, please do not hesitate to contact this office.

Sincerely,

Nicole Budzek

Nicole Budzek

COMPLIANCE STATEMENT

TRIDENT
ENVIRONMENTAL
Site Remediation, Land Use & Ecology

P/ 732.818.8699 F/ 732.818.3744
E/ info@tridentenviro.com

1423.0016
July 25, 2018

New Jersey Department of Environmental Protection
Division of Land Use Regulation
P.O. Box 420
Trenton, NJ 08625-0420

Re: Freshwater Wetlands General Permit No. 6 & 7
Block 44 * Lot 15.01
Manchester Township, Ocean County, NJ

Dear Sir/Madam:

On behalf of our client, please accept the following as a step-by-step statement of compliance for Freshwater Wetlands General Permit No. 6 associated with the above referenced property.

N.J.A.C. 7:7A-7.6 General Permit # 6 - Non-Tributary Wetlands

The project proposes to fill approximately **0.23 acres** of isolated freshwater wetlands. The freshwater wetlands are not part of a surface water tributary system discharging into an inland lake or pond, or a river or stream.

(a) Activities under General Permit 6 will be limited as follows:

1. The proposed activity will disturb no more than one acre of a freshwater wetland and/or State open water, which is not a water of the United States. The total amount of wetlands to be filled is **0.23 acres**

3. Activities under General Permit 6 will not take place in any of the following:

   a. The proposed activity will not take place in a wetland of exceptional resource value as defined in N.J.A.C. 7:7A-3.2. The wetlands intended to be filled do not meet the classification of exceptional resource value. They do not discharge into FW1 or FW2 trout production waters or their tributaries.

   b. The site does not contain State open waters defined as a special aquatic site

   c. The proposed activity will not take place in wetlands designated as priority wetlands by the USEPA.

d. The proposed activity will not take place in a State open water larger than one acre.

7:7A-7.7 General permit 7—Human-made ditches or swales in headwaters

General permit 7 authorizes activities in freshwater wetlands that are human-made ditches or in freshwater wetlands that are swales, provided all applicable requirements at N.J.A.C. 7:7A5.7 and 20.3 are met and:

1. The ditch or swale is located in a headwater.

2. The activities will not take place in the following:

i. A ditch or swale that is, or is located within, an exceptional resource value wetland, as described at N.J.A.C. 7:7A-3.2; or

ii. A ditch or swale that is, or is located within, a USEPA priority wetland.

3. The project will disturb **0.15 acres** of a human-made ditch

N.J.A.C. 7:7A-5.7 & 20.3 Conditions that Apply to All General Permit Authorizations

The proposed activity, which will occur in a non-tributary wetland, authorized by Statewide General Permit No. 6 complies as follows:

7:7A-5.7(b)2 The proposed activity will not occur in the proximity of a public water supply intake.

7:7A-5.7(b)3 The proposed activity will not destroy, jeopardize, or adversely modify a present or documented habitat for threatened or endangered species; and shall not jeopardize the continued existence of any local population of a threatened or endangered species.

7:7A-5.7(b)4 The proposed activity will not occur in a component of either the Federal or State Wild and Scenic River System; nor will it occur in a river officially designated by Congress or the State Legislature as a "study river" for possible inclusion in either system while the river is in an official study status.

7:7A-5.7(b)5 The proposed activity will not adversely affect properties that are listed or are eligible for listing on the National Register of Historic Places. If the permittee, before or during the work authorized, encounters a probable historic property that may be eligible for listing on the National Register, the permittee shall immediately notify the NJDEP and proceed as directed.

7:7A-5.7(b)6 Any discharge of dredged or fill material will consist of clean, suitable material free from toxic pollutants in toxic amounts, and shall comply with all applicable NJDEP rules and specifications regarding the use of dredged or fill material.

7:7A-5.7(b)7 The proposed structure or fill authorized will be maintained as specified in the construction plans.

7:7A-5.7(b)8 The proposed activity will not result in a violation of the Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 or implementing rules at N.J.A.C. 7:13.

7:7A-5.7(b)9 If activities under the general permit meet the definition of "major development" at N.J.A.C. 7:8-1.2, then the project of which the activities are a part shall comply in its entirety with the Stormwater Management Rules at N.J.A.C. 7:8.

7:7A-5.7(b)10 If activities under the general permit-by-certification or general permit involve excavation or dredging, the applicant shall use an acceptable disposal site for the excavated or dredged material. No material shall be deposited or dewatered in freshwater wetlands, transition area, state open waters or other environmentally sensitive areas. The Department may require testing of dredged material if there is a reason to suspect that the material is contaminated. If any dredged material is contaminated with toxic substances, the dredged material shall be removed and disposed of in accordance with Department-approved procedures.

7:7A-5.7(b)11 The amount of rip-rap or other energy dissipating material will prevent erosion, as calculated under the Standards for Soil Erosion and Sediment Control in New Jersey at N.J.A.C 2:90.

7:7A-5.7(b)12 Best management practices will be followed whenever applicable.

7:7A-5.7(b)13 The proposed activity will be consistent with the Water Quality Management Planning rules at N.J.A.C. 7:15 and with the applicable approved Water Quality Management Plan (208 Plan) adopted under the New Jersey Water Quality Planning Act, N.J.S.A. 58:11A-1 et. seq.

7:7A-5.7(b)14 The proposed activity will comply with the timing requirements

7:7-5.7(b)15 Activities authorized under a general permit-by-certificate or general permit shall not take place in a vernal habitat, or in a transition area adjacent to a vernal habitat, with the exception of activities associated with general permits 1, 6, 6A and 16, which shall be reviewed on a case-by-case basis in accordance with N.J.A.C. 7:7A-5.3(e)

DATA SHEETS

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 2065 Highway 37/Davies Property/1423.0016 City/County: Manchester/Ocean Sampling Date: 7/31/2018

Applicant/Owner: _____ State: NJ Sampling Point: Wetland

Investigator(s): NB Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR or MLRA): _____ Lat: 522,765 Long: 422,710 Datum: _____

Soil Map Unit Name: Downer Loamy Sand, Lakehurst Sand and Pits, Sand and Gravel NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** **Yes** X **No** _____
Hydric Soil Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes X	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 8 in.

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: Wetland

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pitch Pine			FACU
2.			
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x 1 =	_____
FACW species	_____	x 2 =	_____
FAC species	_____	x 3 =	_____
FACU species	_____	x 4 =	_____
UPL species	_____	x 5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Wetland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0" - 6"	10 YR 3/1						sand	
6" - 12"	2.5 YR 6/1				C	PL	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 2065 Highway 37/Davies Property/1423.0016 City/County: Manchester/Ocean Sampling Date: 7/31/2018

Applicant/Owner: _____ State: NJ Sampling Point: Upland

Investigator(s): NB Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR or MLRA): _____ Lat: 522,765 Long: 422,710 Datum: _____

Soil Map Unit Name: Downer Loamy Sand, Lakehurst Sand and Pits, Sand and Gravel NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: Upland

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pitch Pine			FACU
2. Black Oak			FACU
3. White Oak			FACU
4.			
5.			
6.			
7.			
	_____ = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		

Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0" - 7"	10 YR 4/1						sand	
7" - 20"	2.5 YR 6/2						sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

PHOTOGRAPHS
AND
FIGURES

2065 Highway 37 Site Photographs
Block 44 * Lot 15.01
Manchester Township, Ocean Co., NJ

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ENVIRONMENTAL
Site Remediation, Land Use & Ecology

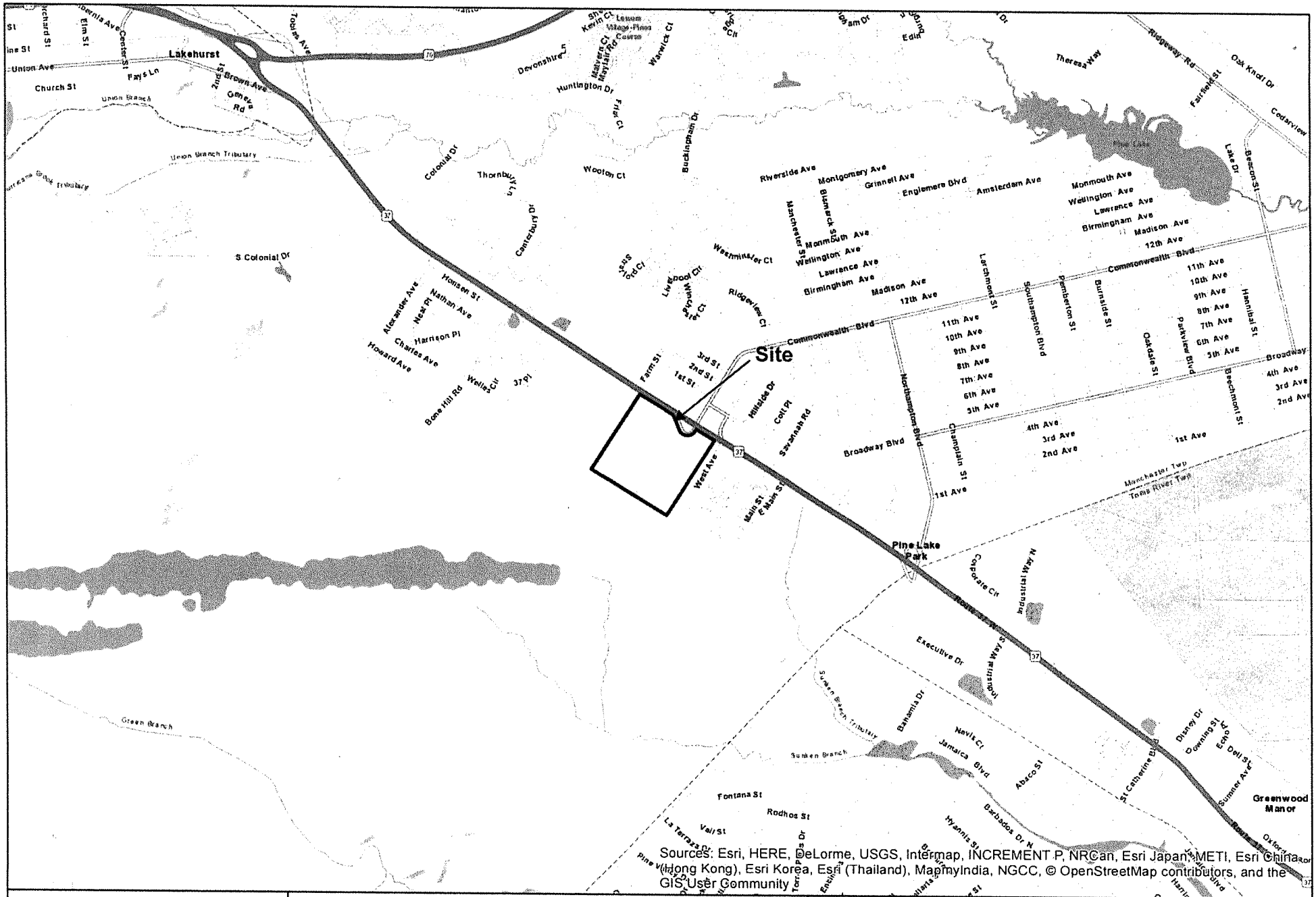
Photograph 1: View along Highway 37 with the site to the left

Photograph 2: View along Highway 37 with the site to the right

Photograph 3: View of the central portion of the site

Photograph 4: View of the central portion of the site

Photograph 5: View of the abandoned commercial structures within the southern portion of the site



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New Jersey Roads Map

2065 Highway 37
Block 44 ~ Lot 15.01

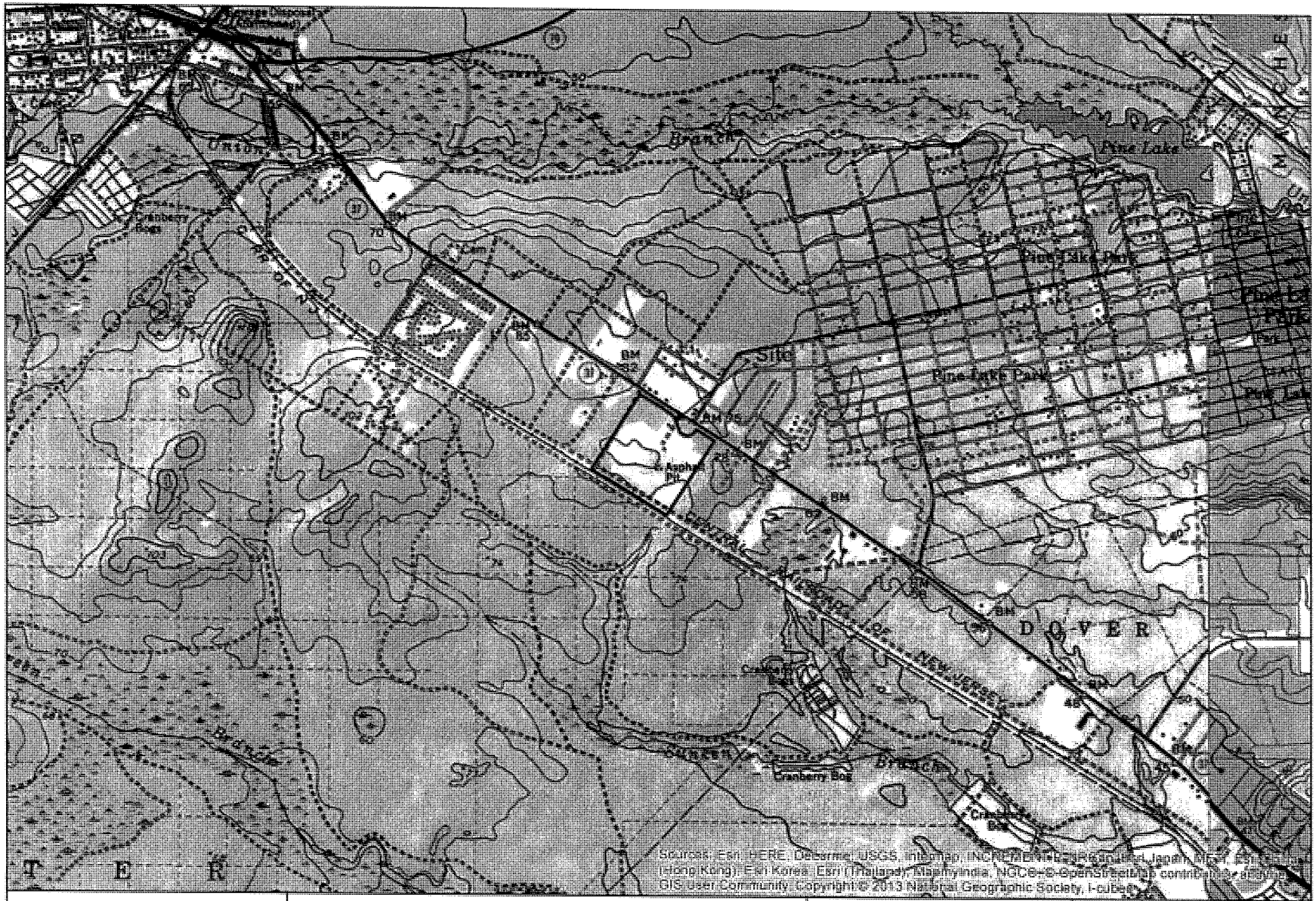
Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 1	JOB NO.: 1423.0016

SCALE: 1 inch = 2,000 feet
Feet

Document Path: M:\JOBS\FWH Job #\1423.0016\roads map.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.



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Keswick Grove USGS Quadrangle

2065 Highway 37
Block 44 – Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 2	JOB NO.: 1423.0016

SCALE: 1 inch = 2,000 feet
STRIKING: Feet

Document Path: M:\JOBS\FWH\Job P\1423\0016\usgs map.mxd

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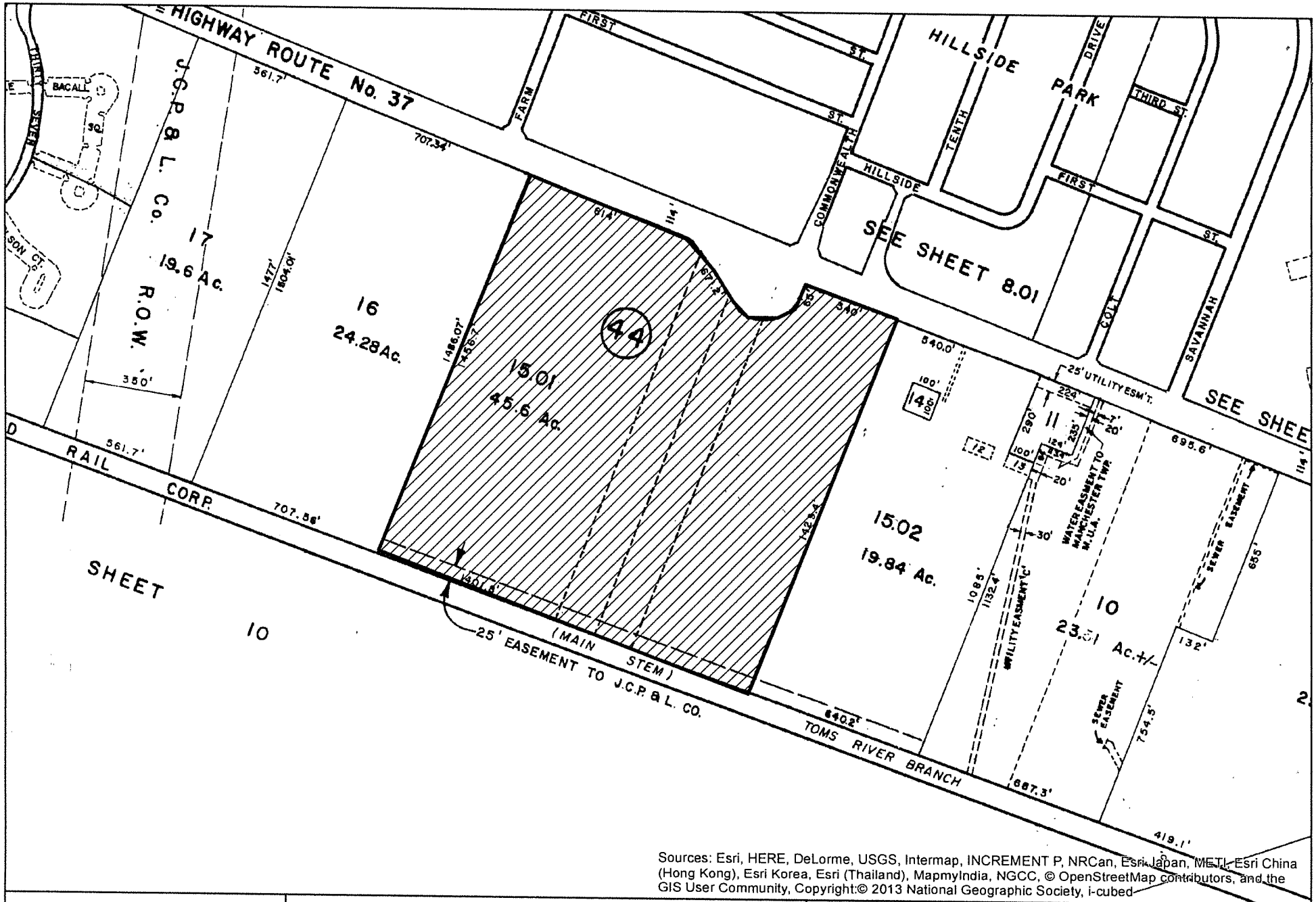

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community, Copyright:© 2013 National Geographic Society, i-cubed

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Manchester Township Tax Map

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY: NB	DATE: 07/24/2018
FIGURE: 3	JOB NO.: 1423.0016
SCALE: 1 inch = 1 feet NTS	

Document Path: M:\JOBS\FWH Job #\1423.0016\tax map.mxd

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Ocean County Soils Map

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 4	JOB NO.: 1423.0016

SCALE: 1 Inch = 300 feet
0 37.5 75 150 225 300 Feet

Document Path: M:\JOBS\FWH Job #\1423.0016\soils map.mxd

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NJDEP Mapped Freshwater Wetlands

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 5	JOB NO.: 1423.0016

SCALE: 1 Inch = 300 feet
0 37.5 75 150 225 300 Feet

Document Path: M:\JOBS\FWH Job #\1423.0016\wetlands map.mxd

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Aerial- 2015

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 6	JOB NO.: 1423.0016

SCALE: 1 inch = 300 feet
0 37.5 75 150 225 300 Feet

Document Path: M:\JOBS\FWH Job #\1423.0016\aerial map.mxd

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Landscape Project Version 3.3

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 7	JOB NO.: 1423.0016

SCALE: 1 inch = 300 feet
0 37.5 75 150 225 300 Feet

Document Path: M:\JOBS\PWH\Job 1\1423.0016\landscape project map.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

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1423.0016
August 19, 2018

CAFRA INDIVIDUAL PERMIT COMPLIANCE STATEMENT

2065 HIGHWAY 37
BLOCK 44 * LOT 15.01
MANCHESTER TOWNSHIP
OCEAN COUNTY
NEW JERSEY

PREPARED FOR:

HARVEY KAREN
150 TENNIS COURT
WALL, NJ 07719

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Figure 5- NJDEP Mapped Freshwater Wetlands
Figure 6- Aerial Map – 2015

I. INTRODUCTION

Trident Environmental was retained to assist in the preparation of a Coastal Area Facility Review Act (CAFRA) Individual Permit. This CAFRA application is for the construction of 216 residential units, one (1) 22,650 sf commercial pad, one (1) 7,225 sf commercial pad and a Wawa with 16 fueling stations and a 5,525 sf market.

This compliance statement has been prepared per the requirements set forth at N.J.A.C. 7:7, Coastal Zone Management Rules.

II. EXISTING CONDITIONS

Site Location:

The property is located along Highway Route 37. It can be found on the Keswick Grove USGS Quadrangles with N.A.D. 1983 state plane coordinates of E (x) 553,283 N (y) 422,935 at the approximate center of the site. The site is located within a Coastal Suburban Planning Area.

Property:

The site contains 45.43 acres consisting of two abandoned commercial structures, vacant cleared land, and undeveloped woodlands.

Current Uses of Adjoining Properties:

North: Highway Route 37 and Commercial Development
West: Undeveloped Woodlands
East: Residential Development
South: Utility Right of Way and Undeveloped Woodlands

III. PROPOSED DEVELOPMENT

The proposed project will construct 216 residential units, one (1) 22,650 sf commercial pad, one (1) 7,225 sf commercial pad and a Wawa with 16 fueling stations and a 5,525 sf market. The residential units will contain a total of 462 parking spaces (216 garage spaces, 216 driveway spaces & 30 additional spaces), the commercial pads will consist of a total of 141 parking spaces. The Wawa will contain a total of 48 parking spaces. Associated development will include roadways and stormwater management basin. Please refer to the Site Development Plan prepared by FWH Associates, P.A. for further detail.

IV. COMPLIANCE WITH CAFRA POLICIES

In accordance with the provisions of CAFRA, Rules on Coastal Zone Management (NJAC 7:7 et. seq.); Trident Environmental identified the following policies to be addressed as listed below:

SUBCHAPTER 9 - SPECIAL AREAS

7:7-9.25 Flood Hazards Areas

7:7-9.26 Riparian Zones
7:7-9.27 Wetlands
7:7-9.28 Wetland Buffers
7:7-9.32 Steep Slopes
7:7-9.36 Endangered or Threatened Wildlife or Plant Species Habitats
7:7-9.37 Critical Wildlife Habitat
7:7-9.39 Special Hazard Areas
7:7-9.42 Pinelands National Reserve and Pinelands Protection Area

SUBCHAPTER 13 – REQUIREMENTS FOR IMPERVIOUS COVER AND VEGETATIVE COVER FOR GENERAL LAND AREAS AND CERTAIN SPECIAL AREAS

7:7-13.15 Coastal Planning Areas in the CAFRA Area
7:7-13.17 Impervious Cover Limits for a Site in the CAFRA Area
7:7-13.18 Vegetative Cover Percentages for a Site in the CAFRA Area

SUBCHAPTER 14. GENERAL LOCATION RULES

7:7-14.2 Basic Location Rule
7:7-14.3 Secondary Impacts

SUBCHAPTER 15- USE RULES

7:7-15.2 Housing
7:7-15.10 Commercial Facility

SUBCHAPTER 16 - RESOURCE RULES

7:7-16.3/16.6 Water Quality and Stormwater Management
7:7-16.7 Vegetation
7:7-16.8 Air Quality
7:7-16.10 Scenic Resources and Design
7:7-16.11 Buffers and Compatibility of Uses
7:7-16.12 Traffic
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SUBCHAPTER 9 - SPECIAL AREAS

7:7-9.25 Flood Hazards Areas

Flood hazard areas include those areas mapped as such by the Department, areas defined or delineated as an A or a V zone by FEMA, and any unmapped areas subject to flooding by the flood hazard area design flood. Flood hazard areas are subject to either tidal or fluvial flooding, and the extent of flood hazard areas shall be determined or calculated in accordance with the procedures at N.J.A.C. 7:13-3.

This entire site is located within an X Zone, which is not a flood hazard area.

7:7-9.26 Riparian Zones

A riparian zone exists along every regulated water, except there is no riparian zone along the Atlantic Ocean nor along any humanmade lagoon, stormwater management basin, or oceanfront barrier island, spit or peninsula.

There are no Riparian Zones located on the site. The closest mapped waterway is located more than 300-ft from the property.

7:7-9.27/ 7:7-9.28 Wetlands /Wetland Buffers

Wetlands are an area that is inundated or saturated by surface water or groundwater at a frequency or duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

The property does contain wetlands. A Letter of Interpretation Line Verification (File No. 1518-07-0003.1) dated 11/19/07 had been previously issued for the site. The project proposes to fill the wetlands on site utilizing a Freshwater Wetland General Permit No. 6 & 7. An application to fill the wetlands has been submitted along with this application.

7:7-9.32 Steep Slopes

Steep slopes are land areas with slopes greater than 15 percent, which is not adjacent to the shoreline and therefore not coastal bluffs. Steep slopes include natural swales and ravines, and human-made areas, such as those created by mining for sand, gravel, or fill, or road grading. Slopes of less than 15 percent are not considered to be steep slopes.

The property does contain areas of steep slopes. No development is proposed on the steep slopes located on site.

7:7-9.36 Endangered & Threatened Species Potential

Trident Environmental Reviewed Landscape Project Version 3.3 data for threatened/endangered wildlife species potential. The Landscape Project was developed by the NJDEP, Division of Fish and Wildlife, Endangered and Non-Game Species Program (ENSP) as a wildlife habitat mapping program used to identify and map critical habitats for endangered, threatened, and special-concern wildlife.

The site lies within the Pinelands Coastal Region of the Landscape Project Version 3.3. A Rank 3, Northern Pine Snake occupied habitat mapped throughout the site. Habitat for Northern pine snake has been identified in the rear of the property along the western property boundary. The remaining areas of the site, are not characterized as critical habitat due to the presence of wetlands that are typically avoided by the pine snake, disturbed areas of the site resulting from prior asphalt plant operations that resulted in an area of contamination, gravel and stone areas throughout the central portion of the site, and asphalt and buildings in the northern adjacent to Route 37.

The applicant will implement both conservation and habitat management measures to maintain and protect habitat on the site for the northern pine snake. A 300-foot conservation easement is proposed from the southern property boundary where no development of structures, roadway, parking areas or impervious coverage would be allowed. The 300-foot buffer will deed restrict 9.68 acres to be maintained and restored to suitable pine snake habitat. This will ensure the areas are protected from any further development or disturbance. The development will construct a shallow recharge basin located adjacent to the conservation easement. The basin will add an additional 150 feet of buffer to existing habitat from the proposed residential portion of the site.

7:7-9.37 Critical Wildlife Habitat

The site was reviewed for critical wildlife habitat as described in 7:7-9.37. Critical wildlife habitat is specifically known to serve an essential role in maintaining wildlife, particularly in wintering, breeding, and migrating.

The project will disturb 11.79 acres of critical wildlife habitat. The project will mitigate for 23.58 acres of critical wildlife habitat. A mitigation proposal will be submitted after the submission of the CAFRA application.

7:7-9.39 Special Hazard Areas

The property contains a groundwater CEA NJDEP Case No. 98-06-11-1151-20, Program Interest No. 016764. The CEA is estimated at 340 feet in length with a width of 130 feet and is located in the southwestern portion of the site near the western property boundary. The site also mapped within a TCE CKE (PI No. G000009218). The location of the TCE Plume has been delineated on the site and is estimated to be about 500 feet in length by about 280 feet in width located near the jughandle on State Highway 37 in the northeast portion of the Site.

The project proposed to construct four (4) recharge stormwater basins as part of the project. The project has been designed to ensure the recharging of stormwater will not adversely affect the groundwater contamination on the site. The proposed locations for the Infiltration Basins surround the CEA Boundary and the TCE Plume Area at distances of between 50 feet to 750 feet away and are located hydraulically downgradient of the Groundwater CEA Boundary and TCE Plume Area. Therefore, their impact on the groundwater flow direction and movement of the CEA Boundary and TCE Plume Areas is negligible.

The Groundwater CEA Area is underlain by the Cohansey Formation, which is fine to medium to coarse-grained sand facies, and Fill which is reworked native and Cohansey sand. The soil hydraulic conductivity (K) is 44 ft./day, the hydraulic gradient (i) is 0.019 ft./ft., and the effective porosity is 0.25. The soil test pits conducted on the site encountered groundwater between 3.6 and 13.6 feet. The measured permeability rate ranged from <0.2 in./hr. (0.4 ft./day) in SP-B, F, G, and I to 31.24 in./hr. (62 ft./day) in SP-E. Soil test borings SP-1 through SP-9, which are between 7 and 15 feet deep encountered yellow brownish sand with 5% to 15% gravel and encountered groundwater between 6 and 15 feet. The measured permeability rate ranged from 16.86 in./hr. (33 ft./day) in soil test boring SP-9 to 71.13 in./hr. (142 ft./day) in SP-1.

The hydrogeologic properties and soil test borings information detailed above would also indicate that the proposed shallow Infiltration Basins would drain quickly and not adversely

impact the groundwater flow direction and movement of the CEA Boundary and TCE Plume Areas, which are surrounded by the proposed Infiltration Basins.

The proposed residential and commercial developments will be constructed with a vapor barrier in accordance with the required regulations outlined in N.J.A.C. 7:26E.

7:7-9.42 Pinelands National Reserve and Pinelands Protection Area

The Pinelands National Reserve includes those lands and water areas defined in the National Parks and Recreation Act of 1978, Section 502 (P.L. 95-625), an approximately 1,000,000 acre area ranging from Monmouth County in the north, south to Cape May County and from Gloucester and Camden County on the west to the barrier islands of Island Beach State Park and Brigantine Island along the Atlantic Ocean on the east (see Appendix, Figure 10, incorporated herein by reference). The "Pinelands Area" is a slightly smaller area within the Pinelands National Reserve. It was designated for State regulation by the Pinelands Protection Act of 1979 (N.J.S.A. 13:18-1 et seq.). The Pinelands Commission adopted a Comprehensive Management Plan in November, 1980. Within the Pinelands Area, the law delineates a Preservation Area, where the plan shall "preserve an extensive and contiguous area of land in its natural state, thereby insuring the continuation of a Pinelands environment...." (Section 8c).

The property is located with Regional Growth Area within the Pinelands National Reserve. The project has been designed to be consistent with the intent, policies, and objectives of the Pinelands National Reserve.

SUBCHAPTER 13 - REQUIREMENTS FOR IMPERVIOUS COVER AND VEGETATIVE COVER FOR GENERAL LAND AREAS AND CERTAIN SPECIAL AREAS.

7:7 - 13.15 Coastal Planning Areas in the CAFRA Area

The site is situated within a Coastal Suburban Planning Area.

7:7 - 13.17 Impervious Cover Limits for a Site in the CAFRA Area

The site is within a Coastal Suburban Planning Area, and the impervious coverage limits are determined under 7:7-13.17, Table H. This article states the impervious cover limit is calculated by multiplying the net land area by the appropriate impervious coverage percentage found in Table H.

The net land area is 45.63 acres, the corresponding impervious cover percentage of a Coastal Suburban Planning Area, within a sewer service area is 30 percent. For impervious limits and the proposed impervious, please refer to the table below.

PROPOSED IMPERVIOUS SURFACE ON-SITE

Planning Area	Net Land Area	Allowable Impervious	Proposed Impervious
Suburban	45.43 AC	13.63 Ac (30%)	13.39 Ac (29.5%)

7:7 – 13.18 Vegetative Cover Percentages for a Site in the CAFRA Area

The acreage in which trees and herbaceous/shrub vegetation shall be planted or preserved is calculated by first identifying forested and unforested portions of the site, as determined under N.J.A.C. 7:7-13.5.

Forested portions of a site within a Coastal Suburban Planning Area, within a sewer service area require 35 percent of the forested part of the site to be preserved. The unforested portions of a site within a Coastal Suburban Planning Area require 5 percent preservation and planting.

PROPOSED TREE PRESERVATION ON-SITE

Planning Area	Net Land Area	Existing Net Forested Area	Required Tree Preservation (Forested)	Existing Net Unforested Area	Required Tree Preservation (Unforested)	Total Required Tree Preservation	Total Proposed Tree Preservation
Suburban	45.43 Ac	23.77 Ac	8.32Ac (35%)	21.66 Ac	1.08 Ac (5%)	9.40 Ac	11.98 Ac

PROPOSED HERBACEOUS & SHRUB PLANTING ON-SITE

Planning Area	Net Land Area	Allowable Impervious	Required Tree Preservation	Allowable Herb / Shrub	Proposed Herb / Shrub
Suburban	45.43 Ac	13.63 Ac	9.40 Ac	22.40 Ac	20.06 Ac

SUBCHAPTER 14 - GENERAL LOCATION RULES

7:7-14.2 Basic Location Rule

The proposed development is not anticipated to impact public health, safety, welfare or the natural environment.

7:7-14.3 Secondary Impacts

No secondary impacts of the proposed development are anticipated regarding traffic or wastewater treatment systems. With regards to the potential effects related to the slight increases in traffic and sanitary sewer flows from the project, these increases are negligible and can easily be accommodated by the existing roadway and utility infrastructure in the area of the development.

SUBCHAPTER 15. USE RULES

7:7-15.2 Housing

The development is located adjacent to an existing Ocean Ride bus stop is located along Highway Route 37 and Commonwealth Boulevard. The development will provide lighted sidewalks with shade trees throughout the development and along Highway Route 37.

7:7-15.10 Commercial Facility

The proposed commercial development will comply with all applicable location and resource rules. The commercial building is located in a Highway Development Zone. The structures will be compatible with scale and design with surrounding commercial development.

SUBCHAPTER 16 - RESOURCE RULES

7:7-16.3/16.6 Water Quality and Stormwater Management

The proposed project meets the definition of "major development" and will comply with the Stormwater Management rules at N.J.A.C. 7:8. For detailed information regarding stormwater, please refer to the Stormwater Management Plan prepared by FWH Associates, P.A.

7:7-16.7 Vegetation

The site contains native vegetation that will be disturbed as part of the project. Upon completion of the project, the site will be landscaped with native vegetation to the maximum extent practical. A Landscape Plan has been provided within the Site Development plans prepared by FWH Associates, P.A.

7:7-16.8 Air Quality

The proposed development will conform to all applicable State and Federal regulations, standards, and guidelines for ozone, particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, lead, and visibility.

The proposed development will be located along Highway Route 37. The development will utilize the Ocean Ride bus stop already situated on Highway Route 37 and Commonwealth Boulevard.

7:7-16.10 Scenic Resources and Design

The proposed development will blend in with the surrounding landscape and neighboring developments. Development surrounding the property includes residential development, commercial development, roadways and undeveloped wooded areas. The proposed development will benefit the surrounding area.

7:7-16.11 Buffers and Compatibility of Uses

Buffers are natural or human-made areas, structures, or objects that serve to separate distinct uses or areas. The compatibility of uses is the ability for users to existing together without aesthetic or functional conflicts. Adequate buffers will be provided where practical. The project will be compatible with the surrounding area. The Highway Route 37 corridor consists of a mix of residential and commercial developments. The residential portion of the site will be set back from Highway Route 37.

7:7-16.12 Traffic

The proposed project will operate a service Level "D" or better upon completion of the roadway improvements along Highway Route 37. Please refer to the traffic report in Appendix C for further detail.

7:7-16.14 Solid and Hazardous Waste

Solid waste means any garbage, refuse, sludge or other waste material, including solid, liquid, semi-solid or contained gaseous material. A material is a solid waste if it is "disposed of" by being discharged, deposited, injected, dumped, spilled, leaked or placed into or on any land or water so that such material or any constituent thereof may enter the environment or be emitted into the air or discharged into ground or surface waters. Solid waste becomes a hazardous waste when it exhibits any of the characteristics which are specified in the Federal Regulations on Identification and Listing of Hazardous Waste (40 C.F.R. 261). The general characteristics of hazardous waste include, but are not limited to, characteristics of ignitability, characteristics of corrosivity, characteristics of reactivity and characteristics of toxicity.

The property contains a groundwater CEA NJDEP Case No. 98-06-11-1151-20, Program Interest No. 016764. The CEA is estimated at 340 feet in length with a width of 130 feet and is located in the southwestern portion of the site near the western property boundary. The site also mapped within a TCE CKE (PI No. G000009218). The location of the TCE Plume has been delineated on the site and is estimated to be about 500 feet in length by about 280 feet in width located near the jughandle on State Highway 37 in the northeast portion of the site.

The proposed development will conform with all applicable State and Federal regulations, standards and guidelines for the handling and disposal of solid and hazardous wastes, including the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., the Solid Waste Management rules, N.J.A.C. 7:26, the Recycling rules, N.J.A.C. 7:26A, and the Hazardous Waste rules, N.J.A.C. 7:26G.

V. SECTION 10 ANALYSES 13:19-10

The project conforms to all applicable criteria pertaining to N.J.S.A. 13:19-10:

a. The proposed project conforms to all applicable air, water and radiation emissions and effluent standards and all applicable water quality criteria and air quality standards.

   The proposed development as proposed will result in the minimal emission of pollutants into the air. No emission of radiation is anticipated. During the construction phase of the project, short-term air quality impacts may occur are related to the production of fugitive dust and the generation of emissions from exhausts of construction vehicles. Mitigation measures, including dust control practices and the use of construction equipment with efficient air pollution control devices, will minimize these adverse effects on local air quality.

The operation of the project will not result in the violation of any air quality standard. Heating and air conditioning equipment will be energy efficient and comply with applicable emission regulations. The long-term air quality impacts anticipated from the project are related primarily to automobile exhaust emissions, primarily carbon monoxide (CO), hydrocarbons, and nitrogen oxides (NOx). Impact to air quality from automobiles will be minimized since the adjacent roadway will operate at a service Level "D" or better upon completion of the project.

The site will be serviced by municipal sewer. This off-site treatment of wastewater by a regional municipal facility will ensure compliance with applicable water quality standards.

The proposed project will not result in the violation of any applicable water quality standard, through strict adherence to the Soil Erosion and Sediment Control Plan approved by the Ocean County Soil Conservation District and through the treatment of stormwater.

b. The proposed project will prevent air emissions and water effluents more than the existing dilution, assimilative, and recovery capacities of the air and water environments at the site and within the surrounding region.

   The impacts will be minimized by mitigating measures, including dust control practices, the use of efficient air pollution control devices, soil erosion, and sediment control measures, and treatment of wastewater.

c. Measures for the collection and disposal of litter, recyclable, and solid waste will be taken care of through a standard public collection. This will minimize adverse environmental effects and the threat to the public health, safety, and welfare.

   The commercial and residential components will utilize dumpsters, collected by a private hauler, and transported to an approved landfill for disposal. Lacey Township requires the recycling of glass, aluminum, metal cans, plastic, magazines, and newspaper.

d. Upon completion of the proposed project, there will be no impairments to the regenerative capacity of water aquifers or other ground or surface water supplies.

   The stormwater management system has been designed to collect runoff and ensure water quality. These stormwater design will ensure that there are minimal feasible impairment of the regenerative capacity if water aquifers or other ground or surface water supplies. For specific details refer to the Stormwater Management Report prepared for the project by FWH Associates, P.A.

e. The proposed project will cause minimal interference with the natural functioning of the plant, animal, fish, and human life processes at the site and within the surrounding region.

   The proposed project has been designed to cause minimal feasible interference with the natural functioning of the plant, animal, fish, and human life processes at the site and in the surrounding region by complying with applicable municipal and State land use

regulations. The project will preserve 11.98 acres of forested area onsite along with planting natural vegetation throughout the development.

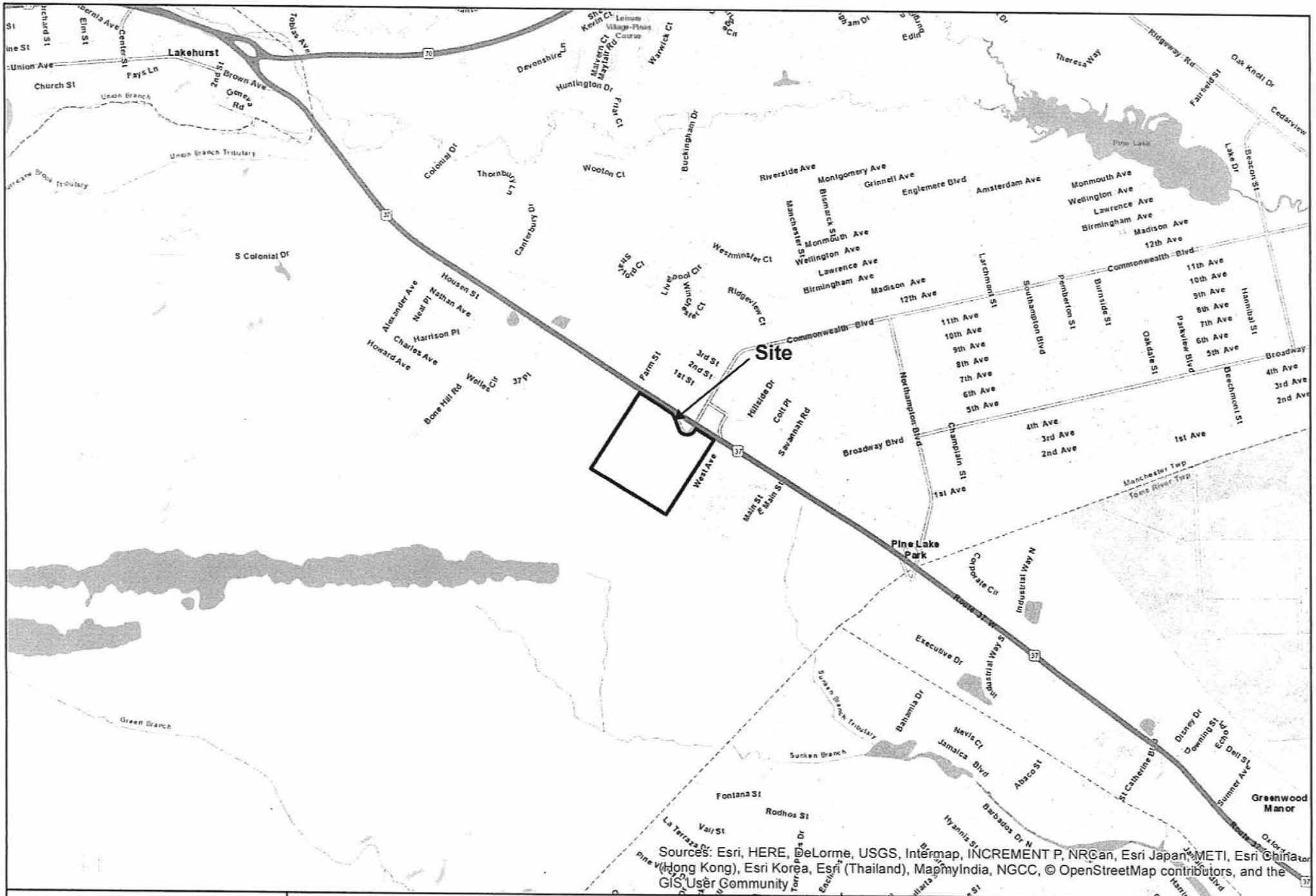
f. The proposed project will be constructed to neither endanger human life or property nor otherwise impair the public health, safety, and welfare.

The proposed project will not endanger human life or property nor otherwise impair the public health, safety, and welfare. The public welfare and safety will be protected through compliance with the state and local permits and ordinances, and the implementation of the best management practices during construction activities, as described above.

g. No areas of historic or archeological land will be disturbed as part of this project.

The project is surrounded by residential and commercial development and will not result in the degradation of unique or irreplaceable land types, historical or archaeological areas, or existing public scenic attributes at the site or within the surrounding region.

FIGURES



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TridentEnviro.com
P/ 732.818.8699 F/ 732.818.3744

New Jersey Roads Map

2065 Highway 37
Block 44 ~ Lot 15.01

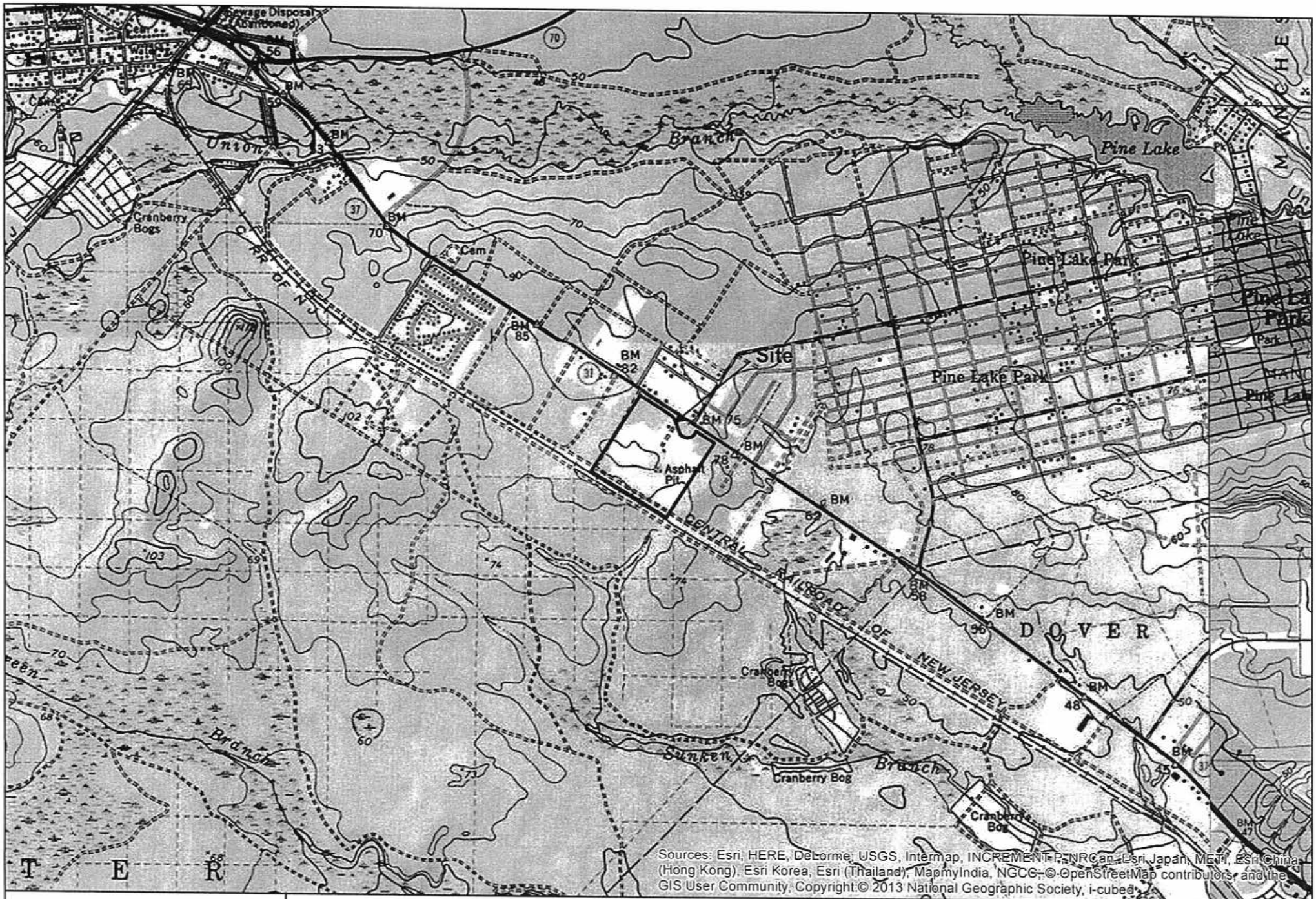
Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 1	JOB NO.: 1423.0016

SCALE: 1 inch = 2,000 feet
375 0 750 Feet

Document Path: M:\JOBS\FWH Job #\1423.0016\roads map.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.



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Keswick Grove
USGS Quadrangle

2065 Highway 37
Block 44 ~ Lot 15.01

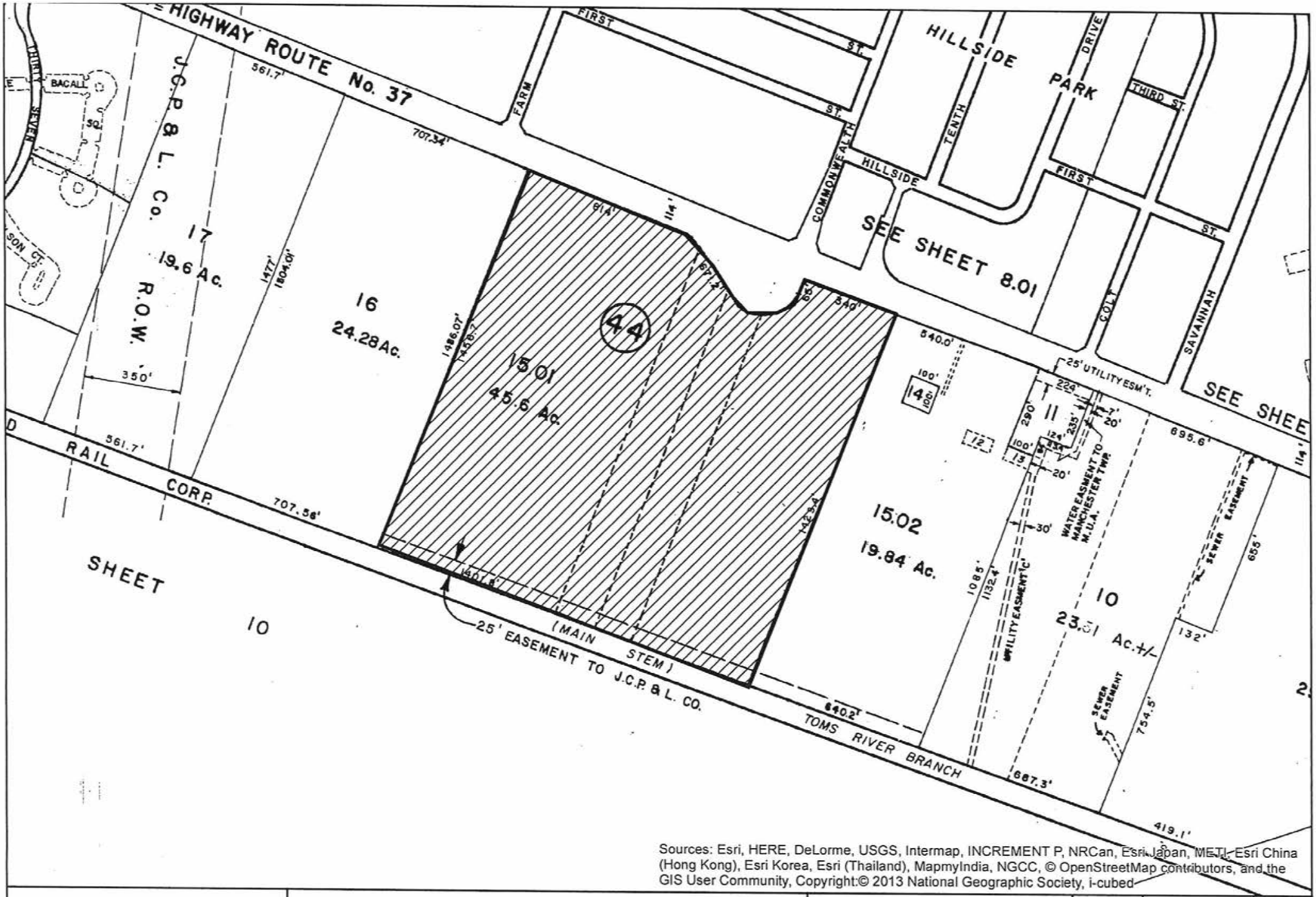
Manchester Twp., Ocean Co., NJ

DRAWN BY: NB	DATE: 07/24/2018
FIGURE: 2	JOB NO.: 1423.0016

SCALE: 1 inch = 2,000 feet
375 250
Feet

Document Path: M:\JOBS\FWH Job #\1423.0016\usgs map.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community, Copyright:© 2013 National Geographic Society, i-cubed

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Manchester Township Tax Map

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY: NB	DATE: 07/24/2018
FIGURE: 3	JOB NO.: 1423.0016
SCALE: 1 inch = 1 feet NTS	

Document Path: M:\JOBS\FWH Job #\1423.0016\tax map.mxd

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Ocean County Soils Map

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 4	JOB NO.: 1423.0016

SCALE: 1 inch = 300 feet
0 37.5 75 150 225 300 Feet

Document Path: M:\JOBS\FWH Job #\1423.0016\soils map.mxd

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NJDEP Mapped Freshwater Wetlands

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 5	JOB NO.: 1423.0016

SCALE: 1 inch = 300 feet
0 37.5 75 150 225 300 Feet

Document Path: M:\JOBS\FWH Job #\1423.0016\wetlands map.mxd

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Aerial- 2015

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 6	JOB NO.: 1423.0016

SCALE: 1 inch = 300 feet
0 37.5 75 150 225 300 Feet

Document Path: M:\JOBS\FWH Job #\1423.0016\aerial map.mxd

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Landscape Project
Version 3.3

2065 Highway 37
Block 44 ~ Lot 15.01

Manchester Twp., Ocean Co., NJ

DRAWN BY:	DATE:
NB	07/24/2018
FIGURE: 7	JOB NO.: 1423.0016

SCALE: 1 inch = 300 feet
0 37.5 75 150 225 300 Feet

Document Path: M:\JOBS\FWH Job #\1423.0016\landscape project map.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

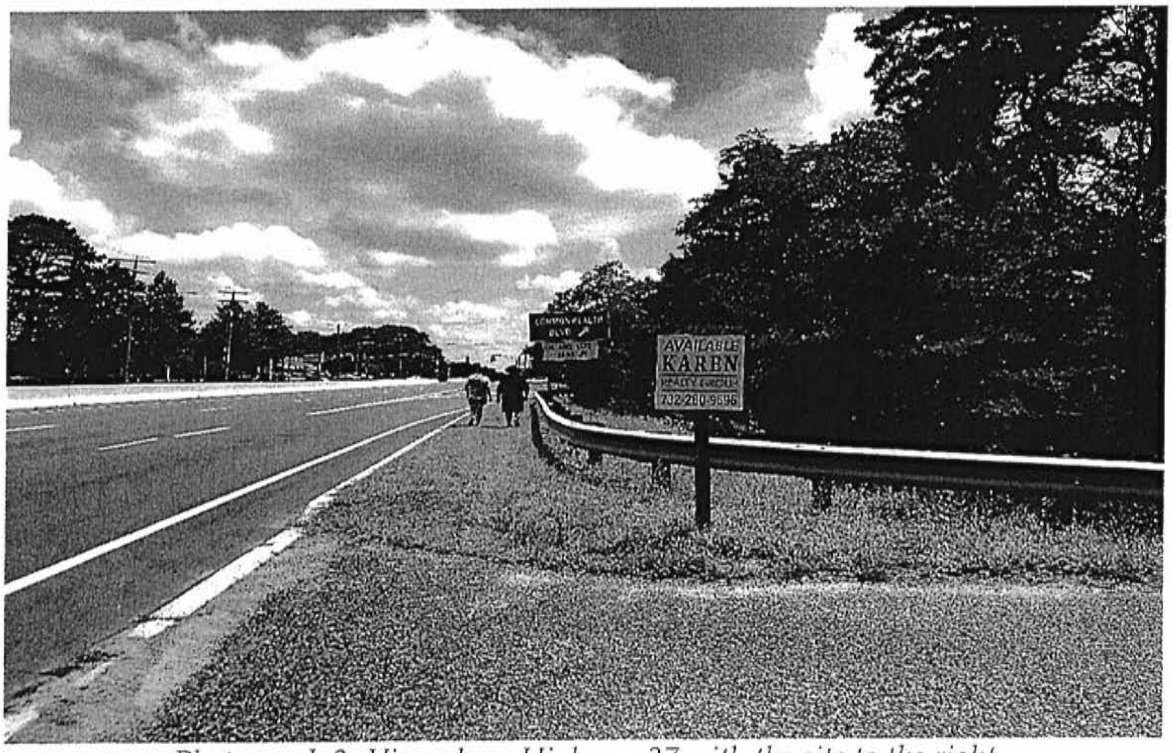
APPENDIX A

Site Photographs

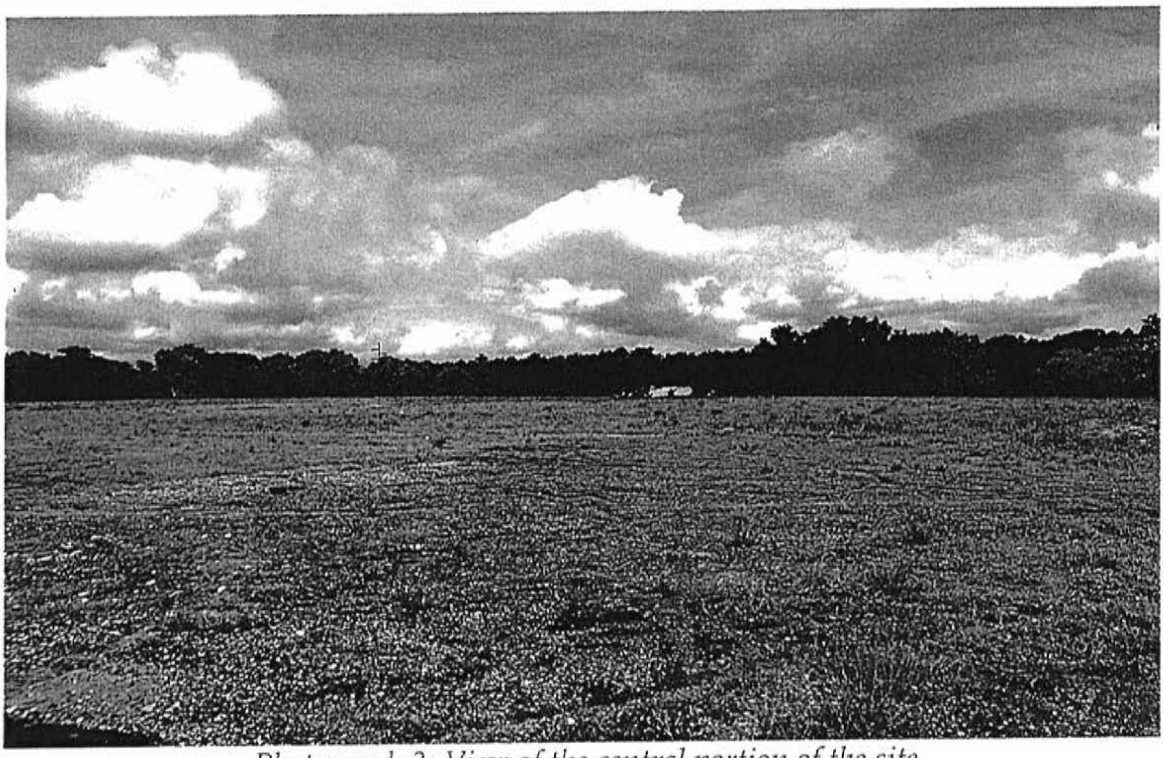
2065 Highway 37 Site Photographs
Block 44 * Lot 15.01
Manchester Township, Ocean Co., NJ

TRIDENT
ENVIRONMENTAL
Site Remediation, Land Use & Ecology

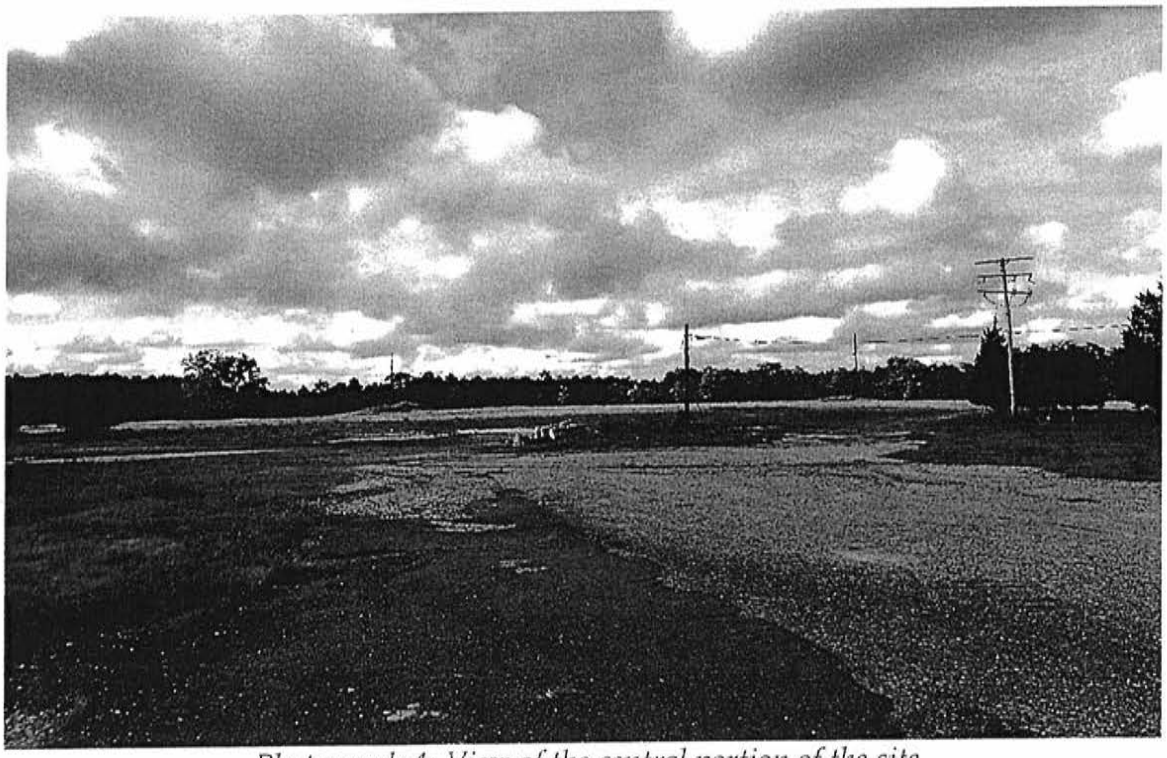
Photograph 1: View along Highway 37 with the site to the left



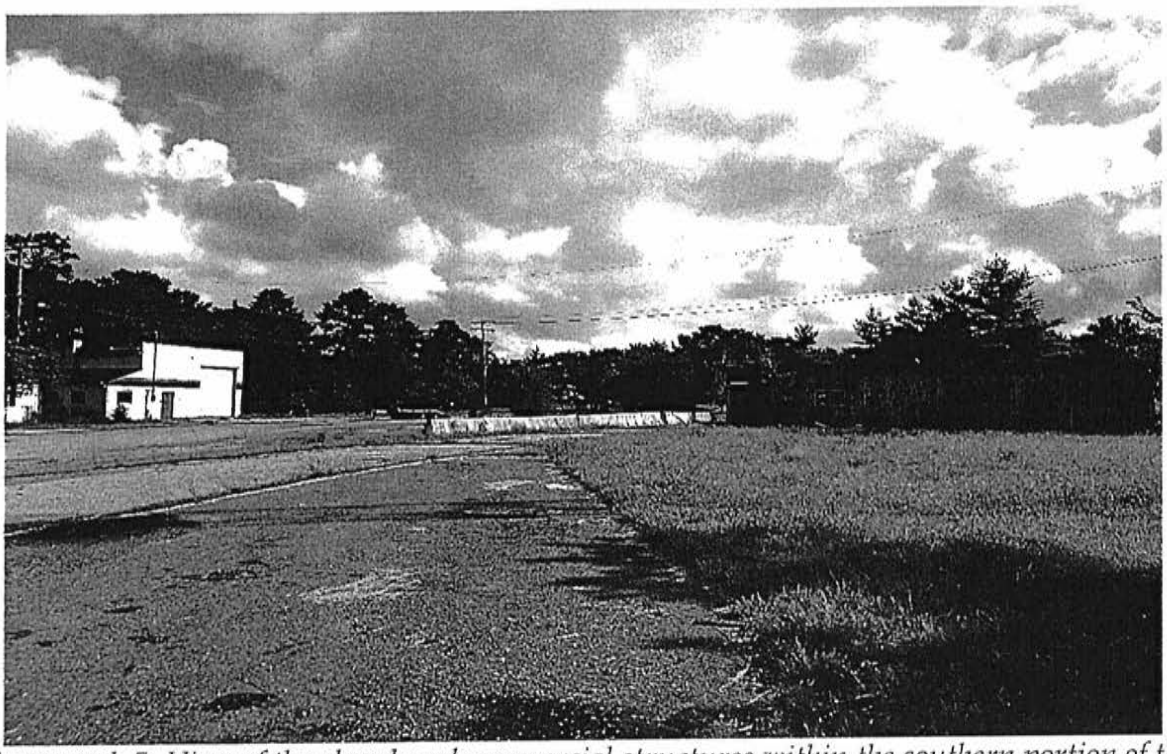
Photograph 2: View along Highway 37 with the site to the right



Photograph 3: View of the central portion of the site



Photograph 4: View of the central portion of the site



Photograph 5: View of the abandoned commercial structures within the southern portion of the site

APPENDIX B

NHP Request

State of New Jersey
MAIL CODE 501-04
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF PARKS & FORESTRY
NEW JERSEY FOREST SERVICE
OFFICE OF NATURAL LANDS MANAGEMENT
P.O. BOX 420
TRENTON, NJ 08625-0420
Tel. (609) 984-1339 Fax (609) 984-0427

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. McCABE
Acting Commissioner

August 6, 2018

Nicole Budzek
Trident Environmental Consultants, Inc.
1856 Route 9
Toms River, NJ 08755

Re: 2065 Highway 37
Block(s) - 44, Lot(s) - 15.01
Manchester Township, Ocean County

Dear Ms. Budzek:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Natural Heritage Data Request Form into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 3 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on, or in the immediate vicinity of, your project site. A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for FHACA plant species will only report precisely located occurrences for those wetland plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 3 (attached) to determine if any precisely located rare wetland plant species covered by

the FHACA rules have been documented. Detailed reports are provided for each category coded as 'Yes' in Table 3. These reports may include species that have also been documented on, or in the immediate vicinity of, the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1, 2 and 3 (attached) to determine if any priority sites are located on, in the immediate vicinity, or within one mile of the project site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

PLEASE SEE 'CAUTIONS AND RESTRICTIONS ON NHP DATA', which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/newcaution2008.pdf.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 18-3907483-14636

Table 1: On Site Data Request Search Results (6 Possible Reports)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Reptilia								
	Northern Pine Snake	Pituophis melanoleucus melanoleucus	Occupied Habitat	3	NA	State Threatened	G4T4	S2

Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Invertebrate Animals					
Catocala herodias gerhardi	Herodias or Pine Barrens Underwing			G3T3	S3
Cicindela patruela consentanea	New Jersey Pine Barrens Tiger Beetle			G3T1T3	S2S3
Grammia placentia	Placentia Tiger Moth			G3G4	S1S3
Lithophane lemmeri	Lemmer's Noctuid Moth			G3G4	S2
Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
Ptichodis bistrigata	Southern Ptichodis			G3	S1S3
Zanclognatha dentata	A Noctuid Moth			G3G4	S3

Total number of records: 7

Table 2: Vicinity Data Request Search Results (6 possible reports)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	No	0 pages included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Amphibia								
	Pine Barrens Treefrog	Hyla andersonii	Breeding Sighting	3	NA	State Threatened	G4	S2
	Pine Barrens Treefrog	Hyla andersonii	Occupied Habitat	3	NA	State Threatened	G4	S2
	Pine Barrens Treefrog	Hyla andersonii	Vernal Pool Breeding	3	NA	State Threatened	G4	S2
Aves								
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Least Tern	Sternula antillarum	Foraging	4	NA	State Endangered	G4	S1B,S1N
Reptilia								
	Corn Snake	Pantherophis guttatus	Occupied Habitat	4	NA	State Endangered	G5	S1
	Northern Pine Snake	Pituophis melanoleucus melanoleucus	Occupied Habitat	3	NA	State Threatened	G4T4	S2

Other Animal Species
In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Invertebrate Animals					
Catocala herodias gerhardi	Herodias or Pine Barrens Underwing			G3T3	S3
Cicindela patruela consentanea	New Jersey Pine Barrens Tiger Beetle			G3T1T3	S2S3
Grammia placentia	Placentia Tiger Moth			G3G4	S1S3
Lithophane lemmeri	Lemmer's Noctuid Moth			G3G4	S2
Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
Ptichodis bistrigata	Southern Ptichodis			G3	S1S3
Zanclognatha dentata	A Noctuid Moth			G3G4	S3

Total number of records: 7

Table 3: Within 1 Mile for FHACA Searches (6 possible reports)

Report Name	Included	Number of Pages
1. Rare Plant Species Occurrences Covered by the Flood Hazard Area Control Act Rule Within One Mile of the Project Site Based on Search of Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within 1 mile	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	2 page(s) included
4. Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Amphibia								
	Pine Barrens Treefrog	Hyla andersonii	Breeding Sighting	3	NA	State Threatened	G4	S2
	Pine Barrens Treefrog	Hyla andersonii	Occupied Habitat	3	NA	State Threatened	G4	S2
	Pine Barrens Treefrog	Hyla andersonii	Vernal Pool Breeding	3	NA	State Threatened	G4	S2
Aves								
	Barred Owl	Strix varia	Breeding Sighting	3	NA	State Threatened	G5	S2B,S2N
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Nesting Colony	2	NA	Special Concern	G5	S3B,S4N
	Least Tern	Sternula antillarum	Foraging	4	NA	State Endangered	G4	S1B,S1N
	Snowy Egret	Egretta thula	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
Insecta								

Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
	Dotted Skipper	Hesperia attalus slossonae	Casual Flyby	2	NA	Special Concern	G3G4T3	S3
	Two-spotted Skipper	Euphyes bimacula	Casual Flyby	2	NA	Special Concern	G4	S3
Reptilia								
	Corn Snake	Pantherophis guttatus	Occupied Habitat	4	NA	State Endangered	G5	S1
	Northern Pine Snake	Pituophis melanoleucus melanoleucus	Occupied Habitat	3	NA	State Threatened	G4T4	S2

Vernal Pool Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.3

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Vernal habitat area	2806
Potential vernal habitat area	1250
Potential vernal habitat area	1253
Potential vernal habitat area	1285

Total number of records: 4

Other Animal Species Within One Mile of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Invertebrate Animals					
Catocala herodias gerhardi	Herodias or Pine Barrens Underwing			G3T3	S3
Cicindela patruela consentanea	New Jersey Pine Barrens Tiger Beetle			G3T1T3	S2S3
Grammia placentia	Placentia Tiger Moth			G3G4	S1S3
Lithophane lemmeri	Lemmer's Noctuid Moth			G3G4	S2
Metarranthis pilosaria	Coastal Bog Metarranthis			G3G4	S3S4
Ptichodis bistrigata	Southern Ptichodis			G3	S1S3
Zanclognatha dentata	A Noctuid Moth			G3G4	S3

Total number of records: 7

APPENDIX C

Traffic Report

TRAFFIC IMPACT STUDY

Proposed Mixed-Use Development
Manchester Township
Ocean County, New Jersey
Block 44, Lot 15.01

Prepared For:
Harvey Karen

Stonefield Engineering & Design, LLC
August 20, 2018
S-17003

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INTRODUCTION

This Traffic Impact Study was prepared to investigate the potential impacts of the proposed mixed-use development on the adjacent roadway network. The subject property is located along the eastbound side of Route 37 in Manchester Township, Ocean County, New Jersey. The site location is shown on appended **Figure 1**.

The subject property is designated as Block 44, Lot 15.01 as depicted on the Manchester Township Tax Map. The site has approximately 1,625 feet of frontage along Route 37. The existing site is occupied by two (2) vacant buildings and access is presently provided via one (1) right-in/right-out driveway along Route 37 located approximately 70 feet west of the Route 37 jughandle at Commonwealth Boulevard. Under the proposed development program, the existing structures would be razed and a mixed-use development consisting of 216 residential units, a 5,525-square-foot convenience market with gas pumps, and 29,875 square feet of commercial space would be constructed. Access to the site is proposed via two (2) right-in/right-out driveways along Route 37. The horizontal alignment of the existing Route 37 eastbound jughandle is proposed to be modified to accommodate a T-intersection with the central drive aisle providing mobility to each of the proposed uses. Roadway and signal improvements are also proposed to the intersection of Route 37 and Commonwealth Boulevard as part of the development plan.

METHODOLOGY

Stonefield Engineering & Design, LLC has prepared this Traffic Impact Study in accordance with the recommended guidelines and practices outlined by the Institute of Transportation Engineers (ITE) within Transportation Impact Analyses for Site Development. A detailed field investigation was performed to assess the existing conditions of the adjacent roadway network. A data collection effort was completed to identify the existing traffic volumes at the study intersections to serve as a base for the traffic analyses. Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using the Highway Capacity Manual, 6th Edition (HCM) and Synchro 10 Software for all study conditions to assess the roadway operations.

For an unsignalized intersection, Level of Service (LOS) A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 80 seconds per vehicle. The Technical Appendix contains the Highway Capacity Analysis Detail Sheets for the study intersections analyzed in this assessment. The traffic

signal timing utilized within the signalized analysis is based on traffic signal plans provided by (New Jersey Department of Transportation) NJDOT and field recordings.

2018 EXISTING CONDITION

2018 EXISTING ROADWAY CONDITIONS

The proposed mixed-use development is located along the eastbound side of Route 37 proximate to its intersection with Commonwealth Boulevard in Manchester Township, Ocean County, New Jersey. The subject property is designated as Block 44, Lot 15.01 as depicted on the Manchester Township Tax Map. The site has approximately 1,625 feet of frontage along Route 37. Land uses in the area are a mix of residential and commercial.

Route 37 is classified as an Urban Principal Arterial roadway with a general east-west orientation and is under the jurisdiction of the NJDOT. Along the site frontage, the roadway provides two (2) lanes of travel in each direction, with jughandles at key intersections to facilitate turning movements, and has a posted speed limit of 50 mph. Curb and shoulders are provided along both sides of the roadway, sidewalk is not provided, and on-street parking is not permitted. Route 37 provides east-west mobility within Ocean County and provides access to Route 70 to the west and the Garden State Parkway and Route 35 to the east with commercial land uses along its length.

Commonwealth Boulevard (County Route 8) is classified as an Urban Major Collector roadway with a general east-west orientation and is under the jurisdiction of Ocean County. In the immediate site vicinity, the alignment runs in a north-south orientation. The roadway provides one (1) lane of travel in each direction, with additional lanes provided at key intersections to facilitate turning movements and provide additional capacity, and has a posted speed limit of 35 mph. Curb and sidewalk are not provided, shoulders are not provided, and on-street parking is not permitted. Commonwealth Boulevard provides access to Route 37 at its westerly terminus and Ridgeway Road (County Route 571) at its easterly terminus for access to residential land uses along its length.

Hillside Drive is a local roadway with a general north-south orientation and is under the jurisdiction of Manchester Township. At its intersection with Commonwealth Boulevard, Hillside Drive has an east-west orientation. In the site vicinity, the roadway provides one (1) lane of travel in each direction and has a posted speed limit of 25 mph. Curb and sidewalk are not provided, shoulders are not provided, and on-street parking is permitted along both sides of the roadway. Hillside provides access between the Route 37 westbound off ramp and Commonwealth Boulevard and provides access to residential land uses along its length.

10th Avenue is a local roadway with a parallel orientation to Commonwealth Boulevard and is under the jurisdiction of Manchester Township. In the site vicinity, the roadway provides one (1) lane of travel in each direction and has a posted speed limit of 25 mph. Curb and sidewalk are not provided, shoulders are not provided, and on-street parking is permitted along both sides of the roadway. 10th Avenue provides access to residential uses along its length from Hillside Drive at its westerly terminus to Ridgeway Road at its easterly terminus.

Route 37 and Commonwealth Boulevard intersect to form a four (4)-leg intersection controlled by a three (3)-phase traffic signal operating on a fixed background cycle length. The eastbound and westbound approaches of Route 37 provide two (2) exclusive through lanes. The southbound approach of Commonwealth Boulevard provides one (1) exclusive left-turn lane and one (1) exclusive right-turn lane. The northbound approach of the Route 37 eastbound jughandle provides one (1) exclusive let-turn lane and one (1) shared through/right-turn lane. A Crosswalk is provided across the westbound leg of the intersection.

Commonwealth Boulevard and Hillside Drive intersect to form an unsignalized T-intersection with the westbound approach of Hillside Drive operating under stop control. The northbound approach of Commonwealth Boulevard provides one (1) shared through/right-turn lane and the southbound approach provides one (1) shared left-turn/through lane. The westbound approach of Hillside Drive provides one (1) shared left-turn/right-turn lane.

10th Avenue and Hillside Drive intersect to form an unsignalized four (4)-leg intersection with the northbound approach of the Route 37 westbound off-ramp and the southbound approach of 10th Avenue operating under stop control. The northbound approach of the Route 37 westbound off-ramp provides one (1) shared left-turn/through lane and one (1) exclusive right-turn lane. The southbound approach of 10th Avenue provides one (1) shared left-turn/right-turn lane. The eastbound approach of Hillside Drive provides one (1) shared left-turn/through lane and the westbound approach provides one (1) shared through/right-turn lane. It is noted that the 10th Avenue approach is slightly offset from the Route 37 off-ramp approach.

2018 EXISTING TRAFFIC VOLUMES

Manual turning movement counts were collected during the typical weekday morning, weekday evening, and Saturday midday time periods to evaluate existing traffic conditions and identify the specific hours when traffic activity on the adjacent roadways is at a maximum and could be potentially impacted by the development of the site. Turning movement counts were collected at the following intersections:

- Route 37 & Commonwealth Boulevard
- Commonwealth Boulevard & Hillside Drive
- 10th Avenue & Hillside Drive

Specifically, manual turning movement counts were conducted on the following dates and during the following times:

- Wednesday, June 27, 2018, from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 7:00 p.m.
- Saturday, June 30, 2018, from 11:00 a.m. to 2:00 p.m.

The study time periods were chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed development. The traffic volume data was collected and analyzed to identify the design peak hour in accordance with HCM and ITE guidelines. Based on the review of the count data the weekday morning peak hour occurred from 8:00 a.m. to 9:00 a.m.; the weekday evening peak hour occurred from 4:00 p.m. to 5:00 p.m., and the Saturday midday peak hour occurred from 11:45 a.m. to 12:45 p.m. The Technical Appendix contains a summary of the turning movement count data. The 2018 Existing weekday morning, weekday evening, and Saturday midday peak-hour volumes are summarized on appended **Figure 2**.

2018 EXISTING LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was conducted for the 2018 Existing Condition during the weekday morning, weekday evening, and Saturday midday peak hours at the study intersection.

Under the Existing Condition, the signalized intersection of Route 37 and Commonwealth Boulevard is calculated to operate at overall Level of Service C during the peak hours studied. Under the Existing Condition, the approaches of the stop-controlled T-intersection of Commonwealth Boulevard and Hillside Drive are calculated to operate at Level of Service B or better during the peak hours studied. It is noted that, in close proximity, a signalized intersection is located to the south of Hillside Drive along Commonwealth Boulevard. This signalized intersection provides the opportunity for gaps in traffic for vehicles exiting Hillside Drive. Under the Existing Condition, the approaches of the stop-controlled intersection of 10th Avenue and Hillside Drive are calculated to operate at Level of Service A during the peak hours studied.

2020 NO-BUILD CONDITION

BACKGROUND GROWTH

The 2018 Existing Condition traffic volume data was grown to a future horizon year of 2020, which is a conservative estimate for when the proposed mixed-use development is expected to be fully constructed. In accordance with industry guidelines, the existing traffic volumes at the study intersections were increased by 1.00% annually for two (2) years to generate the 2020 Base Traffic Volumes. These volumes are summarized on appended **Figure 3**. The 1.00% background growth rate was obtained the New Jersey Department of Transportation (NJDOT) Annual Background Growth Rate Table.

OTHER PLANNED DEVELOPMENT PROJECTS

To evaluate the future traffic conditions, it is important to consider the potential site-generated traffic of other projects that could influence the traffic volume at the study intersections. Other planned development projects include those that are either in the entitlement process or have recently been approved for building permits in proximity to the proposed development. Based on consultations with Beth-Ellen Gencarelli of the Manchester Township Clerk's office the following developments are anticipated to impact traffic volumes within the study area:

- Coventry Estates (The Willows) – 19 single-family dwellings located along Karen Court north of the study area, Block 38 Lots 3.01 – 3.20
- Presidential Gardens – 519 multi-family residential units located along Route 37 west of the study area, Block 46.01 Lots 1.01 and 1.03

Appended **Figure 4** illustrates the site-generated traffic associated with the 19 single-family dwellings and 519 multi-family residential units assigned to the study area network.

2020 NO-BUILD TRAFFIC VOLUMES

The site-generated trips associated with the 19 single-family dwellings and 519 multi-family residential units were added to the 2020 Base Traffic Volumes to calculate the 2020 No-Build Traffic Volumes for the weekday morning, weekday evening, and Saturday midday peak hours. These volumes are summarized on appended **Figure 5**.

2020 NO-BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2020 No-Build Condition during the weekday morning, weekday evening, and Saturday midday peak hours at the study intersection.

The signalized intersection of Route 37 and Commonwealth Boulevard is calculated to operate generally consistent with the findings of the Existing Condition at overall Level of Service C during the peak hours studied. The approaches of the stop-controlled T-intersection of Commonwealth Boulevard and Hillside Drive are calculated to operate generally consistent with the findings of the Existing Condition at Level of Service B or better during the peak hours studied. The approaches of the stop-controlled intersection of 10th Avenue and Hillside Drive are calculated to operate generally consistent with the findings of the Existing Condition at Level of Service A during the peak hours studied.

2020 BUILD CONDITION

The site-generated traffic volume of the proposed mixed-use development was estimated to identify the potential impacts of the project. For the purpose of this analysis, a complete project "build out" is assumed within two (2) years of the preparation of this study.

TRIP GENERATION

Trip generation projections for the proposed mixed-use development were prepared utilizing NJDOT's Highway Access Permit System (HAPS) and ITE's Trip Generation Manual, 10th Edition. It is noted that the HAPS does not contain data for the enter/exit trip distribution for its land uses. Therefore, the enter/exit trip distribution for each land use was obtained from the ITE's Trip Generation Manual, 10th Edition. Trip generation rates associated with Land Use 221 "Multifamily Housing (Mid-Rise)", Land Use 820 "Shopping Center", Land Use 960 "Super Convenience Market/Gas Station" were cited for the 216 residential units, 29,875 square feet of commercial space, and 5,525-square-foot convenience market with gas pumps, respectively. **Table 1** provides the weekday morning, weekday evening, and Saturday midday peak hour trip generation volumes associated with the proposed development.

TABLE 1 – PROPOSED TRIP GENERATION

	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
Land Use	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**
216 Units Multifamily Housing (Mid-Rise) *ITE Land Use 221*	20	58	78	58	37	95	47	48	95
29,875 SF Shopping Center *ITE Land Use 820*	17	11	28	113	123	236	124	114	238
5,525 SF Super Convenience Market/Gas Station *ITE Land Use 960*	230	229	459	192	191	383	176	176	352
Total	**267**	**298**	**565**	**363**	**351**	**714**	**347**	**338**	**685**

Chapter 6 of ITE's Trip Generation Handbook, 3rd Edition, states that internally captured trips can be a component of the travel patterns at mixed-use developments, such as the one proposed. When combined within a single development, individual land uses tend to interact, and thus attract a portion of each other's trip generation, such as an occupant in the residential development visiting the convenience market. Utilizing the published data, internal trips were calculated between the proposed uses during the weekday morning, weekday evening, and Saturday midday peak-hours. It is noted that the Trip Generation Handbook does not contain

data for the Saturday midday peak hour. However, it is logical that an interaction comparable to the weekday evening peak period would occur during the Saturday midday peak period. As such, the weekday evening rate has been utilized for the Saturday midday peak hour. Based on the published ITE data, approximately 0.4% of the site-generated weekday morning peak-hour trips, 12.0% of the site-generated weekday evening peak-hour trips, and 9.3% of the site-generated Saturday midday peak-hour trips are comprised of internally captured trips. The internal capture portion of the site-generated traffic is shown in **Table 2**.

As stated within Chapter 10 of ITE's Trip Generation Handbook, 3rd Edition, there are instances when the total number of trips generated by a site is different from the amount of new traffic added to the street system by the generator. Retail uses and convenience markets with gas are specifically located on or adjacent to busy streets to attract motorists already on the roadway. Therefore, the retail uses associated with the proposed site would be expected to attract a portion of its trips from the traffic passing the site on the way from an origin to an ultimate destination. These trips do not add new traffic to the adjacent roadway system and are referred to as pass-by trips.

Based upon the published ITE data for Land Use 820 "Shopping Center," 34% of the site-generated traffic during the weekday evening peak hour and 26% of the site-generated traffic during the Saturday midday peak hour is comprised of pass-by traffic. For Land Use 960 "Super Convenience Market/Gas Station," 76% of the site-generated traffic during the weekday morning and weekday evening peak hour is comprised of pass-by traffic. It is noted that the Trip Generation Handbook does not contain data for Land Use 960, "Super Convenience Market/Gas Station," during the Saturday midday peak hour. However, it is logical that an interaction comparable to the weekday peak periods would occur during the Saturday midday peak period. As such, the weekday pass-by rate has been utilized for the Saturday midday peak hour. **Table 2** shows the additional site generated traffic for the proposed development in terms of newly generated traffic and pass-by traffic.

TABLE 2 – PROPOSED TRIP GENERATION – NEW & PASS-BY TRIPS

Land Use Code	Land Use	Amount	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
			Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
221	Multifamily Housing (Mid-Rise)	216 Units	20	58	78	58	37	95	47	48	95
820	Shopping Center	29,875 SF	17	11	28	113	123	236	124	114	238
960	Super Convenience Market/Gas Station	5,525 SF	230	229	459	192	191	383	176	176	352
HAPS Trip Generation Total			**267**	**298**	**565**	**363**	**351**	**714**	**347**	**338**	**685**
Internal Capture Trip Reduction			-1	-1	-2	-43	-43	-86	-32	-32	-64
Land Use 820 Pass-By Trip Reduction			-	-	-	-37	-37	-74	-29	-29	-58
Land Use 960 Pass-By Trip Reduction			-175	-175	-350	-138	-138	-276	-129	-129	-258
Total New Vehicular Trips			**91**	**122**	**213**	**145**	**133**	**278**	**157**	**148**	**305**

At the site driveways, the calculated number of pass-by trips is shown as a negative number at the through movement as the vehicles are temporarily diverted from the through travel stream into and out of the site access point.

TRIP ASSIGNMENT/DISTRIBUTION

The trips generated by the proposed development were distributed according to the location of major arterial roadways, existing traffic patterns, and the access management plan of the site. Pass-by trips generated by the proposed development were distributed based on the access management plan of the site. The "New" Site-Generated Traffic Volumes are illustrated on **Figure 6** and the "Pass-By" Site-Generated Traffic Volumes expected to access the site are depicted on **Figure 7**.

2020 BUILD TRAFFIC VOLUMES

The site-generated trips were added to the 2020 No-Build Traffic Volumes to calculate the 2020 Build Traffic Volumes and are shown on appended **Figure 8**.

2020 BUILD LOS/CAPACITY ANALYSIS

According to the Site Plan prepared by FWH Associates, dated 8/10/2018, improvements to the intersection of Route 37 and Commonwealth Boulevard would be made to mitigate the impact of the increased traffic volume. Mitigations to Commonwealth Boulevard would include converting the exclusive southbound left-turn lane into a shared left-turn/through lane. Mitigations to the northbound approach would include adding one (1) shared left-turn/through lane and converting the shared right-turn/through lane into an exclusive right-turn lane. To accommodate the changes to the intersection of Route 37 and Commonwealth Boulevard

a new three (3)-phase traffic signal operating on a fixed background cycle length is proposed. The proposed signal timing plan utilizes split phasing to facilitate northbound and southbound left turns.

A Level of Service and Volume/Capacity analysis was also conducted for the 2020 Build Condition during the weekday morning, weekday evening, and Saturday midday peak hours at the study intersections and proposed site driveways. Appended **Table A1** compares the Existing, No-Build, and Build Conditions Level of Service and delay values.

The signalized intersection of Route 37 and Commonwealth Boulevard is calculated to operate at overall Level of Service C or better during the peak hours studied. The approaches of the stop-controlled T-intersection of Commonwealth Boulevard and Hillside Drive are calculated to operate generally consistent with the findings of the No-Build Condition at Level of Service B or better during the peak hours studied. The approaches of the stop-controlled intersection of 10th Avenue and Hillside Drive are calculated to operate at Level of Service B or better during the peak hours studied.

The approaches of the proposed two-way stop-controlled intersection of the access roadway, jughandle, and egress driveway are calculated to operate at Level of Service B or better during the peak hours studied. The approaches of the proposed two-way stop-controlled intersection of the access roadway, convenience market driveway, and retail driveway are calculated to operate at Level of Service A during the peak hours studied.

The approach at the westerly proposed driveway along Route 37 is calculated to operate at Level of Service C or better during the peak hours studied. The approach at the easterly proposed driveway along Route 37 is calculated to operate at Level of Service C during the peak hours studied. The calculated 95th percentile queue length of approximately one (1) vehicle at the westerly proposed driveway and two (2) vehicles at the easterly proposed driveway during the peak hours can be accommodated within the proposed throat depths.

SITE CIRCULATION

A review was conducted of the proposed mixed-use development using the Site Plan prepared by FWH Associates, dated 8/10/2018. In completing this review, particular attention was focused on the site access, circulation, and parking supply.

Access is proposed via two (2) right-in/right-out driveways along Route 37 and a central access roadway that intersects the existing Route 37 eastbound jughandle. The proposed convenience market would be located on the easterly side of the central access roadway with access proposed via one (1) egress-only driveway located north of the Route 37 eastbound jughandle and one (1) full-movement driveway located south of the Route 37 eastbound jughandle. Further, the proposed convenience market would have access to Route 37 via

one (1) right-in/right-out driveway located east of the Route 37 and Commonwealth Boulevard intersection. The proposed retail uses would be located on the westerly side of the central access roadway with access proposed via one (1) full-movement driveway located across from the full-movement driveway of the convenience market. Further, the proposed retail uses would have access to Route 37 via one (1) right-in/right-out driveway located west of the Route 37 and Commonwealth Boulevard intersection.

The proposed parking field for the convenience market would be located along the easterly, northerly, and southerly sides of the building with the fueling station located north of the building along the Route 37 frontage. The trash enclosure would be provided at the southeast corner of the site. The proposed parking field for the retail uses would be located predominately to the west and north of both buildings. Circulation throughout the residential area of the site would be facilitated via six (6) two-way access roadways.

CONCLUSIONS

This report was prepared to examine the potential traffic impact of the proposed mixed-use development consisting of 216 residential units, 5,525-square-foot convenience market with gas pumps, and 29,875 square feet of commercial space. The analysis findings, which have been based on industry-standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network. The site driveways and on-site layout have been designed to provide for effective access to and from the subject property and the parking supply would be sufficient to support this project.

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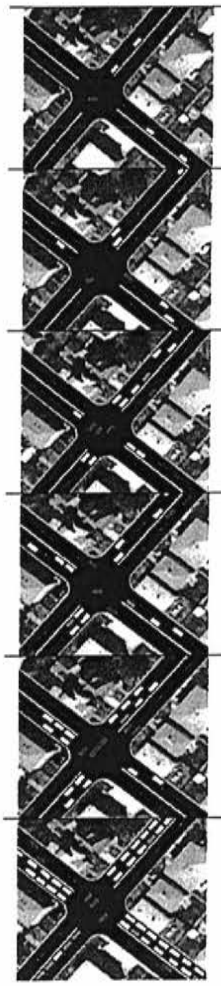
TECHNICAL APPENDIX

LEVEL OF SERVICE/AVERAGE CONTROL DELAY CRITERIA

LEVEL OF SERVICE /AVERAGE CONTROL DELAY CRITERIA

The ability of a roadway to effectively accommodate traffic demand is determined through an assessment of the volume-to-capacity ratio, delay and Level of Service of the lane group and/or intersection. The volume-to-capacity ratio is the ratio of traffic flow rate to capacity for a given transportation facility. As defined within the Highway Capacity Manual 2010 (HCM 2010), intersection delay is the total additional travel time experienced by drivers, passengers, or pedestrians as a result of control measures and interaction with other users of the facility, divided by the volume departing from the corresponding cross section of the facility. Level of service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

For an unsignalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay less than 10 seconds per vehicle and LOS F denotes operations with delay in excess of 80 seconds per vehicle.



Level Of Service (LOS)	Signalized Delay Range (average control delay in sec/veh)	Unsignalized Delay Range (average control delay in sec/veh)
A	<=10	<=10
B	>10 and <=20	>10 and <=15
C	>20 and <=35	>15 and <=25
D	>35 and <=55	>25 and <=35
E	>55 and <=80	>35 and <=50
F	>80	>50

Source: Highway Capacity Manual 2010

STONEFIELD

Table A1: Comparative Level of Service (Delay) Table

Route 37, Manchester, Ocean County, New Jersey

X (n) = Level of Service (seconds of delay)

		2018 Existing Condition			2020 No-Build Condition			2020 Build Condition		
Intersection	**Lane Group**	**AM Peak LOS (Delay)**	**PM Peak LOS (Delay)**	**SAT Peak LOS (Delay)**	**AM Peak LOS (Delay)**	**PM Peak LOS (Delay)**	**SAT Peak LOS (Delay)**	**AM Peak LOS (Delay)**	**PM Peak LOS (Delay)**	**SAT Peak LOS (Delay)**
Route 37 (E/W) & Commonwealth Boulevard (N/S)	EB Through	D (35.3)	C (30.7)	C (32.5)	C (34.8)	C (27.9)	C (29.1)	B (15.4)	C (22.4)	B (19.7)
	WB Through	D (38.8)	C (29.8)	C (30.4)	D (35.7)	C (28.2)	C (27.2)	B (15.4)	C (21.7)	B (17.5)
	NB Left	C (29.6)	C (23.4)	C (20.7)	C (23.4)	C (26.8)	C (24.4)	C (27.8)	C (33.2)	C (28.9)
	NB Through/Right	C (30.7)	C (25.2)	C (22.2)	C (24.3)	C (29.1)	C (26.3)	--	--	--
	NB Left/Through	--	--	--	--	--	--	D (36.5)	E (67.7)	D (49.7)
	NB Right (B)	--	--	--	--	--	--	C (25.2)	C (30.2)	C (26.5)
	SB Left	B (11.3)	C (20.3)	B (17.0)	B (12.9)	C (23.4)	C (20.5)	--	--	--
	SB Left/Through	--	--	--	--	--	--	C (30.5)	E (56.6)	D (48.2)
	SB Right	B (10.5)	B (18.5)	B (16.8)	B (11.9)	C (21.3)	C (20.3)	C (20.9)	C (28.7)	C (26.9)
	Overall	**C (33.1)**	**C (28.5)**	**C (29.1)**	**C (31.7)**	**C (27.4)**	**C (27.2)**	**B (18.4)**	**C (28.6)**	**C (23.5)**
Jughandle (E)/Egress Driveway (W) & Access Roadway (N/S)	EB Left	--	--	--	--	--	--	A (9.6)	B (10.8)	B (10.6)
	EB Right	--	--	--	--	--	--	A (8.5)	A (8.7)	A (8.7)
	WB Right	--	--	--	--	--	--	A (8.6)	A (8.6)	A (8.6)
Retail Driveway (E)/Market Driveway (W) & Access Roadway (N/S)	NB Left	--	--	--	--	--	--	A (0.0)	A (0.0)	A (0.0)
	SB Left	--	--	--	--	--	--	A (7.4)	A (7.3)	A (7.3)
	EB Left/Through/Right	--	--	--	--	--	--	A (9.4)	A (9.6)	A (9.6)
	WB Left/Through/Right	--	--	--	--	--	--	A (8.5)	A (8.4)	A (8.4)
Route 37 (E/W) & Westerly Driveway (N)	NB Right	--	--	--	--	--	--	B (12.2)	C (17.0)	C (16.1)
Route 37 (E/W) & Easterly Driveway (N)	NB Right	--	--	--	--	--	--	C (19.0)	C (24.1)	C (20.9)
Hillside Drive (E/W) & Route 37 westbound off-ramp (N)/10th Avenue (S)	EB Left/Through	A (7.2)	A (7.2)	A (7.2)	A (7.2)	A (7.2)	A (7.2)	A (7.2)	A (7.2)	A (7.2)
	NB Left/Through	A (9.0)	A (9.4)	A (9.1)	A (9.0)	A (9.5)	A (9.1)	A (9.2)	B (10.0)	A (9.5)
	NB Right	A (8.3)	A (8.4)	A (0.0)	A (8.3)	A (8.4)	A (0.0)	A (8.3)	A (8.4)	A (0.0)
	SB Left/Right	A (8.4)	A (8.4)	A (8.4)	A (8.4)	A (8.4)	A (8.4)	A (8.4)	A (8.4)	A (8.4)
Hillside Drive (W) & Commonwealth Boulevard (N/S)	WB Left/Right	B (10.7)	B (12.4)	B (11.1)	B (10.8)	B (12.7)	B (11.3)	B (11.4)	B (14.8)	B (12.8)
	SB Left/Through	A (7.3)	A (7.6)	A (7.5)	A (7.4)	A (7.6)	A (7.5)	A (7.4)	A (7.7)	A (7.6)

TURNING MOVEMENT COUNT DATA

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070
201.340.4468 t. 201.340.4472 f.

Intersection of Route 37 (E/W)
and Commonwealth Boulevard (N/S)
Manchester, Ocean County, New Jersey
Wednesday, June 27, 2018

File Name : S-17003.01
Site Code : 00017003
Start Date : 6/27/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Route 37 Eastbound					Route 37 Westbound					Jug Handle Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
07:00 AM	0	122	0	0	122	0	226	1	0	227	0	8	0	0	8	23	0	7	11	41	398
07:15 AM	0	119	0	0	119	0	244	0	0	244	3	13	0	0	16	23	0	7	21	51	430
07:30 AM	0	148	0	0	148	0	237	0	0	237	2	15	0	0	17	31	0	6	17	54	456
07:45 AM	0	163	0	0	163	0	196	0	0	196	3	8	0	1	12	33	0	9	29	71	442
Total	0	552	0	0	552	0	903	1	0	904	8	44	0	1	53	110	0	29	78	217	1726
08:00 AM	0	178	0	0	178	0	208	0	0	208	3	16	0	0	19	43	0	9	23	75	480
08:15 AM	1	174	0	0	175	0	206	0	0	206	4	6	1	0	11	31	0	7	27	65	457
08:30 AM	0	190	0	0	190	0	240	0	0	240	0	13	0	0	13	34	0	7	16	57	500
08:45 AM	0	192	0	0	192	0	181	0	0	181	6	15	0	0	21	41	0	6	13	60	454
Total	1	734	0	0	735	0	835	0	0	835	13	50	1	0	64	149	0	29	79	257	1891
*** BREAK ***																					
04:00 PM	0	289	1	0	290	0	273	1	0	274	10	42	0	0	52	54	0	16	24	94	710
04:15 PM	0	245	0	0	245	0	257	2	0	259	11	34	0	0	45	51	0	18	25	94	643
04:30 PM	0	281	0	0	281	0	246	1	0	247	10	38	0	0	48	37	0	11	31	79	655
04:45 PM	0	256	0	0	256	0	257	0	0	257	11	35	0	0	46	42	0	5	21	68	627
Total	0	1071	1	0	1072	0	1033	4	0	1037	42	149	0	0	191	184	0	50	101	335	2635
05:00 PM	0	263	0	0	263	0	249	0	0	249	6	42	0	0	48	31	1	12	23	67	627
05:15 PM	0	258	0	0	258	0	265	0	0	265	6	43	0	0	49	70	0	13	19	102	674
05:30 PM	0	224	0	0	224	0	254	0	0	254	10	34	1	0	45	39	0	10	23	72	595
05:45 PM	0	213	0	0	213	0	202	0	0	202	12	45	0	0	57	46	0	21	19	86	558
Total	0	958	0	0	958	0	970	0	0	970	34	164	1	0	199	186	1	56	84	327	2454
06:00 PM	0	210	0	0	210	0	216	0	0	216	7	34	1	0	42	39	0	14	12	65	533
06:15 PM	0	210	0	0	210	0	198	2	0	200	7	34	0	0	41	37	0	7	23	67	518
06:30 PM	0	182	0	0	182	0	174	1	0	175	7	47	0	0	54	29	0	8	24	61	472
06:45 PM	0	136	0	0	136	0	149	0	1	150	11	28	0	0	39	31	0	10	15	56	381
Total	0	738	0	0	738	0	737	3	1	741	32	143	1	0	176	136	0	39	74	249	1904
Grand Total	1	4053	1	0	4055	0	4478	8	1	4487	129	550	3	1	683	765	1	203	416	1385	10610
Apprch %	0	100	0	0		0	99.8	0.2	0		18.9	80.5	0.4	0.1		55.2	0.1	14.7	30		
Total %	0	38.2	0	0	38.2	0	42.2	0.1	0	42.3	1.2	5.2	0	0	6.4	7.2	0	1.9	3.9	13.1	
Auto	1	3987	1	0	3989	0	4410	8	1	4419	128	547	3	1	679	760	1	203	411	1375	10462
% Auto	100	98.4	100	0	98.4	0	98.5	100	100	98.5	99.2	99.5	100	100	99.4	99.3	100	100	98.8	99.3	98.6
HV	0	62	0	0	62	0	65	0	0	65	1	0	0	0	1	5	0	0	1	6	134
% HV	0	1.5	0	0	1.5	0	1.5	0	0	1.4	0.8	0	0	0	0.1	0.7	0	0	0.2	0.4	1.3
B/SB	0	4	0	0	4	0	3	0	0	3	0	3	0	0	3	0	0	0	4	4	14
% B/SB	0	0.1	0	0	0.1	0	0.1	0	0	0.1	0	0.5	0	0	0.4	0	0	0	1	0.3	0.1

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070
201.340.4468 t. 201.340.4472 f.

Intersection of Route 37 (E/W)
and Commonwealth Boulevard (N/S)
Manchester, Ocean County, New Jersey
Wednesday, June 27, 2018

File Name : S-17003.01
Site Code : 00017003
Start Date : 6/27/2018
Page No : 2

	Route 37 Eastbound					Route 37 Westbound					Jug Handle Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	178	0	0	178	0	208	0	0	208	3	16	0	0	19	43	0	9	23	75	480
08:15 AM	1	174	0	0	175	0	206	0	0	206	4	6	1	0	11	31	0	7	27	65	457
08:30 AM	0	190	0	0	190	0	240	0	0	240	0	13	0	0	13	34	0	7	16	57	500
08:45 AM	0	192	0	0	192	0	181	0	0	181	6	15	0	0	21	41	0	6	13	60	454
Total Volume	1	734	0	0	735	0	835	0	0	835	13	50	1	0	64	149	0	29	79	257	1891
% App. Total	0.1	99.9	0	0		0	100	0	0		20.3	78.1	1.6	0		58	0	11.3	30.7		
PHF	.250	.956	.000	.000	.957	.000	.870	.000	.000	.870	.542	.781	.250	.000	.762	.866	.000	.806	.731	.857	.946
Auto	1	721	0	0	722	0	812	0	0	812	13	48	1	0	62	147	0	29	75	251	1847
% Auto	100	98.2	0	0	98.2	0	97.2	0	0	97.2	100	96.0	100	0	96.9	98.7	0	100	94.9	97.7	97.7
HV	0	13	0	0	13	0	23	0	0	23	0	0	0	0	0	2	0	0	0	2	38
% HV	0	1.8	0	0	1.8	0	2.8	0	0	2.8	0	0	0	0	0	1.3	0	0	0	0.8	2.0
B/SB	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	4	4	6
% B/SB	0	0	0	0	0	0	0	0	0	0	0	4.0	0	0	3.1	0	0	0	5.1	1.6	0.3
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	289	1	0	290	0	273	1	0	274	10	42	0	0	52	54	0	16	24	94	710
04:15 PM	0	245	0	0	245	0	257	2	0	259	11	34	0	0	45	51	0	18	25	94	643
04:30 PM	0	281	0	0	281	0	246	1	0	247	10	38	0	0	48	37	0	11	31	79	655
04:45 PM	0	256	0	0	256	0	257	0	0	257	11	35	0	0	46	42	0	5	21	68	627
Total Volume	0	1071	1	0	1072	0	1033	4	0	1037	42	149	0	0	191	184	0	50	101	335	2635
% App. Total	0	99.9	0.1	0		0	99.6	0.4	0		22	78	0	0		54.9	0	14.9	30.1		
PHF	.000	.926	.250	.000	.924	.000	.946	.500	.000	.946	.955	.887	.000	.000	.918	.852	.000	.694	.815	.891	.928
Auto	0	1057	1	0	1058	0	1020	4	0	1024	41	149	0	0	190	182	0	50	100	332	2604
% Auto	0	98.7	100	0	98.7	0	98.7	100	0	98.7	97.6	100	0	0	99.5	98.9	0	100	99.0	99.1	98.8
HV	0	13	0	0	13	0	12	0	0	12	1	0	0	0	1	2	0	0	1	3	29
% HV	0	1.2	0	0	1.2	0	1.2	0	0	1.2	2.4	0	0	0	0.5	1.1	0	0	1.0	0.9	1.1
B/SB	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
% B/SB	0	0.1	0	0	0.1	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070
201.340.4468 t. 201.340.4472 f.

Intersection of Hillside Drive (W)
and Commonwealth Boulevard (N/S)
Manchester, Ocean County, New Jersey
Wednesday, June 27, 2018

File Name : S-17003.02
Site Code : 00017003
Start Date : 6/27/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Eastbound					Hillside Drive Westbound					Commonwealth Boulevard Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
08:00 AM	0	0	0	0	0	12	0	2	0	14	0	18	1	0	19	1	64	0	0	65	98
08:15 AM	0	0	0	0	0	19	0	5	0	24	0	13	0	0	13	0	53	0	0	53	90
08:30 AM	0	0	0	0	0	17	0	2	0	19	0	15	0	0	15	1	50	0	0	51	85
08:45 AM	0	0	0	0	0	19	0	5	0	24	0	23	2	0	25	1	45	0	0	46	95
Total	0	0	0	0	0	67	0	14	0	81	0	69	3	0	72	3	212	0	0	215	368
*** BREAK ***																					
04:00 PM	0	0	0	0	0	21	0	6	0	27	0	44	4	0	48	1	70	0	0	71	146
04:15 PM	0	0	0	0	0	23	0	11	0	34	0	36	7	0	43	0	71	0	0	71	148
04:30 PM	0	0	0	0	0	17	0	5	0	22	0	36	0	0	36	1	59	0	0	60	118
04:45 PM	0	0	0	0	0	20	0	7	0	27	0	34	3	0	37	1	50	0	0	51	115
Total	0	0	0	0	0	81	0	29	0	110	0	150	14	0	164	3	250	0	0	253	527
Grand Total	0	0	0	0	0	148	0	43	0	191	0	219	17	0	236	6	462	0	0	468	895
Apprch %	0	0	0	0		77.5	0	22.5	0		0	92.8	7.2	0		1.3	98.7	0	0		
Total %	0	0	0	0	0	16.5	0	4.8	0	21.3	0	24.5	1.9	0	26.4	0.7	51.6	0	0	52.3	
Auto	0	0	0	0	0	146	0	42	0	188	0	217	17	0	234	6	456	0	0	462	884
% Auto	0	0	0	0	0	98.6	0	97.7	0	98.4	0	99.1	100	0	99.2	100	98.7	0	0	98.7	98.8
HV	0	0	0	0	0	2	0	1	0	3	0	0	0	0	0	0	1	0	0	1	4
% HV	0	0	0	0	0	1.4	0	2.3	0	1.6	0	0	0	0	0	0	0.2	0	0	0.2	0.4
B/SB	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	5	0	0	5	7
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0.9	0	0	0.8	0	1.1	0	0	1.1	0.8

	Eastbound					Hillside Drive Westbound					Commonwealth Boulevard Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	12	0	2	0	14	0	18	1	0	19	1	64	0	0	65	98
08:15 AM	0	0	0	0	0	19	0	5	0	24	0	13	0	0	13	0	53	0	0	53	90
08:30 AM	0	0	0	0	0	17	0	2	0	19	0	15	0	0	15	1	50	0	0	51	85
08:45 AM	0	0	0	0	0	19	0	5	0	24	0	23	2	0	25	1	45	0	0	46	95
Total Volume	0	0	0	0	0	67	0	14	0	81	0	69	3	0	72	3	212	0	0	215	368
% App. Total	0	0	0	0		82.7	0	17.3	0		0	95.8	4.2	0		1.4	98.6	0	0		
PHF	.000	.000	.000	.000	.000	.882	.000	.700	.000	.844	.000	.750	.375	.000	.720	.750	.828	.000	.000	.827	.939
Auto	0	0	0	0	0	66	0	14	0	80	0	67	3	0	70	3	206	0	0	209	359
% Auto	0	0	0	0	0	98.5	0	100	0	98.8	0	97.1	100	0	97.2	100	97.2	0	0	97.2	97.6
HV	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	2
% HV	0	0	0	0	0	1.5	0	0	0	1.2	0	0	0	0	0	0	0.5	0	0	0.5	0.5
B/SB	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	5	0	0	5	7
% B/SB	0	0	0	0	0	0	0	0	0	0	0	2.9	0	0	2.8	0	2.4	0	0	2.3	1.9

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070
201.340.4468 t. 201.340.4472 f.

Intersection of Hillside Drive (W)
and Commonwealth Boulevard (N/S)
Manchester, Ocean County, New Jersey
Wednesday, June 27, 2018

File Name : S-17003.02
Site Code : 00017003
Start Date : 6/27/2018
Page No : 2

	Eastbound					Hillside Drive Westbound					Commonwealth Boulevard Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	0	0	0	0	21	0	6	0	27	0	44	4	0	48	1	70	0	0	71	146
04:15 PM	0	0	0	0	0	23	0	11	0	34	0	36	7	0	43	0	71	0	0	71	148
04:30 PM	0	0	0	0	0	17	0	5	0	22	0	36	0	0	36	1	59	0	0	60	118
04:45 PM	0	0	0	0	0	20	0	7	0	27	0	34	3	0	37	1	50	0	0	51	115
Total Volume	0	0	0	0	0	81	0	29	0	110	0	150	14	0	164	3	250	0	0	253	527
% App. Total	0	0	0	0		73.6	0	26.4	0		0	91.5	8.5	0		1.2	98.8	0	0		
PHF	.000	.000	.000	.000	.000	.880	.000	.659	.000	.809	.000	.852	.500	.000	.854	.750	.880	.000	.000	.891	.890
Auto	0	0	0	0	0	80	0	28	0	108	0	150	14	0	164	3	250	0	0	253	525
% Auto	0	0	0	0	0	98.8	0	96.6	0	98.2	0	100	100	0	100	100	100	0	0	100	99.6
HV	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	2
% HV	0	0	0	0	0	1.2	0	3.4	0	1.8	0	0	0	0	0	0	0	0	0	0	0.4
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070
201.340.4468 t. 201.340.4472 f.

Intersection of Hillside Drive (E/W)
and 10th Avenue (N/S)
Manchester, Ocean County, New Jersey
Wednesday, June 27, 2018

File Name : S-17003.03
Site Code : 00017003
Start Date : 6/27/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Hillside Drive Eastbound					Hillside Drive Westbound					Route 37 Westbound Off-Ramp Northbound					10th Avenue Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
08:00 AM	1	0	0	0	1	0	1	0	0	1	13	0	1	0	14	0	0	0	0	0	16
08:15 AM	0	0	0	0	0	0	5	0	0	5	19	0	2	0	21	0	0	0	0	0	26
08:30 AM	0	1	0	0	1	0	1	0	0	1	16	0	0	0	16	0	0	2	0	2	20
08:45 AM	0	3	0	0	3	0	6	0	0	6	17	0	0	0	17	0	0	1	0	1	27
Total	1	4	0	0	5	0	13	0	0	13	65	0	3	0	68	0	0	3	0	3	89
*** BREAK ***																					
04:00 PM	0	4	0	0	4	0	0	0	0	0	26	2	0	0	28	0	0	1	0	1	33
04:15 PM	2	5	0	0	7	0	4	0	0	4	27	2	1	0	30	0	0	3	0	3	44
04:30 PM	0	1	0	0	1	0	4	1	0	5	16	1	1	0	18	0	0	2	0	2	26
04:45 PM	0	3	0	0	3	0	1	0	0	1	25	1	0	0	26	0	0	1	0	1	31
Total	2	13	0	0	15	0	9	1	0	10	94	6	2	0	102	0	0	7	0	7	134
Grand Total	3	17	0	0	20	0	22	1	0	23	159	6	5	0	170	0	0	10	0	10	223
Apprch %	15	85	0	0		0	95.7	4.3	0		93.5	3.5	2.9	0		0	0	100	0		
Total %	1.3	7.6	0	0	9	0	9.9	0.4	0	10.3	71.3	2.7	2.2	0	76.2	0	0	4.5	0	4.5	
Auto	3	17	0	0	20	0	22	1	0	23	156	6	5	0	167	0	0	10	0	10	220
% Auto	100	100	0	0	100	0	100	100	0	100	98.1	100	100	0	98.2	0	0	100	0	100	98.7
HV	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	3
% HV	0	0	0	0	0	0	0	0	0	0	1.9	0	0	0	1.8	0	0	0	0	0	1.3
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Hillside Drive Eastbound					Hillside Drive Westbound					Route 37 Westbound Off-Ramp Northbound					10th Avenue Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	1	0	0	0	1	0	1	0	0	1	13	0	1	0	14	0	0	0	0	0	16
08:15 AM	0	0	0	0	0	0	5	0	0	5	19	0	2	0	21	0	0	0	0	0	26
08:30 AM	0	1	0	0	1	0	1	0	0	1	16	0	0	0	16	0	0	2	0	2	20
08:45 AM	0	3	0	0	3	0	6	0	0	6	17	0	0	0	17	0	0	1	0	1	27
Total Volume	1	4	0	0	5	0	13	0	0	13	65	0	3	0	68	0	0	3	0	3	89
% App. Total	20	80	0	0		0	100	0	0		95.6	0	4.4	0		0	0	100	0		
PHF	.250	.333	.000	.000	.417	.000	.542	.000	.000	.542	.855	.000	.375	.000	.810	.000	.000	.375	.000	.375	.824
Auto	1	4	0	0	5	0	13	0	0	13	64	0	3	0	67	0	0	3	0	3	88
% Auto	100	100	0	0	100	0	100	0	0	100	98.5	0	100	0	98.5	0	0	100	0	100	98.9
HV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
% HV	0	0	0	0	0	0	0	0	0	0	1.5	0	0	0	1.5	0	0	0	0	0	1.1
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070
201.340.4468 t. 201.340.4472 f.

Intersection of Hillside Drive (E/W)
and 10th Avenue (N/S)
Manchester, Ocean County, New Jersey
Wednesday, June 27, 2018

File Name : S-17003.03
Site Code : 00017003
Start Date : 6/27/2018
Page No : 2

	Hillside Drive Eastbound					Hillside Drive Westbound					Route 37 Westbound Off-Ramp Northbound					10th Avenue Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	4	0	0	4	0	0	0	0	0	26	2	0	0	28	0	0	1	0	1	33
04:15 PM	2	5	0	0	7	0	4	0	0	4	27	2	1	0	30	0	0	3	0	3	44
04:30 PM	0	1	0	0	1	0	4	1	0	5	16	1	1	0	18	0	0	2	0	2	26
04:45 PM	0	3	0	0	3	0	1	0	0	1	25	1	0	0	26	0	0	1	0	1	31
Total Volume	2	13	0	0	15	0	9	1	0	10	94	6	2	0	102	0	0	7	0	7	134
% App. Total	13.3	86.7	0	0		0	90	10	0		92.2	5.9	2	0		0	0	100	0		
PHF	.250	.650	.000	.000	.536	.000	.563	.250	.000	.500	.870	.750	.500	.000	.850	.000	.000	.583	.000	.583	.761
Auto	2	13	0	0	15	0	9	1	0	10	92	6	2	0	100	0	0	7	0	7	132
% Auto	100	100	0	0	100	0	100	100	0	100	97.9	100	100	0	98.0	0	0	100	0	100	98.5
HV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	2
% HV	0	0	0	0	0	0	0	0	0	0	2.1	0	0	0	2.0	0	0	0	0	0	1.5
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070
201.340.4468 t. 201.340.4472 f.

Intersection of Route 37 (E/W)
and Commonwealth Boulevard (N/S)
Manchester, Ocean County, New Jersey
Saturday, June 30, 2018

File Name : S-17003.01_sat
Site Code : 00017003
Start Date : 6/30/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Route 37 Eastbound					Route 37 Westbound					Jug Handle Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
11:00 AM	0	218	0	0	218	0	221	0	0	221	7	41	1	0	49	37	0	15	9	61	549
11:15 AM	0	222	1	0	223	0	241	0	0	241	9	30	0	0	39	27	0	19	5	51	554
11:30 AM	1	232	0	0	233	0	223	0	0	223	9	40	0	0	49	33	0	13	19	65	570
11:45 AM	0	269	0	0	269	0	224	0	0	224	9	31	0	0	40	31	0	15	29	75	608
Total	1	941	1	0	943	0	909	0	0	909	34	142	1	0	177	128	0	62	62	252	2281
12:00 PM	0	231	0	0	231	0	247	0	0	247	4	39	0	0	43	32	0	16	25	73	594
12:15 PM	0	254	0	0	254	0	220	0	0	220	9	28	0	0	37	26	0	13	19	58	569
12:30 PM	0	275	0	0	275	0	251	0	0	251	9	29	1	0	39	27	0	19	22	68	633
12:45 PM	0	231	0	0	231	0	202	0	0	202	2	39	0	0	41	36	0	6	15	57	531
Total	0	991	0	0	991	0	920	0	0	920	24	135	1	0	160	121	0	54	81	256	2327
01:00 PM	1	235	0	0	236	0	221	0	0	221	5	32	0	0	37	36	0	5	16	57	551
01:15 PM	0	249	0	0	249	0	228	0	0	228	5	46	0	0	51	27	0	10	12	49	577
01:30 PM	0	256	0	0	256	0	261	0	0	261	13	30	0	0	43	31	0	9	20	60	620
01:45 PM	0	264	0	0	264	0	246	0	0	246	6	37	0	0	43	18	0	14	19	51	604
Total	1	1004	0	0	1005	0	956	0	0	956	29	145	0	0	174	112	0	38	67	217	2352
Grand Total	2	2936	1	0	2939	0	2785	0	0	2785	87	422	2	0	511	361	0	154	210	725	6960
Apprch %	0.1	99.9	0	0		0	100	0	0		17	82.6	0.4	0		49.8	0	21.2	29		
Total %	0	42.2	0	0	42.2	0	40	0	0	40	1.2	6.1	0	0	7.3	5.2	0	2.2	3	10.4	
Auto	2	2927	1	0	2930	0	2778	0	0	2778	86	421	2	0	509	356	0	153	210	719	6936
% Auto	100	99.7	100	0	99.7	0	99.7	0	0	99.7	98.9	99.8	100	0	99.6	98.6	0	99.4	100	99.2	99.7
HV	0	7	0	0	7	0	7	0	0	7	1	1	0	0	2	5	0	1	0	6	22
% HV	0	0.2	0	0	0.2	0	0.3	0	0	0.3	1.1	0.2	0	0	0.4	1.4	0	0.6	0	0.8	0.3
B/SB	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% B/SB	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Route 37 Eastbound					Route 37 Westbound					Jug Handle Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	269	0	0	269	0	224	0	0	224	9	31	0	0	40	31	0	15	29	75	608
12:00 PM	0	231	0	0	231	0	247	0	0	247	4	39	0	0	43	32	0	16	25	73	594
12:15 PM	0	254	0	0	254	0	220	0	0	220	9	28	0	0	37	26	0	13	19	58	569
12:30 PM	0	275	0	0	275	0	251	0	0	251	9	29	1	0	39	27	0	19	22	68	633
Total Volume	0	1029	0	0	1029	0	942	0	0	942	31	127	1	0	159	116	0	63	95	274	2404
% App. Total	0	100	0	0		0	100	0	0		19.5	79.9	0.6	0		42.3	0	23	34.7		
PHF	.000	.935	.000	.000	.935	.000	.938	.000	.000	.938	.861	.814	.250	.000	.924	.906	.000	.829	.819	.913	.949
Auto	0	1023	0	0	1023	0	941	0	0	941	31	127	1	0	159	115	0	63	95	273	2396
% Auto	0	99.4	0	0	99.4	0	99.9	0	0	99.9	100	100	100	0	100	99.1	0	100	100	99.6	99.7
HV	0	5	0	0	5	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	7
% HV	0	0.5	0	0	0.5	0	0.1	0	0	0.1	0	0	0	0	0	0.9	0	0	0	0.4	0.3
B/SB	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% B/SB	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070
201.340.4468 t. 201.340.4472 f.

Intersection of Hillside Drive (W)
and Commonwealth Boulevard (N/S)
Manchester, Ocean County, New Jersey
Saturday, June 30, 2018

File Name : S-17003.02_sat
Site Code : 00017003
Start Date : 6/30/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Eastbound					Hillside Drive Westbound					Commonwealth Boulevard Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
11:45 AM	0	0	0	0	0	17	0	7	0	24	0	43	1	0	44	0	55	0	0	55	123
Total	0	0	0	0	0	17	0	7	0	24	0	43	1	0	44	0	55	0	0	55	123
12:00 PM	0	0	0	0	0	14	0	9	0	23	0	32	1	0	33	4	62	0	0	66	122
12:15 PM	0	0	0	0	0	12	0	7	0	19	0	28	2	0	30	2	54	0	0	56	105
12:30 PM	0	0	0	0	0	15	0	8	0	23	0	36	1	0	37	2	60	0	0	62	122
Grand Total	0	0	0	0	0	58	0	31	0	89	0	139	5	0	144	8	231	0	0	239	472
Apprch %	0	0	0	0		65.2	0	34.8	0		0	96.5	3.5	0		3.3	96.7	0	0		
Total %	0	0	0	0	0	12.3	0	6.6	0	18.9	0	29.4	1.1	0	30.5	1.7	48.9	0	0	50.6	
Auto	0	0	0	0	0	58	0	31	0	89	0	138	5	0	143	8	231	0	0	239	471
% Auto	0	0	0	0	0	100	0	100	0	100	0	99.3	100	0	99.3	100	100	0	0	100	99.8
HV	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% HV	0	0	0	0	0	0	0	0	0	0	0	0.7	0	0	0.7	0	0	0	0	0	0.2
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Eastbound					Hillside Drive Westbound					Commonwealth Boulevard Northbound					Commonwealth Boulevard Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	0	0	0	0	17	0	7	0	24	0	43	1	0	44	0	55	0	0	55	123
12:00 PM	0	0	0	0	0	14	0	9	0	23	0	32	1	0	33	4	62	0	0	66	122
12:15 PM	0	0	0	0	0	12	0	7	0	19	0	28	2	0	30	2	54	0	0	56	105
12:30 PM	0	0	0	0	0	15	0	8	0	23	0	36	1	0	37	2	60	0	0	62	122
Total Volume	0	0	0	0	0	58	0	31	0	89	0	139	5	0	144	8	231	0	0	239	472
% App. Total	0	0	0	0		65.2	0	34.8	0		0	96.5	3.5	0		3.3	96.7	0	0		
PHF	.000	.000	.000	.000	.000	.853	.000	.861	.000	.927	.000	.808	.625	.000	.818	.500	.931	.000	.000	.905	.959
Auto	0	0	0	0	0	58	0	31	0	89	0	138	5	0	143	8	231	0	0	239	471
% Auto	0	0	0	0	0	100	0	100	0	100	0	99.3	100	0	99.3	100	100	0	0	100	99.8
HV	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% HV	0	0	0	0	0	0	0	0	0	0	0	0.7	0	0	0.7	0	0	0	0	0	0.2
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Stonefield Engineering & Design, LLC

92 Park Avenue, Rutherford, NJ 07070
201.340.4468 t. 201.340.4472 f.

Intersection of Hillside Drive (E/W)
and 10th Avenue (N/S)
Manchester, Ocean County, New Jersey
Saturday, June 30, 2018

File Name : S-17003.03_sat
Site Code : 00017003
Start Date : 6/30/2018
Page No : 1

Groups Printed- Auto - HV - B/SB

	Hillside Drive Eastbound					Hillside Drive Westbound					Route 37 Westbound Off-Ramp Northbound					10th Avenue Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
11:45 AM	0	1	0	0	1	0	3	0	0	3	19	0	0	0	19	0	0	2	0	2	25
Total	0	1	0	0	1	0	3	0	0	3	19	0	0	0	19	0	0	2	0	2	25
12:00 PM	1	4	0	0	5	0	5	0	0	5	17	0	0	0	17	0	0	1	0	1	28
12:15 PM	1	2	0	0	3	0	3	0	0	3	14	1	0	0	15	0	0	2	0	2	23
12:30 PM	1	2	0	0	3	0	4	0	0	4	17	0	0	0	17	0	0	2	0	2	26
Grand Total	3	9	0	0	12	0	15	0	0	15	67	1	0	0	68	0	0	7	0	7	102
Apprch %	25	75	0	0		0	100	0	0		98.5	1.5	0	0		0	0	100	0		
Total %	2.9	8.8	0	0	11.8	0	14.7	0	0	14.7	65.7	1	0	0	66.7	0	0	6.9	0	6.9	
Auto	3	9	0	0	12	0	15	0	0	15	67	1	0	0	68	0	0	7	0	7	102
% Auto	100	100	0	0	100	0	100	0	0	100	100	100	0	0	100	0	0	100	0	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Hillside Drive Eastbound					Hillside Drive Westbound					Route 37 Westbound Off-Ramp Northbound					10th Avenue Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45 AM																					
11:45 AM	0	1	0	0	1	0	3	0	0	3	19	0	0	0	19	0	0	2	0	2	25
12:00 PM	1	4	0	0	5	0	5	0	0	5	17	0	0	0	17	0	0	1	0	1	28
12:15 PM	1	2	0	0	3	0	3	0	0	3	14	1	0	0	15	0	0	2	0	2	23
12:30 PM	1	2	0	0	3	0	4	0	0	4	17	0	0	0	17	0	0	2	0	2	26
Total Volume	3	9	0	0	12	0	15	0	0	15	67	1	0	0	68	0	0	7	0	7	102
% App. Total	25	75	0	0		0	100	0	0		98.5	1.5	0	0		0	0	100	0		
PHF	.750	.563	.000	.000	.600	.000	.750	.000	.000	.750	.882	.250	.000	.000	.895	.000	.000	.875	.000	.875	.911
Auto	3	9	0	0	12	0	15	0	0	15	67	1	0	0	68	0	0	7	0	7	102
% Auto	100	100	0	0	100	0	100	0	0	100	100	100	0	0	100	0	0	100	0	100	100
HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% HV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% B/SB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

INTERNAL CAPTURE SHEETS

Project Name:	Mixed-Use Development
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	247	247	1.00	240	240
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	20	20	1.00	58	58
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	70		31	0	34	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	1	12	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		79	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	20		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	42	0	0		0
Hotel	0	10	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	246	247	246	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	20	20	20	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	0	240	240	240	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	57	58	57	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Project Name:	Mixed-Use Development
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	305	305	1.00	314	314
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	58	58	1.00	37	37
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	6		91	13	82	16
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	1	16	8	0		1
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		24	0	0	2	0
Retail	0		0	0	27	0
Restaurant	0	153		0	9	0
Cinema/Entertainment	0	12	0		2	0
Residential	0	31	0	0		0
Hotel	0	6	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	16	289	305	289	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	27	31	58	31	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	27	287	314	287	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	16	21	37	21	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Project Name:	Mixed-Use Development
Analysis Period:	**Saturday Peak Hour**

Table 7-S: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-S (D): Entering Trips			Table 7-S (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	300	300	1.00	290	290
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	47	47	1.00	48	48
Hotel	1.00	0	0	1.00	0	0

Table 8-S (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	9		0	0	20	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	16	0	0		0
Hotel	0	0	0	0	0	

Table 8-S (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		12	0	0	0	0
Retail	0		0	0	17	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	15	0	0		0
Hotel	0	0	0	0	0	

Table 9-S (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	15	285	300	285	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	17	30	47	30	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-S (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	17	273	290	273	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	15	33	48	33	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

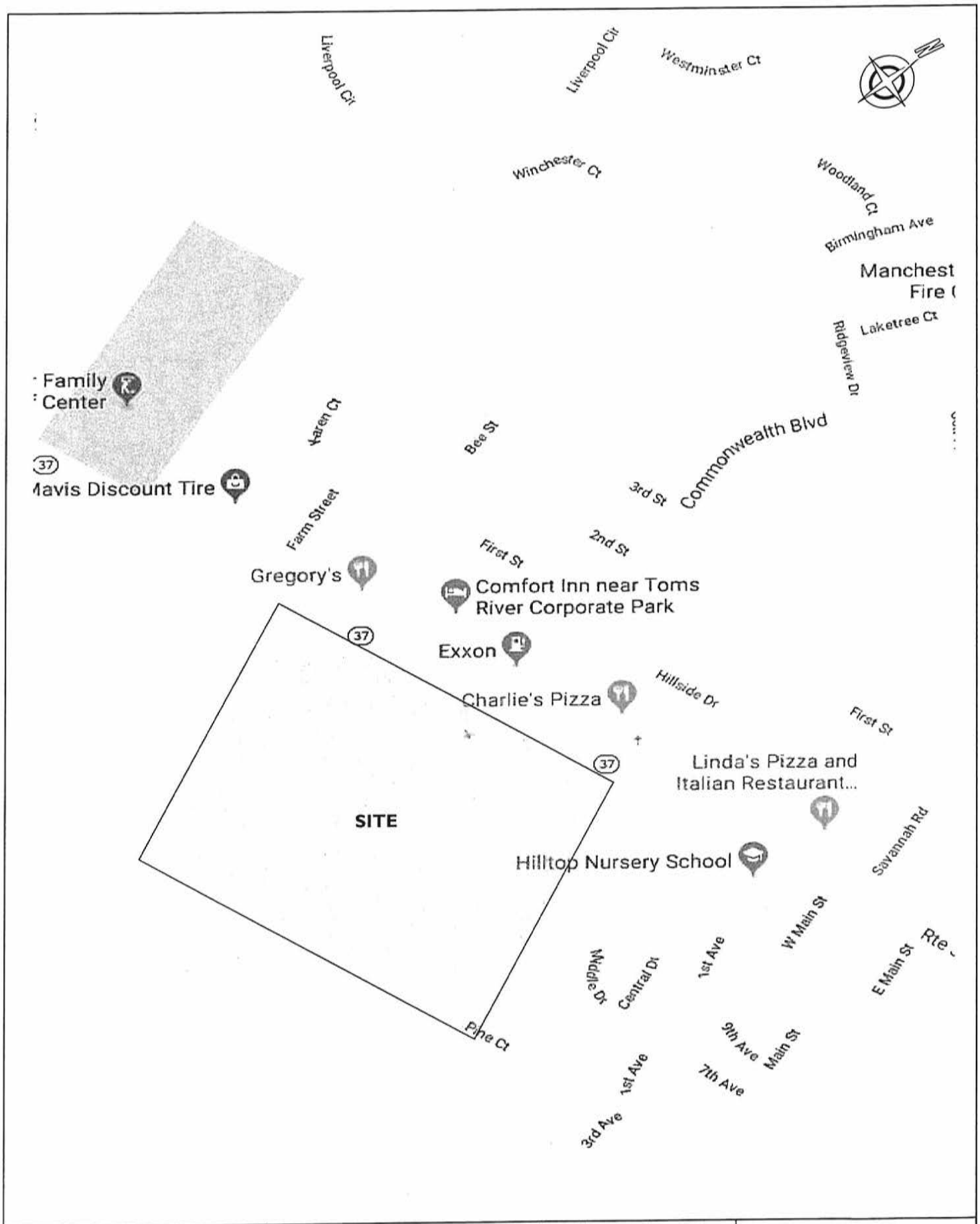
[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-S

[2]Person-Trips

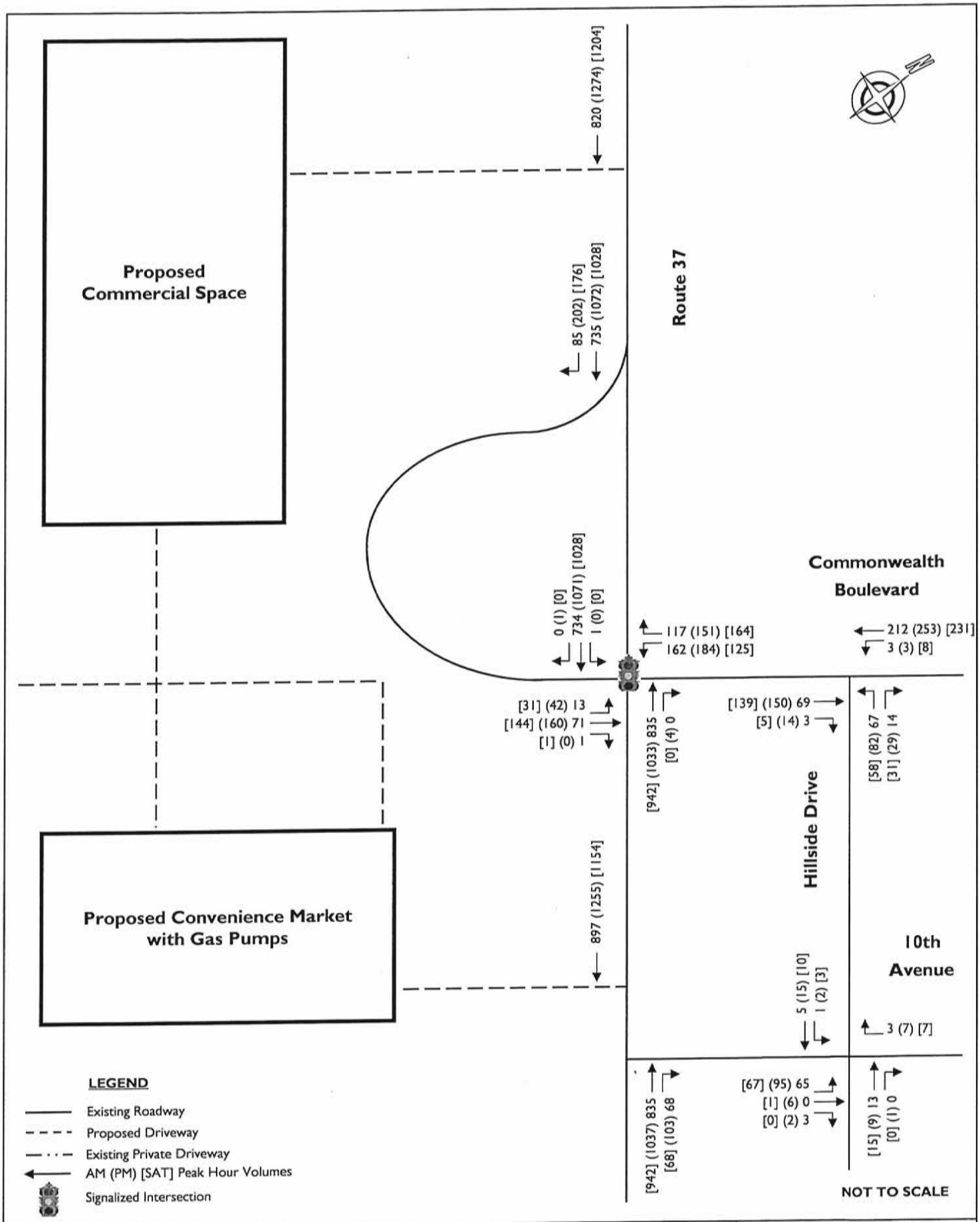
[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

FIGURES



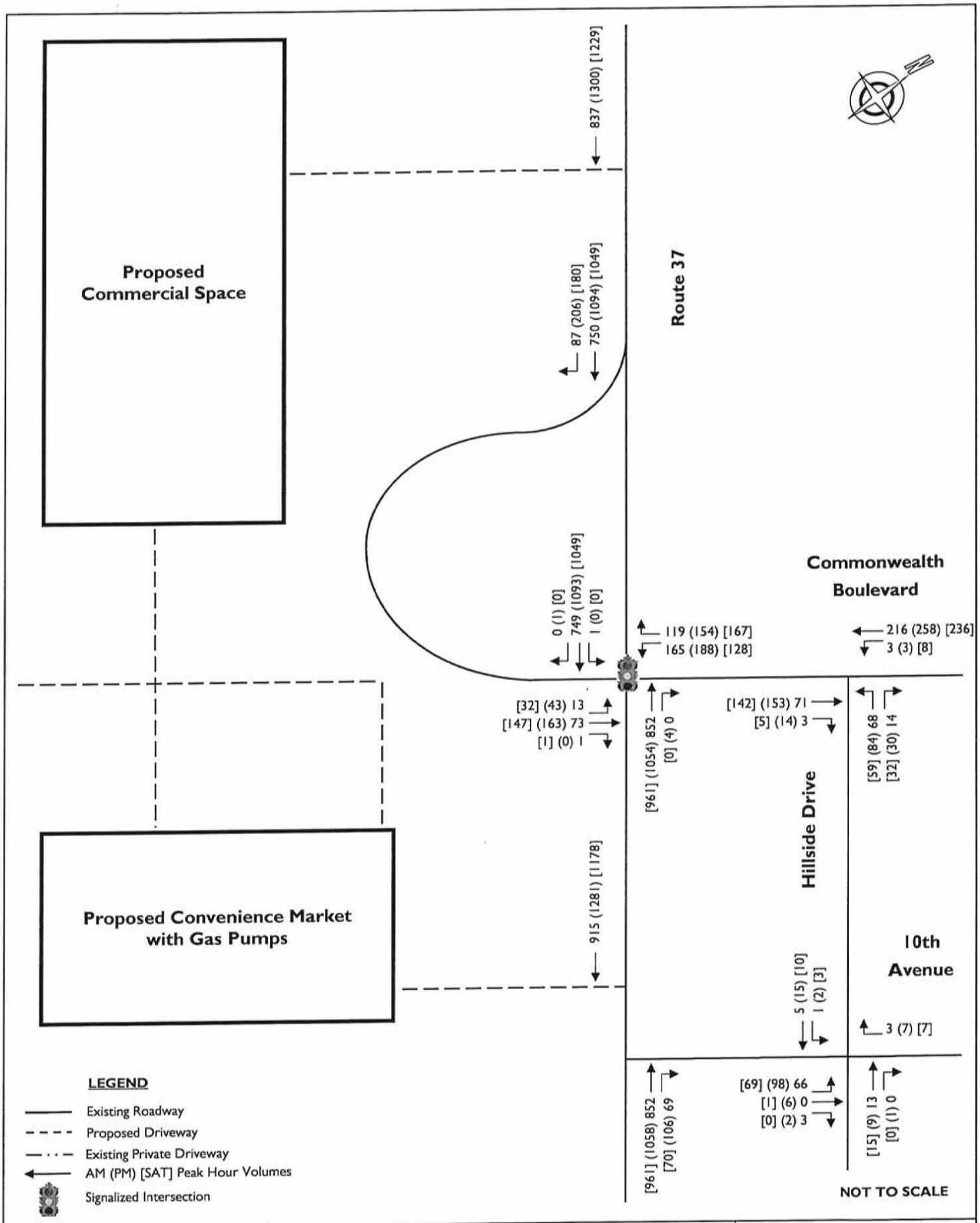
STONEFIELD	**Proposed Mixed-Use Development** **Route 37 & Commonwealth Boulevard** **Manchester, Ocean County, New Jersey** **Traffic Impact Study**	**FIGURE 1** **Site Location Map**



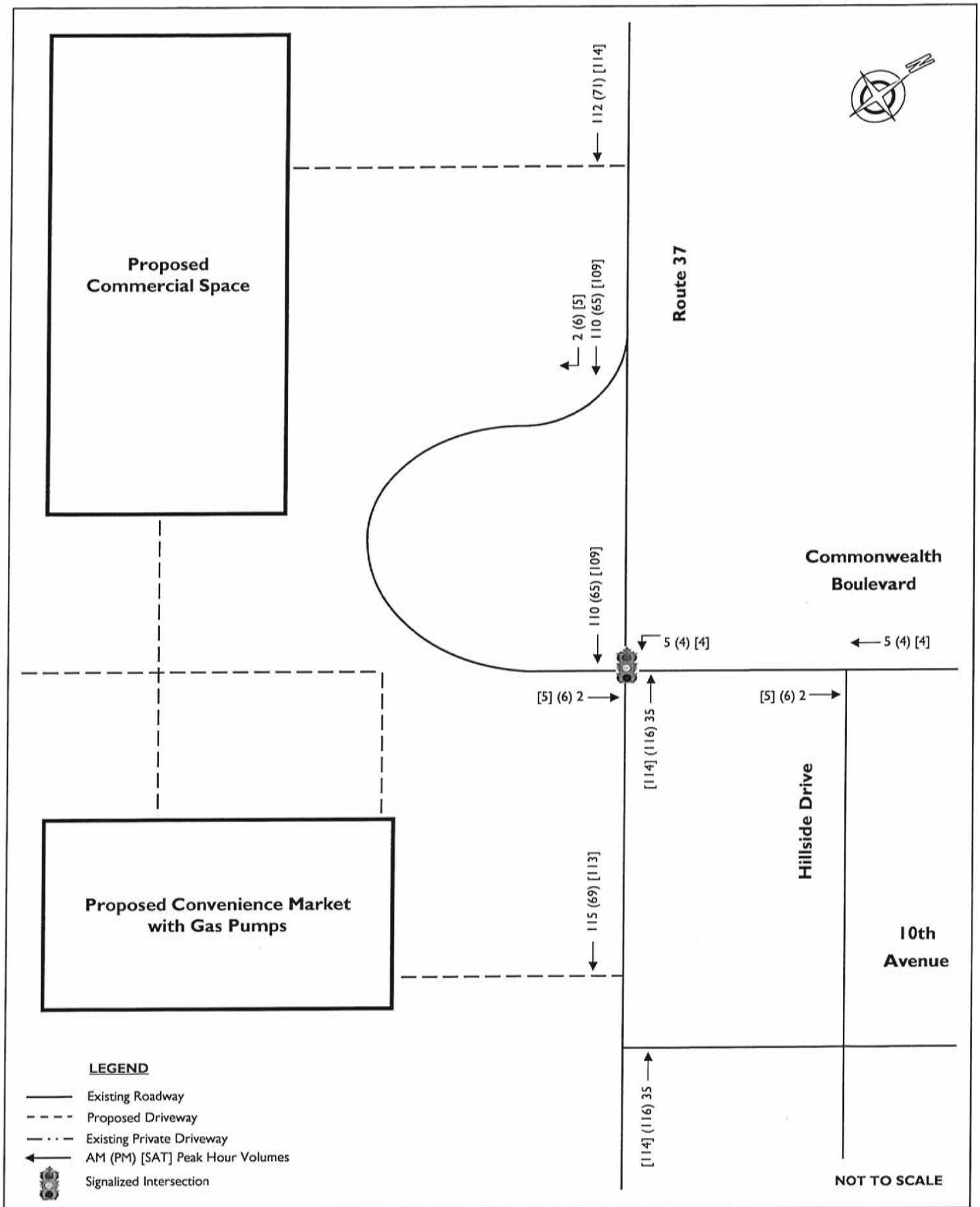
STONEFIELD

Proposed Mixed-Use Development
Route 37 & Commonwealth Boulevard
Manchester, Ocean County, New Jersey
Traffic Impact Study

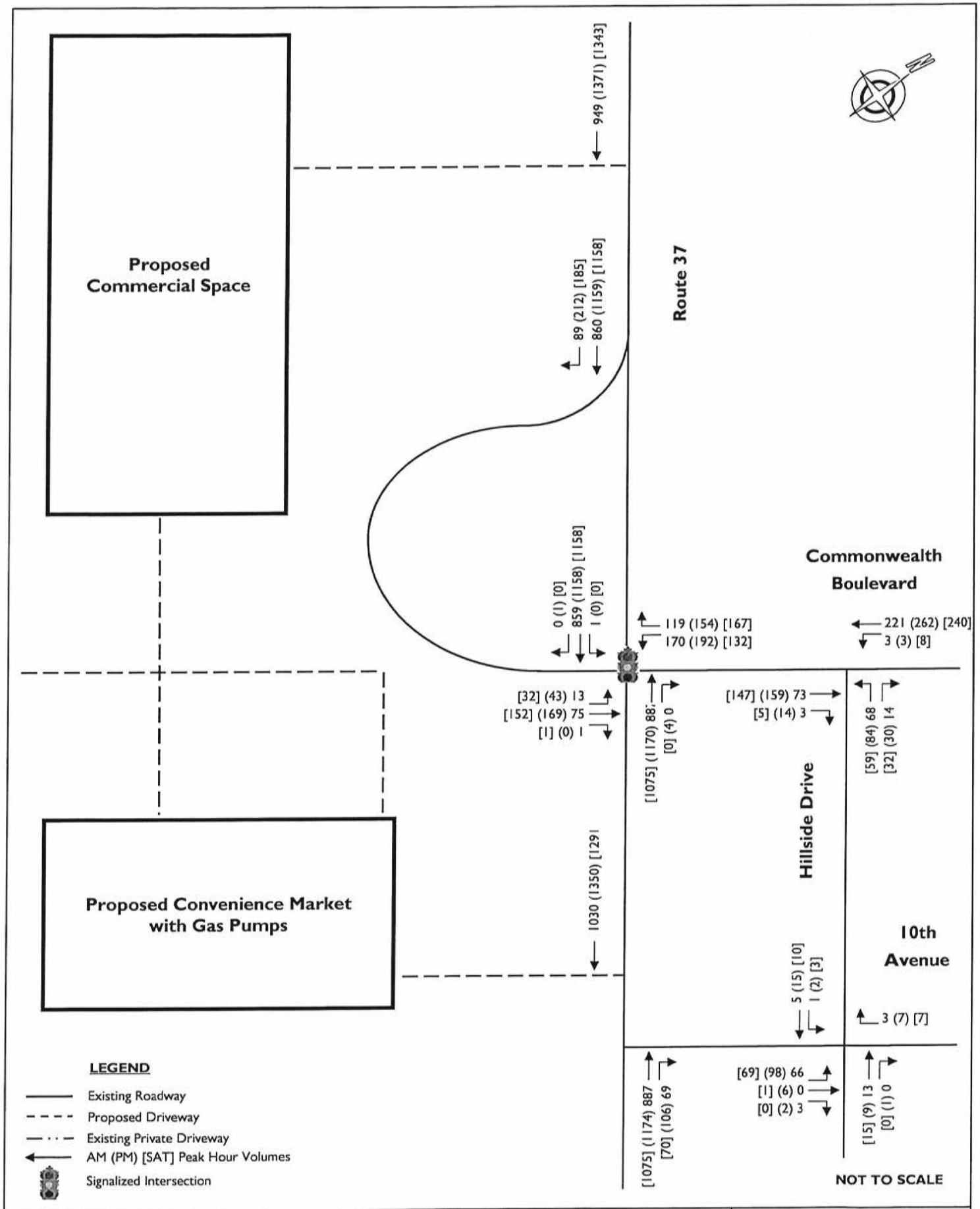
FIGURE 2
2018 Existing Traffic Volumes



STONEFIELD	Proposed Mixed-Use Development Route 37 & Commonwealth Boulevard Manchester, Ocean County, New Jersey Traffic Impact Study	FIGURE 3 2020 Base Traffic Volumes



STONEFIELD	Proposed Mixed-Use Development Route 37 & Commonwealth Boulevard Manchester, Ocean County, New Jersey Traffic Impact Study	FIGURE 4 Other Planned Projects Future Traffic Volumes



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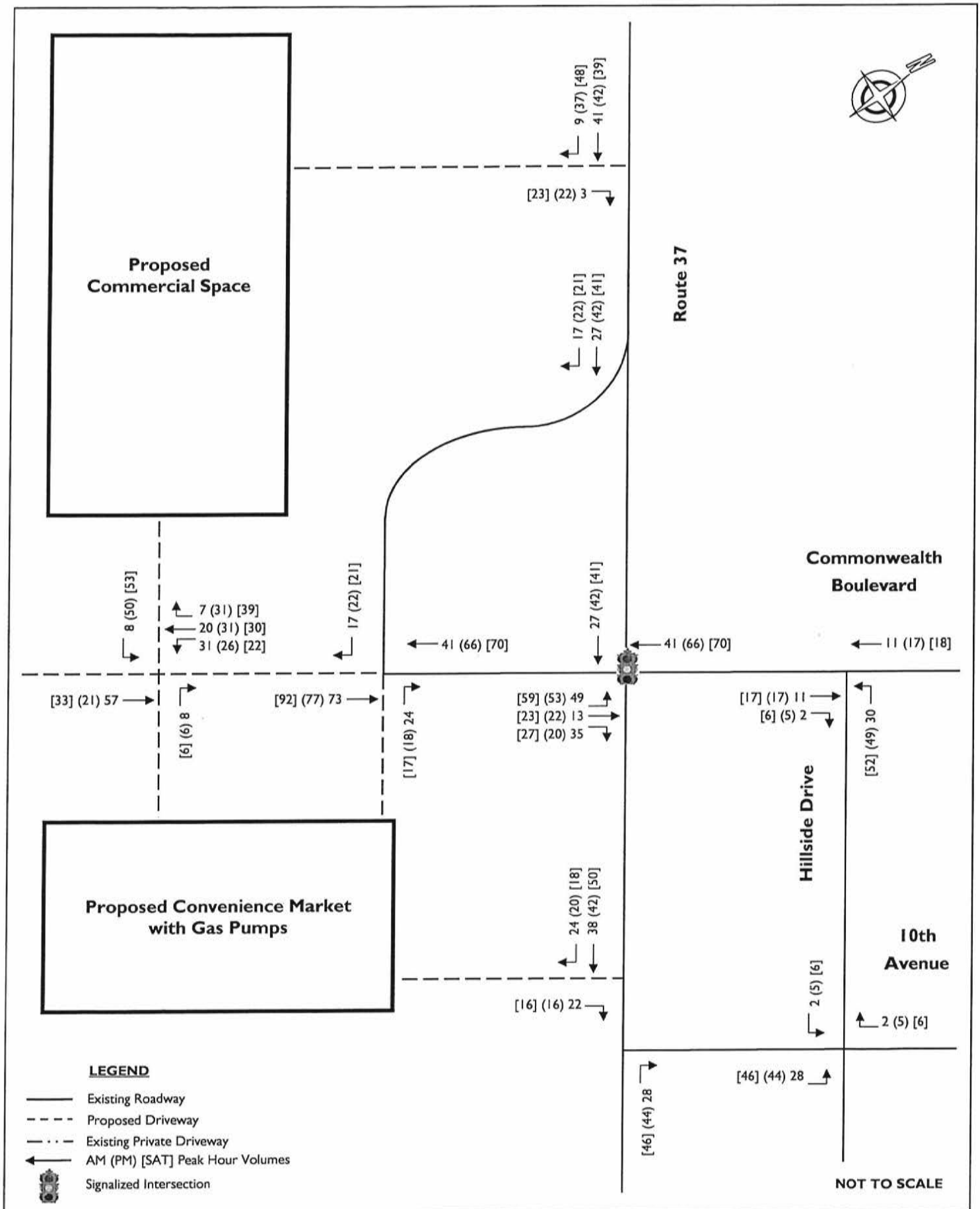
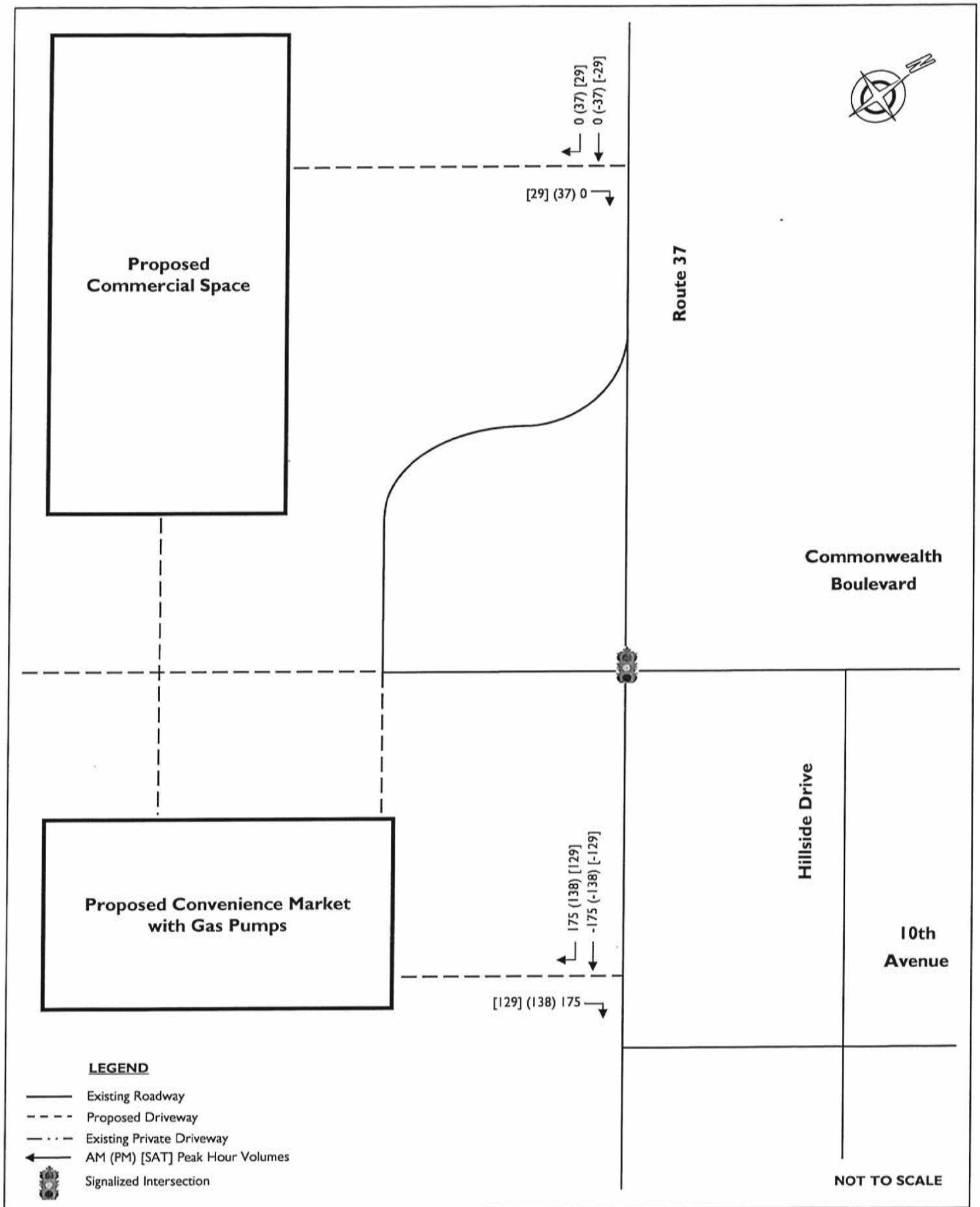
Proposed Mixed-Use Development
Route 37 & Commonwealth Boulevard
Manchester, Ocean County, New Jersey
Traffic Impact Study

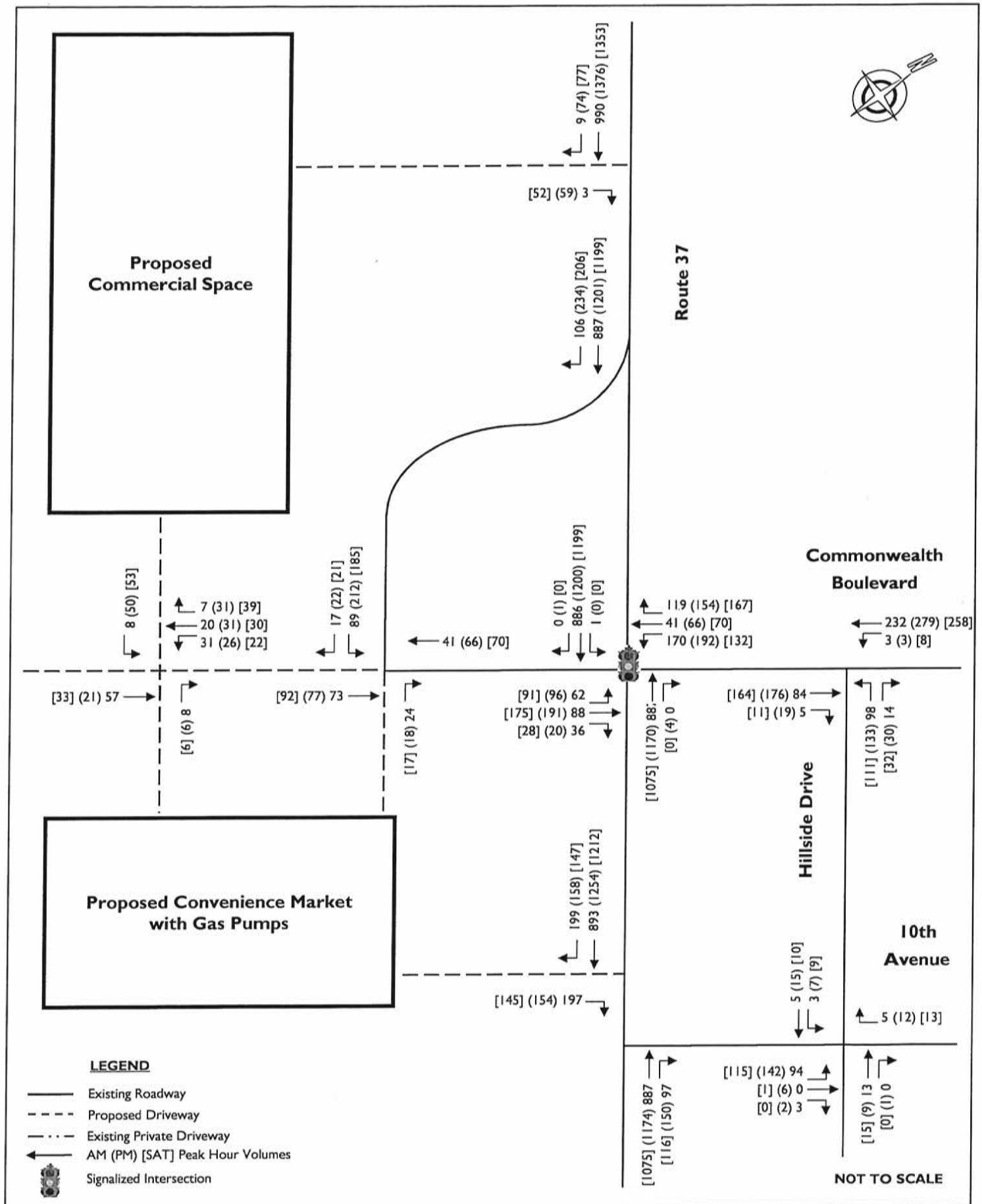
FIGURE 5
2020 No-Build Traffic Volumes



STONEFIELD	**Proposed Mixed-Use Development** **Route 37 & Commonwealth Boulevard** **Manchester, Ocean County, New Jersey** **Traffic Impact Study**	**FIGURE 6** **"New" Site-Generated Traffic Volumes**



STONEFIELD	Proposed Mixed-Use Development Route 37 & Commonwealth Boulevard Manchester, Ocean County, New Jersey Traffic Impact Study	FIGURE 7 "Pass-By" Site-Generated Traffic Volumes



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Proposed Mixed-Use Development
Route 37 & Commonwealth Boulevard
Manchester, Ocean County, New Jersey
Traffic Impact Study

FIGURE 8
2020 Build Traffic Volumes

CAPACITY ANALYSIS DETAIL SHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	734	0	0	835	0	13	71	1	162	0	117
Future Volume (vph)	0	734	0	0	835	0	13	71	1	162	0	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00		1.00
Frt		1.00			1.00		1.00	1.00		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3539			3539		1787	1896		1787		1615
Flt Permitted		1.00			1.00		0.95	1.00		0.64		1.00
Satd. Flow (perm)		3539			3539		1787	1896		1196		1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	773	0	0	879	0	14	75	1	171	0	123
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	54
Lane Group Flow (vph)	0	773	0	0	879	0	14	75	0	171	0	69
Heavy Vehicles (%)	0%	2%	2%	0%	2%	0%	1%	0%	0%	1%	0%	0%
Turn Type		NA			NA		Perm	NA		pm+pt		custom
Protected Phases		4			8			2		1		1
Permitted Phases							2			6		6
Actuated Green, G (s)		32.9			32.9		26.5	26.5		59.1		59.1
Effective Green, g (s)		32.9			32.9		26.5	26.5		59.1		59.1
Actuated g/C Ratio		0.31			0.31		0.25	0.25		0.56		0.56
Clearance Time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		1108			1108		451	478		839		909
v/s Ratio Prot		0.22			c0.25			0.04		c0.06		0.02
v/s Ratio Perm							0.01			c0.06		0.02
v/c Ratio		0.70			0.79		0.03	0.16		0.20		0.08
Uniform Delay, d1		31.7			32.9		29.6	30.6		11.1		10.5
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		3.7			5.9		0.0	0.2		0.1		0.0
Delay (s)		35.3			38.8		29.6	30.7		11.3		10.5
Level of Service		D			D		C	C		B		B
Approach Delay (s)		35.3			38.8			30.5			11.0	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	5	0	0	13	0	65	0	3	0	0	3
Future Vol, veh/h	1	5	0	0	13	0	65	0	3	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	1	6	0	0	16	0	79	0	4	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	-	-	-	0	26	24	6	26	24	16
Stage 1	-	-	-	-	-	-	8	8	-	16	16	-
Stage 2	-	-	-	-	-	-	18	16	-	10	8	-
Critical Hdwy	4.1	-	-	-	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1615	-	0	0	-	-	984	873	1083	990	873	1069
Stage 1	-	-	0	0	-	-	1013	893	-	1009	886	-
Stage 2	-	-	0	0	-	-	1001	886	-	1016	893	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1615	-	-	-	-	-	980	872	1083	986	872	1069
Mov Cap-2 Maneuver	-	-	-	-	-	-	980	872	-	986	872	-
Stage 1	-	-	-	-	-	-	1012	892	-	1008	886	-
Stage 2	-	-	-	-	-	-	998	886	-	1012	892	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0	9	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	980	1083	1615	-	-	-	1069
HCM Lane V/C Ratio	0.081	0.003	0.001	-	-	-	0.003
HCM Control Delay (s)	9	8.3	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	67	14	69	3	3	212
Future Vol, veh/h	67	14	69	3	3	212
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	0	0	0	0	1
Mvmt Flow	71	15	73	3	3	226

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	307	75	0	0	76	0
Stage 1	75	-	-	-	-	-
Stage 2	232	-	-	-	-	-
Critical Hdwy	6.42	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	685	992	-	-	1536	-
Stage 1	948	-	-	-	-	-
Stage 2	807	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	684	992	-	-	1536	-
Mov Cap-2 Maneuver	684	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	807	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	723	1536	-
HCM Lane V/C Ratio	-	-	0.119	0.002	-
HCM Control Delay (s)	-	-	10.7	7.3	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1071	0	0	1033	0	42	160	0	184	0	151
Future Volume (vph)	0	1071	0	0	1033	0	42	160	0	184	0	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00		1.00
Frt		1.00			1.00		1.00	1.00		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3574			3574		1770	1900		1787		1615
Flt Permitted		1.00			1.00		0.95	1.00		0.58		1.00
Satd. Flow (perm)		3574			3574		1770	1900		1096		1615
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	1152	0	0	1111	0	45	172	0	198	0	162
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	51
Lane Group Flow (vph)	0	1152	0	0	1111	0	45	172	0	198	0	111
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	2%	0%	0%	1%	0%	0%
Turn Type		NA			NA		Perm	NA		pm+pt		custom
Protected Phases		4			8			2		1		1
Permitted Phases							2			6		6
Actuated Green, G (s)		49.7			49.7		42.7	42.7		52.3		52.3
Effective Green, g (s)		49.7			49.7		42.7	42.7		52.3		52.3
Actuated g/C Ratio		0.43			0.43		0.37	0.37		0.45		0.45
Clearance Time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		1544			1544		657	705		538		734
v/s Ratio Prot		c0.32			0.31			0.09		c0.02		0.01
v/s Ratio Perm							0.03			c0.15		0.06
v/c Ratio		0.75			0.72		0.07	0.24		0.37		0.15
Uniform Delay, d1		27.4			26.9		23.3	25.0		19.8		18.4
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		3.3			2.9		0.0	0.2		0.4		0.1
Delay (s)		30.7			29.8		23.4	25.2		20.3		18.5
Level of Service		C			C		C	C		C		B
Approach Delay (s)		30.7			29.8			24.8			19.4	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	28.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	15	0	0	9	1	95	6	2	0	0	7
Future Vol, veh/h	2	15	0	0	9	1	95	6	2	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	3	20	0	0	12	1	125	8	3	0	0	9

Major/Minor	Major1		Major2				Minor1			Minor2		
Conflicting Flow All	13	0	-	-	-	0	43	39	20	45	39	13
Stage 1	-	-	-	-	-	-	26	26	-	13	13	-
Stage 2	-	-	-	-	-	-	17	13	-	32	26	-
Critical Hdwy	4.1	-	-	-	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1619	-	0	0	-	-	960	857	1064	962	857	1073
Stage 1	-	-	0	0	-	-	992	878	-	1013	889	-
Stage 2	-	-	0	0	-	-	1002	889	-	990	878	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1619	-	-	-	-	-	950	855	1064	951	855	1073
Mov Cap-2 Maneuver	-	-	-	-	-	-	950	855	-	951	855	-
Stage 1	-	-	-	-	-	-	990	876	-	1011	889	-
Stage 2	-	-	-	-	-	-	993	889	-	977	876	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0	9.4	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	944	1064	1619	-	-	-	1073
HCM Lane V/C Ratio	0.141	0.002	0.002	-	-	-	0.009
HCM Control Delay (s)	9.4	8.4	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.5	0	0	-	-	-	0

Intersection						
Int Delay, s/veh	2.6					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	82	29	150	14	3	253
Future Vol, veh/h	82	29	150	14	3	253
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	3	0	0	0	0
Mvmt Flow	92	33	169	16	3	284

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	467	177	0	0	185	0
Stage 1	177	-	-	-	-	-
Stage 2	290	-	-	-	-	-
Critical Hdwy	6.41	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	556	863	-	-	1402	-
Stage 1	856	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	554	863	-	-	1402	-
Mov Cap-2 Maneuver	554	-	-	-	-	-
Stage 1	853	-	-	-	-	-
Stage 2	762	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.4	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	611	1402	-
HCM Lane V/C Ratio	-	-	0.204	0.002	-
HCM Control Delay (s)	-	-	12.4	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1028	0	0	942	0	31	144	1	125	0	164
Future Volume (vph)	0	1028	0	0	942	0	31	144	1	125	0	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00		1.00
Frt		1.00			1.00		1.00	1.00		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3574			3610		1805	1898		1787		1615
Flt Permitted		1.00			1.00		0.95	1.00		0.62		1.00
Satd. Flow (perm)		3574			3610		1805	1898		1158		1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1082	0	0	992	0	33	152	1	132	0	173
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	64
Lane Group Flow (vph)	0	1082	0	0	992	0	33	153	0	132	0	109
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
Turn Type		NA			NA		Perm	NA		pm+pt		custom
Protected Phases		4			8			2		1		1
Permitted Phases							2			6		6
Actuated Green, G (s)		46.8			46.8		46.7	46.7		55.2		55.2
Effective Green, g (s)		46.8			46.8		46.7	46.7		55.2		55.2
Actuated g/C Ratio		0.41			0.41		0.41	0.41		0.48		0.48
Clearance Time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		1454			1469		732	770		585		775
v/s Ratio Prot		c0.30			0.27			0.08		c0.01		0.01
v/s Ratio Perm							0.02			c0.10		0.06
v/c Ratio		0.74			0.68		0.05	0.20		0.23		0.14
Uniform Delay, d1		29.0			27.9		20.7	22.1		16.8		16.7
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		3.5			2.5		0.0	0.1		0.2		0.1
Delay (s)		32.5			30.4		20.7	22.2		17.0		16.8
Level of Service		C			C		C	C		B		B
Approach Delay (s)		32.5			30.4			21.9			16.9	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	29.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	10	0	0	15	0	67	1	0	0	0	7
Future Vol, veh/h	3	10	0	0	15	0	67	1	0	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	3	11	0	0	16	0	74	1	0	0	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	-	-	-	0	37	33	11	34	33	16
Stage 1	-	-	-	-	-	-	17	17	-	16	16	-
Stage 2	-	-	-	-	-	-	20	16	-	18	17	-
Critical Hdwy	4.1	-	-	-	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1615	-	0	0	-	-	973	864	1076	978	864	1069
Stage 1	-	-	0	0	-	-	1008	885	-	1009	886	-
Stage 2	-	-	0	0	-	-	1004	886	-	1006	885	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1615	-	-	-	-	-	964	862	1076	976	862	1069
Mov Cap-2 Maneuver	-	-	-	-	-	-	964	862	-	976	862	-
Stage 1	-	-	-	-	-	-	1006	883	-	1007	886	-
Stage 2	-	-	-	-	-	-	997	886	-	1003	883	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0	9.1	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	962	-	1615	-	-	-	1069
HCM Lane V/C Ratio	0.078	-	0.002	-	-	-	0.007
HCM Control Delay (s)	9.1	0	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.3	-	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	58	31	139	5	8	231
Future Vol, veh/h	58	31	139	5	8	231
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	60	32	145	5	8	241

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	405	148	0	0	150	0
Stage 1	148	-	-	-	-	-
Stage 2	257	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	606	904	-	-	1444	-
Stage 1	884	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	602	904	-	-	1444	-
Mov Cap-2 Maneuver	602	-	-	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	791	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	681	1444	-
HCM Lane V/C Ratio	-	-	0.136	0.006	-
HCM Control Delay (s)	-	-	11.1	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	859	0	0	887	0	13	75	1	170	0	119
Future Volume (vph)	0	859	0	0	887	0	13	75	1	170	0	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00		1.00
Frt		1.00			1.00		1.00	1.00		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3539			3539		1787	1896		1787		1615
Flt Permitted		1.00			1.00		0.95	1.00		0.65		1.00
Satd. Flow (perm)		3539			3539		1787	1896		1222		1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	904	0	0	934	0	14	79	1	179	0	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	1	0	0	0	54
Lane Group Flow (vph)	0	904	0	0	934	0	14	79	0	179	0	71
Heavy Vehicles (%)	0%	2%	2%	0%	2%	0%	1%	0%	0%	1%	0%	0%
Turn Type		NA			NA		Perm	NA		pm+pt		custom
Protected Phases		4			8			2		1		1
Permitted Phases							2			6		6
Actuated Green, G (s)		35.9			35.9		35.2	35.2		56.1		56.1
Effective Green, g (s)		35.9			35.9		35.2	35.2		56.1		56.1
Actuated g/C Ratio		0.34			0.34		0.34	0.34		0.53		0.53
Clearance Time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		1210			1210		599	635		749		862
v/s Ratio Prot		0.26			c0.26			0.04		c0.04		0.01
v/s Ratio Perm							0.01			c0.09		0.03
v/c Ratio		0.75			0.77		0.02	0.12		0.24		0.08
Uniform Delay, d1		30.5			30.9		23.4	24.2		12.7		11.9
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		4.2			4.8		0.0	0.1		0.2		0.0
Delay (s)		34.8			35.7		23.4	24.3		12.9		11.9
Level of Service		C			D		C	C		B		B
Approach Delay (s)		34.8			35.7			24.2			12.5	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM 2000 Control Delay	31.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Intersection												
Int Delay, s/veh	7.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	5	0	0	13	0	66	0	3	0	0	3
Future Vol, veh/h	1	5	0	0	13	0	66	0	3	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	1	6	0	0	16	0	80	0	4	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	-	-	-	0	26	24	6	26	24	16
Stage 1	-	-	-	-	-	-	8	8	-	16	16	-
Stage 2	-	-	-	-	-	-	18	16	-	10	8	-
Critical Hdwy	4.1	-	-	-	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1615	-	0	0	-	-	984	873	1083	990	873	1069
Stage 1	-	-	0	0	-	-	1013	893	-	1009	886	-
Stage 2	-	-	0	0	-	-	1001	886	-	1016	893	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1615	-	-	-	-	-	980	872	1083	986	872	1069
Mov Cap-2 Maneuver	-	-	-	-	-	-	980	872	-	986	872	-
Stage 1	-	-	-	-	-	-	1012	892	-	1008	886	-
Stage 2	-	-	-	-	-	-	998	886	-	1012	892	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0	9	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	980	1083	1615	-	-	-	1069
HCM Lane V/C Ratio	0.082	0.003	0.001	-	-	-	0.003
HCM Control Delay (s)	9	8.3	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	68	14	73	3	3	221
Future Vol, veh/h	68	14	73	3	3	221
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	0	0	0	0	1
Mvmt Flow	72	15	78	3	3	235

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	321	80	0	0	81	0
Stage 1	80	-	-	-	-	-
Stage 2	241	-	-	-	-	-
Critical Hdwy	6.42	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	673	986	-	-	1529	-
Stage 1	943	-	-	-	-	-
Stage 2	799	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	672	986	-	-	1529	-
Mov Cap-2 Maneuver	672	-	-	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	799	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	711	1529	-
HCM Lane V/C Ratio	-	-	0.123	0.002	-
HCM Control Delay (s)	-	-	10.8	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1158	0	0	1170	0	43	169	0	192	0	154
Future Volume (vph)	0	1158	0	0	1170	0	43	169	0	192	0	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00		1.00
Frt		1.00			1.00		1.00	1.00		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3574			3574		1770	1900		1787		1615
Flt Permitted		1.00			1.00		0.95	1.00		0.55		1.00
Satd. Flow (perm)		3574			3574		1770	1900		1039		1615
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	1245	0	0	1258	0	46	182	0	206	0	166
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	38
Lane Group Flow (vph)	0	1245	0	0	1258	0	46	182	0	206	0	128
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	2%	0%	0%	1%	0%	0%
Turn Type		NA			NA		Perm	NA		pm+pt		custom
Protected Phases		4			8			2		1		1
Permitted Phases							2			6		6
Actuated Green, G (s)		53.9			53.9		37.6	37.6		48.1		48.1
Effective Green, g (s)		53.9			53.9		37.6	37.6		48.1		48.1
Actuated g/C Ratio		0.47			0.47		0.33	0.33		0.42		0.42
Clearance Time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		1675			1675		578	621		483		675
v/s Ratio Prot		0.35			c0.35			0.10		c0.03		0.01
v/s Ratio Perm							0.03			c0.15		0.07
v/c Ratio		0.74			0.75		0.08	0.29		0.43		0.19
Uniform Delay, d1		24.9			25.0		26.7	28.8		22.8		21.1
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		3.0			3.2		0.1	0.3		0.6		0.1
Delay (s)		27.9			28.2		26.8	29.1		23.4		21.3
Level of Service		C			C		C	C		C		C
Approach Delay (s)		27.9			28.2			28.6			22.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	7.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	15	0	0	9	1	98	6	2	0	0	7
Future Vol, veh/h	2	15	0	0	9	1	98	6	2	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	3	20	0	0	12	1	129	8	3	0	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	13	0	-	-	-	0	43	39	20	45	39	13
Stage 1	-	-	-	-	-	-	26	26	-	13	13	-
Stage 2	-	-	-	-	-	-	17	13	-	32	26	-
Critical Hdwy	4.1	-	-	-	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1619	-	0	0	-	-	960	857	1064	962	857	1073
Stage 1	-	-	0	0	-	-	992	878	-	1013	889	-
Stage 2	-	-	0	0	-	-	1002	889	-	990	878	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1619	-	-	-	-	-	950	855	1064	951	855	1073
Mov Cap-2 Maneuver	-	-	-	-	-	-	950	855	-	951	855	-
Stage 1	-	-	-	-	-	-	990	876	-	1011	889	-
Stage 2	-	-	-	-	-	-	993	889	-	977	876	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0	9.5	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	944	1064	1619	-	-	-	1073
HCM Lane V/C Ratio	0.145	0.002	0.002	-	-	-	0.009
HCM Control Delay (s)	9.5	8.4	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.5	0	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	84	30	159	14	3	262
Future Vol, veh/h	84	30	159	14	3	262
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	3	0	0	0	0
Mvmt Flow	94	34	179	16	3	294

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	487	187	0	0	195	0
Stage 1	187	-	-	-	-	-
Stage 2	300	-	-	-	-	-
Critical Hdwy	6.41	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	541	852	-	-	1390	-
Stage 1	847	-	-	-	-	-
Stage 2	754	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	539	852	-	-	1390	-
Mov Cap-2 Maneuver	539	-	-	-	-	-
Stage 1	844	-	-	-	-	-
Stage 2	754	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.7	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	597	1390	-
HCM Lane V/C Ratio	-	-	0.215	0.002	-
HCM Control Delay (s)	-	-	12.7	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1158	0	0	1075	0	32	152	1	132	0	167
Future Volume (vph)	0	1158	0	0	1075	0	32	152	1	132	0	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00		1.00
Frt		1.00			1.00		1.00	1.00		1.00		0.85
Flt Protected		1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)		3574			3610		1805	1898		1787		1615
Flt Permitted		1.00			1.00		0.95	1.00		0.59		1.00
Satd. Flow (perm)		3574			3610		1805	1898		1112		1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1219	0	0	1132	0	34	160	1	139	0	176
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	51
Lane Group Flow (vph)	0	1219	0	0	1132	0	34	161	0	139	0	125
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
Turn Type		NA			NA		Perm	NA		pm+pt		custom
Protected Phases		4			8			2		1		1
Permitted Phases							2			6		6
Actuated Green, G (s)		52.4			52.4		40.8	40.8		49.6		49.6
Effective Green, g (s)		52.4			52.4		40.8	40.8		49.6		49.6
Actuated g/C Ratio		0.46			0.46		0.35	0.35		0.43		0.43
Clearance Time (s)		7.0			7.0		6.0	6.0		3.0		3.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)		1628			1644		640	673		513		696
v/s Ratio Prot		c0.34			0.31			0.08		c0.01		0.01
v/s Ratio Perm							0.02			c0.10		0.07
v/c Ratio		0.75			0.69		0.05	0.24		0.27		0.18
Uniform Delay, d1		25.9			24.8		24.4	26.2		20.3		20.2
Progression Factor		1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		3.2			2.4		0.0	0.2		0.3		0.1
Delay (s)		29.1			27.2		24.4	26.3		20.5		20.3
Level of Service		C			C		C	C		C		C
Approach Delay (s)		29.1			27.2			26.0			20.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	10	0	0	15	0	69	1	0	0	0	7
Future Vol, veh/h	3	10	0	0	15	0	69	1	0	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	3	11	0	0	16	0	76	1	0	0	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	-	-	-	0	37	33	11	34	33	16
Stage 1	-	-	-	-	-	-	17	17	-	16	16	-
Stage 2	-	-	-	-	-	-	20	16	-	18	17	-
Critical Hdwy	4.1	-	-	-	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1615	-	0	0	-	-	973	864	1076	978	864	1069
Stage 1	-	-	0	0	-	-	1008	885	-	1009	886	-
Stage 2	-	-	0	0	-	-	1004	886	-	1006	885	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1615	-	-	-	-	-	964	862	1076	976	862	1069
Mov Cap-2 Maneuver	-	-	-	-	-	-	964	862	-	976	862	-
Stage 1	-	-	-	-	-	-	1006	883	-	1007	886	-
Stage 2	-	-	-	-	-	-	997	886	-	1003	883	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0	9.1	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	962	-	1615	-	-	-	1069
HCM Lane V/C Ratio	0.08	-	0.002	-	-	-	0.007
HCM Control Delay (s)	9.1	0	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.3	-	0	-	-	-	0

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	59	32	147	5	8	240
Future Vol, veh/h	59	32	147	5	8	240
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	61	33	153	5	8	250

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	422	156	0	0	158	0
Stage 1	156	-	-	-	-	-
Stage 2	266	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	592	895	-	-	1434	-
Stage 1	877	-	-	-	-	-
Stage 2	783	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	588	895	-	-	1434	-
Mov Cap-2 Maneuver	588	-	-	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	783	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	669	1434	-
HCM Lane V/C Ratio	-	-	0.142	0.006	-
HCM Control Delay (s)	-	-	11.3	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	886	0	0	887	0	62	88	36	170	41	119
Future Volume (vph)	0	886	0	0	887	0	62	88	36	170	41	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0	6.0		6.0	6.0
Lane Util. Factor		0.95			0.95		0.95	0.95	1.00		1.00	1.00
Frt		1.00			1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)		3539			3539		1698	1797	1615		1812	1615
Flt Permitted		1.00			1.00		0.95	1.00	1.00		0.96	1.00
Satd. Flow (perm)		3539			3539		1698	1797	1615		1812	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	933	0	0	934	0	65	93	38	179	43	125
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	35	0	0	103
Lane Group Flow (vph)	0	933	0	0	934	0	58	100	3	0	222	22
Heavy Vehicles (%)	0%	2%	2%	0%	2%	0%	1%	0%	0%	1%	0%	0%
Turn Type		NA			NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		4			8		2	2		6	6	
Permitted Phases									2			6
Actuated Green, G (s)		25.5			25.5		5.1	5.1	5.1		10.4	10.4
Effective Green, g (s)		25.5			25.5		5.1	5.1	5.1		10.4	10.4
Actuated g/C Ratio		0.42			0.42		0.08	0.08	0.08		0.17	0.17
Clearance Time (s)		7.0			7.0		6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1504			1504		144	152	137		314	279
v/s Ratio Prot		0.26			c0.26		0.03	c0.06			c0.12	
v/s Ratio Perm									0.00			0.01
v/c Ratio		0.62			0.62		0.40	0.66	0.02		0.71	0.08
Uniform Delay, d1		13.5			13.5		26.0	26.6	25.2		23.4	20.8
Progression Factor		1.00			1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		1.9			1.9		1.8	9.8	0.1		7.1	0.1
Delay (s)		15.4			15.4		27.8	36.5	25.2		30.5	20.9
Level of Service		B			B		C	D	C		C	C
Approach Delay (s)		15.4			15.4			31.7			27.0	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	89	0	17	0	0	24	0	73	0	0	41	0
Future Vol, veh/h	89	0	17	0	0	24	0	73	0	0	41	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	0	0	0	0	2	0	0	0	0	2	0
Mvmt Flow	94	0	18	0	0	25	0	77	0	0	43	0

Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	82	-	43	-	-	39	-	0	-	-	-	0
Stage 1	43	-	-	-	-	-	-	-	-	-	-	-
Stage 2	39	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.33	-	6.2	-	-	6.93	-	-	-	-	-	-
Critical Hdwy Stg 1	6.13	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	-	3.3	-	-	3.319	-	-	-	-	-	-
Pot Cap-1 Maneuver	901	0	1033	0	0	1024	0	-	0	0	-	0
Stage 1	971	0	-	0	0	-	0	-	0	0	-	0
Stage 2	971	0	-	0	0	-	0	-	0	0	-	0
Platoon blocked, %								-			-	
Mov Cap-1 Maneuver	878	-	1033	-	-	1024	-	-	-	-	-	-
Mov Cap-2 Maneuver	878	-	-	-	-	-	-	-	-	-	-	-
Stage 1	971	-	-	-	-	-	-	-	-	-	-	-
Stage 2	947	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	8.6	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	WBLn1	SBT
Capacity (veh/h)	-	878	1033	1024	-
HCM Lane V/C Ratio	-	0.107	0.017	0.025	-
HCM Control Delay (s)	-	9.6	8.5	8.6	-
HCM Lane LOS	-	A	A	A	-
HCM 95th %tile Q(veh)	-	0.4	0.1	0.1	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	0	0	0	8	0	57	0	31	20	7
Future Vol, veh/h	8	0	0	0	0	8	0	57	0	31	20	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	0	0	0	0	2	0	0	0	2	0	2
Mvmt Flow	8	0	0	0	0	8	0	60	0	33	21	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	121	151	25	151	154	30	28	0	0	60	0	0
Stage 1	91	91	-	60	60	-	-	-	-	-	-	-
Stage 2	30	60	-	91	94	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.5	6.2	7.3	6.5	6.93	4.1	-	-	4.13	-	-
Critical Hdwy Stg 1	6.13	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4	3.3	3.5	4	3.319	2.2	-	-	2.219	-	-
Pot Cap-1 Maneuver	848	744	1057	814	741	1038	1599	-	-	1543	-	-
Stage 1	916	823	-	950	849	-	-	-	-	-	-	-
Stage 2	983	849	-	921	821	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	828	728	1057	801	725	1038	1599	-	-	1543	-	-
Mov Cap-2 Maneuver	828	728	-	801	725	-	-	-	-	-	-	-
Stage 1	916	806	-	950	849	-	-	-	-	-	-	-
Stage 2	975	849	-	901	804	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	8.5	0	3.9
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1599	-	-	828	1038	1543	-	-
HCM Lane V/C Ratio	-	-	-	0.01	0.008	0.021	-	-
HCM Control Delay (s)	0	-	-	9.4	8.5	7.4	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0.1	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↳			↑↑		↱
Traffic Vol, veh/h	990	9	0	0	0	3
Future Vol, veh/h	990	9	0	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	0	0	3	0	0
Mvmt Flow	1042	9	0	0	0	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	-	521
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	0	0	-	0	505
Stage 1	-	0	0	-	0	-
Stage 2	-	0	0	-	0	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	-	505
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	505	-	-
HCM Lane V/C Ratio	0.006	-	-
HCM Control Delay (s)	12.2	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↳			↑↑		↱
Traffic Vol, veh/h	893	199	0	0	0	197
Future Vol, veh/h	893	199	0	0	0	197
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	0	0	3	0	2
Mvmt Flow	940	209	0	0	0	207

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	575
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	461
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	461
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	461	-	-	-
HCM Lane V/C Ratio	0.45	-	-	-
HCM Control Delay (s)	19	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	2.3	-	-	-

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	5	0	0	13	0	94	0	3	0	0	5
Future Vol, veh/h	3	5	0	0	13	0	94	0	3	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	4	6	0	0	16	0	115	0	4	0	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	-	-	-	0	33	30	6	32	30	16
Stage 1	-	-	-	-	-	-	14	14	-	16	16	-
Stage 2	-	-	-	-	-	-	19	16	-	16	14	-
Critical Hdwy	4.1	-	-	-	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1615	-	0	0	-	-	974	867	1083	981	867	1069
Stage 1	-	-	0	0	-	-	1006	888	-	1009	886	-
Stage 2	-	-	0	0	-	-	1000	886	-	1009	888	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1615	-	-	-	-	-	967	865	1083	976	865	1069
Mov Cap-2 Maneuver	-	-	-	-	-	-	967	865	-	976	865	-
Stage 1	-	-	-	-	-	-	1004	886	-	1007	886	-
Stage 2	-	-	-	-	-	-	994	886	-	1004	886	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.7	0	9.2	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	967	1083	1615	-	-	-	1069
HCM Lane V/C Ratio	0.119	0.003	0.002	-	-	-	0.006
HCM Control Delay (s)	9.2	8.3	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.4	0	0	-	-	-	0

Intersection						
Int Delay, s/veh	3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	98	14	84	5	3	232
Future Vol, veh/h	98	14	84	5	3	232
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	0	0	0	0	1
Mvmt Flow	104	15	89	5	3	247

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	345	92	0	0	94	0
Stage 1	92	-	-	-	-	-
Stage 2	253	-	-	-	-	-
Critical Hdwy	6.42	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	652	971	-	-	1513	-
Stage 1	932	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	651	971	-	-	1513	-
Mov Cap-2 Maneuver	651	-	-	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.4	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	679	1513	-
HCM Lane V/C Ratio	-	-	0.175	0.002	-
HCM Control Delay (s)	-	-	11.4	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1200	0	0	1170	0	96	191	20	192	66	154
Future Volume (vph)	0	1200	0	0	1170	0	96	191	20	192	66	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0	6.0		6.0	6.0
Lane Util. Factor		0.95			0.95		0.95	0.95	1.00		1.00	1.00
Frt		1.00			1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)		3574			3574		1681	1799	1615		1818	1615
Flt Permitted		1.00			1.00		0.95	1.00	1.00		0.96	1.00
Satd. Flow (perm)		3574			3574		1681	1799	1615		1818	1615
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	1290	0	0	1258	0	103	205	22	206	71	166
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	19	0	0	113
Lane Group Flow (vph)	0	1290	0	0	1258	0	93	215	3	0	277	53
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	2%	0%	0%	1%	0%	0%
Turn Type		NA			NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		4			8		2	2		6	6	
Permitted Phases									2			6
Actuated Green, G (s)		36.6			36.6		10.6	10.6	10.6		13.8	13.8
Effective Green, g (s)		36.6			36.6		10.6	10.6	10.6		13.8	13.8
Actuated g/C Ratio		0.46			0.46		0.13	0.13	0.13		0.17	0.17
Clearance Time (s)		7.0			7.0		6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1635			1635		222	238	213		313	278
v/s Ratio Prot		c0.36			0.35		0.06	c0.12			c0.15	
v/s Ratio Perm									0.00			0.03
v/c Ratio		0.79			0.77		0.42	0.90	0.01		0.88	0.19
Uniform Delay, d1		18.4			18.2		31.9	34.2	30.2		32.3	28.3
Progression Factor		1.00			1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		4.0			3.6		1.3	33.5	0.0		24.3	0.3
Delay (s)		22.4			21.7		33.2	67.7	30.2		56.6	28.7
Level of Service		C			C		C	E	C		E	C
Approach Delay (s)		22.4			21.7			55.5			46.2	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection												
Int Delay, s/veh	6.7											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰		↱			↱		↑↑			↑	
Traffic Vol, veh/h	212	0	22	0	0	18	0	77	0	0	66	0
Future Vol, veh/h	212	0	22	0	0	18	0	77	0	0	66	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	0	0	0	0	1	0	0	0	0	1	0
Mvmt Flow	228	0	24	0	0	19	0	83	0	0	71	0

Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	113	-	71	-	-	42	-	0	-	-	-	0
Stage 1	71	-	-	-	-	-	-	-	-	-	-	-
Stage 2	42	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.315	-	6.2	-	-	6.915	-	-	-	-	-	-
Critical Hdwy Stg 1	6.115	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.515	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5095	-	3.3	-	-	3.3095	-	-	-	-	-	-
Pot Cap-1 Maneuver	861	0	997	0	0	1023	0	-	0	0	-	0
Stage 1	941	0	-	0	0	-	0	-	0	0	-	0
Stage 2	970	0	-	0	0	-	0	-	0	0	-	0
Platoon blocked, %								-			-	
Mov Cap-1 Maneuver	845	-	997	-	-	1023	-	-	-	-	-	-
Mov Cap-2 Maneuver	845	-	-	-	-	-	-	-	-	-	-	-
Stage 1	941	-	-	-	-	-	-	-	-	-	-	-
Stage 2	952	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	8.6	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	WBLn1	SBT
Capacity (veh/h)	-	845	997	1023	-
HCM Lane V/C Ratio	-	0.27	0.024	0.019	-
HCM Control Delay (s)	-	10.8	8.7	8.6	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	1.1	0.1	0.1	-

Intersection												
Int Delay, s/veh	4.4											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	0	0	0	0	6	0	21	0	26	31	31
Future Vol, veh/h	50	0	0	0	0	6	0	21	0	26	31	31
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	0	0	0	0	1	0	0	0	1	0	2
Mvmt Flow	54	0	0	0	0	6	0	23	0	28	33	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	118	129	50	129	145	12	66	0	0	23	0	0
Stage 1	106	106	-	23	23	-	-	-	-	-	-	-
Stage 2	12	23	-	106	122	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.5	6.2	7.3	6.5	6.915	4.1	-	-	4.115	-	-
Critical Hdwy Stg 1	6.13	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.53	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4	3.3	3.5	4	3.3095	2.2	-	-	2.2095	-	-
Pot Cap-1 Maneuver	852	765	1024	843	750	1069	1549	-	-	1598	-	-
Stage 1	899	811	-	998	880	-	-	-	-	-	-	-
Stage 2	1007	880	-	905	799	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	836	751	1024	832	737	1069	1549	-	-	1598	-	-
Mov Cap-2 Maneuver	836	751	-	832	737	-	-	-	-	-	-	-
Stage 1	899	796	-	998	880	-	-	-	-	-	-	-
Stage 2	1001	880	-	889	785	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	8.4	0	2.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1549	-	-	836	1069	1598	-	-
HCM Lane V/C Ratio	-	-	-	0.064	0.006	0.017	-	-
HCM Control Delay (s)	0	-	-	9.6	8.4	7.3	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↳			↑↑		↱
Traffic Vol, veh/h	1376	74	0	0	0	59
Future Vol, veh/h	1376	74	0	0	0	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	0	0	1	0	0
Mvmt Flow	1480	80	0	0	0	63

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	-	740
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	0	0	-	0	364
Stage 1	-	0	0	-	0	-
Stage 2	-	0	0	-	0	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	-	364
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	17
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	364	-	-
HCM Lane V/C Ratio	0.174	-	-
HCM Control Delay (s)	17	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.6	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	1254	158	0	0	0	154
Future Vol, veh/h	1254	158	0	0	0	154
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	1	0	0	1	0	1
Mvmt Flow	1348	170	0	0	0	166

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	759
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.92
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.31
Pot Cap-1 Maneuver	-	-	0	-	0	351
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	351
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	24.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	351	-	-	-
HCM Lane V/C Ratio	0.472	-	-	-
HCM Control Delay (s)	24.1	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	2.4	-	-	-

Intersection	
Int Delay, s/veh	8.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	15	0	0	9	1	142	6	2	0	0	12
Future Vol, veh/h	7	15	0	0	9	1	142	6	2	0	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	0	0	2	0	0	0	0	0
Mvmt Flow	9	20	0	0	12	1	187	8	3	0	0	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	13	0	-	-	-	0	59	51	20	57	51	13
Stage 1	-	-	-	-	-	-	38	38	-	13	13	-
Stage 2	-	-	-	-	-	-	21	13	-	44	38	-
Critical Hdwy	4.1	-	-	-	-	-	7.12	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.518	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1619	-	0	0	-	-	937	844	1064	945	844	1073
Stage 1	-	-	0	0	-	-	977	867	-	1013	889	-
Stage 2	-	-	0	0	-	-	998	889	-	975	867	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1619	-	-	-	-	-	919	839	1064	932	839	1073
Mov Cap-2 Maneuver	-	-	-	-	-	-	919	839	-	932	839	-
Stage 1	-	-	-	-	-	-	971	862	-	1007	889	-
Stage 2	-	-	-	-	-	-	983	889	-	958	862	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0	10	8.4
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	915	1064	1619	-	-	-	1073
HCM Lane V/C Ratio	0.213	0.002	0.006	-	-	-	0.015
HCM Control Delay (s)	10	8.4	7.2	0	-	-	8.4
HCM Lane LOS	B	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.8	0	0	-	-	-	0

Intersection	
Int Delay, s/veh	3.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	133	30	176	19	3	279
Future Vol, veh/h	133	30	176	19	3	279
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	1	3	0	0	0	0
Mvmt Flow	149	34	198	21	3	313

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	528	209	0	0	219	0
Stage 1	209	-	-	-	-	-
Stage 2	319	-	-	-	-	-
Critical Hdwy	6.41	6.23	-	-	4.1	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.327	-	-	2.2	-
Pot Cap-1 Maneuver	513	829	-	-	1362	-
Stage 1	828	-	-	-	-	-
Stage 2	739	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	511	829	-	-	1362	-
Mov Cap-2 Maneuver	511	-	-	-	-	-
Stage 1	826	-	-	-	-	-
Stage 2	739	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.8	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	550	1362	-
HCM Lane V/C Ratio	-	-	0.333	0.002	-
HCM Control Delay (s)	-	-	14.8	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.5	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1199	0	0	1075	0	91	175	28	132	70	167
Future Volume (vph)	0	1199	0	0	1075	0	91	175	28	132	70	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0	6.0		6.0	6.0
Lane Util. Factor		0.95			0.95		0.95	0.95	1.00		1.00	1.00
Frt		1.00			1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)		3574			3610		1715	1800	1615		1828	1615
Flt Permitted		1.00			1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (perm)		3574			3610		1715	1800	1615		1828	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1262	0	0	1132	0	96	184	29	139	74	176
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	25	0	0	134
Lane Group Flow (vph)	0	1262	0	0	1132	0	86	194	4	0	213	42
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
Turn Type		NA			NA		Split	NA	Perm	Split	NA	Perm
Protected Phases		4			8		2	2		6	6	
Permitted Phases									2			6
Actuated Green, G (s)		31.9			31.9		9.2	9.2	9.2		9.9	9.9
Effective Green, g (s)		31.9			31.9		9.2	9.2	9.2		9.9	9.9
Actuated g/C Ratio		0.46			0.46		0.13	0.13	0.13		0.14	0.14
Clearance Time (s)		7.0			7.0		6.0	6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1628			1645		225	236	212		258	228
v/s Ratio Prot		c0.35			0.31		0.05	c0.11			c0.12	
v/s Ratio Perm									0.00			0.03
v/c Ratio		0.78			0.69		0.38	0.82	0.02		0.83	0.18
Uniform Delay, d1		16.0			15.1		27.8	29.6	26.5		29.2	26.5
Progression Factor		1.00			1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		3.7			2.4		1.1	20.1	0.0		18.9	0.4
Delay (s)		19.7			17.5		28.9	49.7	26.5		48.2	26.9
Level of Service		B			B		C	D	C		D	C
Approach Delay (s)		19.7			17.5			41.7			38.5	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	185	0	21	0	0	17	0	92	0	0	70	0
Future Vol, veh/h	185	0	21	0	0	17	0	92	0	0	70	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	195	0	22	0	0	18	0	97	0	0	74	0

Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	123	-	74	-	-	49	-	0	-	-	-	0
Stage 1	74	-	-	-	-	-	-	-	-	-	-	-
Stage 2	49	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.3	-	6.2	-	-	6.9	-	-	-	-	-	-
Critical Hdwy Stg 1	6.1	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	-	3.3	-	-	3.3	-	-	-	-	-	-
Pot Cap-1 Maneuver	850	0	993	0	0	1016	0	-	0	0	-	0
Stage 1	940	0	-	0	0	-	0	-	0	0	-	0
Stage 2	964	0	-	0	0	-	0	-	0	0	-	0
Platoon blocked, %								-			-	
Mov Cap-1 Maneuver	835	-	993	-	-	1016	-	-	-	-	-	-
Mov Cap-2 Maneuver	835	-	-	-	-	-	-	-	-	-	-	-
Stage 1	940	-	-	-	-	-	-	-	-	-	-	-
Stage 2	947	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	8.6	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	WBLn1	SBT
Capacity (veh/h)	-	835	993	1016	-
HCM Lane V/C Ratio	-	0.233	0.022	0.018	-
HCM Control Delay (s)	-	10.6	8.7	8.6	-
HCM Lane LOS	-	B	A	A	-
HCM 95th %tile Q(veh)	-	0.9	0.1	0.1	-

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	53	0	0	0	0	6	0	33	0	22	30	39
Future Vol, veh/h	53	0	0	0	0	6	0	33	0	22	30	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	60	-	-	60	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	56	0	0	0	0	6	0	35	0	23	32	41

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	117	134	53	134	154	18	73	0	0	35	0	0
Stage 1	99	99	-	35	35	-	-	-	-	-	-	-
Stage 2	18	35	-	99	119	-	-	-	-	-	-	-
Critical Hdwy	7.3	6.5	6.2	7.3	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	858	760	1020	836	741	1063	1540	-	-	1589	-	-
Stage 1	912	817	-	982	870	-	-	-	-	-	-	-
Stage 2	1004	870	-	912	801	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	843	749	1020	827	731	1063	1540	-	-	1589	-	-
Mov Cap-2 Maneuver	843	749	-	827	731	-	-	-	-	-	-	-
Stage 1	912	806	-	982	870	-	-	-	-	-	-	-
Stage 2	998	870	-	899	790	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.6	8.4	0	1.8
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1540	-	-	843	1063	1589	-	-
HCM Lane V/C Ratio	-	-	-	0.066	0.006	0.015	-	-
HCM Control Delay (s)	0	-	-	9.6	8.4	7.3	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↳			↑↑		↱
Traffic Vol, veh/h	1353	77	0	0	0	52
Future Vol, veh/h	1353	77	0	0	0	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	Free	-	None	-	Stop
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	1	0	0	0	0	0
Mvmt Flow	1424	81	0	0	0	55

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	-	712
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	0	0	-	0	379
Stage 1	-	0	0	-	0	-
Stage 2	-	0	0	-	0	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	-	379
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	16.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	379	-	-
HCM Lane V/C Ratio	0.144	-	-
HCM Control Delay (s)	16.1	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.5	-	-

Intersection						
Int Delay, s/veh	2					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↳			↑↑		↱
Traffic Vol, veh/h	1212	147	0	0	0	145
Future Vol, veh/h	1212	147	0	0	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	1276	155	0	0	0	153

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	716
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	-	-	0	-	0	377
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	377
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	20.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	377	-	-	-
HCM Lane V/C Ratio	0.405	-	-	-
HCM Control Delay (s)	20.9	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.9	-	-	-

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	10	0	0	15	0	115	1	0	0	0	13
Future Vol, veh/h	9	10	0	0	15	0	115	1	0	0	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	160	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	11	0	0	16	0	126	1	0	0	0	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	16	0	-	-	-	0	54	47	11	48	47	16
Stage 1	-	-	-	-	-	-	31	31	-	16	16	-
Stage 2	-	-	-	-	-	-	23	16	-	32	31	-
Critical Hdwy	4.1	-	-	-	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1615	-	0	0	-	-	949	849	1076	958	849	1069
Stage 1	-	-	0	0	-	-	991	873	-	1009	886	-
Stage 2	-	-	0	0	-	-	1000	886	-	990	873	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1615	-	-	-	-	-	932	844	1076	952	844	1069
Mov Cap-2 Maneuver	-	-	-	-	-	-	932	844	-	952	844	-
Stage 1	-	-	-	-	-	-	985	868	-	1003	886	-
Stage 2	-	-	-	-	-	-	987	886	-	983	868	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.4	0	9.5	8.4
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	931	-	1615	-	-	-	1069
HCM Lane V/C Ratio	0.137	-	0.006	-	-	-	0.013
HCM Control Delay (s)	9.5	0	7.2	0	-	-	8.4
HCM Lane LOS	A	A	A	A	-	-	A
HCM 95th %tile Q(veh)	0.5	-	0	-	-	-	0

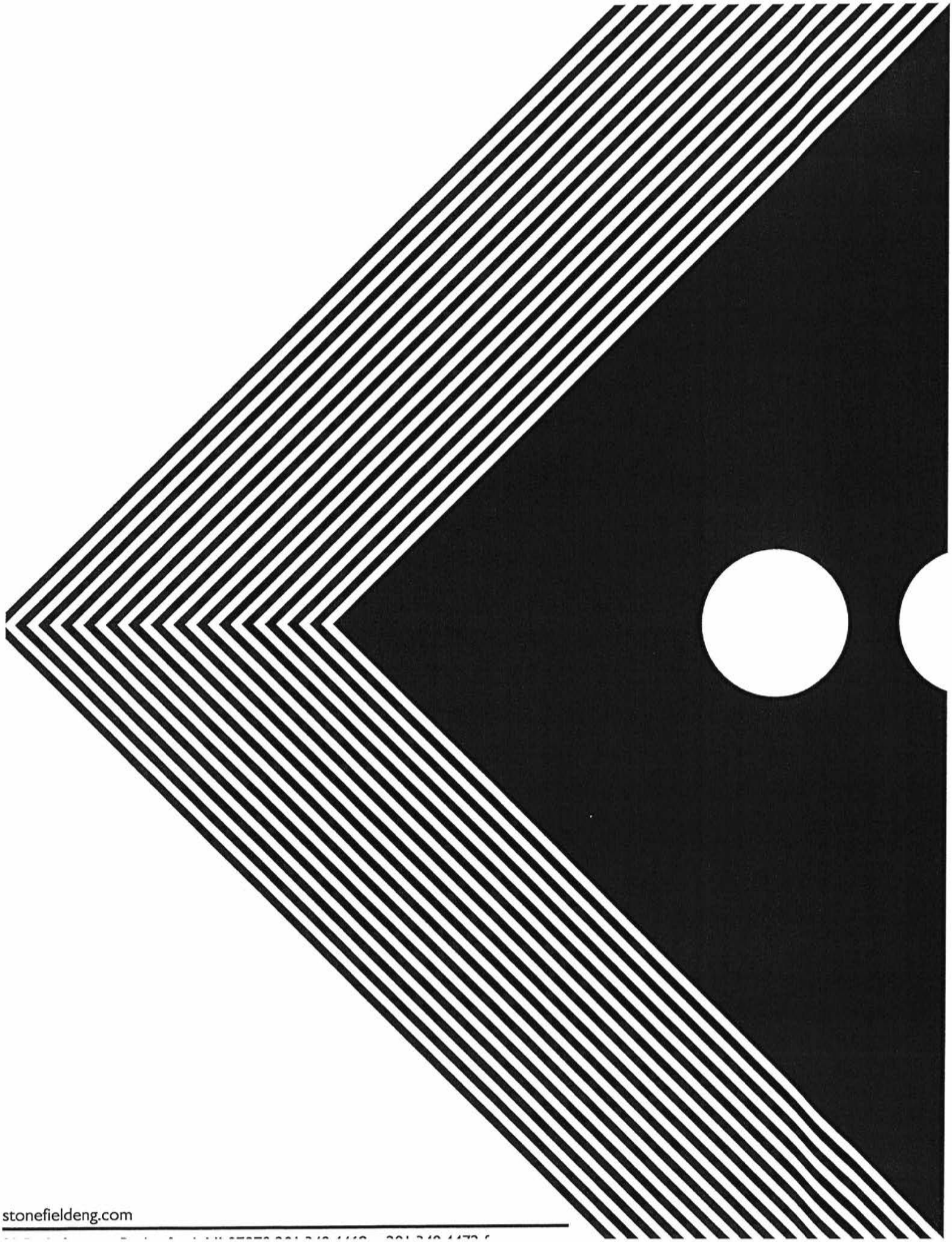
Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	111	32	164	11	8	258
Future Vol, veh/h	111	32	164	11	8	258
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	116	33	171	11	8	269

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	462	177	0	0	182	0
Stage 1	177	-	-	-	-	-
Stage 2	285	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	562	871	-	-	1405	-
Stage 1	859	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	558	871	-	-	1405	-
Mov Cap-2 Maneuver	558	-	-	-	-	-
Stage 1	853	-	-	-	-	-
Stage 2	768	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	607	1405	-
HCM Lane V/C Ratio	-	-	0.245	0.006	-
HCM Control Delay (s)	-	-	12.8	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1	0	-



APPENDIX D

Water and Sanitary Sewer
Service Determination

REMINGTON & VERNICK ENGINEERS

9 Allen Street
Toms River, NJ 08753
O: (732) 286-9220
F: (732) 505-8416

August 16, 2018

Mr. Harvey Karen
Davies Consultants, LLC.
150 Tennis Court
Wall, New Jersey 07719

Re: Application for Service Determination
Water and Sanitary Sewer
Block 44, Lot 15.01
Our File: 1519-T-006

Dear Mr. Karen:

Our office has received the application for water and sewer service determination and finds the following:

A. General:

The applicant, Davies Consultants, is proposing to construct twenty-seven (27) buildings with 216 2-bedroom townhomes as well as a clubhouse and pool facility. Two (2) commercial pads that are 7,225 SF and 22,605 SF with 16 fueling stations and a 5,525 SF market are also proposed. The applicant is requesting water and sanitary sewer service determination at this time. The applicant's primary mailing address is located at 150 Tennis Court, Wall, New Jersey 07719. The applicants engineer is Jessica L. Staszewski, P.E., of FWH Associates, P.A. The applicant's attorney is not known at this time.

B. Water:

1. The applicant has submitted an Application for Water Service Determination. We have the following comments:
2.
    a. The projected daily water demand for the development is 44,225 GPD or approximately 0.0442 MGD.

    b. The property upon which the site is located, Block 44, Lot 15.01, can be serviced by the existing water main located in Route 37. The applicant shall submit an application for Preliminary Water System Approval and must submit for all subsequent approvals before connecting to the authorities main.

    c. At this time capacity is available to service the project. The Township shall allocate water capacity to the project only for the development of the currently proposed improvements. The Township's commitment of available water capacity occurs only upon the Township issuance of Final Approval for the project.

C. Sewer:

1. The applicant has submitted an Application for Sewer Service Determination. We have the followings comments:

    a. The projected daily sewer flow for the development is 54,141 GPD or approximately 0.0541 MGD.

    b. The property upon which the site is located, Block 44, Lot 15.01, can be serviced by the existing sewer main located in New Jersey Route 37. The applicant shall submit an application for preliminary sewer system approval and must submit for all subsequent approvals before connecting to the Authority's main.

    c. At this time capacity is available to service the project. The Township shall allocate sewer capacity to the project only for the development of the currently proposed improvements. The Township's commitment of available sewer capacity occurs only upon the Township issuance of Final Approval for the project.

Should any questions arise regarding this matter, please do not hesitate to contact our Toms River office.

God Bless America,

REMINGTON & VERNICK ENGINEERS

Alan B. Dittenhofer, P.E., P.P., C.M.E.

TED/ABD:ag

cc: Via E-Mail
Mr. Al Yodakis, PE – Director of Public Works (AYodakis@manchestertwp.com)
Mr. Joseph Veni, PE, Principal Engineer (JVeni@manchestertwp.com)
Mr. Jeff Ruerup, Operations Manager (JRuerup@manchestertwp.com)
Davies Consultants, LLC. (150 Tennis Court, Wall, NJ 07719)
Ms. Jessica L. Staszewski, P.E., P.P., FWH Associates, P.A. (jstaszewski@fwhassociate.com)
Mr. Trace Dittenhofer, E.I.T., RVE (trace.dittenhofer@rve.com)

APPENDIX E

Statement of Qualifications

TRIDENT
ENVIRONMENTAL
Site Remediation, Land Use & Ecology

P/ 732.818.8699 F/ 732.818.3744
E/ info@tridentenviro.com

Kyle Weise - Director of Land Use Services
KWeise@tridentenviro.com
732-818-8698

Experience

Trident Environmental, Toms River, New Jersey, August 2002 - Present

- Environmental Scientist

Brick Township Municipal Authority, Brick, New Jersey, March 2002 – August 2002

- Lab Technician, - Water Treatment Plant Operator

Qualification Highlights

- B.S., Environmental Science, Western New England College, 2002
- NAHB Certified Green Professional-2009
- Expert Witness Testimony

Summary of Qualifications

Mr. Weise is a Sr. Environmental Scientist with the firm of Trident Environmental Consultants and is responsible for the organization and execution of various environmental reports, permitting for a wide range of projects, and conducting environmental site investigations and assessments.

Mr. Weise is well versed in the rules and regulations set forth by the NJDEP in the form of the N.J.A.C. 7:7 – Coastal Program Rules, N.J.A.C. 7:7E- Coastal Zone Management Rules N.J.A.C. 7:7A Freshwater Wetland Protection Act Rules and N.J.A.C. 7:13 Flood Hazard Area Control Act Rules and Pinelands CMP.

In the 16 years Mr. Weise has been with Trident Environmental Consultants, he has prepared or assisted in the preparation of numerous applications for Letters of Interpretation (LOI), Wetland Delineation Reports, Tidelands Conveyances, Waterfront Development Permits, CAFRA Permits, various State General and Individual Wetland Permits for submittal to the New Jersey Department of Environmental Protection (NJDEP), Pinelands Commission and United States Army Corps of Engineers. Mr. Weise also prepares Environmental Impact Statements (E.I.S.) for Township Approval.

Mr. Weise has also conducted threatened/endangered surveys for Bog Turtles, Northern Pine Snakes, Barred Owls and Indiana Bats in New Jersey, New York, Pennsylvania, Delaware, and Maryland. These activities include helping with directed visual surveys, implementation of various trapping methods in a variety of habitats and radio-telemetry projects.

Additionally, Mr. Weise is versed in, geographical information systems (GIS), habitat assessments, wildlife surveys, laboratory testing and analysis, soil sampling and characterization, river/pond and sediment sampling and wetland mitigation. Mr. Weise helped design and received the necessary State approvals for the Nishisakawick Creek and Great Egg Harbor River, Marsh Bog Brook I & II and Barkers Brook Mitigation Banks.

Expert Testimony:

Mr. Weise has provided expert testimony to municipal boards and environmental commissions.

Planning Boards: Upper Freehold Township, Monmouth County, New Jersey
Lakewood Township, Ocean County, New Jersey.

Zoning Boards: Neptune Township, Monmouth County, New Jersey

Environmental Commissions: Howell Township, Monmouth County, New Jersey
Freehold Township, Monmouth County, New Jersey

TRIDENT
ENVIRONMENTAL
Site Remediation, Land Use & Ecology

P/ 732.818.8699 F/ 732.818.3744
E/ info@tridentenviro.com

Nicole Budzek
Environmental Scientist

Education:
B.S. Marine and Environmental Biology and Policy
Monmouth University-2015

Professional Experience:

Ms. Nicole Budzek is an Environmental Scientist with the firm of Trident Environmental.

Ms. Budzek has completed the wetlands delineation certificate series with Rutgers University. She has conducted wetland delineations. She has prepared and assisted in the preparation of numerous applications for Letters of Interpretation (LOI), Wetland Delineation Reports, CAFRA General and Individual Permits and Waterfront Development Permits, various State General and Individual Wetland Permits for submittal to the New Jersey Department of Environmental Protection (NJDEP) and Pinelands Commission. Ms. Budzek has also prepared Environmental Impact Statements (EIS) for Township Approval.

Furthermore, Ms. Budzek has performed Phase I and Phase II investigations to support due diligence requirements for property transactions. She has also conducted soil and groundwater sampling, tank sweep investigations, soil sampling and characterization, soil permeability testing, and tree surveys.

Additionally, Ms. Budzek is well versed in ESRI Arc Map Geographic Information Systems (GIS) software and Global Positioning Systems (GPS). She has created various maps to depict visual representations for clients.

Related Certifications & Experience:

OSHA 40-hour Health and Safety (29 CFR 1910.120) plus all annual 8 hour refreshers.

Rutgers University Wetland Delineation Certificate

Rutgers University Soils and Site Evaluation for Septic Disposal Systems and Stormwater BMP's

New Jersey Conservation Foundation Advanced Pineland Plant Course

Attended the New Jersey Ecological Evaluation Practitioners Forum

Attended the LSRP Continuing Education Course: Due Diligence in New Jersey

Career Positions:

2015 – Present, Trident Environmental, Toms River, New Jersey – Environmental Scientist

2015, National Oceanic and Atmospheric Administration, Highlands, New Jersey- Research Associate/Lab Technician

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

SITUATED IN

MANCHESTER TOWNSHIP, OCEAN COUNTY, N.J.

PREPARED FOR

HARVEY KAREN
150 TENNIS COURT
WALL, NEW JERSEY, 07719

PREPARED BY

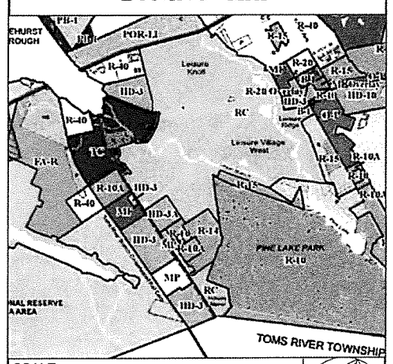
FWH ASSOCIATES, P.A.

CIVIL ENGINEERS
LANDSCAPE ARCHITECTS
LAND SURVEYORS
SITE PLANNERS
1856 ROUTE 9 TOMS RIVER NEW JERSEY 08755 (732)797-3100

SHEET INDEX

Sheet	Title	Date
1	TITLE SHEET	8/10/18
2	PROJECT NOTES	8/10/18
3	EXISTING CONDITIONS	8/10/18
4	OVERALL SITE PLAN	8/10/18
5-8	SITE PLAN	8/10/18
9	OVERALL GRADING AND DRAINAGE PLAN	8/10/18
10-13	GRADING AND DRAINAGE PLAN	8/10/18
14	OVERALL UTILITY PLAN	8/10/18
15-18	UTILITY PLAN	8/10/18
19-22	LANDSCAPE PLAN	8/10/18
23-26	LIGHTING PLAN	8/10/18
27	LANDSCAPE AND LIGHTING DTAILS	8/10/18
28-30	ROAD PROFILES	8/10/18
31-34	OFFROAD PROFILES	8/10/18
35	BASIN CROSS SECTIONS	8/10/18
36-38	CONSTRUCTION DETAILS	8/10/18
39	NON STRUCTURAL STRATEGIES PLAN	8/10/18

ZONING MAP



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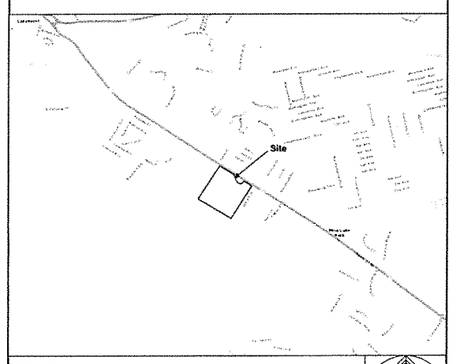
N.T.S.

GENERAL LOCATION MAP



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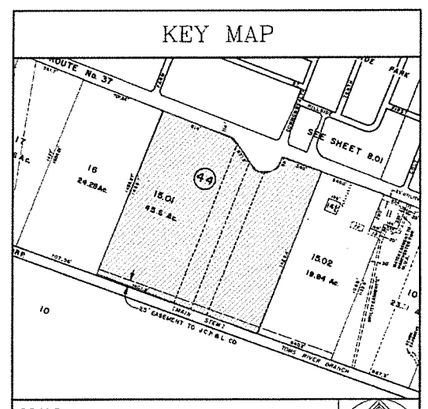
KEY MAP



SCALE:
N.T.S.

DATE	REVISION	DRAWN	CHECKED	RELEASED

TITLE SHEET

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, N.J.

FWH ASSOCIATES, P.A.
CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESERVE SPECIALISTS
ARCHITECTS
FWHASSOCIATES.COM
1856 Rt. 9 Toms River, NJ 08755 T: 732.797.3100 F: 732.797.3223

Brian P. Murphy
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42600

DRAWN BY CSM	DATE 8/10/18
DESIGNED BY JS	SCALE N.T.S.
CHECKED BY JS	DRAWING NO. PD-170
RELEASED BY BPM	PROJECT NO. 1423.0016
SHEET NO. 1	OF 39

August 3, 2018 Client #1423.0016
List of adjoiners within 200 feet
Block 44 Lot 15.02 Owner(s)

Block 41.01 Lot 1 Angster Edward F
29 Central Ave
Toms River, NJ 08757

Block 42.01 Lot 12 Krupnick, Feldman & Izbdy, et als
PO Box 309
Lakewood, NJ 08701

Block 42.05 Lot 8 1980 Route 37, LLC
90 W Sylvania Ave
Neptune City, NJ 07753

Block 44 Lot 10 Pine Acres LLC
1881 Hwy 37
Toms River, NJ 08757

Block 44 Lot 11 Bay Rum LLC c/o Hilltop Nursery Sch
1917 Hwy 37
Toms River, NJ 08757

Block 44 Lot 14 Pine Acres LLC
1881 Hwy 37
Toms River, NJ 08757

Block 44 Lot 15.01 Davies Consultants Inc
28510 Sombrero Dr
Bonita Springs, FL 34135

Block 44 Lot 15.02 Pine Acres Mobile Home Park
157 70th St
Avalon, NJ 08202

Block 75.01 Lot 1 Heritage Minerals Inc/Hovsons Inc
4000 Rt 66 Hovchild Plaza
Tinton Falls, NJ 07753

Block 200 Lot 1 Consolidated Rail Corp
6 Penn Center Plaza
Philadelphia, PA 19103

Comcast
830 Route 37 West
Toms River, NJ 08755

Manchester Township
Clerk's Office
1 Colonial Drive
Manchester, NJ 08759

NJ Natural Gas
PO Box 1464
Wall, NJ 07719

Verizon, Eng Dept
PO Box 152206
Irving, TX 75015

NJ DEP
CN 401
Trenton, NJ 08625

Ocean County MUA
PO Box P
Bayville, NJ 08721

GPU
400 Lincoln Street
Phillipsburg, NJ 08865

NJDOT
Route 79 & Daniels Way
Freehold, NJ 07728

Ocean County Road Dept
119 Hooper Avenue
Toms River, NJ 08753

GRADING AND DRAINAGE NOTES

1) THE CONTRACTOR SHALL PROTECT VEGETATION IN AREAS THAT ARE TO BE LEFT IN THE NATURAL STATE.

2) ALL STRUCTURES TO BE SET ON A COMPACTED BASE, 6" THICK OF CLEAN CRUSHED STONE CONFORMING TO NJDOT #57 COARSE AGGREGATE.

3) ALL STORM STRUCTURES TO BE PRECAST REINFORCED CONCRETE UNLESS OTHERWISE APPROVED BY THE ENGINEER.

4) ALL STORM SEWER TO BE CLASS III, WALL B, AS PER ASTM C-76 WITH RUBBER "O" RING JOINTS CONFORMING TO ASTM C-443, UNLESS OTHERWISE SPECIFIED.

5) ALL PRECAST DRAINAGE STRUCTURES SHALL CONTAIN REINFORCING STEEL AND BE DESIGNED FOR HS-20 LOADING.

6) ANY DRAINAGE STRUCTURE THAT IS TO BE LEFT UNCOVERED FOR MORE THAN 8 HOURS SHALL BE PROTECTED WITH BARRICADES IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES OR OSHA STANDARDS.

7) HDPE STORM PIPE SHALL COMPLY WITH THE MOST CURRENT AASHTO DESIGNATION M294, TYPE S OR SP, AND SHALL CONFORM TO ASTM D3350 WITH SMOOTH INTERIOR WALLS.

8) CONDUIT OUTLET PROTECTION SHALL BE INSTALLED PRIOR TO THE CONSTRUCTION OF ANY PIPE RUN.

9) ALL JOINTS SHALL BE MORTARED WITH 2:1 SAND MORTAR UNLESS OTHERWISE NOTED ON THE PLANS.

10) THE CONTRACTOR SHALL NOTIFY THE UNDERSIGNED PROFESSIONAL IMMEDIATLEY IF ANY FIELD CONDITIONS ENCOUNTERED DIFFER MATERIALLY FROM THOSE REPRESENTED HEREON. SUCH CONDITIONS COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE OR INEFFECTIVE.

11) ANY WASTE, DEBRIS OR ANY OTHER SIMILAR MATERIAL FOUND ON SITE OR GENERATED BY OPERATIONS DURING CONSTRUCTION SHALL BE PROPERLY REMOVED AND DISPOSED OF BY THE DEVELOPER IN ACCORDANCE WITH ALL APPLICABLE LAWS & REGULATIONS.

12) ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH CURRENT OSHA LAW AND STATE GOVERNING SAFETY CODES.

SANITARY SEWER NOTES:

1) THE AUTHORITY SHALL BE NOTIFIED 72 HOURS IN ADVANCE OF SEWER INSTALLATION. NO SEWERS SHALL BE INSTALLED WITHOUT INSPECTION BY THE AUTHORITY'S ENGINEER.

2) ALL TELEPHONE, ELECTRIC AND GAS LINES WILL BE INSTALLED UNDERGROUND. CROSSINGS OF PROPOSED PAVEMENT WILL BE INSTALLED PRIOR TO THE CONSTRUCTION OF PAVEMENT BASE COURSE.

3) THE CONTRACTOR SHALL NOTIFY THE UNDERSIGNED PROFESSIONAL IMMEDIATELY IF ANY FIELD CONDITIONS ENCOUNTERED DIFFER MATERIALLY FROM THOSE REPRESENTED HEREON. SUCH CONDITIONS COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE OR INEFFECTIVE.

4) THE CONTRACTOR IS RESPONSIBLE FOR PROJECT SAFETY INCLUDING PROVISIONS OF ALL APPROPRIATE SAFETY DEVISED AND TRAINING REQUIRED.

5) ALL SANITARY SEWER TO BE 8" SDR-35 PVC PIPE UNLESS OTHERWISE SPECIFIED. FITTINGS SHALL BE SDR 35 AND SHALL CONFORM TO ASTM-D3034. THE POLYVINYL CHLORIDE COMPOUNDS FOR THE PIPE SHALL HAVE A CELL CLASSIFICATION OF 12454-B (WITH MINIMUM TENSILE MODULUS OF 500,000 PSI) AS DEFINED IN ASTM-D1784.

6) ALL PIPES AND FITINGS THAT WILL BE INSTALLED AT A DEPTH OF 16 FEET OR MORE SHALL BE C-900.

7) ANY DUCTILE IRON PIPE USED FOR SANITARY SEWER SHALL HAVE MECHANICAL JOINT FITTINGS AND MUST BE LINED WITH PROTECTO 401 COATING OR AN APPROVED EQUAL.

8) PROPER PIPE COVERAGE IS TO BE MAINTAINED DURING ALL PHASES OF CONSTRUCTION. ALL STORM AND SANITARY SEWER LENGTHS SHOWN HEREON ARE FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.

9) THE SANITARY SEWER SHALL BE SEPERATED FROM ALL WATER MAINS BY A MINIMUM OF TEN (10) FEET HORIZONTALLY AND EIGHTEEN (18) INCHES VERTICALLY. WHENEVER A CROSSING MAY OCCUR, THE WATER MAIN SHOULD BE LOCATED ABOVE THE SANITARY SEWER BY EIGHTEEN (18) INCHES, MINIMUM. IF THIS SEPERATION CANNOT BE MET, THE WATER MAIN MUST BE PROTECTED WITH A CONCRETE CRADLE AND THE SANITARY SEWER MAIN SHALL BE DUCTILE IRON PIPE WITH WATERTIGHT JOINTS AT A MINIMUM DISTANCE OF TEN (10) FEET FROM EACH SIDE OF THE WATERMAIN.

10) PIPE JOINTS SHALL BE INTEGRAL BELL GASKETED JOINTS THAT WHEN ASSEMBLED, FORM A POSITIVE SEAL. THE JOINTS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM-D3211 AND THE LUBRICANT USED FOR ASSEMBLY SHALL BE AS PROVIDED OR RECOMMENDED BY THE PIPE MANUFACTURER AND SHALL HAVE NO DETRIMENTAL EFFECT ON THE GASKET OR THE PIPE.

11) THE PIPE SHALL BE INSTALLED AS SPECIFIED IN ASTM D2321. IN NO CASE SHALL LESS THAN A CLASS III MATERIAL BE USED FOR BEDDING AND HAUNCHING MATERIALS.

12) SIZE OF THE SEWER LATERAL LINES ARE TO BE 4", UNLESS OTHERWISE SPECIFIED.

13) ALL SANITARY LATERALS ARE TO BE SCHEDULE 40 PVC.

WATER DISTRIBUTION NOTES

1) ALL WATER MAIN TO BE CLASS 52 DUCTILE IRON PIPE. PROPER PIPE COVERAGE IS TO BE MAINTAINED DURING ALL PHASES OF CONSTRUCTION.

2) ALL WATER MAINS SHALL BE INSTALLED AT A DEPTH TO OBTAIN A MINIMUM OF THREE AND A HALF (3.5) FEET OF COVER TO THE TOP OF THE PIPE.

3) ALL TELEPHONE, ELECTRIC AND GAS LINES WILL BE INSTALLED UNDERGROUND. CROSSINGS OF PROPOSED PAVEMENT WILL BE INSTALLED PRIOR TO THE CONSTRUCTION OF PAVEMENT BASE COURSE.

4) THE CONTRACTOR SHALL NOTIFY THE UNDERSIGNED PROFESSIONAL IMMEDIATELY IF ANY FIELD CONDITIONS ENCOUNTERED DIFFER MATERIALLY FROM THOSE REPRESENTED HEREON. SUCH CONDITIONS COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE OR INEFFECTIVE.

5) THE CONTRACTOR IS RESPONSIBLE FOR PROJECT SAFETY INCLUDING PROVISION OF ALL APPROPRIATE SAFETY DEVISED AND TRAINING REQUIRED.

6) ALL JOINTS SHALL BE PUSH ON SINGLE GASKET OR MECHANICAL JOINT SINGLE GASKET CONFORMING TO AWWA C111.

7) GATE VALVES SHALL BE COMPOSED OF A DUCTILE IRON BODY WITH RESILIENT WEDGE TYPE GATES.

8) ALL VALVE BOXES MUST BE CENTERED ON VALVE AND MUST BE SET TO FINISHED GRADE.

9) ALL VALVE BOXES FOR HYDRANT ASSEMBLIES MUST BE SET IN PAVEMENT OR PARKING AREA WHERE POSSIBLE. ALL VALVE BOXES MUST BE SET TO FINISHED PAVEMENT SURFACE ELEVATION.

10) ALL THRUST BLOCKS WILL BE CALCULATED IN THE FIELD AND WILL BE FOUNDED ON VIRGIN SOIL.

11) ALL FITTINGS SHALL BE CEMENT LINED DIP WITH MECHANICAL JOINTS ENDS AND RETAINER GLANDS UNLESS OTHERWISE NOTED.

12) THE AUTHORITY SHALL BE NOTIFIED AT LEAST 48 HOURS BEFORE ANY CONSTRUCTION IS TO COMMENCE ON THE WATER SYSTEMS.

PROPOSED IMPERVIOUS SURFACE ON-SITE

Planning Area	Net Land Area	Allowable Impervious	Proposed Impervious
Suburban	45.43 AC	13.63 Ac (30%)	13.39 Ac (29.5%)

PROPOSED TREE PRESERVATION ON-SITE

Planning Area	Net Land Area	Existing Net Forested Area	Required Tree Preservation (Forested)	Existing Net Unforested Area	Required Tree Preservation (Unforested)	Total Required Tree Preservation	Total Proposed Tree Preservation
Suburban	45.43 Ac	23.77 Ac	8.32Ac (35%)	21.66 Ac	1.08 Ac (5%)	9.40 Ac	11.98 Ac

PROPOSED HERBACEOUS & SHRUB PLANTING ON-SITE

Planning Area	Net Land Area	Allowable Impervious	Required Tree Preservation	Allowable Herb / Shrub	Proposed Herb / Shrub
Suburban	45.43 Ac	13.63 Ac	9.40 Ac	22.40 Ac	20.06 Ac

GENERAL NOTES:

1) THE SUBJECT PROPERTY IS KNOWN AS LOT 15.02 IN BLOCK 44 AS SHOWN ON THE OFFICIAL TAX MAP OF THE MUNICIPALITY OF MANCHESTER, OCEAN COUNTY, NJ.

2) THE PROPERTY IS LOCATED IN THE HD 3 ZONE AND CONTAINS A TOTAL TRACT AREA OF 45.43 ACRES.

3) Existing Use: VACANT (PREVIOUS ASPHALT PLANT)

4) Proposed Use: RESIDENTIAL, FUELING STATION, RETAIL

5) APPLICANT: KAREN REALTY GROUP
150 TENNIS CT
WALL, NJ 07719

OWNER: DAVIES CONSULTANTS
28510 SOMBRERO DRIVE
BONITA SPRINGS, FL 34135

6) OUTBOUND INFORMATION AND TOPOGRAPHIC INFORMATION TAKEN FROM A PLAN ENTITLED "BOUNDARY & TOPOGRAPHIC SURVEY 2065 N.J.S.H ROUTE 37 LOT 15.01 BLOCK 44 SITUATED IN TOWNSHIP OF MANCHESTER, OCEAN COUNTY, NEW JERSEY" PREPARED BY FWH ASSOCIATES P.A DATED 8-3-18 SIGNED BY WILLIAM P. SCHEMEL PROFESSIONAL LAND SURVEYOR

7) PHYSICAL LOCATION OF FEATURES PROVIDED BY VERTEX AERIAL MAPPING DATED 2-4-17

8) VERTICAL DATUM: NAVD 1988, DERIVED FROM GPS OBSEREVATIONS

9) BENCHMARK: TOP OF MONUMENT EAST BOUND N.J.S.H ROUTE 37
ELEVATION: 75.72

10) FRESH WATER WETLANDS HAVE BEEN IDENTIFIED ONSITE

11) NO 100 YEAR FLOOD PLAINS ARE KNOWN TO EXIST ON THE SITE PER THE FLOOD INSURANCE RATE MAP FOR THE MUNICIPALLITY OF MANCHESTER, OCEAN COUNTY, NJ

12) SOIL TEST PIT LOGS ARE PROVIDED IN A REPORT ENTITLED "STORMWATER MANAGEMENT REPORT", PREPARED FWH ASSOCIATES P.A.

13) MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:

A. RESIDENTIAL SITE IMPROVEMENT STANDARDS (N.J.A.C. 5:21).
B. NEW JERSEY DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICAIONS FOR ROAD AND BRIDGE CONSTRUCTION", 2007; AS SUPPLEMENTED.
C. CURRENT PREVAILING MUNICIPAL, COUNTY, AND/OR STATE AGENCY SPECIFICATIONS, STANDARDS, CONDITIONS, AND REQUIREMENTS.
D. CURRENT PREVAILING UTILITY COMPANY/AUTHORITY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
E. CURRENCT MANUFACTURER SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.

14) GAS, ELECTRIC, LIGHTING, CABLE TELEVISION, AND ELECTRICAL SERVICE PLANS, IF REQUIRED, SHALL BE PREPARED BY THE RESPECTIVE UTILITY COMPANIES THAT SERVICE THE AREA PRIOR TO SITE CONSTRUCTION AND SHALL BE INSTALLED PER ORDINANCE REQUIREMENTS.

15) TELEPHONE, ELECTRIC, AND GAS LINES WILL BE INSTALLED UNDERGROUND. CROSSINGS OF PROPOSED PAVEMENTS WILL BE INSTALLED PRIOR TO THE CONSTRUCTION OF PAVEMENT BASE COURSE.

16) THE SIZE AND LOCATION OF STRUCTURES WITHIN 200' ARE APPROXIMATE.

17) BUILDING FOOTPRINT DIMENSIONS SHOW HEREON ARE APPROXIMATE. FINAL BUILDING FOOTPRINT DIMENSIONS FOR EACH DWELLING/BUILDING SHALL BE FURNISHED ON THE INDIVIDUAL PLOT PLANS/ARCHITECTURAL PLANS AT THE TIME OF APPLICATION FOR A BUILDING PERMIT. ALL STRUCTURES SHALL CONFORM TO THE APPROVED BULK ZONING REQUIREMENTS.

18) ALL TRAFFIC CONTROL, SIGNAGE AND STRIPING SHALL BE IN CONFORMANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION, CHAPTER 105.

19) CURBS SHALL BE DEPRESSED FLUSH WITH PAVEMENT, AND HANDICAPPED ACCESSIBLE RAMPS INSTALLED WHERE SIDEWALKS AND CROSSWALKS INTERSECT SAME. DETECTABLE WARNINGS SHALL BE INCLUDED ON HANDICAP ACCESSIBLE RAMPS LOCATED ON PUBLIC ROADWAYS AND WHERE OTHERWISE DIRECTED BY A REGULATORY AGENCY HAVING JURISDICTION.

20) THE CONTRACTOR IS DIRECTED TO THE FACT THAT THE APPROXIMATE LOCATIONS OF KNOWN UTILITY STRUCTURES AND FACILITIES THAT MAY BE ENCOUNTERED WITHIN AND ADJACENT TO THE LIMITS OF THE WORK ARE SHOWN ON THE PLANS. THE ACCURACY AND COMPLETENESS OF THIS INFORMATION IS NOT GUARANTEED BY THE ENGINEER, AND THE CONTRACTOR IS ADVISED TO VERIFY IN THE FIELD ALL THE FACTS CONCERNING THE LOCATION OF THESE UTILITIES PRIOR TO CONSTRUCTION.

21) STREET SURFACES AND OTHER SURFACES DISTURBED BY THE CONSTRUCTION OF FACILITIES FOR THIS PROJECT SHALL BE RESTORED IN ACCORDANCE WITH THE REQUIREMENTS OF THE TOWNSHIP OF TOMS RIVER, THE COUNTY OF OCEAN AND THE THE STATE OF NJ.

22) THE OWNER WILL SECURE ALL NECESSARY PERMITS FROM MUNICIPAL, COUNTY, OR STATE AGENCIES PRIOR TO THE START OF CONSTRUCTION.

23) THE OWNER OR HIS REPRESENTATIVE SHALL DESIGNATE AN INDIVIDUAL RESPONSIBLE FOR THE CONSTRUCTION SITE SAFETY DURING THE COURSE OF THE SITE IMPROVEMENT PURSUANT TO N.J.A.C. 5: 23-2.21(e) OF THE NEW JERSEY UNIFORM CONSTRUCTION CODE AND CFR 1926.3 (OSHA COMPETENT PERSON).

24) THE CONTRACTOR SHALL PROTECT VEGETATION IN AREAS THAT ARE TO BE LEFT IN THE NATURAL STATE.

25) ANY DRAINAGE STRUCTURE THAT IS TO BE LEFT UNCOVERED FOR MORE THAN 8 HOURS SHALL BE PROTECTED WITH BARRICADES IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES OR OSHA STANDARDS.

DATE	REVISION	DRAWN	CHECKED	RELEASED

PROJECT NOTES

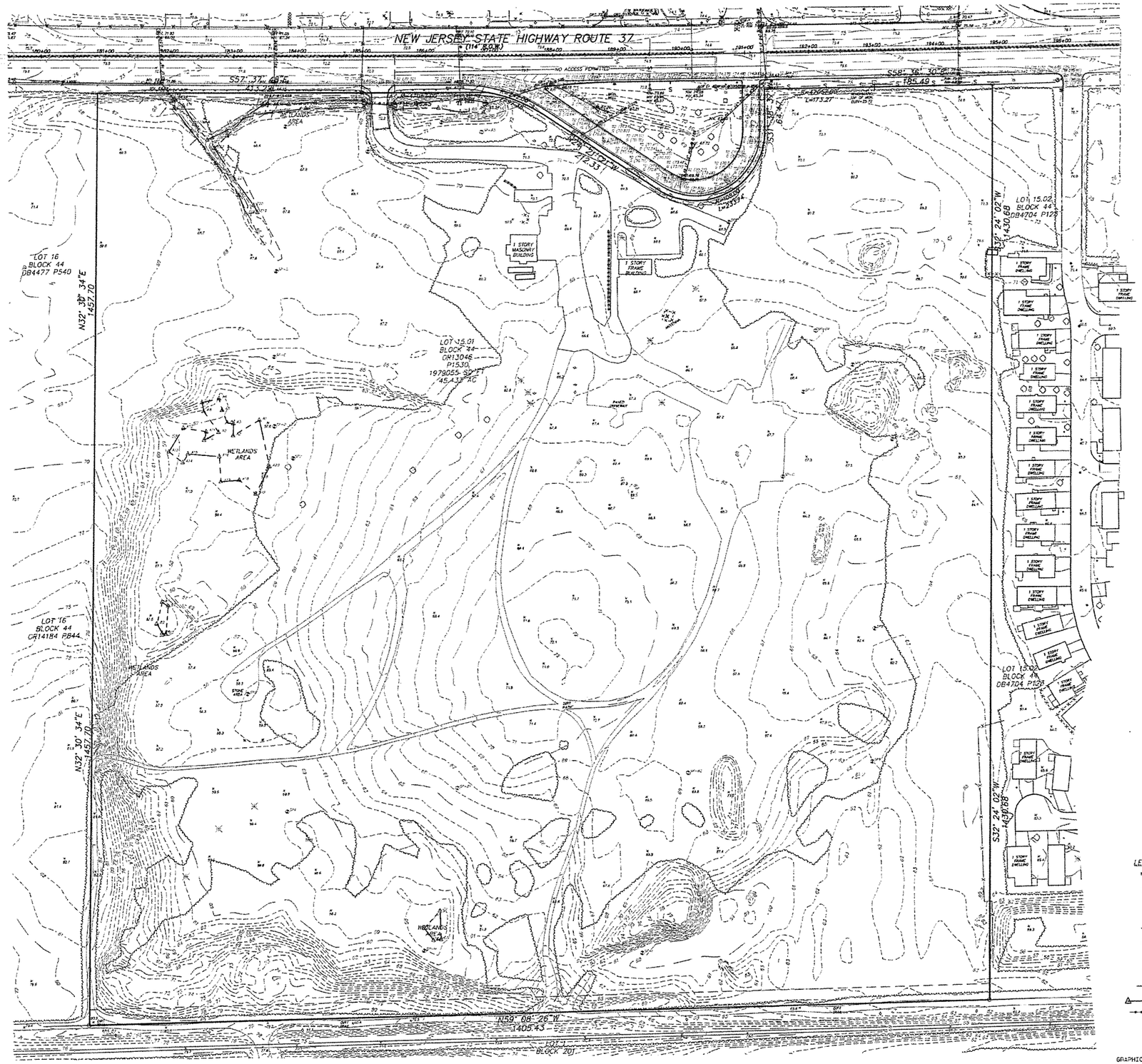
PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESERVE SPECIALISTS
ARCHITECTS
FWHASSOCIATES.COM
1856 Rt. 9, Toms River, NJ 08755 T: 732.797.3100 F: 732.797.0223

Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY: CSJ	DATE: 8/10/18
DESIGNED BY: JS	SCALE: N.T.S.
CHECKED BY: JS	DRAWING NO.: PD-170
RELEASED BY: BPM	PROJECT NO.: 1423.0016
SHEET NO.: 2	OF: 39



Soil Pit #	Ground Elevation	ESHW Elevation	GW Elevation	Perm Elevation	Perm. Rate in/hr	Comment
1	69.1	56.1	> 54.1	66.1	71.13	
2	57.50	52.92	50.50	53.50	57.73	Clay layer 52.5-49.5
3	59.00	55.00	52.00	55.67	18.11	
4	59.10	55.10	53.10	55.10	17.62	Basin 4
5	68.40	57.40	55.07	63.40	37.30	
6	66.20	55.20	53.20	57.20	37.68	Basin 3
7	68.50	57.50	55.50	64.50	38.32	
8	63.30	54.30	52.30	59.97	51.11	
9	61.80	56.80	52.80	58.47	16.80	Basin 4
A	68.30	57.05	55.30	60.80	22.15	Basin 1
B	70.00	57.00	> 55.0	59.58	< 0.2	Basin 1 Clay layer 61.67 - 57.0
C	67.60	57.10	55.27	59.60	37.11	Basin 2
D	57.70	55.20	53.45	55.62	8.51	Ex Sump 2
E	65.20	54.53	52.70	60.20	30.71	Basin 2
F	66.50	55.00	52.83	61.50	< 0.2	Basin 3 Clay layer 65.5 - 56.75
				58.17	< 0.2	
G	67.50	56.25	53.17	59.17	<0.2	Clay layer 56.67 - 56.25
				56.67	<0.2	
H	58.20	55.78	54.53	55.70	4.29	Ex Sump 5
I	60.50	55.08	53.25	53.83	<0.2	Ex Sump 6
B1	66.10	53.60	52.60	53.43	29.31	Basin 4 Clay layer 55.1 - 54.77
B2	68.90	55.57	53.90	56.40	32.29	Basin 4 Clay layer 58.9 - 56.4
B3	71.4	> 55.4	> 55.4	56.82	18.79	Basin 1
B4	66.1	58.1	56.93	59.10	32.63	Basin 3

LEGEND

- 103.2 x — EXISTING SPOT ELEV
- FIRE HYDRANT
- WATER VALVE
- CO — CLEANOUT
- UTILITY POLE
- CATCH BASIN
- SAN MANHOLE
- ST — STORM MANHOLE
- SIGN
- WETLANDS LINE
- CONC. BARRIER
- BUSH

GRAPHIC SCALE 1" = 60'

0 60 120 180

DATE	REVISION	DRAWN	CHECKED	RELEASED

EXISTING CONDITIONS PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES P.A.

CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
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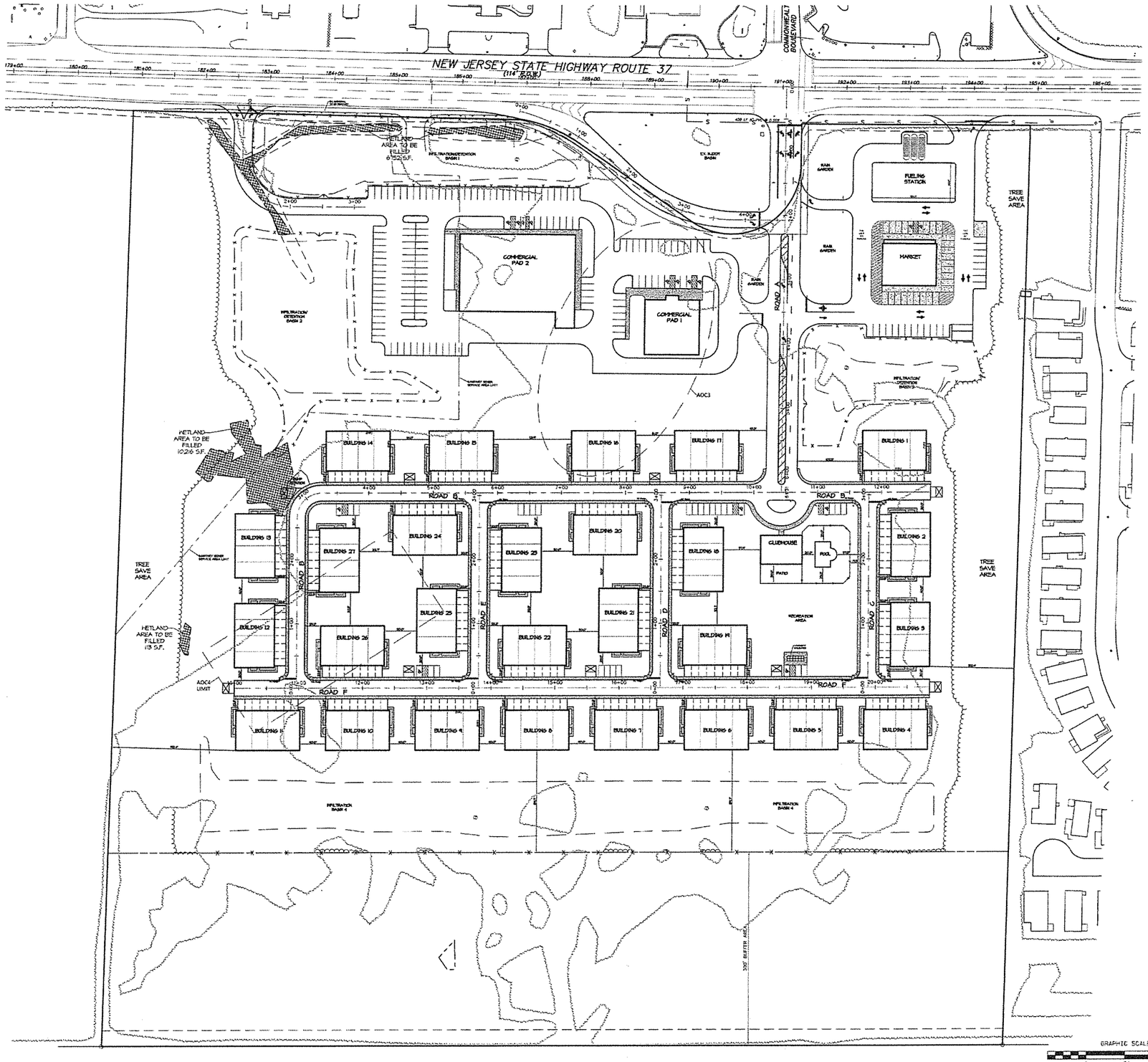
William P. Schemel

PROFESSIONAL LAND SURVEYOR
N.J. LIC. NO. 36275

DRAWN BY CSM	DATE 8/10/18
DESIGNED BY JS	SCALE 1"=60'
CHECKED BY JS	DRAWING NO. FD-170
RELEASED BY MPS	PROJECT NO. 1423.0016
SHEET NO. 3 OF 39	



SEE SHEET 2 FOR ALL ALL PROJECT NOTES

PROPOSED IMPERIVOUS SURFACE ON-SITE

Planning Area	Net Land Area	Allowable Impervious	Proposed Impervious
Suburban	45.43 AC	13.63 Ac (30%)	13.39 Ac (29.5%)

PROPOSED TREE PRESERVATION ON-SITE

Planning Area	Net Land Area	Existing Net Forested Area	Required Tree Preservation (Forested)	Existing Net Unforested Area	Required Tree Preservation (Unforested)	Total Required Tree Preservation	Total Proposed Tree Preservation
Suburban	45.43 Ac	23.77 Ac	8.32Ac (35%)	21.66 Ac	1.08 Ac (5%)	9.40 Ac	11.98 Ac

PROPOSED HERBACEOUS & SHRUB PLANTING ON-SITE

Planning Area	Net Land Area	Allowable Impervious	Required Tree Preservation	Allowable Herb / Shrub	Proposed Herb / Shrub
Suburban	45.43 Ac	13.63 Ac	9.40 Ac	22.40 Ac	20.06 Ac

DATE	REVISION	DRAWN	CHECKED	RELEASED

OVERALL SITE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
CIVIL ENGINEERS
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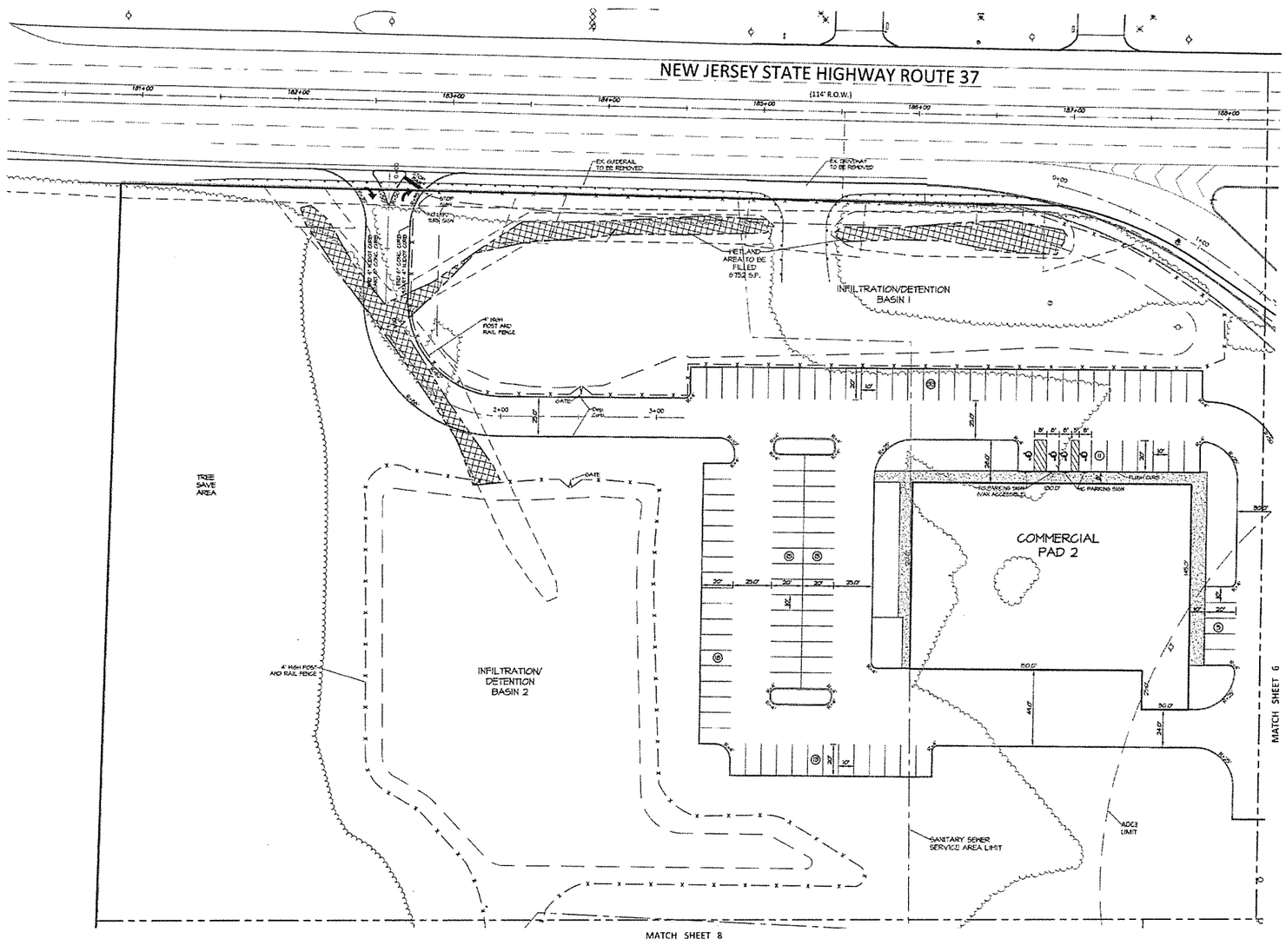
Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

William P. Schemel
PROFESSIONAL LAND SURVEYOR
N.J. LIC. NO. 36275

DRAWN BY: CSM	DATE: 8/10/18
DESIGNED BY: JS	SCALE: 1"=50'
CHECKED BY: JS	DRAWING NO.: PO-170
REVIEWED BY: BPM	PROJECT NO.: 1423.0016
SHEET NO.: 4	OF: 39



GRAPHIC SCALE 1"=30'
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DATE	REVISION	DRAWN	CHECKED	RELEASED

SITE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
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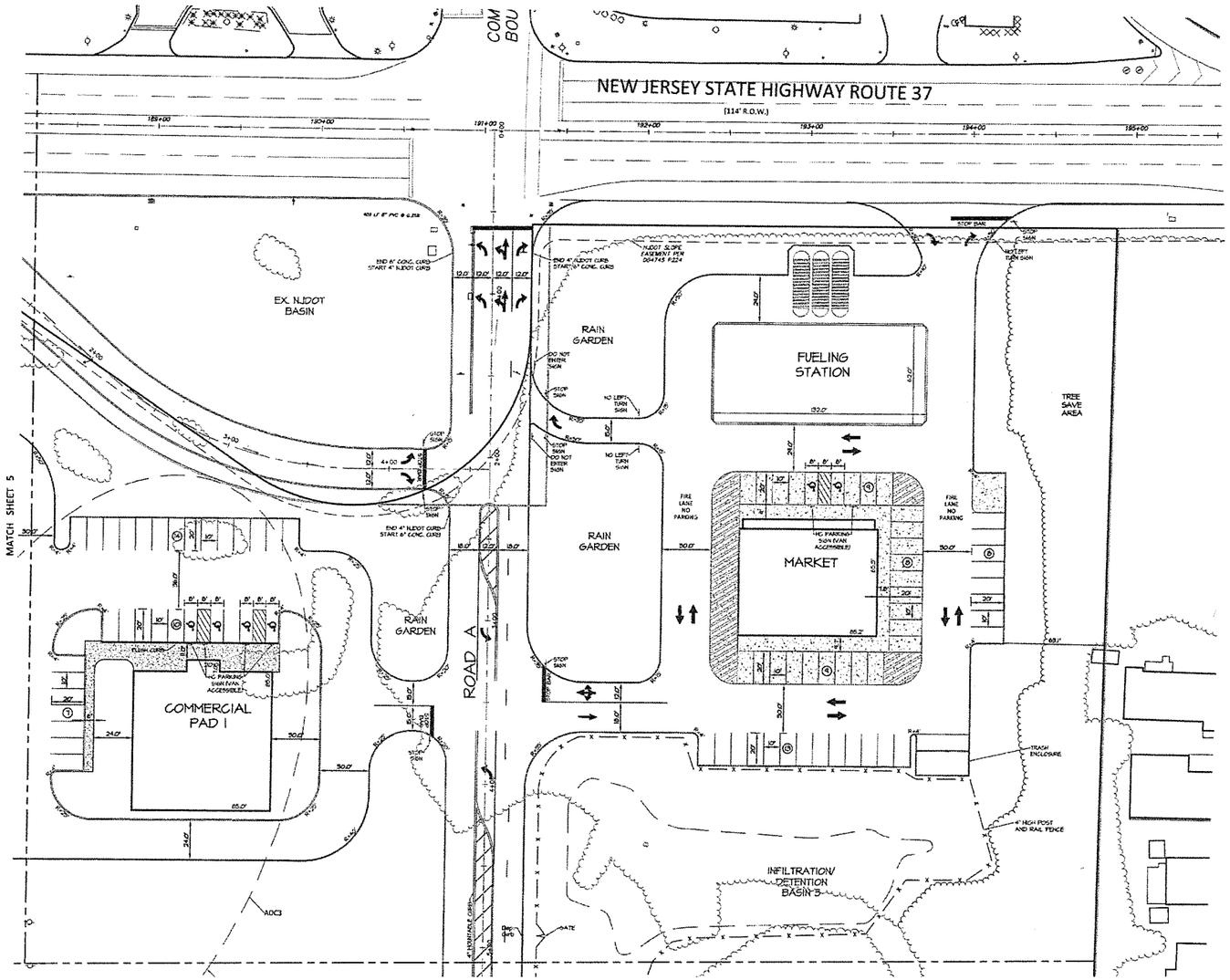
N.J. LIC. NO. 42000

DRAWN BY CSM	DATE 8/10/18
DESIGNED BY JS	SCALE 1"=30'
CHECKED BY JS	WORK NO. PO-170
REVIEWED BY BPM	PROJECT NO. 1423.0016
SHEET NO. 5	OF 39



GRAPHIC SCALE 1"=30'
0 30 60 90

DATE	REVISION	DRAWN	CHECKED	RELEASED

SITE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
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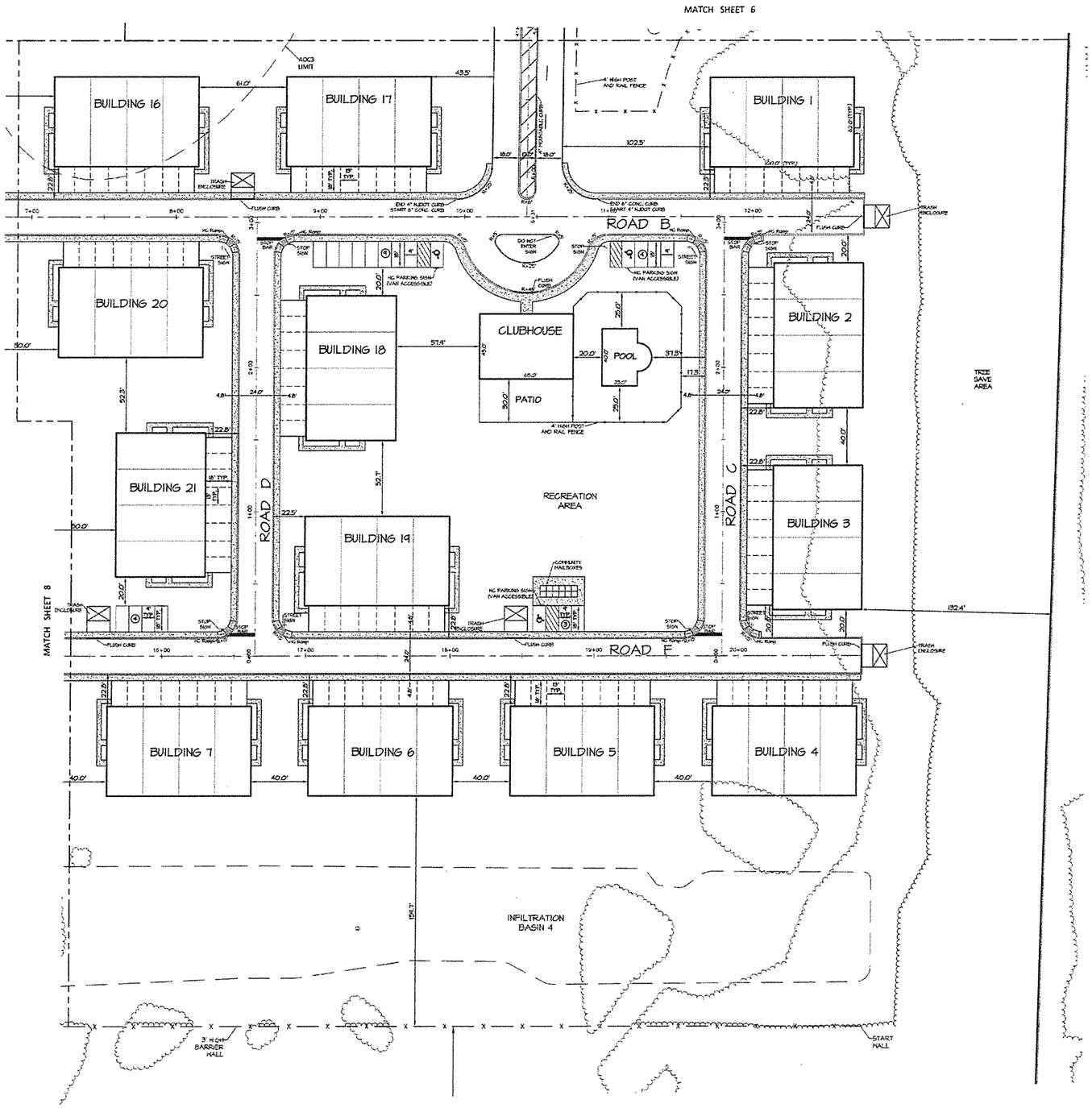
DESIGN BY CSM	DATE 8/10/16
DRAWN BY JS	SCALE 1"=30'
CHECKED BY JS	PROJECT NO. PD-170
RELEASED BY BPM	FILE NO. 1423.0018
SHEET NO. 6	OF 39



DATE	REVISION	DRAWN	CHECKED	RELEASED

SITE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
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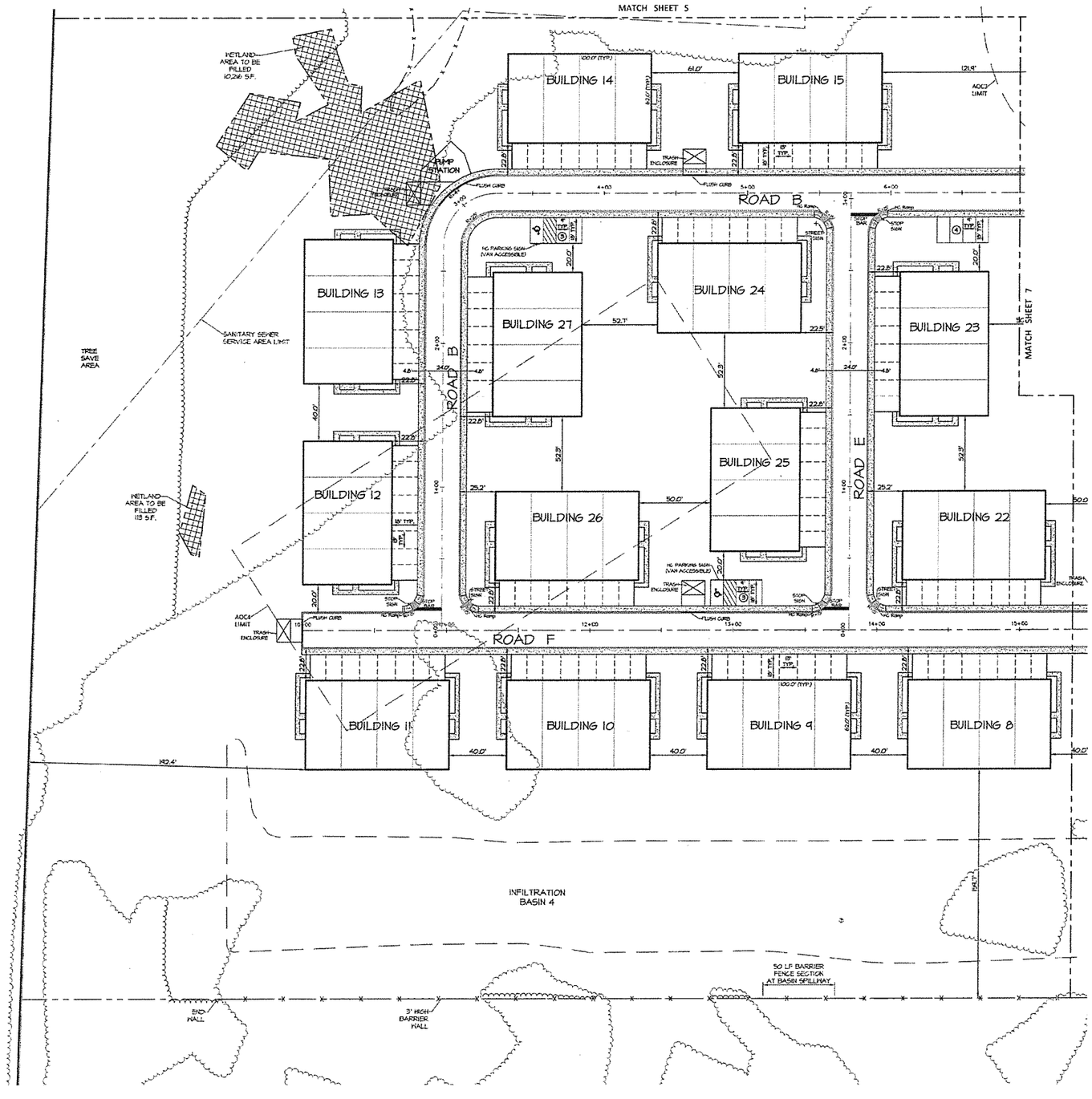
Brian P. Murphy 8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY CSM	DATE 8/10/18
DESIGNED BY JS	SCALE 1"=30'
CHECKED BY JS	DRAWING NO. PO-170
REVIEWED BY BPM	PROJECT NO. 1423.0016
SHEET NO. 7	OF 39



DATE	REVISION	DRAWN	CHECKED	RELEASED

SITE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.

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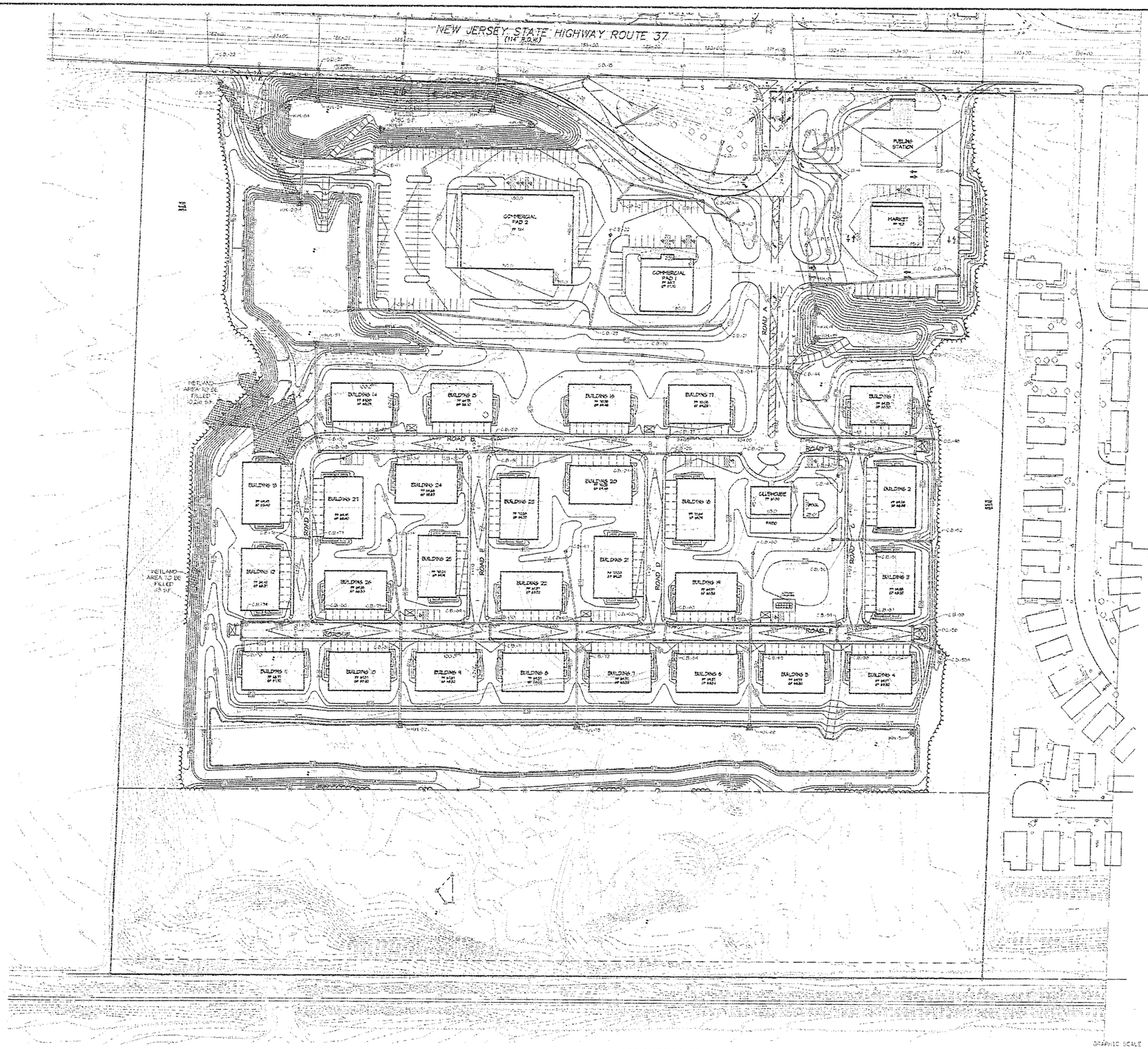
Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY: CSM	DATE: 8/10/18
DESIGNED BY: JS	SCALE: 1"=30'
CHECKED BY: JS	DRAWING No.: PO-170
RECORDED BY: BPM	PROJECT No.: 1423.0016
SHEET No.: 8	OF: 39



Soil Pit #	Ground Elevation	ESHW Elevation	GW Elevation	Perm Elevation	Perm. Rate in/hr	Comment
1	68.1	56.1	>54.1	66.1	71.44	
2	57.50	52.92	50.50	55.50	67.73	Clay layer 52.5-49.5
3	59.00	55.00	52.00	55.67	18.11	
4	59.10	55.10	53.10	55.10	19.62	Basin 4
5	66.40	57.40	55.07	63.40	37.30	
6	66.30	55.30	53.20	57.20	37.64	Basin 3
7	68.50	57.50	55.50	64.50	35.32	
8	63.30	54.30	52.30	59.57	51.11	
9	61.90	55.80	52.80	58.47	16.30	Basin 4
A	62.30	57.05	55.30	60.60	22.15	Basin 1
B	70.00	57.00	>55.0	59.58	<0.2	Basin 1 Clay layer 61.67 - 57.0
C	67.60	57.10	55.27	59.60	37.11	Basin 2
D	57.70	55.70	52.42	55.62	8.31	Ex Sump 2
E	65.20	54.53	52.70	60.20	30.71	Basin 2
F	66.50	55.00	52.53	61.50	<0.2	Basin 2 Clay layer 65.5 - 56.75
				58.17	<0.2	
G	67.50	56.25	53.17	60.17	<0.2	Clay layer 56.67 - 56.25
				56.67	<0.2	
H	55.20	55.73	54.53	55.70	4.29	Ex Sump 5
I	60.50	55.00	53.25	53.62	<0.2	Ex Sump 6
B1	66.10	53.60	52.50	53.43	28.31	Basin 4 Clay layer 55.1 - 54.77
B2	68.80	55.57	53.90	56.40	32.50	Basin 4 Clay layer 55.9 - 56.4
B3	71.4	>55.4	>55.4	56.67	18.70	Basin 1
B4	66.1	58.1	56.93	58.10	32.44	Basin 1

LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- PROPOSED STORM SEWER
- F.F. 75.00 FINISH FLOOR ELEVATION
- G.F. 75.00 GARAGE FLOOR ELEVATION
- B.F. 75.00 BASEMENT FLOOR ELEVATION
- WOODLINE

GRAPHIC SCALE 1" = 60'

0 60 120 180

SEE SHEET 2 FOR ALL GRADING AND DRAINAGE NOTES

DATE	REVISION	DRAWN	CHECKED	RELEASED

OVERALL GRADING AND DRAINAGE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

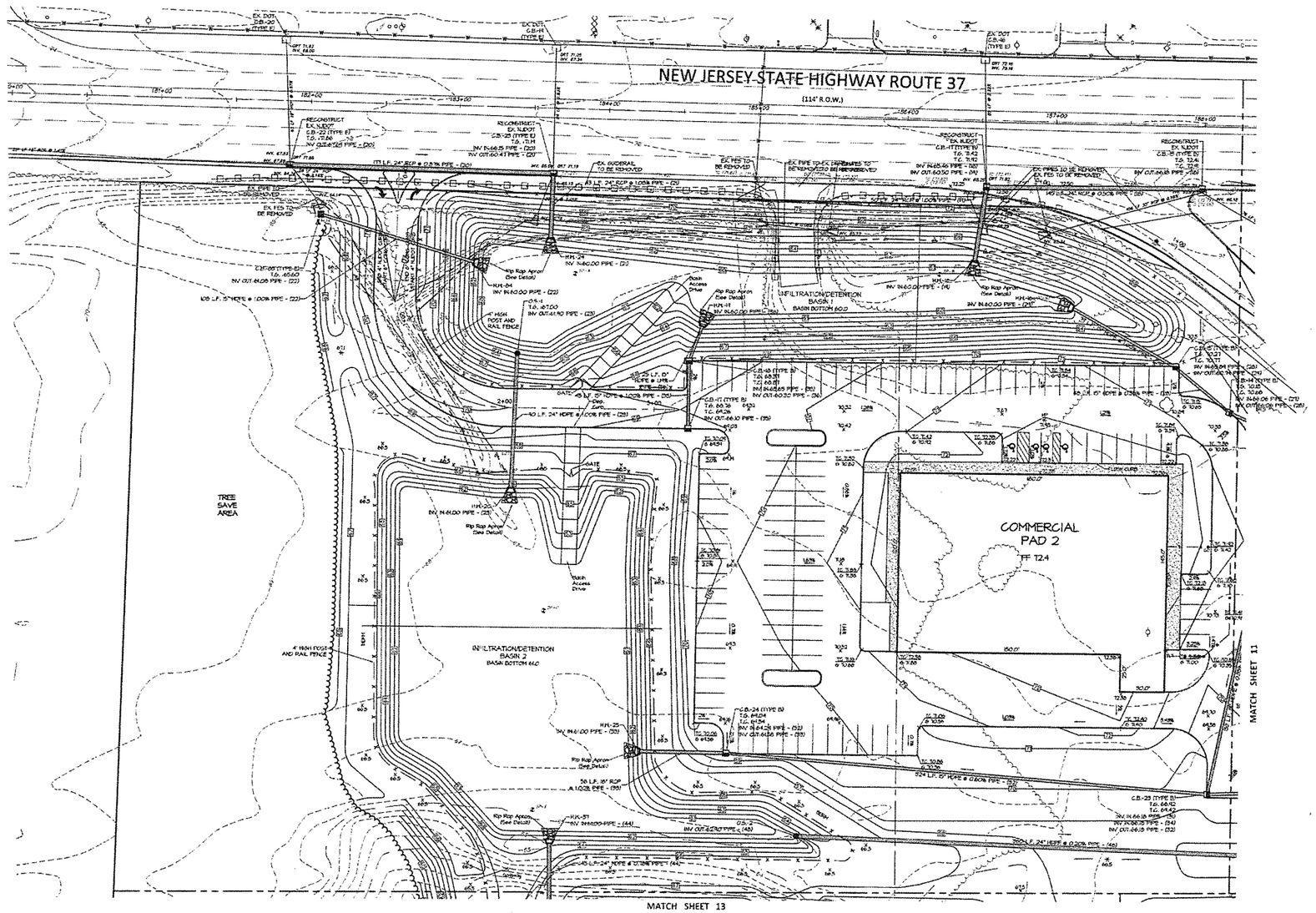
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESEARCH SPECIALISTS
ARCHITECTS

FWHASSOCIATES.COM

Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY: CSM	DATE: 8/10/18
DESIGNED BY: JS	SCALE: 1"=60'
CHECKED BY: JS	DRAWING NO.: 70-170
SUBMITTED BY: BPM	PROJECT NO.: 1423.0016
SHEET NO.: 2	39



LEGEND

75	EXISTING CONTOUR
75	PROPOSED CONTOUR
x (87.5)	EXISTING SPOT ELEVATION
75.42	PROPOSED SPOT ELEVATION
	PROPOSED STORM SEWER
F.F. 75.00	FINISH FLOOR ELEVATION
G.F. 75.00	GARAGE FLOOR ELEVATION
B.F. 75.00	BASEMENT FLOOR ELEVATION
	WOODSLINE

GRAPHIC SCALE 1"=30'

0 30 60 90

SEE SHEET 2 FOR ALL GRADING AND DRAINAGE NOTES

DATE	REVISION	DRAWN	CHECKED	RELEASED

GRADING AND DRAINAGE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8

SITUATED IN

MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.

CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESIDENT SPECIALISTS
ARCHITECTS

FWHASSOCIATES.COM

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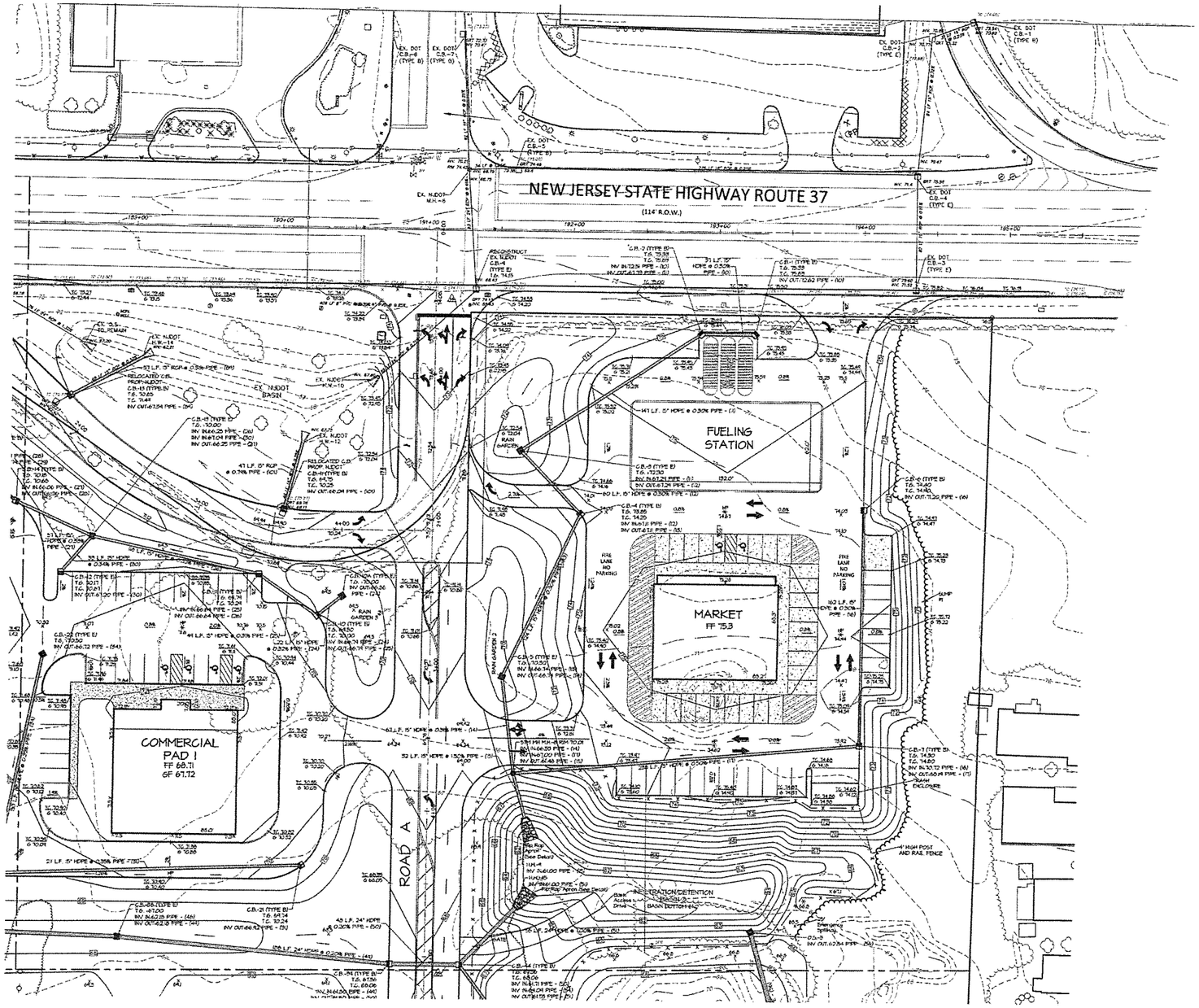
Brian P. Murphy 8/21/19

PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY CSM	DATE 8/10/19
DESIGNED BY JS	SCALE 1"=30'
CHECKED BY JS	DRAWING NO. PG-170
RELEASED BY BPM	PROJECT NO. 1423.0016
SHEET NO. 10	OF 39



LEGEND

75	EXISTING CONTOUR
75	PROPOSED CONTOUR
x (87.3)	EXISTING SPOT ELEVATION
75.42	PROPOSED SPOT ELEVATION
	PROPOSED STORM SEWER
F.F. 75.00	FINISH FLOOR ELEVATION
G.F. 75.00	GARAGE FLOOR ELEVATION
B.F. 75.00	BASEMENT FLOOR ELEVATION
	WOODLINE

GRAPHIC SCALE 1"=30'

0 30 60 90

SEE SHEET 2 FOR ALL GRADING AND DRAINAGE NOTES

DATE	REVISION	DRAWN	CHECKED	RELEASED

GRADING AND DRAINAGE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8

SITUATED IN

MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES

CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESERVE SPECIALISTS
ARCHITECTS

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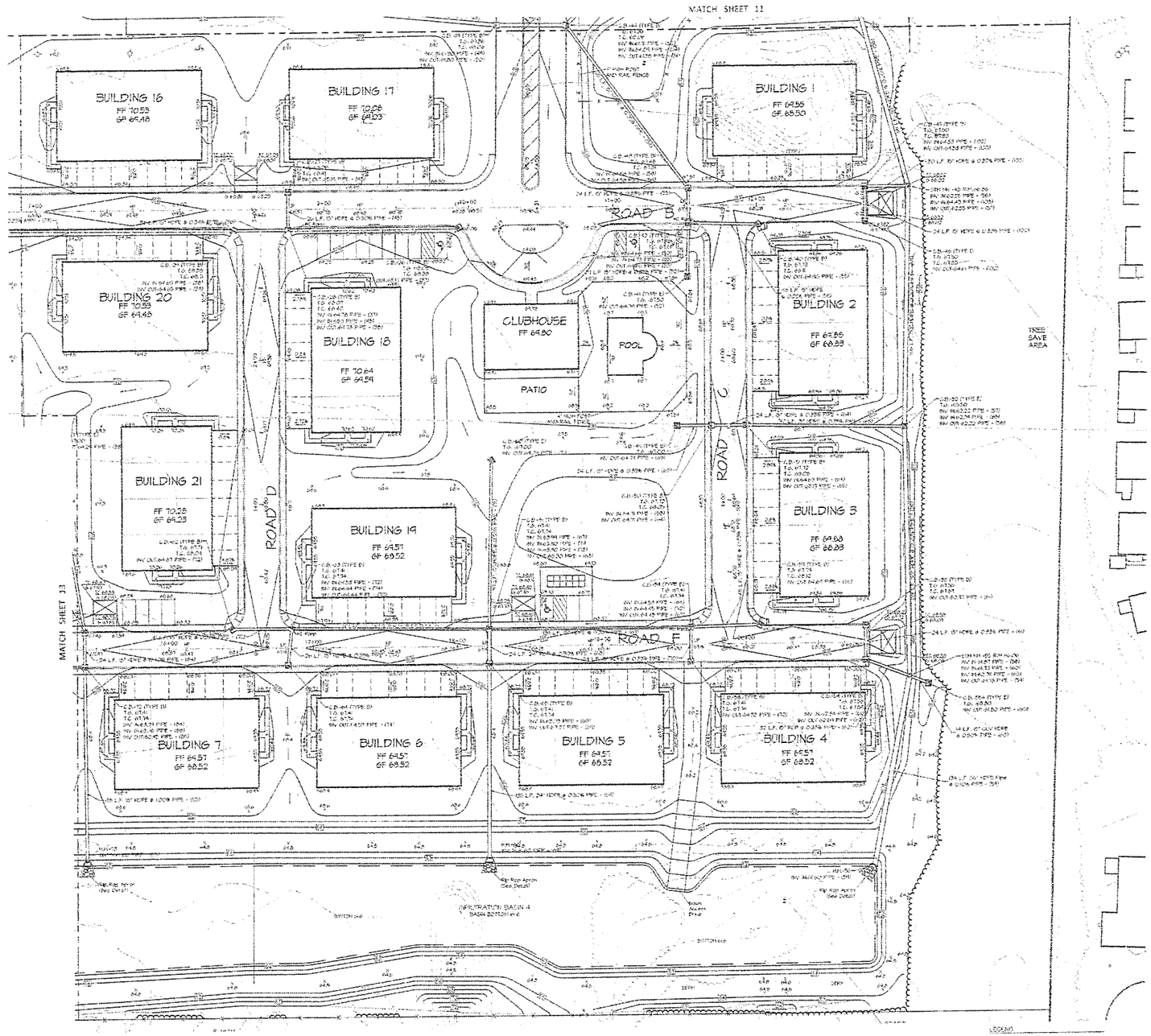
Brian P. Murphy
9/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DESIGN BY CSM	DATE 8/10/18
DRAWN BY JS	SCALE 1"=30'
CHECKED BY JS	PROJECT NO.
RELEASED BY BTM	JOB NO. 1423.0016
SHEET NO. 11	OF 30



LEGEND

	EXISTING CONTOUR
	PROPOSED CONTOUR
	EXISTING SPOT ELEVATION
	PROPOSED SPOT ELEVATION
	PROPOSED STORM SEWER
FF 75.00	FINISH FLOOR ELEVATION
GF 75.00	GARAGE FLOOR ELEVATION
BF 75.00	BASEMENT FLOOR ELEVATION
	WOODSLINE

GRAPHIC SCALE 1"=30'

0 30 60 90

SEE SHEET 2 FOR ALL GRADING AND DRAINAGE NOTES

DATE	REVISION	DRAWN	CHECKED	RELEASED

GRADING AND DRAINAGE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 5
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWHASSOCIATES.COM

Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY: DSM	DATE: 8/10/18
DESIGNED BY: JG	SCALE: 1"=30'
CHECKED BY: JS	DRAWING NO.
REVISED BY: SPM	DATE: 1/23/2018
SHEET NO. 12	39

MATCH SHEET 10

BUILDING 14
FF 69.30
GF 68.25

BUILDING 15
FF 69.75
GF 68.70

ROAD B

BUILDING 13
FF 69.45
GF 68.40

BUILDING 27
FF 69.45
GF 68.40

BUILDING 24
FF 68.66
GF 68.63

BUILDING 23
FF 70.58
GF 69.53

MATCH SHEET 12

ROAD D

ROAD E

BUILDING 12
FF 69.42
GF 68.37

BUILDING 26
FF 69.58
GF 68.50

BUILDING 25
FF 70.24
GF 69.19

BUILDING 22
FF 69.57
GF 68.52

ROAD F

BUILDING 11
FF 69.77
GF 67.72

BUILDING 10
FF 69.57
GF 68.52

BUILDING 9
FF 69.57
GF 68.52

BUILDING 8
FF 69.57
GF 68.52

INFILTRATION BASIN #1
BASIN BOTTOM 61.0

LEGEND:

67	EXISTING CONTOUR
67	PROPOSED CONTOUR
x 67.51	EXISTING SPOT ELEVATION
67.42	PROPOSED SPOT ELEVATION
	PROPOSED STORM SEWER
F.F. 70.00	FINISH FLOOR ELEVATION
G.F. 70.00	GARAGE FLOOR ELEVATION
B.F. 70.00	BASEMENT FLOOR ELEVATION
	FOOTLINE

GRAPHIC SCALE 1" = 30'
0 30 60 90

SEE SHEET 2 FOR ALL GRADING AND DRAINAGE NOTES

DATE	REVISION	DRAWN	CHECKED	SUBMITTED

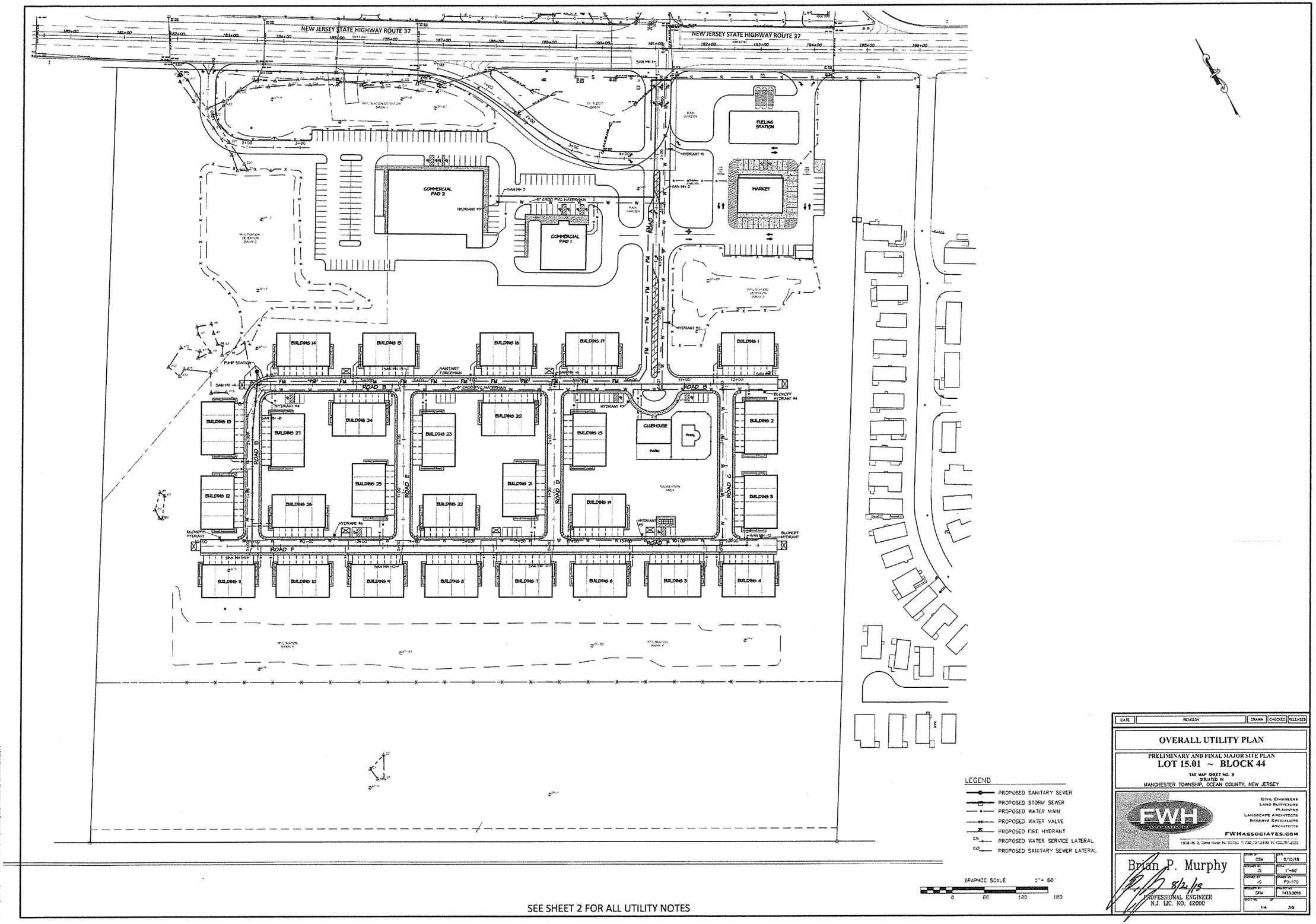
GRADING AND DRAINAGE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESERVE SPECIALISTS
ARCHITECTS
FWHASSOCIATES.COM

Brian P. Murphy
PROFESSIONAL ENGINEER
N.J. LIC. NO. 40000

DRAWN BY: CSM	DATE: 6/10/14
REVISED: JS	DATE: 7/30
REVISED: JS	DATE:
REVISED: BPM	DATE: 1/23/2015
SHEET NO. 13	OF 30



SEE SHEET 2 FOR ALL UTILITY NOTES

DATE	REVISION	DRAWN	CHECKED	RELEASED

OVERALL UTILITY PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
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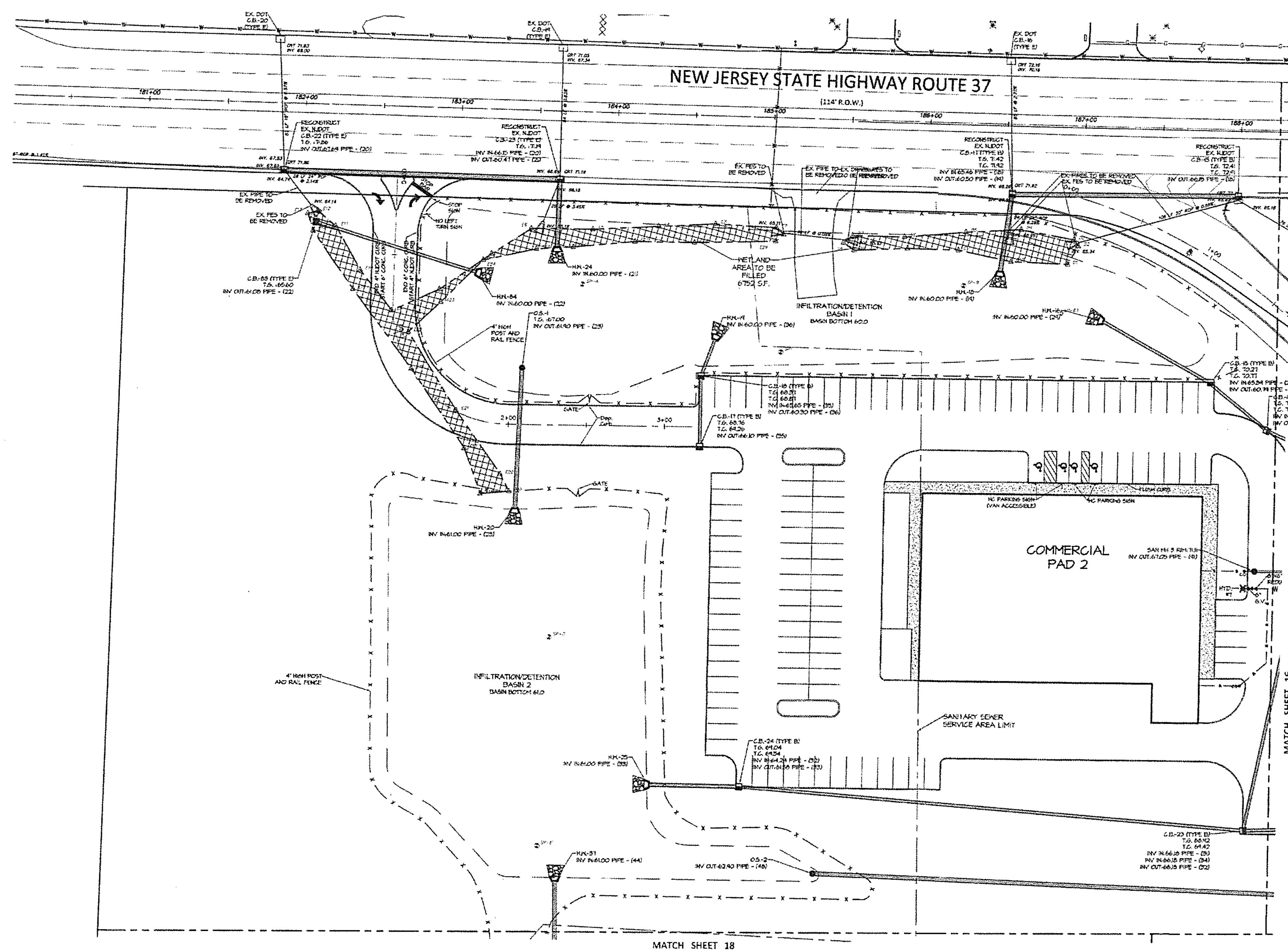
Brian P. Murphy
8/2/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY: CSM	DATE: 8/10/18
DESIGNED BY: JS	SCALE: 1"=60'
CHECKED BY: JS	DRAWING NO.: F0-170
RELEASED BY: GPM	PROJECT NO.: 1423.0016
SHEET NO.: 14 OF 39	



Crossing #	Sanitary	Water	Storm	Clearance	
1	inv 62.53		inv 64.68	1.25'	C.C.
2	inv 61.57		inv 65.15	2.68'	
3	inv 60.49		inv 64.81	3.42'	
4	inv 59.82		inv 64.36	3.64'	
5	inv 59.38		inv 62.16	1.82'	
6	inv 62.25		inv 64.49	2.71'	
7	inv 61.77		inv 63.23	0.50'	C.C.
8	inv 61.28		inv 64.49	2.31'	
9	inv 60.69		inv 63.84	2.25'	
10	inv 60.20		inv 64.49	2.33'	
11	inv 59.60		inv 62.00	1.44'	C.C.
12	inv 58.90		inv 62.78	2.98'	
13	inv 58.42		inv 64.35	5.04'	
14	inv 65.02	inv 68.43		2.71'	
15		inv 59.79	inv 61.73	1.00'	C.C.
16	inv 62.21	inv 64.42		1.50'	
17		inv 62.84	inv 64.72	1.00'	C.C.
18		inv 63.24	inv 65.12	1.00'	C.C.
19		inv 62.90	inv 64.78	1.00'	C.C.
20		inv 62.45	inv 64.33	1.00'	C.C.
21		inv 60.23	inv 62.17	1.00'	C.C.
22	inv 57.69	inv 63.08		4.48'	
23		inv 62.51	inv 64.99	1.00'	C.C.
24		inv 60.95	inv 62.81	1.00'	C.C.
25	inv 58.80	inv 61.95		2.35'	
26		inv 60.06	inv 62.00	1.00'	C.C.
27		inv 62.65	inv 64.52	1.00'	C.C.
28		inv 62.00	inv 63.88	1.00'	C.C.
29		inv 62.00	inv 64.45	1.57'	
30		inv 61.35	inv 63.29	1.00'	C.C.
31		inv 62.58	inv 64.46	1.00'	C.C.
32		inv 62.72	inv 64.60	1.14'	C.C.
33		inv 62.43	inv 64.69	1.38'	C.C.
34		inv 62.43	inv 64.81	1.5'	

LEGEND

- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED WATER MAIN
- PROPOSED WATER VALVE
- PROPOSED FIRE HYDRANT
- GS PROPOSED WATER SERVICE LATERAL
- CO PROPOSED SANITARY SEWER LATERAL

GRAPHIC SCALE 1"=30'

0 30 60 90

SEE SHEET 2 FOR ALL UTILITY NOTES

DATE	REVISION	DRAWN	CHECKED	RELEASED

UTILITY PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
Civil Engineers
Land Surveyors
Planners
Landscape Architects
Reserve Specialists
Architects
FWHASSOCIATES.COM
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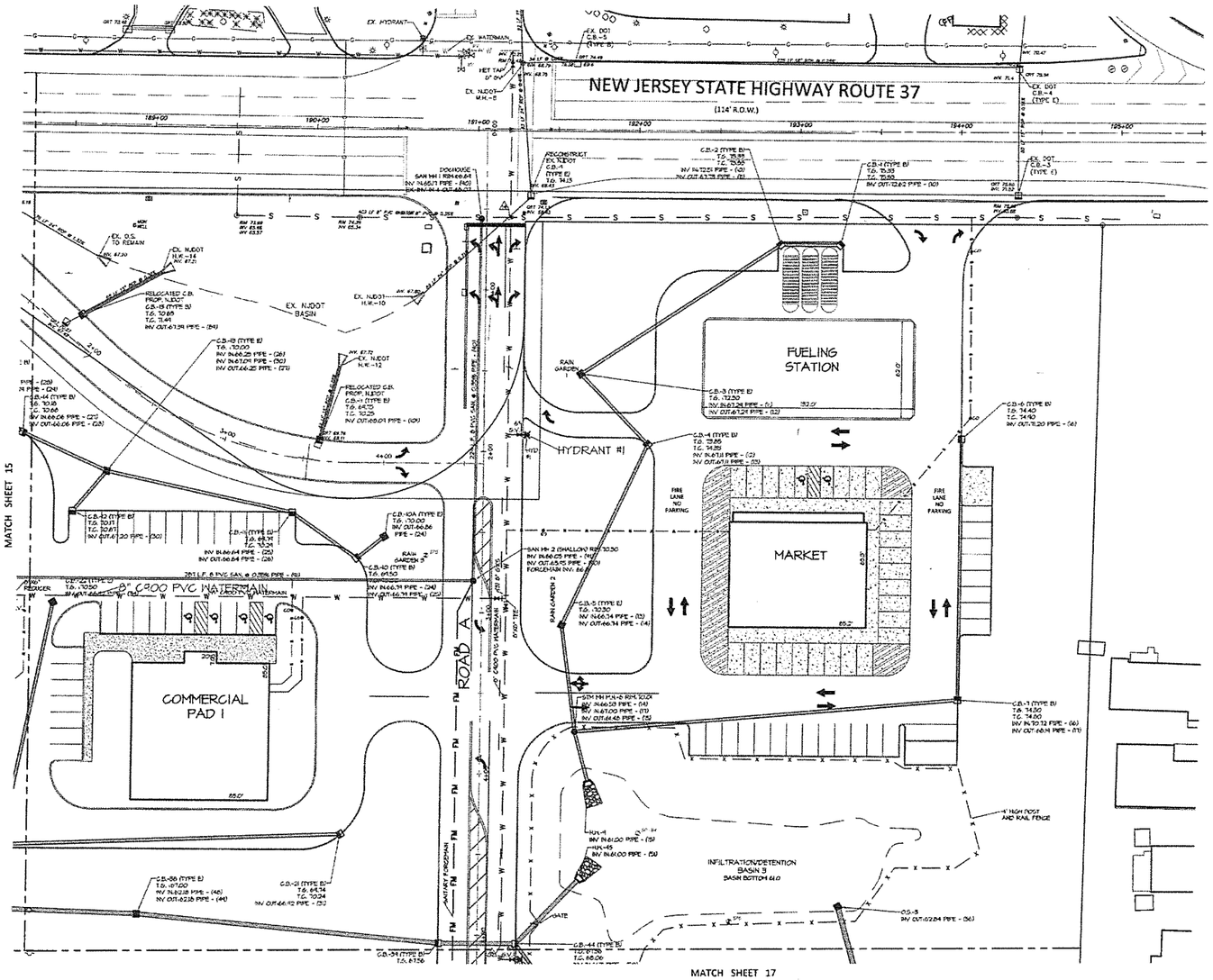
Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY: CSM	DATE: 5/10/18
DESIGNED BY: JS	SCALE: 1"=30'
CHECKED BY: JS	DRAWING NO.: FD-170
RELEASED BY: BPM	PROJECT NO.: 1423.0016
SHEET NO.: 15	OF: 39



Crossing #	Sanitary	Water	Storm	Clearance	
1	Inv 62.53		Inv 64.68	1.25'	C.C.
2	Inv 61.37		Inv 65.15	2.68'	
3	Inv 60.49		Inv 64.81	3.42'	
4	Inv 59.82		Inv 64.36	3.64'	
5	Inv 59.58		Inv 62.16	1.82'	
6	Inv 62.25		Inv 64.49	2.71'	
7	Inv 61.77		Inv 63.23	0.50'	C.C.
8	Inv 61.28		Inv 64.49	2.33'	
9	Inv 60.69		Inv 63.94	2.25'	
10	Inv 60.20		Inv 64.49	1.39'	
11	Inv 59.60		Inv 62.00	1.44'	C.C.
12	Inv 58.90		Inv 62.78	2.98'	
13	Inv 58.42		Inv 64.36	5.04'	
14	Inv 65.01	Inv 68.43		2.71'	
15		Inv 59.79	Inv 61.73	1.00'	C.C.
16	Inv 62.21	Inv 64.42		1.50'	
17		Inv 62.84	Inv 64.72	1.00'	C.C.
18		Inv 63.24	Inv 65.12	1.00'	C.C.
19		Inv 62.90	Inv 64.78	1.00'	C.C.
20		Inv 62.45	Inv 64.33	1.00'	C.C.
21		Inv 60.23	Inv 62.17	1.00'	C.C.
22	Inv 57.89	Inv 61.08		4.48'	
23		Inv 62.51	Inv 64.39	1.00'	C.C.
24		Inv 60.95	Inv 62.81	1.00'	C.C.
25	Inv 58.89	Inv 61.95		2.35'	
26		Inv 60.00	Inv 62.00	1.00'	C.C.
27		Inv 62.65	Inv 64.52	1.00'	C.C.
28		Inv 62.00	Inv 63.88	1.00'	C.C.
29		Inv 62.00	Inv 64.45	1.57'	
30		Inv 61.35	Inv 63.29	1.00'	C.C.
31		Inv 62.55	Inv 64.46	1.00'	C.C.
32		Inv 62.72	Inv 64.60	1.14'	C.C.
33		Inv 62.43	Inv 64.69	1.38'	C.C.
34		Inv 62.43	Inv 64.81	1.5'	

LEGEND

- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED WATER MAIN
- PROPOSED WATER VALVE
- PROPOSED FIRE HYDRANT
- CS PROPOSED WATER SERVICE LATERAL
- CO PROPOSED SANITARY SEWER LATERAL

GRAPHIC SCALE 1"=30'

0 30 60 90

SEE SHEET 2 FOR ALL UTILITY NOTES

DATE	REVISION	DRAWN	CHECKED	RELEASED

UTILITY PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8

SITUATED IN

MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.

CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RENEWAL SPECIALISTS
ARCHITECTS

FWHASSOCIATES.COM

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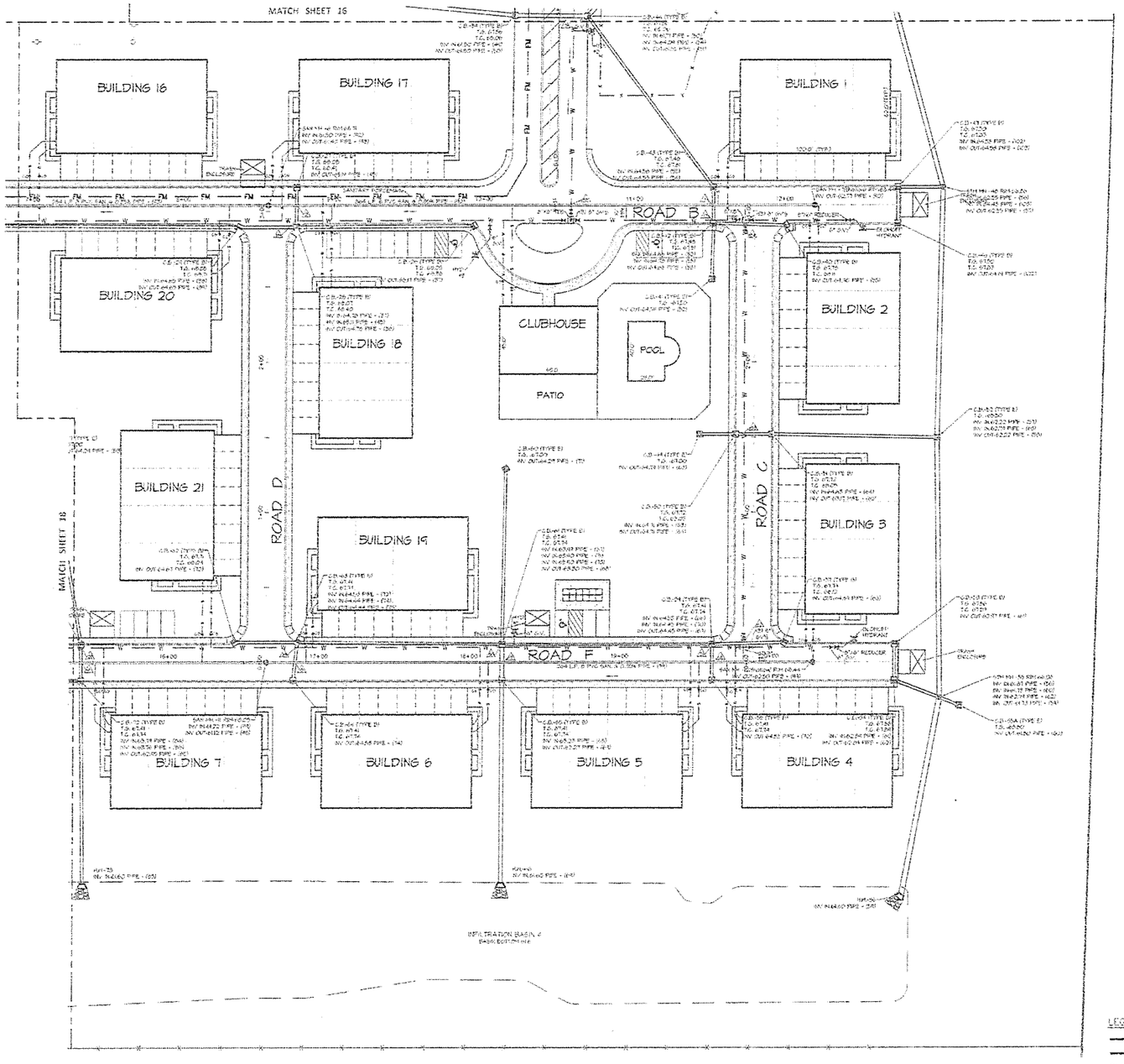
Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY CSM	DATE 8/10/18
DESIGNED BY JS	SCALE 1"=30'
CHECKED BY JS	DRAWING NO. PD-170
REVIEWED BY BPM	PROJECT NO. 1423.0018
SHEET NO. 16	OF 39



CATCH BASIN	RIM ELEV.	INVERT	SHEETS	CHANGE	
1	inv 61.57		inv 59.08	1.55	C.C.
2	inv 60.37		inv 55.15	2.00	
3	inv 60.27		inv 54.61	3.82	
4	inv 59.67		inv 54.36	3.67	
5	inv 59.30		inv 52.16	1.57	
6	inv 62.35		inv 61.03	2.71	
7	inv 61.77		inv 53.23	0.60	C.C.
8	inv 61.75		inv 60.49	2.81	
9	inv 63.69		inv 63.94	2.15	
10	inv 60.23		inv 61.09	3.07	
11	inv 59.63		inv 57.96	1.44	C.C.
12	inv 58.90		inv 62.75	2.00	
13	inv 58.23		inv 62.76	3.04	
14	inv 60.05	inv 58.43		2.71	
15		inv 59.79	inv 61.73	1.00	C.C.
16	inv 62.31	inv 61.42		1.50	
17		inv 62.64	inv 64.72	1.00	C.C.
18		inv 63.32	inv 65.12	1.00	C.C.
19		inv 62.90	inv 64.78	1.00	C.C.
20		inv 62.46	inv 64.13	1.00	C.C.
21		inv 62.33	inv 63.17	1.00	C.C.
22	inv 57.49	inv 63.08		1.45	
23		inv 62.31	inv 64.04	1.00	C.C.
24		inv 62.95	inv 62.93	1.00	C.C.
25	inv 56.89	inv 63.75		2.33	
26		inv 60.06	inv 62.00	1.00	C.C.
27		inv 62.65	inv 63.57	1.00	C.C.
28		inv 62.60	inv 61.88	1.00	C.C.
29		inv 62.00	inv 63.25	1.57	
30		inv 61.93	inv 63.07	1.00	C.C.
31		inv 62.30	inv 63.46	1.00	C.C.
32		inv 62.72	inv 64.03	1.17	C.C.
33		inv 62.32	inv 64.09	1.86	C.C.
34		inv 62.43	inv 62.61	1.5	

LEGEND

- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED WATER MAIN
- PROPOSED WATER VALVE
- PROPOSED FIRE HYDRANT
- PROPOSED WATER SERVICE LATERAL
- PROPOSED SANITARY SEWER LATERAL

GRAPHIC SCALE 1" = 30'

0 30 60 90

SEE SHEET 2 FOR ALL UTILITY NOTES

DATE	REVISION	DRAWN	CHECKED	RELEASED

UTILITY PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 5

SITUATED IN

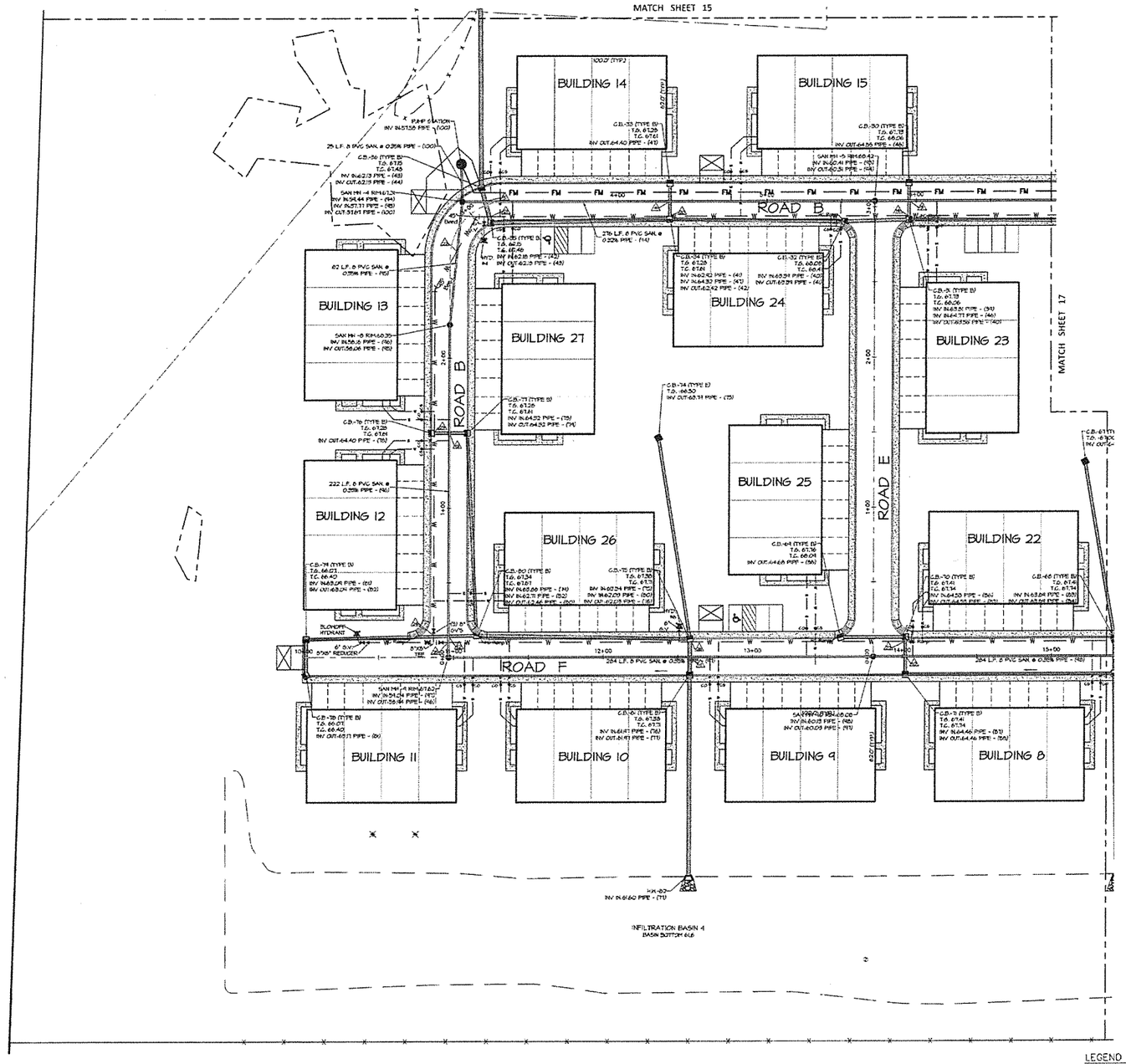
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
ENERGY SPECIALISTS
ARCHITECTS

FWMASSOCIATES.COM

Brian P. Murphy
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY CSM	DATE 8/30/18
SCALE 1" = 30'	
DESIGNED BY JS	FILE NO. FD-170
CHECKED BY JS	
PROJECT NO. BPM	PROJECT NAME 1422.0018
SHEET 17	OF 39



Crossing #	Sanitary	Water	Storm	Clearance	
1	inv 62.53		inv 64.68	1.25'	C.C.
2	inv 61.57		inv 65.15	2.68'	
3	inv 60.49		inv 64.81	3.42'	
4	inv 59.82		inv 64.36	3.64'	
5	inv 59.38		inv 62.16	1.82'	
6	inv 62.25		inv 64.49	2.71'	
7	inv 61.77		inv 63.13	0.50'	C.C.
8	inv 61.28		inv 64.49	2.31'	
9	inv 60.69		inv 63.84	2.25'	
10	inv 60.20		inv 64.49	3.39'	
11	inv 59.60		inv 62.00	1.44'	C.C.
12	inv 58.90		inv 62.78	2.09'	
13	inv 58.42		inv 64.36	5.09'	
14	inv 65.01	inv 68.43		2.71	
15		inv 59.79	inv 61.73	1.00'	C.C.
16	inv 62.21	inv 64.42		1.50'	
17		inv 62.64	inv 64.72	1.00'	C.C.
18		inv 63.24	inv 65.12	1.00'	C.C.
19		inv 62.90	inv 64.78	1.00'	C.C.
20		inv 62.45	inv 64.33	1.00'	C.C.
21		inv 60.23	inv 62.17	1.00'	C.C.
22	inv 57.83	inv 63.08		4.48'	
23		inv 62.51	inv 64.39	1.00'	C.C.
24		inv 60.95	inv 62.81	1.00'	C.C.
25	inv 58.89	inv 61.95		2.35'	
26		inv 60.06	inv 62.00	1.00'	C.C.
27		inv 62.65	inv 64.52	1.00'	C.C.
28		inv 62.00	inv 63.68	1.00'	C.C.
29		inv 62.00	inv 64.45	1.57'	
30		inv 61.35	inv 63.29	1.00'	C.C.
31		inv 62.58	inv 64.46	1.00'	C.C.
32		inv 62.72	inv 64.90	1.14'	C.C.
33		inv 62.43	inv 64.69	1.33'	C.C.
34		inv 62.43	inv 64.91	1.5'	

LEGEND

- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED WATER MAIN
- PROPOSED WATER VALVE
- PROPOSED FIRE HYDRANT
- PROPOSED WATER SERVICE LATERAL
- PROPOSED SANITARY SEWER LATERAL

GRAPHIC SCALE 1"=30'

0 30 60 90

SEE SHEET 2 FOR ALL UTILITY NOTES

DATE	REVISION	DRAWN	CHECKED	RELEASED

UTILITY PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
Civil Engineers
Land Surveyors
Planners
Landscape Architects
Reserve Specialists
Architects
FWHASSOCIATES.COM
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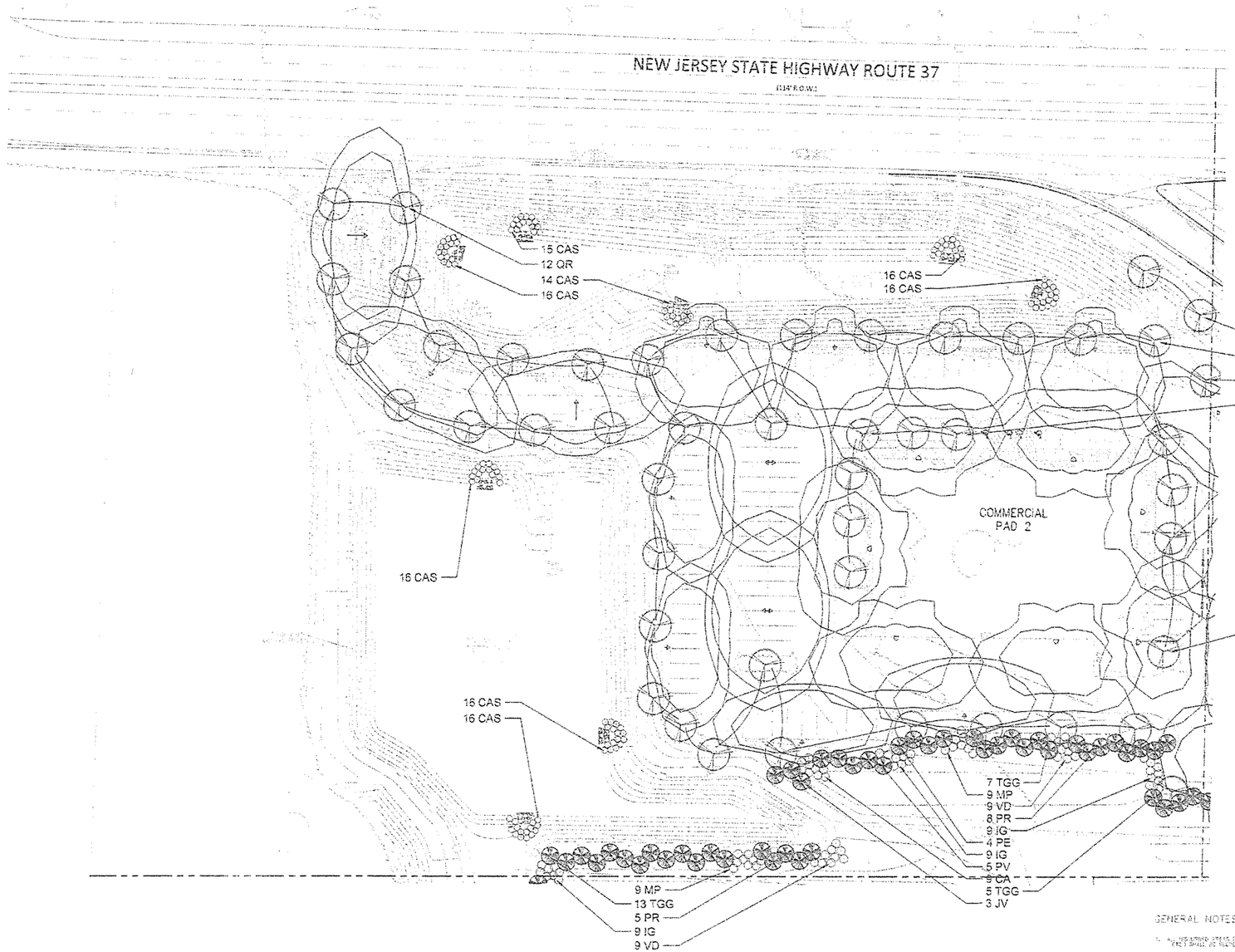
Brian P. Murphy 8/21/18
PROFESSIONAL ENGINEER
NJ LIC. NO. 42000

DESIGN BY CSM	DATE 8/10/18
DRAWN BY JS	SCALE 1"=30'
CHECKED BY JS	DATUM NO. FD-170
RELEASED BY BPM	PROJECT NO. 1423.0016
SHEET NO. 16	OF 39



PLANTING SCHEDULE

KEY	QTY.	BOTANICAL NAME	COMMON NAME	DESCRIPTION/COMMENTS
		STREET TREES		
CO	1	Celtis x occidentalis 'Magnifica'	Magnifica Hackberry	2 – 2½" cal., 12'-14' ht., B&B, remove branches to 7' ht.
LS	22	Liquidambar styraciflua 'Rotundiloba'	Sweetgum	2 – 2½" cal., 12'-14' ht., B&B, remove branches to 7' ht.
QR	14	Quercus rubra	Northern Red Oak	2 – 2½" cal., 12'-14' ht., B&B, remove branches to 7' ht.
		EVERGREEN TREES		
JV	3	Juniperus virginiana	Eastern Red Cedar	4–6' ht., B&B
PG	4	Picea glauca	Black Leaf Pine	6–8' ht., B&B
PR	13	Pinus rigida	Pitch Pine	6–8' ht., B&B
PV	6	Pinus virginiana	Virginia Pine	6–8' ht., B&B
TGG	25	Thuja occidentalis x plicata 'Green Giant'	Green Giant Arborvitae	6–8' ht., B&B
		ORNAMENTAL TREES		
PVC	19	Prunus virginiana 'Canada Red'	Canada Red Cherry	2 – 2½" cal., 8–10' ht., B&B
		SHRUBS		
CA	3	Clethra alnifolia	Sweetpepperbush	24"-30" ht., #5 cont.
CAS	125	Cornus alba 'Sibirica'	Red Twig Dogwood	36" – 38" ht., #5 cont.
IG	27	Ilex glabra	Inkberry Holly	24"-30" ht., #5 cont.
MP	16	Myrica pensylvanica	Bayberry	24"-30" ht., #5 cont.
VD	18	Viburnum dentatum 'Northern Beauty'	Northern Beauty Arrowwood Viburnum	36" – 50" ht., #5 cont.

GENERAL NOTES

1. ALL UNDISTURBED AREAS (OPEN SPACE, CLEAR AREAS, PARKING MEDIANS, ETC.) SHALL BE SEEDED OR SODDED.
2. LANDSCAPE CONTRACTOR SHALL VERIFY ALL UTILITIES (PROPERTIES AND EASEMENTS PRIOR TO INSTALLATION. IF DISCREPANCIES OCCUR, THE LANDSCAPE ARCHITECT'S OFFICE SHALL BE NOTIFIED IMMEDIATELY.
3. SUBSTITUTION AND FINAL LOCATION OF ALL PLANTS ARE SUBJECT TO THE LANDSCAPE ARCHITECT AND TOWNSHIP APPROVAL.
4. PLANTS MUST BE PICKED IN THE PLANT SCHEDULE (SMALLEST, THE LARGEST DIMENSION).
5. SEE SHEET NO. 17 OF 37 FOR PLANTING AND SPECIAL DETAILS, NOTES, AND DETAILS.

GRAPHIC SCALE 1"=30'

0 30 60 90

THIS PLAN TO BE USED FOR LANDSCAPING PURPOSES ONLY.

DATE	REVISION	DRAWN	CHECKED	RELEASED

LANDSCAPE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8

SITUATED IN

MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESIDENT SPECIALISTS
ARCHITECTS

FWHASSOCIATES.COM

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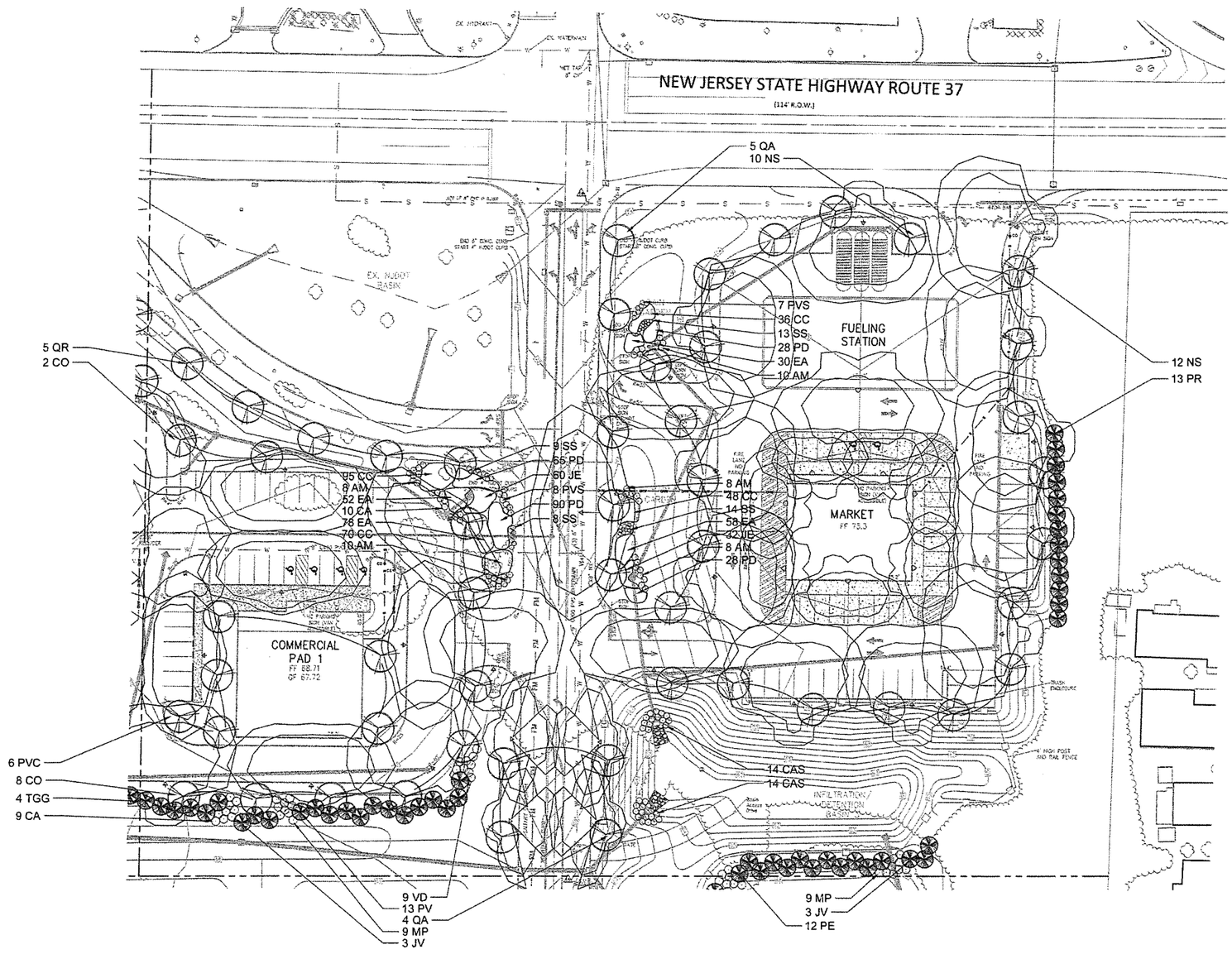
N.J. Lic. No. A3001146
Professional Planner N.J. Lic. No. 4005

DRAWN BY:	DATE: 5/10/16
SCALE:	1"=30'
DESIGNED BY:	SHEET NO.
CHECKED BY:	
JOB NO.	1423.2016
SHEET 19 OF 39	



PLANTING SCHEDULE

KEY	QTY.	BOTANICAL NAME	COMMON NAME	DESCRIPTION/COMMENTS
		STREET TREES		
CO	10	Celtis x occidentalis 'Magnifica'	Magnifica Hackberry	2 – 2 ½" cal., 12'-14' ht., BB., remove branches to 7' ht.
NS	22	Nyssa sylvatica	Blackgum	2 – 2 ½" cal., 12'-14' ht., BB., remove branches to 7' ht.
QA	9	Quercus alba	White Oak	2 – 2 ½" cal., 12'-14' ht., BB., remove branches to 7' ht.
QR	5	Quercus rubra	Northern Red Oak	2 – 2 ½" cal., 12'-14' ht., BB., remove branches to 7' ht.
		EVERGREEN TREES		
JV	6	Juniperus virginiana	Eastern Red Cedar	4'-6' ht., BB
PE	12	Pinus echinata	Short Leaf Pine	6'-8' ht., BB.
PR	13	Pinus rigida	Pitch Pine	6'-8' ht., BB.
PV	13	Pinus virginiana	Virginian Pine	6'-8' ht., BB
TGG	4	Thuja standishii x plicata 'Green Giant'	Green Giant Arborvitae	6'-8' ht., BB.
		ORNAMENTAL TREES		
PVC	8	Prunus virginiana 'Canada Red'	Canada Red Cherry	2 – 2 ½" cal., 8-10' ht., BB
		SHRUBS		
AM	44	Aronia melanocarpa 'Viking'	Viking Black Chokeberry	18" – 18" ht., #2 cont.
CA	29	Clethra alnifolia	Summersweet	24"-30" ht., #3 cont.
CAS	28	Cornus alba 'Sibirica'	Red Twig Dogwood	30" – 36" ht., #5 cont.
CC	249	Conoclinium coelestinum	Mist Flower	Plnts. 2' o.c.
EA	218	Echinacea angustifolia	Purple Coneflower	Plnts. 2' o.c.
JE	92	Juncus effusus	Soft Rush	Plnts. 2.5' o.c.
MP	18	Myrica pensylvanica	Bayberry	24"-30" ht., #5 cont.
PV	15	Panicum virgatum	Switchgrass Thundercloud	Gallons
PD	211	Penstemon digitalis	Tall White Beardtongue	Plnts. 2' o.c.
SS	44	Solidago sempervirens	Seaside Goldenrod	Plnts. 4' o.c.
VD	9	Viburnum dentatum 'Northern Beauty'	Northern Beauty Arrowwood Viburnum	30" – 36" ht., #5 cont.

GENERAL NOTES

1. ALL DISTURBED AREAS (SPOIL SPACE, LAWN AREAS AROUND BUILDINGS ETC.) SHALL BE SEEDED OR SODDED.
2. LANDSCAPE CONTRACTOR SHALL VERIFY ALL UTILITIES (PROPOSED AND EXISTING) PRIOR TO INSTALLATION. IF DISCREPANCIES OCCUR, THE THE LANDSCAPE ARCHITECT'S OFFICE SHALL BE NOTIFIED IMMEDIATELY.
3. SUBSTITUTION AND FINAL LOCATION OF ALL PLANT MATERIAL IS SUBJECT TO THE LANDSCAPE ARCHITECT AND TOWNSHIP'S APPROVAL.
4. IF DISCREPANCIES OCCUR IN THE PLANT SCHEDULE QUANTITIES, THE PLAN SHALL SUPERSEDE.
5. SEE SHEET NO. 27 OF 37 FOR PLANTING AND SEEDING SCHEDULES, NOTES, AND DETAILS.

GRAPHIC SCALE 1"=30'

0 30 60 90

THIS PLAN TO BE USED FOR LANDSCAPING PURPOSES ONLY.

DATE	REVISION	DRAWN	CHECKED	RELEASED

LANDSCAPE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.

CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
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RESERVE SPECIALISTS
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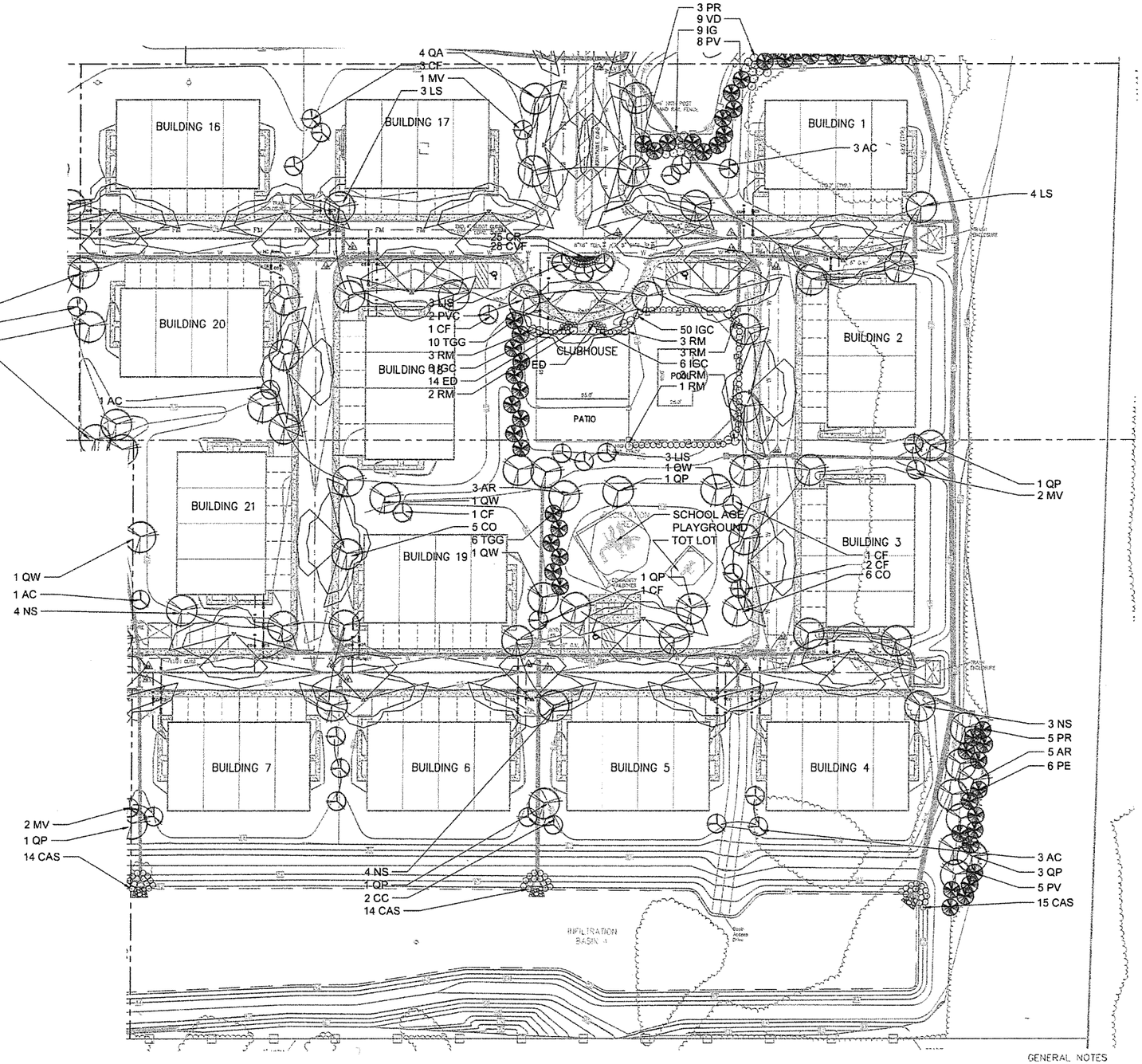
DRAWN BY MVM	DATE 8/10/18
DESIGNED BY MVM	SCALE 1"=30'
CHANGED BY MVM	DRAWING NO.
REVIEWED BY LGW	PROJECT NO. 1423.0016
SHEET NO. 20	OF 39



PLANTING SCHEDULE

KEY	QTY.	BOTANICAL NAME	COMMON NAME	DESCRIPTION/COMMENTS
		STREET TREES		
CO	11	Celtis x occidentalis "Magnifica"	Magnifica Hackberry	2 – 2 ½" cal., 12'-14' ht., BB., remove branches to 7' ht.
LS	8	Liquidambar styraciflua Rotundiloba	Sweetgum	2 – 2 ½" cal., 12'-14' ht., BB. remove branches to 7' ht.
NS	11	Nyssa sylvatica	Blackgum	2 – 2 ½" cal., 12'-14' ht., BB., remove branches to 7' ht.
QA	4	Quercus alba	White Oak	2 – 2 ½" cal., 12'-14' ht., BB., remove branches to 7' ht.
		SHADE TREES		
AR	11	Acer rubrum "Red Sunset"	Red Sunset Maple	2 - 2 ½" cal., 12'-14' ht., BB
QP	8	Quercus palustris	Pin Oak	2 – 2 ½" cal., 12'-14' ht., BB
QW	6	Quercus phellos	Willow Oak	3 – 2 ½" cal., 12'-14' ht., BB.
		EVERGREEN TREES		
PE	6	Pinus echinata	Short Leaf Pine	6'-8' ht., BB
PR	8	Pinus rigida	Pitch Pine	6'-8' ht., BB.
PV	13	Pinus virginiana	Virginian Pine	6'-8' ht., BB
TGG	16	Thuja standishii x plicata "Green Giant"	Green Giant Arborvitae	6'-8' ht., BB.
		ORNAMENTAL TREES		
AC	9	Amelanchier canadensis	Serviceberry	6'-8' ht., BB.
CC	2	Cercis canadensis	Eastern Redbud	6'-8' ht., BB.
CF	9	Cornus florida	Flowering Dogwood	6'-8' ht., BB.
LIS	6	Lagerstroemia indica x fauriei "Sioux"	Sioux Crape Myrtle	6'-8' ht., BB.
MV	5	Magnolia virginiana	Sweetbay Magnolia	6'-8' ht., BB.
PVC	2	Prunus virginiana "Canada Red"	Canada Red Cherry	2 – 2 ½" cal., 8'-10' ht., BB
		SHRUBS		
CVF	28	Calluna vulgaris Firefly	Firefly Scotch Heather	12" – 15" ht., #2 cont.
CAS	43	Cornus alba "Sibirica"	Red Twig Dogwood	36" – 36" ht., #3 cont.
CR	25	Coreopsis lanceolata "Garnet"	Garnet Coreopsis	#2, 15" O.C.
ED	28	Erica x darleyensis "Mediterranean Pink"	Mediterranean Pink Heath	18"-24" ht., #3 cont.
IG	9	Ilex glabra	Inkberry Holly	24"-30" ht., #5 cont.
RM	16	Rhododendron maximum "Roseum"	Rosebay Rhododendron	30" – 36" ht., BB
VD	9	Viburnum dentatum" Northern Beauty"	Northern Beauty Arrowwood Viburnum	30" – 36" ht., #5 cont.

GENERAL NOTES

1. ALL DISTURBED AREAS (OPEN SPACE, LAWN AREAS AROUND BUILDINGS ETC.) SHALL BE SEEDED OR SODDED.
2. LANDSCAPE CONTRACTOR SHALL VERIFY ALL UTILITIES (PROPOSED AND EXISTING) PRIOR TO INSTALLATION. IF DISCREPANCIES OCCUR, THE THE LANDSCAPE ARCHITECT'S OFFICE SHALL BE NOTIFIED IMMEDIATELY.
3. SUBSTITUTION AND FINAL LOCATION OF ALL PLANT MATERIAL IS SUBJECT TO THE LANDSCAPE ARCHITECT AND TOWNSHIP'S APPROVAL.
4. IF DISCREPANCIES OCCUR IN THE PLANT SCHEDULE QUANTITIES, THE PLAN SHALL SUPERSEDE.
5. SEE SHEET NO. 27 OF 37 FOR PLANTING AND SEEDING SCHEDULES, NOTES, AND DETAILS.

GRAPHIC SCALE 1"=30'

0 30 60 90

THIS PLAN TO BE USED FOR LANDSCAPING PURPOSES ONLY.

DATE	REVISION	DRAWN	CHECKED	RELEASED

LANDSCAPE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.

CIVIL ENGINEERS
LAND SURVEYORS
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LANDSCAPE ARCHITECTS
RESERVE SPECIALISTS
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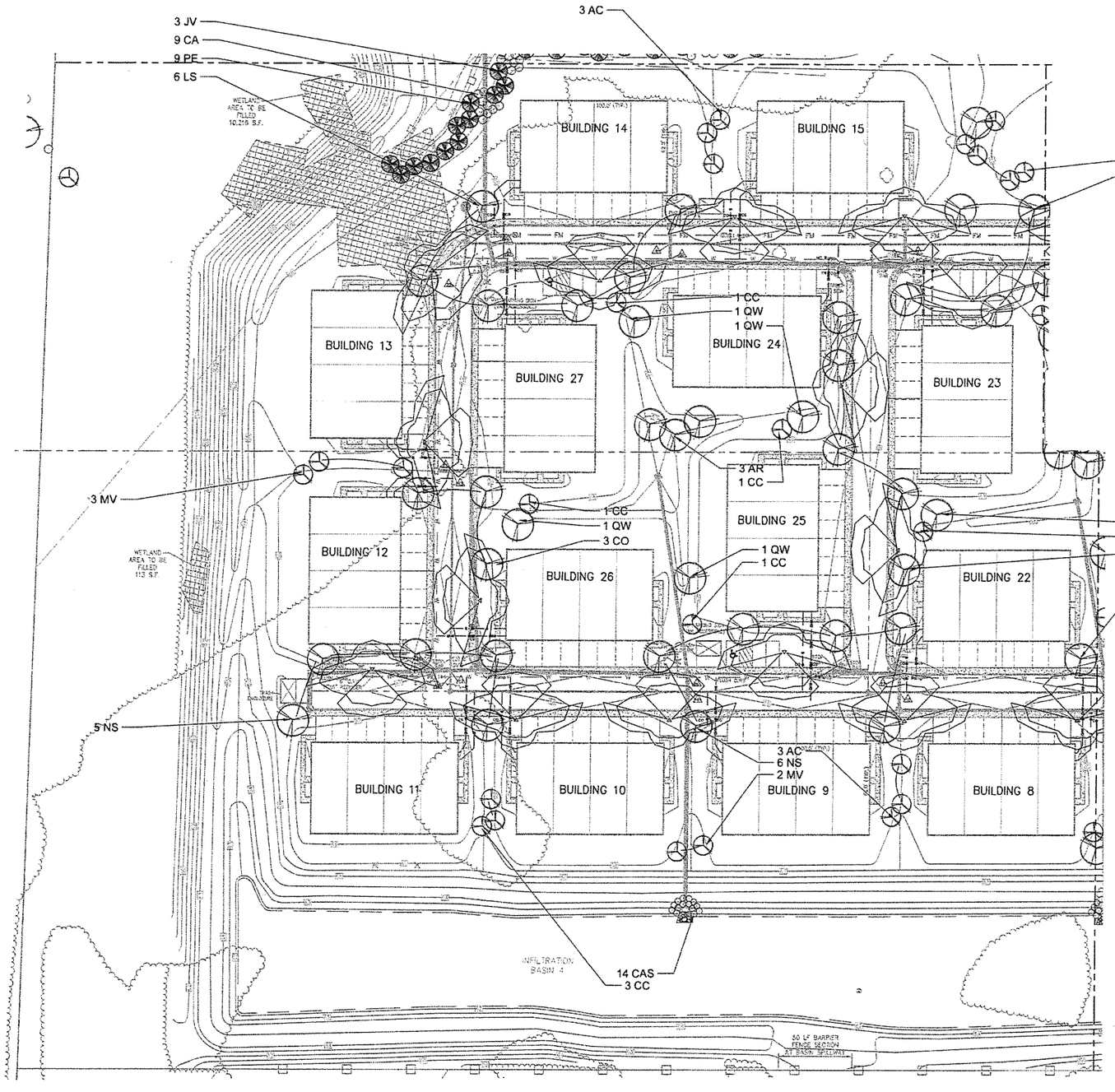
DRAWN BY: MVM	DATE: 8/10/18
DESIGNED BY: MVM	SCALE: 1"=30'
CHECKED BY: MVM	SURVEY NO.
DRAWING NO.: LGW	PROJECT NO.: 1423.0016
SHEET NO.: 21	OF: 39



PLANTING SCHEDULE

KEY	QTY.	BOTANICAL NAME	COMMON NAME	DESCRIPTION/COMMENTS
		STREET TREES		
CO	8	Celtis x occidentalis 'Magnifica'	Magnifica Hackberry	2 – 2 ½" cal., 12'-14' ht., BB., remove branches to 7' ht.
LS	10	Liquidamber styraciflua 'Rotundiloba'	Sweetgum	2 – 2 ½" cal., 12'-14' ht., BB., remove branches to 7' ht.
NS	12	Nyssa sylvatica	Blackgum	2 – 2 ½" cal., 12'-14' ht., BB., remove branches to 7' ht.
		SHADE TREES		
AR	3	Acer rubrum "Red Sunset"	Red Sunset Maple	2 – 2 ½" cal., 12'-14' ht., BB.
QW	5	Quercus phellos	Willow Oak	2 – 2 ½" cal., 12'-14' ht., BB.
		EVERGREEN TREES		
JV	3	Juniperus virginiana	Eastern Red Cedar	4'-6' ht., BB.
PE	9	Pinus echinata	Short Leaf Pine	6'-8' ht., BB.
		ORNAMENTAL TREES		
AC	7	Amelanchier canadensis	Serviceberry	6'-8' ht., BB.
CC	12	Cercis canadensis	Eastern Redbud	6'-8' ht., BB.
MV	5	Magnolia virginiana	Sweetbay Magnolia	6'-8' ht., BB.
		SHRUBS		
CA	6	Clethra alnifolia	Summersweet	24"-30" ht., #5 cont.
CAS	14	Cornus alba 'Siberica'	Red Twig Dogwood	30" – 36" ht., #5 cont.

GRAPHIC SCALE 1"=30'

0 30 60 90

THIS PLAN TO BE USED FOR LANDSCAPING PURPOSES ONLY.

GENERAL NOTES

1. ALL DISTURBED AREAS (OPEN SPACE, LAWN AREAS AROUND BUILDINGS ETC.) SHALL BE SEEDED OR SODDED.
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3. SUBSTITUTION AND FINAL LOCATION OF ALL PLANT MATERIAL IS SUBJECT TO THE LANDSCAPE ARCHITECT AND TOWNSHIP'S APPROVAL.
4. IF DISCREPANCIES OCCUR IN THE PLANT SCHEDULE QUANTITIES, THE PLAN SHALL SUPERSEDE.
5. SEE SHEET NO. 27 OF 37 FOR PLANTING AND SEEDING SCHEDULES, NOTES, AND DETAILS.

DATE	REVISION	DRAWN	CHECKED	RELEASED

LANDSCAPE PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES P.A.

Civil Engineers
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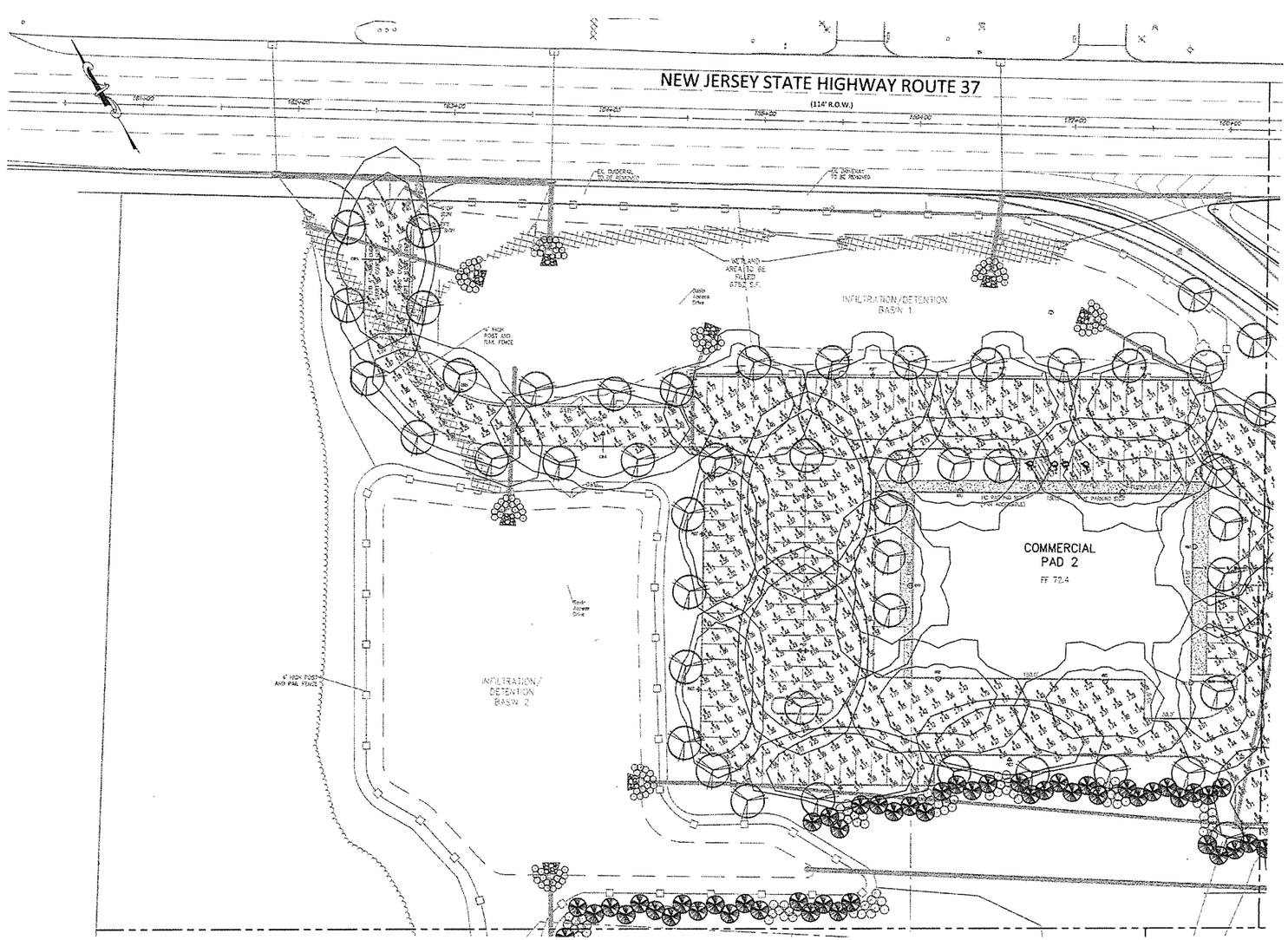
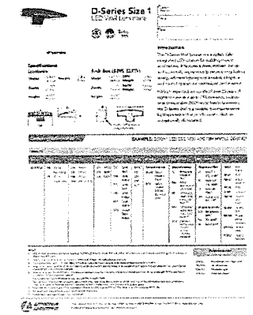
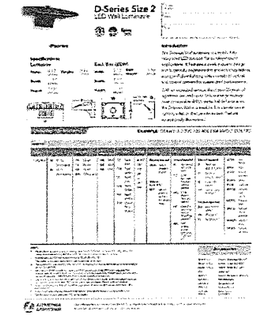
DRAWN BY MVM	DATE 8/10/15
DESIGNED BY MVM	SCALE 1"=30'
REVIEWED BY MVM	PROJECT NO.
RECORDED BY LGW	PROJECT NO. 1423.0016
SHEET NO. 22	OF 39

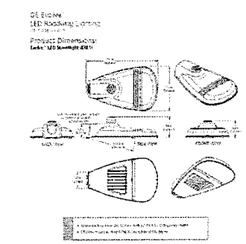




WM1 LIGHTING DETAIL



WM3 LIGHTING DETAIL



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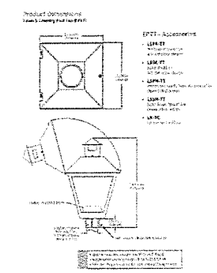
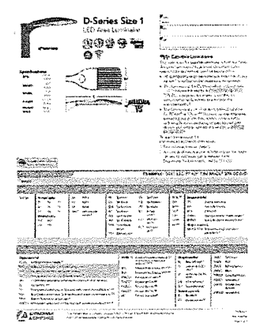
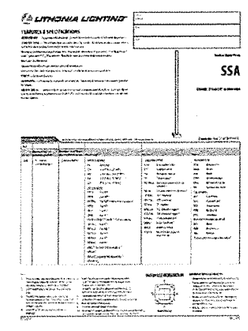


TC LIGHTING DETAIL



PM2F/PM2T/PM3T/PMFT LIGHTING DETAIL



PM2F/PM2T/PM3T/PMFT LIGHT POLE DETAIL

POINT TO POINT LIGHTING CALCULATION

INDIVIDUAL LIGHT FIXTURE CONTOURS = 1.0 FC, 0.5 FC.
CAP file created by LMPro 2.0.07 on 8/17/2016 12:56:53 PM

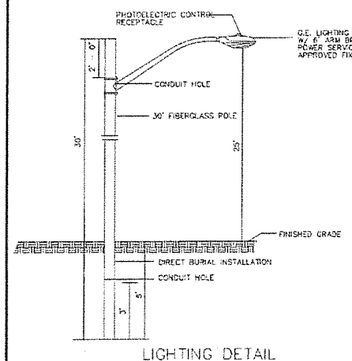
CALCULATION SUMMARY

AREA NAME	DIMENSIONS	GRID TYPE	# PTS	SPAC	GROUP	AVE	MAX	MIN	MAX/MIN	AVG/MIN
Residential	2303.13x2033.31Ft	New Grid:HNR	907	10.00	<>	1.13	5.29	0.22	23.78	5.09
Commonwealth Blvd.	2303.13x2033.31Ft	New Grid:HNR	211	10.00	<>	1.72	5.51	0.42	13.08	4.11
Commercial	2303.13x2033.31Ft	New Grid:HNR	1405	10.00	<>	2.11	7.15	0.58	12.42	3.78

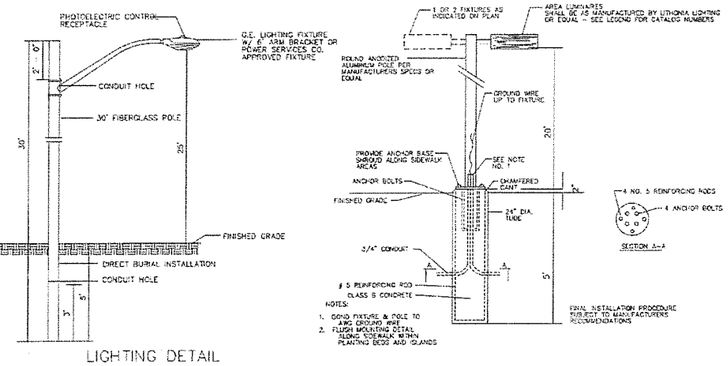
LIGHTING SCHEDULE

Key	Qty	Light Type	Wattage	Number of Fixtures per Poles	Mounting Height	Description
▲ PM2F	2	L.E.D.	138	2	20'	Light fixture as manufactured by Lithonia Lighting Systems, Catalog # DSX1 LED P5 40K TFTM MVOLT SPA PER DDBXD w/ SSA 20 4G DM18AS FBC DDB or approved equal.
▲ PM2T	2	L.E.D.	138	1	20'	Light fixture as manufactured by Lithonia Lighting Systems, Catalog # DSX1 LED P5 40K T2M MVOLT SPA PER DDBXD w/ SSA 20 4G DM19AS FBC DDB or approved equal
▲ PM3T	2	L.E.D.	138	1	20'	Light fixture as manufactured by Lithonia Lighting Systems, Catalog # DSX1 LED P5 40K T3M MVOLT SPA PER DDBXD w/ SSA 20 4G DM19AS FBC DDB or approved equal
▲ PMFT	4	L.E.D.	138	1	20'	Light fixture as manufactured by Lithonia Lighting Systems, Catalog # DSX1 LED P5 40K TFTM MVOLT SPA PER DDBXD w/ SSA 20 4G DM18AS FBC DDB or approved equal
▲ CBRA	3	L.E.D.	97	1	25'	Light fixture as manufactured by G.E. Lighting Systems, Catalog # ERL150340XGRAY w/ RBADWHHX1.25 or approved equal
● WM3	7	L.E.D.	71	WALL MOUNTED	20'	Light fixture as manufactured by Lithonia Lighting Systems, Catalog # DSXW2 LED 350 700 40K T3M MVOLT PER DDBXD or approved equal

1. Installation of light fixtures shall be per manufacturer's recommendations.
2. Each fixture shall receive dusk to dawn photocells to control the daily operation of the outdoor lighting.

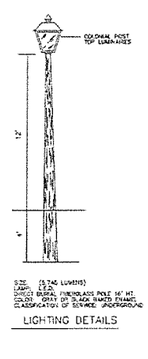


LIGHTING DETAIL



LIGHTING STANDARD DETAIL

NTS



LIGHTING DETAILS

GENERAL NOTES

1. ALL DISTURBED AREAS SHALL BE SEEDED OR SODDED. SEED MIXTURES, SPECIFICATIONS, AND GRADE FORCE SHALL MEET TOWNSHIP REQUIREMENTS PRIOR TO INSTALLATION.
2. LIGHTING CONTRACTOR SHALL VERIFY ALL UTILITIES (PROPOSED AND EXISTING) PRIOR TO INSTALLATION. IF DISCREPANCIES OCCUR, THE ENGINEER'S OFFICE SHALL BE NOTIFIED IMMEDIATELY.
3. SUBSTITUTION AND FINAL LOCATION OF ALL LIGHTING IS SUBJECT TO TOWNSHIP'S APPROVAL.
4. IF DISCREPANCIES OCCUR IN THE SCHEDULE QUANTITIES, THE PLAN SHALL SUPERSEDE.
5. SEE THIS SHEET FOR LIGHTING DETAILS

GRAPHIC SCALE 1"=30'

0 30 60 90

THIS PLAN TO BE USED FOR LIGHTING PURPOSES ONLY.

DATE	REVISION	DRAWN	CHECKED	RELEASED

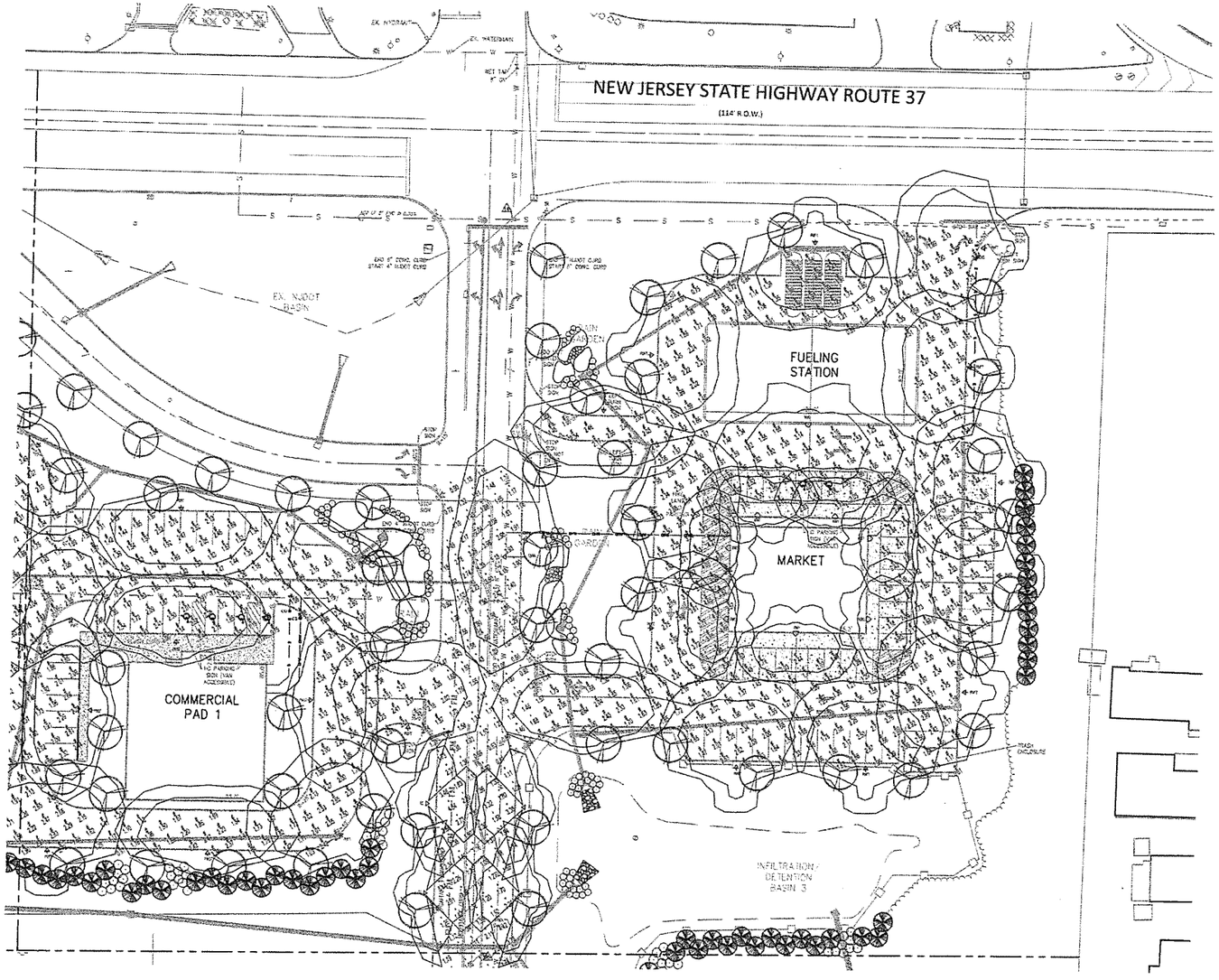
LIGHTING PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
Civil Engineers
Land Surveyors
Planners
Landscape Architects
Resource Specialists
Architects
FWHASSOCIATES.COM
1600 Rt. 9, Toms River, NJ 08755 T: 732.797.3100 F: 732.797.3923

Leroy G. Webb Jr.
Licensed Landscape Architect
N.J. Lic. No. AS00149
Professional Planner N.J. Lic. No. 4006

DRAWN BY MVM	DATE 8/18/18
REVISED BY MVM	SCALE 1"=30'
CHECKED BY MVM	DRAWING NO.
RELEASED BY LGW	PROJECT NO. 1423.0016
SHEET NO. 23	OF 39



POINT TO POINT LIGHTING CALCULATION

INDIVIDUAL LIGHT FIXTURE CONTOURS = 10 FC, 05 FC

DXF file created by LuxPro 2.02 on 01/10/2018 13:56:53 PM

CALCULATIONS SUMMARY

AREA NAME	DIMENSIONS	GRID TYPE	# PTS	SPAC	LOCUS	AVE	MAX	MIN	MAX/MIN	AVE/MIN
Residential	2365.13x2018.31FR	New Grid (HH)	507	10.00	<>	1.17	5.28	0.22	23.78	5.26
Commonwealth Blvd	2365.13x2018.31FR	New Grid (HH)	231	10.00	<>	1.72	5.31	0.42	12.69	4.11
Commercial	2365.13x2018.31FR	New Grid (HH)	1425	10.00	<>	2.17	7.15	0.58	12.48	3.76

LIGHTING SCHEDULE

Key	Qty	Light Type	Wattage	Number of Fixtures per Poles	Mounting Height	Description
▲ PM3T	8	L.E.D.	138	1	20'	Light fixture as manufactured by Lithonia Lighting Systems, Catalog # DSX1 LED P5 40K T3M MVOLT SPA PER DDBXD w/ SSA 20 4G DM19AS FBC DDB or approved equal.
▲ PMFT	13	L.E.D.	138	1	20'	Light fixture as manufactured by Lithonia Lighting Systems, Catalog # DSX1 LED P5 40K TFTM MVDLT SPA PER DDBXD w/ SSA 20 4G DM19AS FBC DDB or approved equal.
▲ CBRA	1	L.E.D.	97	1	25'	Light fixture as manufactured by G.E. Lighting Systems, Catalog # ERL15C340XGRAY w/ RBACWH6X1.25 or approved equal.
▲ TC	4	L.E.D.	56	1	12'	Light fixture as manufactured by G.E. Lighting Systems, Catalog # EPTT01005BA40XPBLCK or approved equal.
⬟ WM1	7	L.E.D.	47	WALL MOUNTED	12'	Light fixture as manufactured by Lithonia Lighting Systems, Catalog # DSXW1 LED 20C 700 40K T3M MVOLT PER DDBXD or approved equal.
⬟ WM3	1	L.E.D.	71	WALL MOUNTED	20'	Light fixture as manufactured by Lithonia Lighting Systems, Catalog # DSXW2 LED 30C 700 40K T3M MVOLT PER DDBXD or approved equal.

1. Installation of light fixtures shall be per manufacturer's recommendations.
Each fixture shall receive dusk to dawn photocells to control the daily operation of the outdoor lighting

GENERAL NOTES

1. ALL DISTURBED AREAS SHALL BE SEEDED OR SODDED. SEED MIXTURES, SPECIFICATIONS, AND GRASS TYPES SHALL MEET TOWNSHIP REQUIREMENTS PRIOR TO INSTALLATION.
2. LIGHTING CONTRACTOR SHALL VERIFY ALL UTILITIES (PROPOSED AND EXISTING) PRIOR TO INSTALLATION. IF DISCREPANCIES OCCUR, THE ENGINEER'S OFFICE SHALL BE NOTIFIED IMMEDIATELY.
3. SUBSTITUTION AND FINAL LOCATION OF ALL LIGHTING IS SUBJECT TO TOWNSHIP'S APPROVAL.
4. IF DISCREPANCIES OCCUR IN THE SCHEDULE QUANTITIES, THE PLAN SHALL SUPERSEDE.
5. SEE SHEET 23 OF 37 FOR LIGHTING DETAILS.

GRAPHIC SCALE 1"=30'

0 30 60 90

THIS PLAN TO BE USED FOR LIGHTING PURPOSES ONLY.

DATE	REVISION	DRAWN	CHECKED	RELEASED

LIGHTING PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESERVE SPECIALISTS
ARCHITECTS
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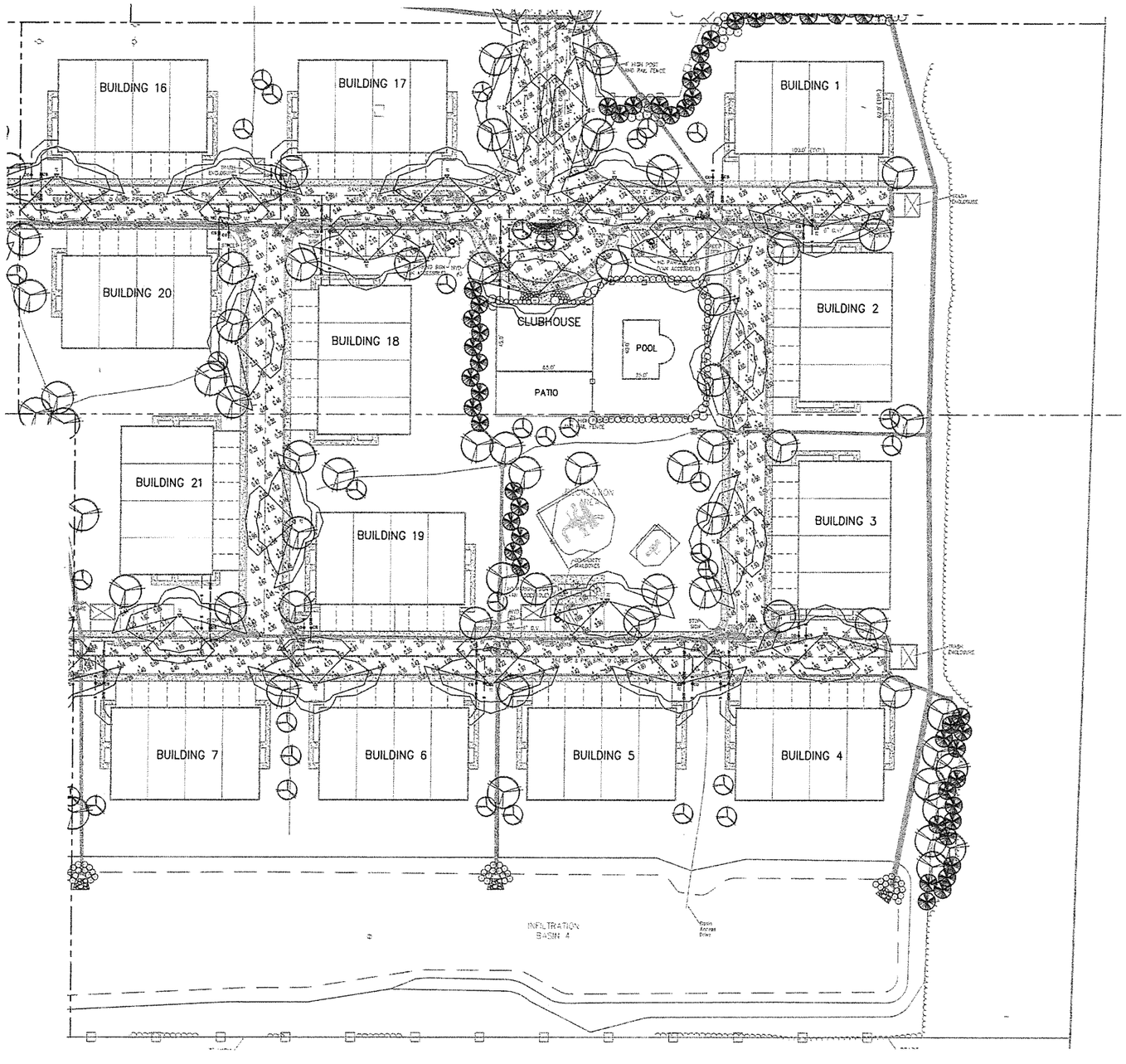
1653 Rt. 9, Toms River, NJ 08755 T: 732.797.3150 F: 732.797.3203

Leroy G. Webb Jr.
Licensed Landscape Architect
N.J. Lic. No. AS00149
Professional Planner N.J. lic. No. 4006

DRAWN BY: MVM	DATE: 8/10/18
DESIGNED BY: MVM	SCALE: 1"=30'
CHECKED BY: MVM	DRAWING NO.
REVIEWED BY: LGW	PROJECT NO. 1423.0016
SHEET NO. 24	OF 39



POINT TO POINT LIGHTING CALCULATION

INDIVIDUAL LIGHT FIXTURE CONTOURS = 1.0 FC, 0.5 FC.
DXF file created by LitePro 2.0CS on 6/17/2016 12:56:53 PM

CALCULATION SUMMARY

AREA NAME	CALCULATION	GRID TYPE	PTS	SPAC	GROUP	AVG	MAX	MIN	AVG/MIN	AVG/MAX
Residential	2305.15x2033.31FH	New Grid / FH	327	10.00	<>	1.17	3.28	0.22	23.76	2.34
Commonwealth Blvd.	2305.15x2033.31FH	New Grid / FH	211	10.00	<>	1.73	5.51	0.42	13.09	4.11
Commercial	2305.15x2033.31FH	New Grid / FH	1405	10.00	<>	2.17	7.16	0.58	12.40	3.76

LIGHTING SCHEDULE

Key	Qty	Light Type	Wattage	Number of Fixtures per Poles	Mounting Height	Description
▲ TC	20	L.E.D.	56	1	12'	Light fixture as manufactured by G.E. Lighting Systems, Catalog # EPTT01005BA40XPBLCK or approved equal.

1. Installation of light fixtures shall be per manufacturer's recommendations.
2. Each fixture shall receive dusk to dawn photocells to control the daily operation of the outdoor lighting.

GENERAL NOTES

1. ALL DISTURBED AREAS SHALL BE SEEDED OR SODDED. SEED MIXTURES, SPECIFICATIONS, AND GRASS TYPES SHALL MEET TOWNSHIP REQUIREMENTS PRIOR TO INSTALLATION.
2. LIGHTING CONTRACTOR SHALL VERIFY ALL UTILITIES (PROPOSED AND EXISTING) PRIOR TO INSTALLATION. IF DISCREPANCIES OCCUR, THE ENGINEER'S OFFICE SHALL BE NOTIFIED IMMEDIATELY.
3. SUBSTITUTION AND FINAL LOCATION OF ALL LIGHTING IS SUBJECT TO TOWNSHIP'S APPROVAL.
4. IF DISCREPANCIES OCCUR IN THE SCHEDULE QUANTITIES, THE PLAN SHALL SUPERSEDE.
5. SEE SHEET 23 OF 37 FOR LIGHTING DETAILS

GRAPHIC SCALE 1"=30'

0 30 60 90

THIS PLAN TO BE USED FOR LIGHTING PURPOSES ONLY.

DATE	REVISION	DRAWN	CHECKED	RELEASED

LIGHTING PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
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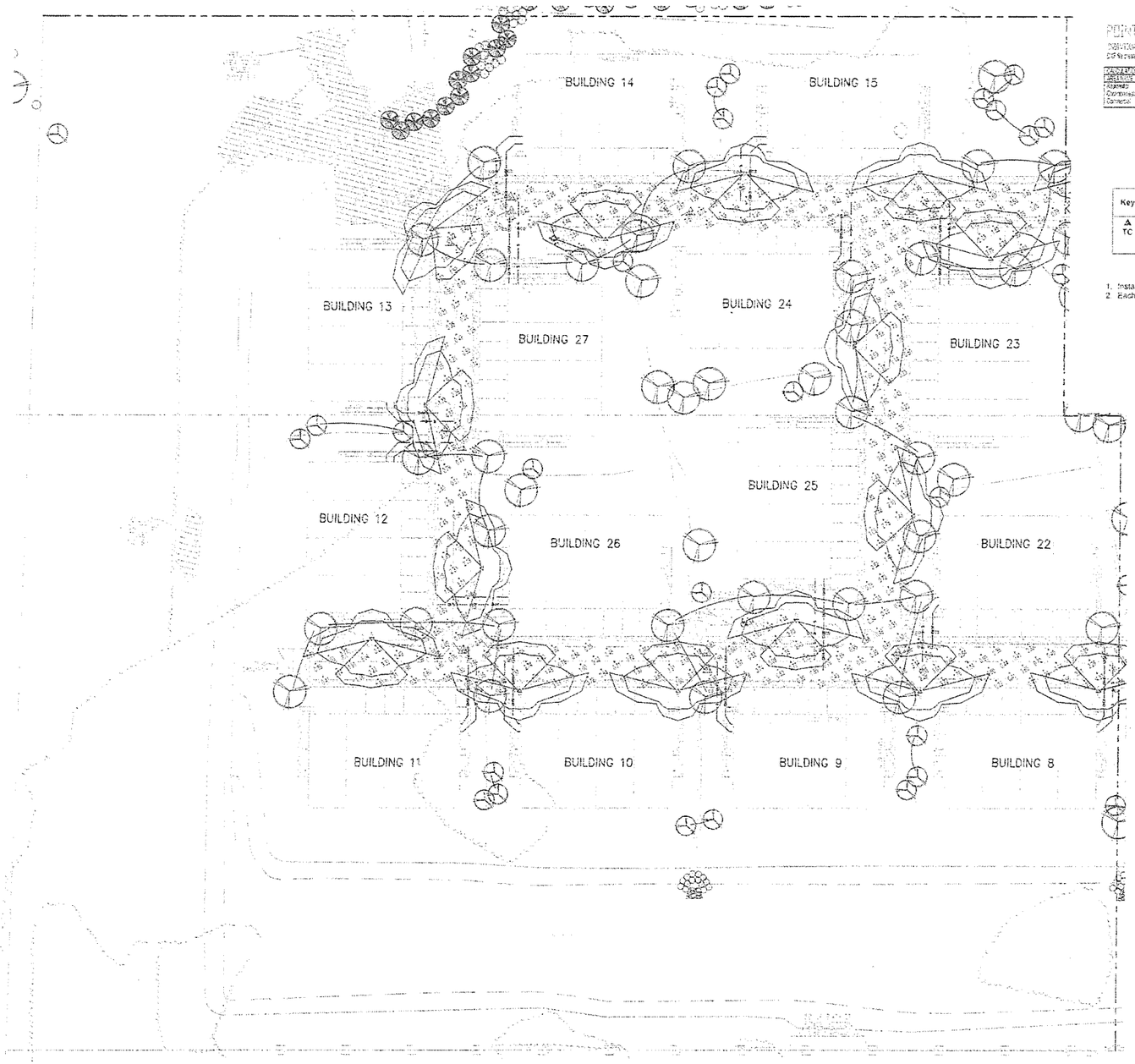
1559 Rt. 9, Toms River, NJ 08755 T: 732.797.3100 F: 732.797.3033

Leroy G. Webb Jr.
Licensed Landscape Architect
N.J. Lic. No. AS00149
Professional Planner N.J. Lic. No. 4006

DRAWN BY: MVM	DATE: 6/10/16
DESIGNED BY: MVM	SCALE: 1"=30'
CHECKED BY: MVM	PROJECT NO.
RELEASED BY: LGW	PROJECT NO. 1423.0016
SHEET NO. 25 OF 39	



POINT TO POINT LIGHTING CALCULATION

CALCULATION SUMMARY										
Label	Calculation	Units	Type	Avg	Max	Min	Avg/Min	Max/Min	Min/Avg	Min/Max
Adjacent	LUX (1x2)(0.0)FC	Non-Grid	4ft	0.0	0.0	0.0	1.00	1.00	1.00	1.00
Commonwealth Blvd.	LUX (1x2)(0.0)FC	Non-Grid	4ft	0.0	0.0	0.0	1.00	1.00	1.00	1.00
Commercial	LUX (1x2)(0.0)FC	Non-Grid	4ft	0.0	0.0	0.0	1.00	1.00	1.00	1.00

LIGHTING SCHEDULE

Key	Qty	Light Type	Wattage	Number of Fixtures per Poles	Mounting Height	Description
A TC	15	L.E.D	50	1	12'	Light fixture as manufactured by G.E. Lighting Systems. Catalog # EPTT010S50A40XPBLDX or approved equal.

1. Installation of light fixtures shall be per manufacturer's recommendations
2. Each fixture shall receive dusk to dawn photocells to control the daily operation of the outdoor lighting.

GENERAL NOTES

1. ALL EXISTING AREAS SHALL BE SURVEYED BEFORE SELECTING FIXTURES, SPECIFICATIONS, AND OPENS TYPE SHALL NOT TOWARDS AND REMOVE PRIOR TO INSTALLATION.
2. LIGHTING CONTRACTOR SHALL VERIFY ALL UTILITIES (INCLUDING TELEPHONE) PRIOR TO INSTALLATION. IF A DISCREPANCY OCCURS, THE ENGINEER'S OFFICE SHALL BE NOTIFIED IMMEDIATELY.
3. SUBSTITUTION AND FINAL LOCATION OF ALL LIGHTING IS SUBJECT TO TOPOGRAPHY AND GRADE.
4. IF DISCREPANCIES OCCUR IN THE SCHEDULE QUANTITIES, THE PLAN SHALL TAKE PRECEDENCE.
5. SEE SHEET 22 OF 27 FOR LIGHTING DETAILS

GRAPHIC SCALE 1"=30'

0 30 60 90

THIS PLAN TO BE USED FOR LIGHTING PURPOSES ONLY.

DATE	REVISION	DRAWN	CHECKED	APPROVED

LIGHTING PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
INTERIOR DESIGNERS
ARCHITECTS
FWHASSOCIATES.COM

Leroy G. Webb Jr.
Licensed Landscape Architect
N.J. Lic. No. ASC0149
Professional Planner N.J. Lic. No. 4006

DRAWN BY MVM	5/10/04
REVISED BY MVM	11-10
PROOFED BY MVM	
CHECKED BY LGW	1-22-2015
SHEET NO. 26	OF 30

PLAYWORLD

Playmakers®
Clubhouse Junction
Product: 500-1609

Product Details

Size: 30'8" x30'9" x16'5"
Weight: 5078 lbs
Capacity: 60
Install Hours: 67
Color:

Certifications:

ASTM F1487
CPSC PUB.325
EN1176*

SCHOOL-AGE PLAYGROUND DETAIL

PLAYWORLD

Play Fundamentals
Clubhouse
Product: FUN-1481

Play Fundamentals playgrounds offer a variety of physical, sensory and social activities that will keep kids engaged. Transfer station provides access to children of all abilities. Panels offer pretend opportunities. while the slide stimulates a child's vestibular and visual sensory systems. Roof provides shade. Made of durable steel and plastic.

Product Details

Size: 13'6" x6'11" x10'4"
Weight: 777 lbs
Capacity: 17
Install Hours: 18

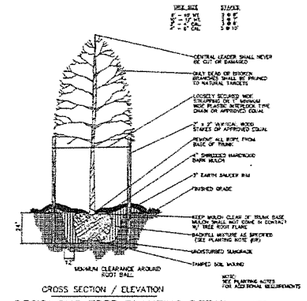
Certifications:

ASTM F1487
CPSC PUB.325
CAN/CSA-Z614
EN1176

TOT LOT PLAYGROUND DETAIL

PLAYGROUND NOTES

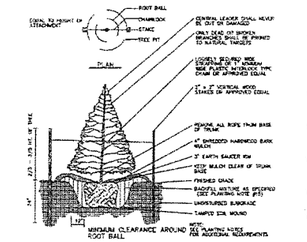
1. All play structures and composites must carry durable warning labels and separate manufacturer's identification. Labels shall not be removable without tools.
2. Installation and construction of all play structures and composites shall be per manufacturer specification.
3. Safety surface material shall meet Consumer Product Safety Commission (CPSC) and ASTM F 1292 standards.
4. Signs shall be provided to give adults guidance on age appropriateness of equipment.
5. A safety audit should be conducted and a maintenance program should be established to ensure a safe environment.



CROSS SECTION / ELEVATION

DECIDUOUS TREE PLANTING DETAIL NTS

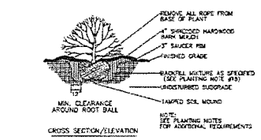
NOTE: WIRE BASKETS ARE TO BE REMOVED PRIOR TO BACKFILLING THE PLANTING PIT



CROSS SECTION / ELEVATION

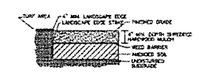
EVERGREEN TREE PLANTING DETAIL NTS

NOTE: WIRE BASKETS ARE TO BE REMOVED PRIOR TO BACKFILLING THE PLANTING PIT



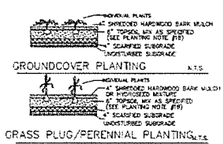
CROSS SECTION/ELEVATION

SHRUB PLANTING DETAIL NTS



PLANTING BED DETAIL

NTS



GROUNDCOVER PLANTING N.T.S.

GRASS PLUG/PERENNIAL PLANTING N.T.S.

PLANTING NOTES

1. Plant material shall be furnished and installed as indicated; including all labor, materials, plants, equipment, incidentals, and clean up.
2. The Contractor shall be responsible for planting at correct grades and alignment.
3. Plants shall be typical of their species and variety; have normal growth habits; well developed branches, densely foliated vigorous root systems and be free from defects and injuries.
4. Contractor shall report any soil or drainage conditions considered detrimental to the growth of plant material.
5. All plant material shall be guaranteed by the Contractor to be in vigorous growing condition. Provision shall be made for a growth guarantee of at least two (2) years for trees and shrubs. Replacements shall be made at the beginning of the first succeeding planting season. All replacements shall have a guarantee equal to that stated above.
6. Insofar as it is practical, plant material shall be planted on the day of delivery. In the event this is not possible, the Contractor shall protect shrubs not planted from drying. Plants shall not remain unplanted for longer than a three (3) day period after delivery.
7. Quality and size of plants, spread of roots, and size of balls shall be in accordance with ANSI Z60 (Rev. 1980) "American Standard for Nursery Stock" as published by the American Association of Nurserymen, Inc.
8. All plants shall be planted in topsoil that is thoroughly watered and tamped as backfilling progresses. Nothing but suitable topsoil, free of dry sod, stiff clay, litter, etc., shall be used for planting.
9. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches. Plants shall be handled from the bottom of the ball only.
10. Planting operations shall be performed during periods within the planting seasons when weather and soil conditions are suitable and in accordance with accepted local practice. Planting seasons are defined as "Spring Planting Season" March 15 through May 15, "Fall Planting Season" Sept. 15 through Nov. 15. Planting is acceptable during other months if weather permits, the ground is not frozen and supplemental watering is provided in the summer.
11. No plant, except ground covers, shall be planted less than two (2) feet from existing structures and sidewalks.
12. Street trees shall be field adjusted to be a minimum distance of 15' from proposed street lighting.
13. Set all plants plumb and straight. Set at such level that, after settlement, a normal or natural relationship to the crown of the plant with the ground surface will be established. Locate plants in the center of the pit.
14. Top pruning should be restricted to removing broken and damaged branches and developing a good tree structure. Main leader of trees must not be cut back. All pruning shall be done at the nursery prior to transplanting or transporting.
15. Each tree and shrub shall be pruned in accordance with standard horticultural practice to preserve natural character of plant. Pruning shall be done with clean, sharp tools. All pruning cuts will be made to natural targets.
16. Trees shall be supported immediately after planting. All trees six (6) inches and over in caliper shall be guyed, unless otherwise noted. Smaller trees shall be staked and supported as indicated.
17. All planting beds shall receive 4" of shredded hardwood bark mulch treated with a pre emergent herbicide. Mulch shall not be piled directly against the root collar.
18. Topsoil mixture for backfilling planted areas shall consist of 2 parts by volume loamy topsoil thoroughly mixed with one part peat moss. Fertilizer will not be used for one year after planting.
19. The following "Fall Hazard Planting", tree species (bare root or B&B) will be planted during the Spring planting season only.

Acer rubrum	Liriodendron tulipifera
Betula vars.	Malus in leaf
Carpinus vars.	Nyssa Sylvatica
Celtis vars.	Ostrya
Cercidiphyllum vars.	Platanus x acerfolia
Crataegus vars.	Populus vars.
Fagus vars.	Prunus All stone fruits
Halesia vars.	Pyrus vars.
Ilex opaca var	Quercus (All oaks except Q. palustris)
All treeform evergreen Ilex vars.	Salix weeping vars.
Koelreuteria vars.	Tilia tomentosa vars.
Liquidambar vars.	Zelkova vars.

SEEDING SCHEDULE

All areas not occupied by buildings, paving or other plant material shall be manually seeded.

The Seed Mixture shall be seed mixture #13 per the Standards for Soil Erosion and Sediment Control in New Jersey, Permanent Vegetation Mixtures, Planting Rates and Planting Dates Table by the NJ Soil Conservation District.

The seed mixture consist of the following:

Common Name	Proportion by Weight
Hard Fescue	175 lbs./acre
Perennial Ryegrass	45 lbs./acre
Kentucky Bluegrass	45 lbs./acre

Application Rates:

Hard Fescue	4 lbs./1000 sf
Perennial Ryegrass	1 lbs./1000 sf
Kentucky Bluegrass	1 lbs./1000 sf

Mulch

Straw/Hay Mixture: 1 ½ – 2 tons/acre

Seeding dates:

Optimal seeding dates: Aug. 15 – Oct. 30
Acceptable seeding dates: Feb. 1 – April 30
May 5 – Aug. 14

GENERAL NOTES

1. ALL DISTURBED AREAS (OPEN SPACE, LAWN AREAS AROUND BUILDINGS ETC.) SHALL BE SEEDED OR SODDED.
2. LANDSCAPE CONTRACTOR SHALL VERIFY ALL UTILITIES (PROPOSED AND EXISTING) PRIOR TO INSTALLATION. IF DISCREPANCIES OCCUR, THE THE LANDSCAPE ARCHITECT'S OFFICE SHALL BE NOTIFIED IMMEDIATELY.
3. SUBSTITUTION AND FINAL LOCATION OF ALL PLANT MATERIAL IS SUBJECT TO THE LANDSCAPE ARCHITECT AND TOWNSHIP'S APPROVAL.
4. IF DISCREPANCIES OCCUR IN THE PLANT SCHEDULE QUANTITIES, THE PLAN SHALL SUPERSEDE.
5. SEE THIS SHEET FOR PLANTING AND SEEDING SCHEDULES, NOTES, AND DETAILS.

THIS PLAN TO BE USED FOR LIGHTING PURPOSES ONLY.

DATE	REVISION	DRAWN	CHECKED	RELEASED

LANDSCAPE DETAILS

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
CIVIL ENGINEERS
LAND SURVEYORS
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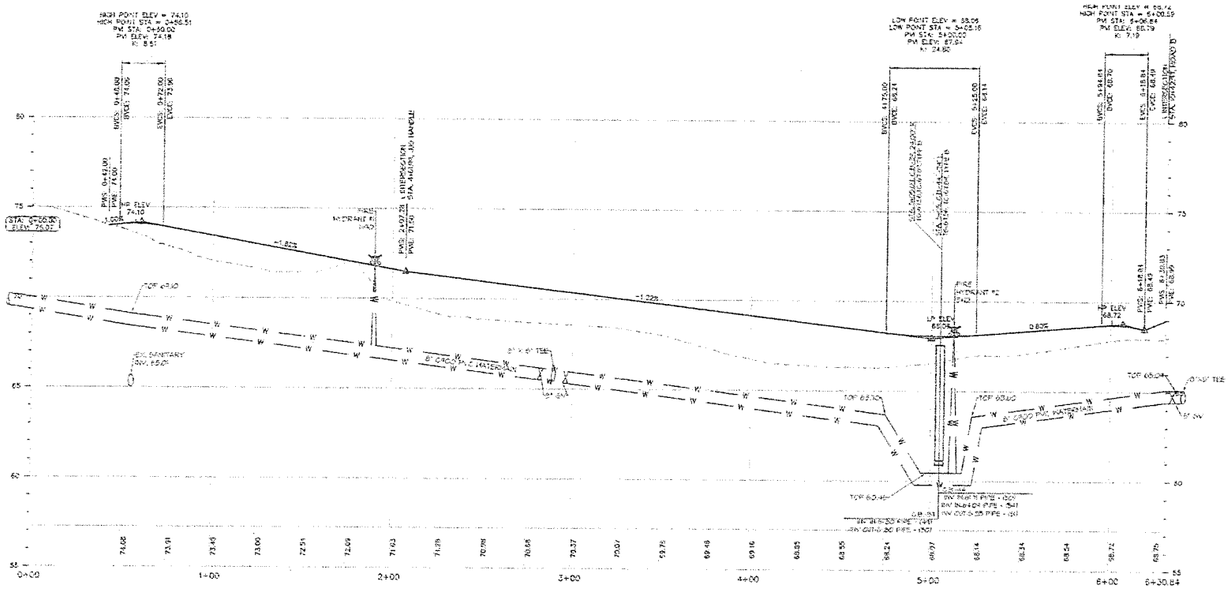
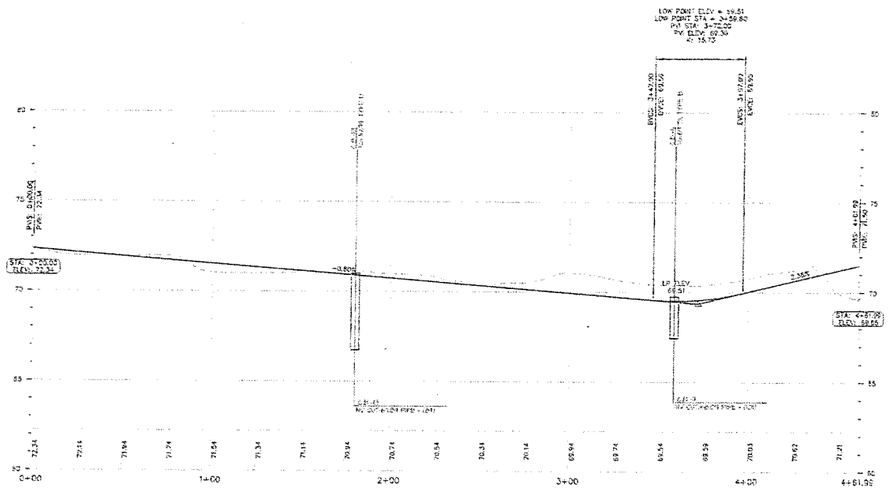
1805 Rt. 9, Toms River, NJ 08755 T: 732.797.3120 F: 732.797.3229

Leroy G. Webb Jr.
Licensed Landscape Architect
N.J. Lic. No. AS00149
Professional Planner N.J. Lic. No. 4006

DRAWN BY: MVM	DATE: 8/10/18
DESIGNED BY: MVM	SCALE: 1"=30'
CHECKED BY: MVM	DRAWING NO.
RELEASED BY: LGW	PROJECT NO. 1423.0016
SHEET NO. 27	OF 39



PROFILE OF BOULEVARD A
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF JUG HANDLE
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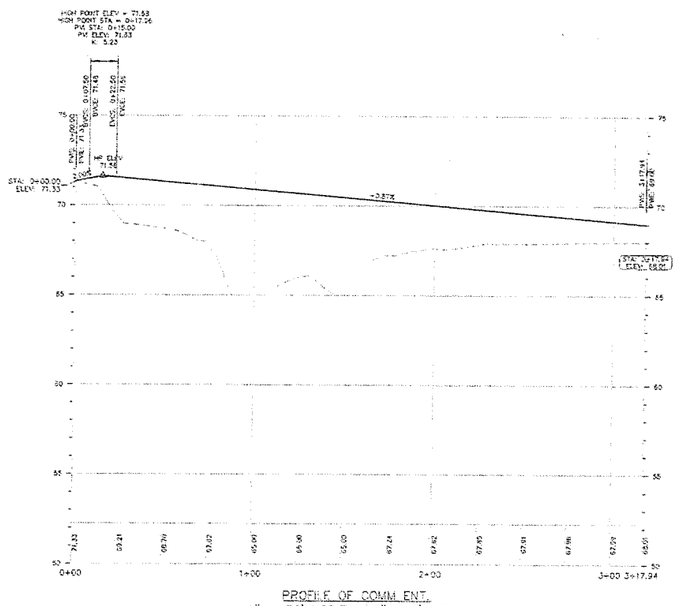


PROFILE OF COMM ENT.
1" = 30' HORIZ. / 1" = 3' VERT.

GRAPHIC SCALE 1"=30'

VERTICAL SCALE 1"=3'

DATE	REVISION	DRAWN	CHECKED	RELEASED

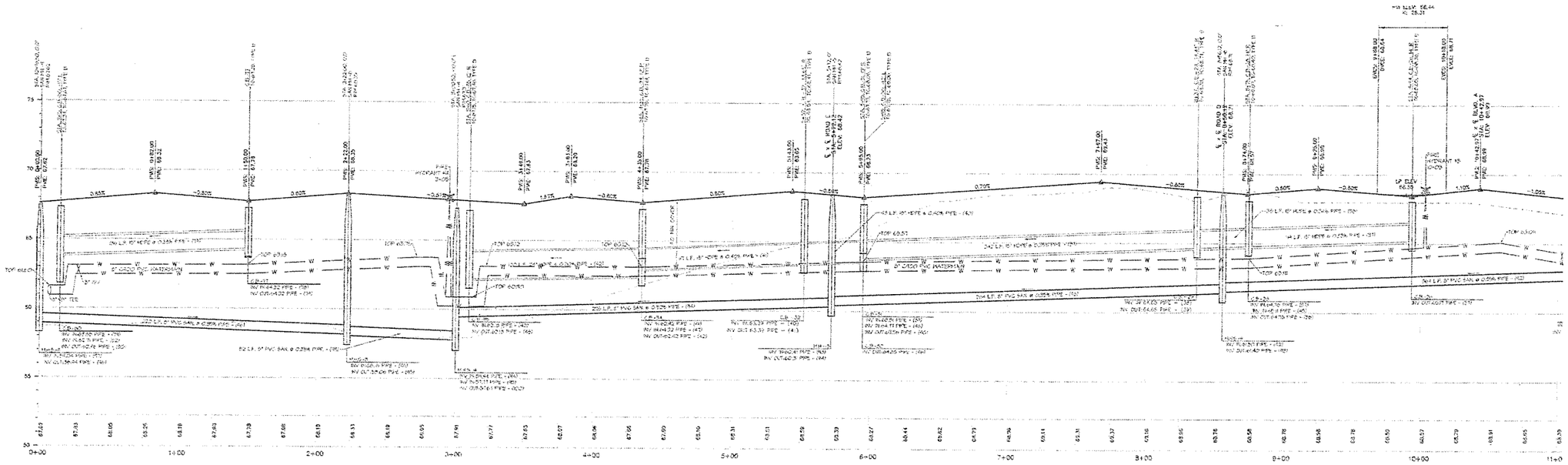
ROAD PROFILES

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWASSOCIATES.COM

Brian P. Murphy
PROFESSIONAL ENGINEER
N.J. LIC NO 42000

DRAWN BY: CSM	DATE: 5/10/18
DESIGNED BY: JS	SCALE: 1"=30'H/1"=3'V
CHECKED BY: JS	DRAWING NO: PD-170
APPROVED BY: BPM	PROJECT NO: 1422.0015
SHEET NO: 28	39



PROFILE OF ROAD B
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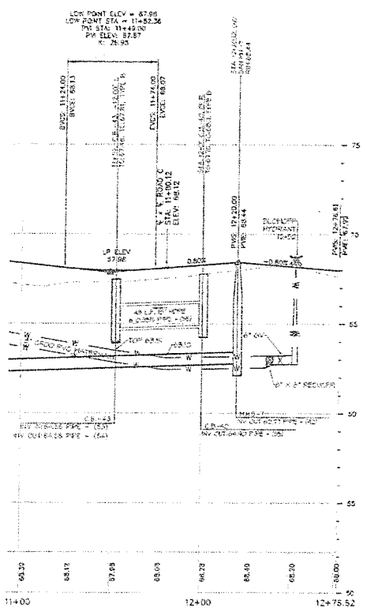
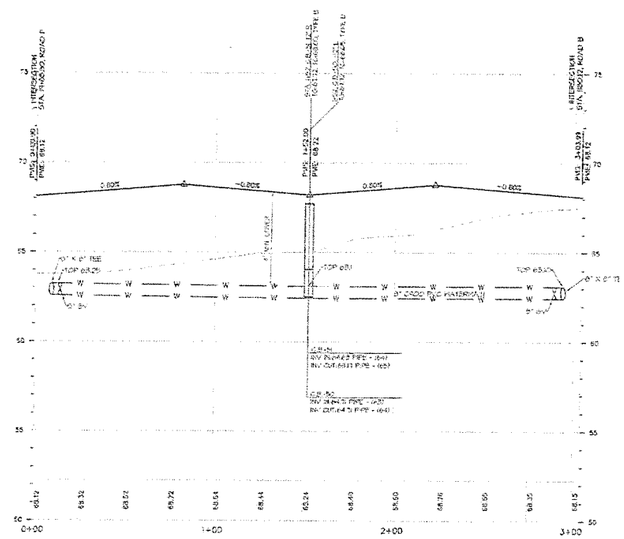
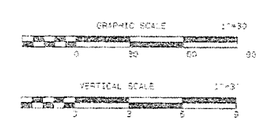


PROFILE OF ROAD B
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF ROAD C
1" = 30' HORIZ. / 1" = 3' VERT.



DATE	REVISION	DRAWN	CHECKED	RELEASED

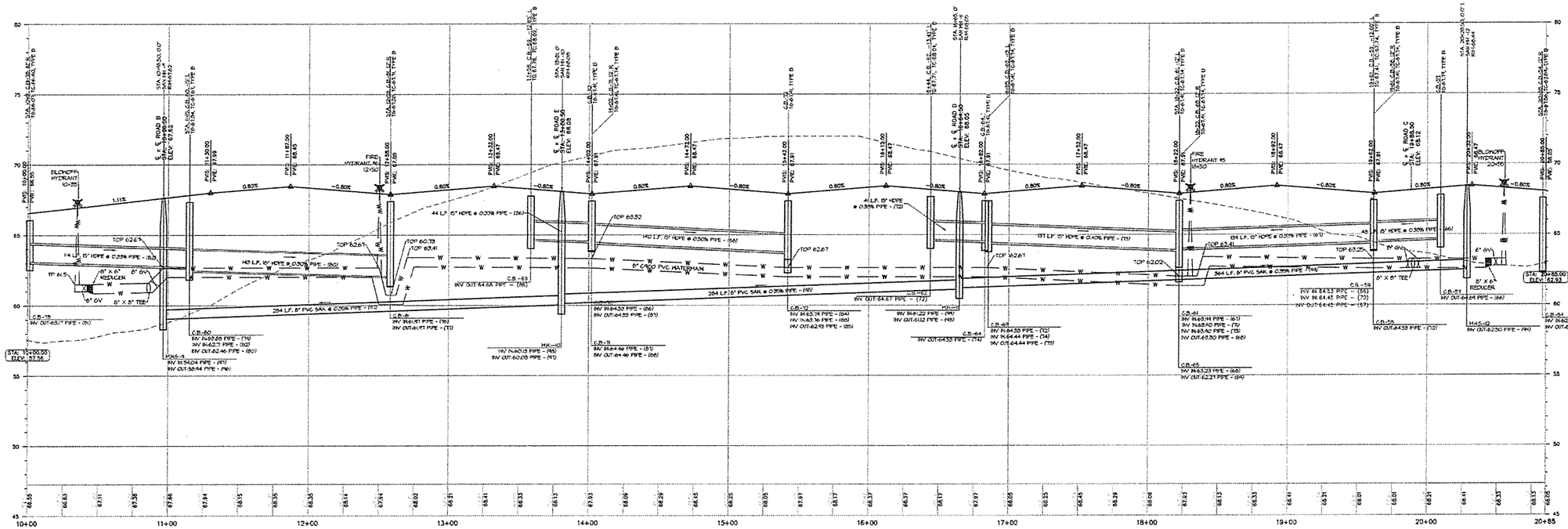
ROAD PROFILES

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

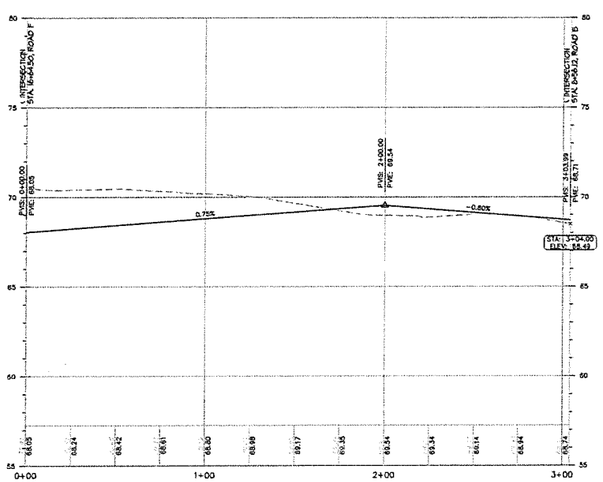
GAS ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESTORING SPECIALISTS
ARCHITECTS
FWHASSOCIATES.COM

Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

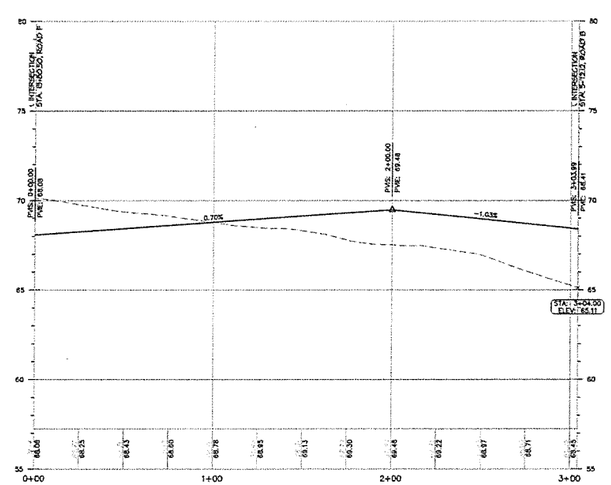
DRAWN	CRM 8/13/18
CHECKED	JS 1"=30'(1"=3')
DESIGNED	JS PG-170
PROJECT	PPM 1423.0015
SHEET	29 39



PROFILE OF ROAD F
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF ROAD D
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF ROAD E
1" = 30' HORIZ. / 1" = 3' VERT.

GRAPHIC SCALE 1"=30'
0 30 60 90

VERTICAL SCALE 1"=3'
0 3 6 9

DATE	REVISION	DRAWN	CHECKED	RELEASED

ROAD PROFILES

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 5
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
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Brian P. Murphy
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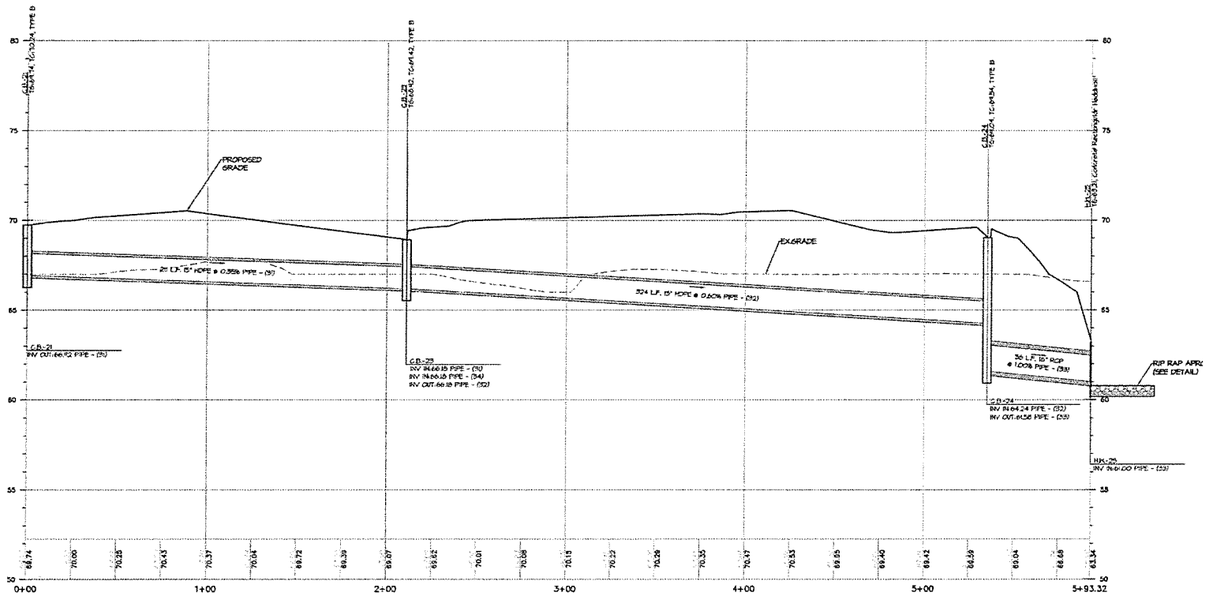
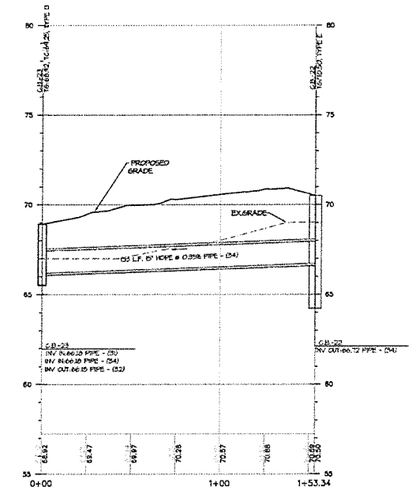
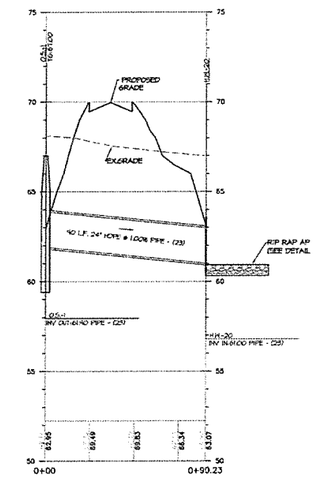
DRAWN BY CSM	DATE 8/10/15
ENGINEER BY JS	SCALE 1"=30'(1"=3')
CHECKED BY JS	ORDER NO. PO-170
REVISED BY BPM	PROJECT NO. 1423.0016
SHEET NO. 30	OF 39



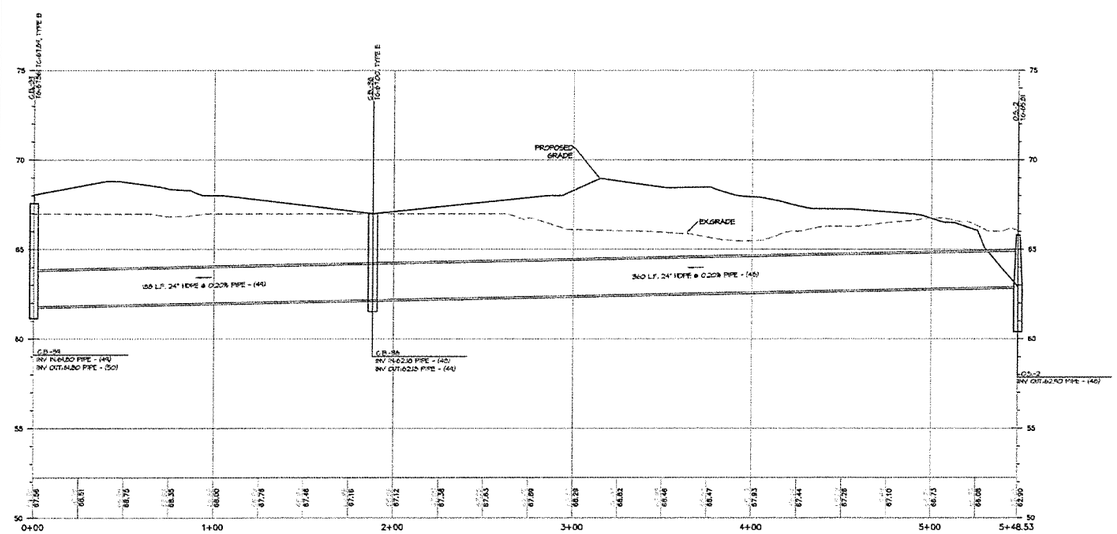
PROFILE OF C.B.-21 ~ H.W.-25
1" = 30' HORIZ. / 1" = 3' VERT.



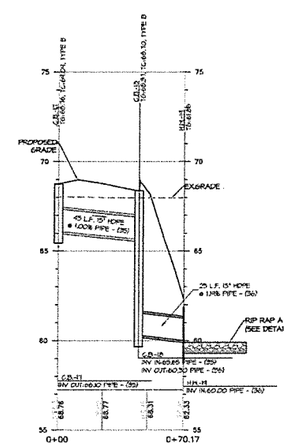
PROFILE OF C.B.-23 ~ C.B.-22
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF O.S.-1 ~ H.W.-20
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF C.B.-39 ~ O.S.-2
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF C.B.-17 ~ H.W.-19
1" = 30' HORIZ. / 1" = 3' VERT.

GRAPHIC SCALE 1"=30'
0 30 60 90

VERTICAL SCALE 1"=3'
0 3 6 9

DATE	REVISION	DRAWN	CHECKED	RELEASED

OFFROAD PROFLES

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
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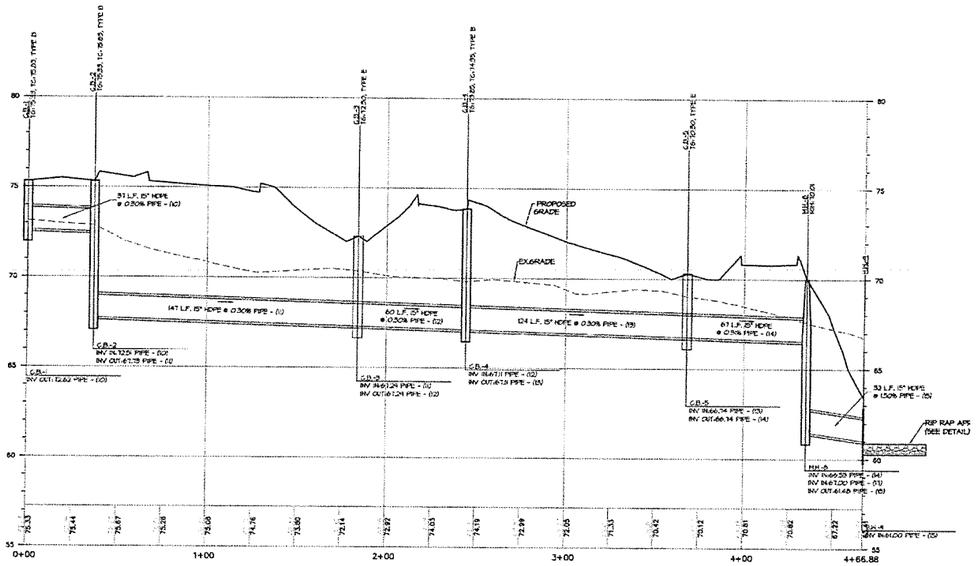
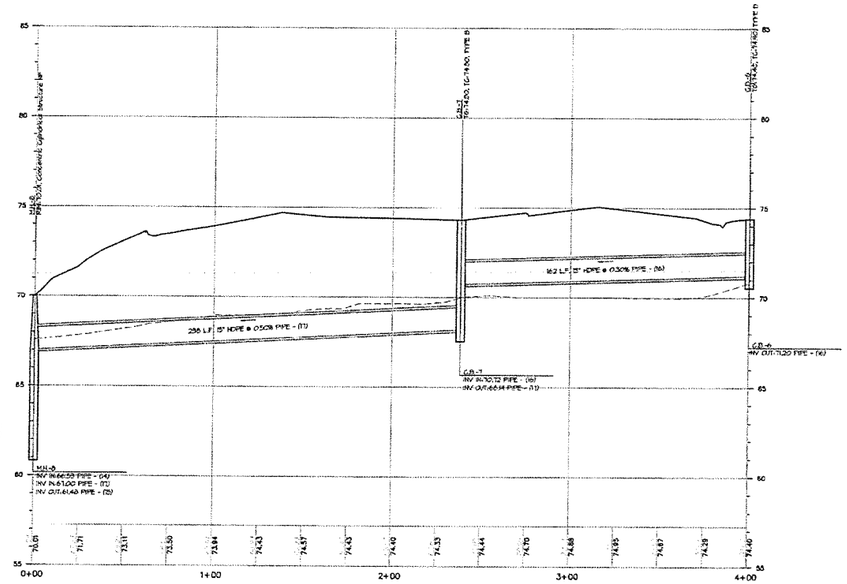
N.J. LIC. NO. 42000

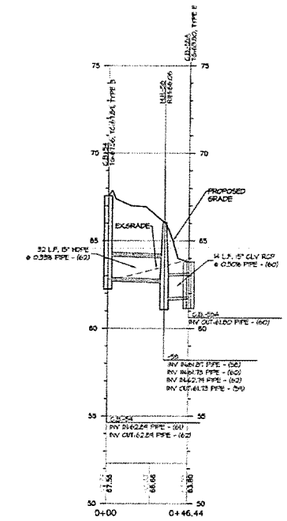
DRAWN BY CSM	DATE 8/10/18
REVIEWED BY JS	SCALE 1"=30'(1"=3'V)
CHECKED BY JS	DRAWING NO. PD-170
RELEASED BY BPM	PROJECT NO. 1423.0016
SHEET NO. 31 OF 39	



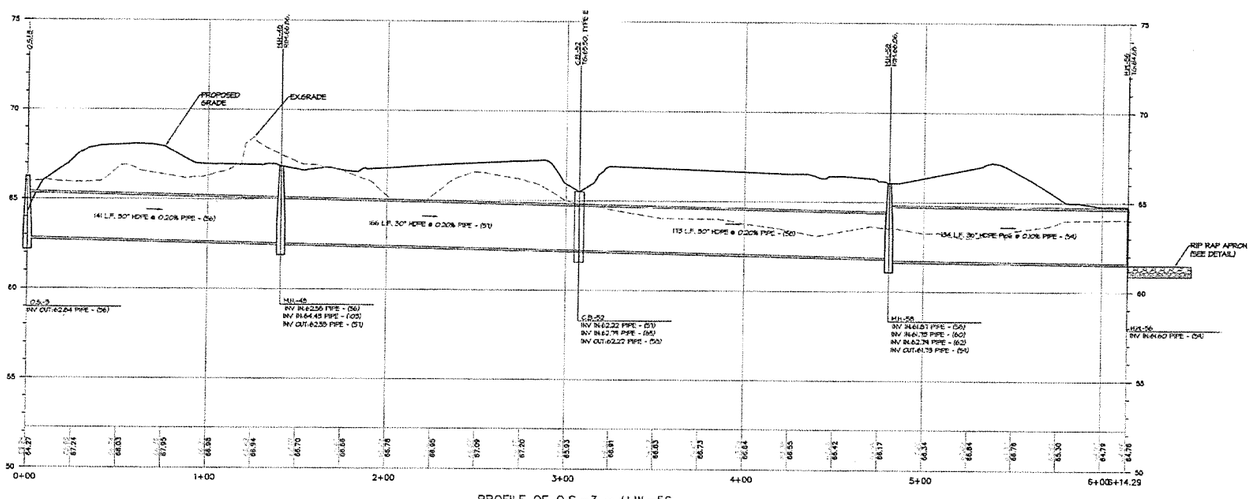
PROFILE OF C.B.1 ~ H.W.-9
1" = 30' HORIZ. / 1" = 3' VERT.



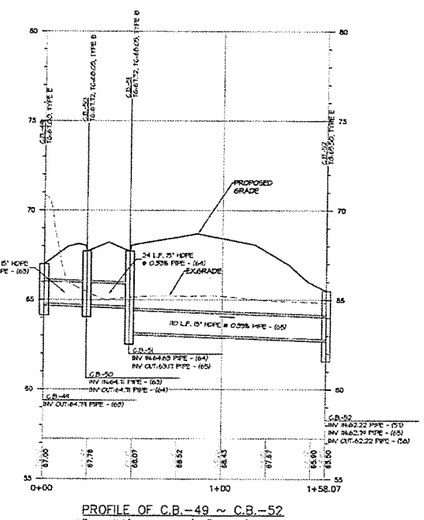
PROFILE OF M.H.-8 ~ C.B.-6
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF C.B.-54 ~ C.B.-55A
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF O.S.-3 ~ H.W.-56
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF C.B.-49 ~ C.B.-52
1" = 30' HORIZ. / 1" = 3' VERT.

GRAPHIC SCALE 1"=30'
0 30 60 90

VERTICAL SCALE 1"=3'
0 3 6 9

DATE	REVISION	DRAWN	CHECKED	RELEASED

OFFROAD PROFILES

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES
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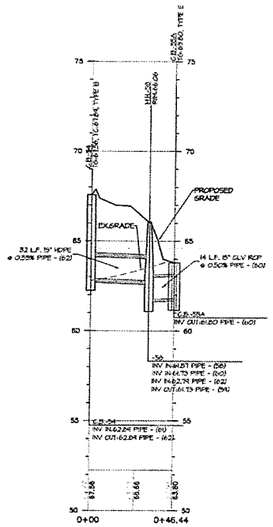
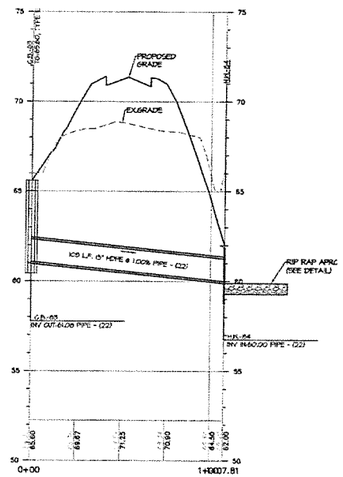
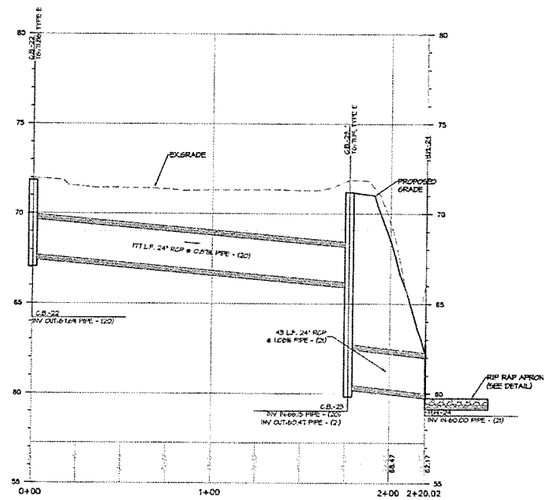
DRAWN BY CSM	DATE 8/12/18
DESIGNED BY JS	SCALE 1"=30'X1"=3'
CHECKED BY JS	DRAWING NO. PD-170
REVIEWED BY DPM	PROJECT NO. 1423.0015
SHEET NO. 32	OF 39



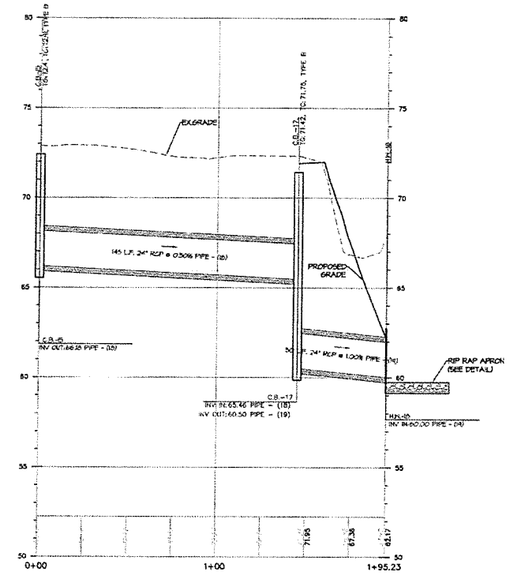
PROFILE OF C.B.-54 ~ C.B.-55A
1" = 30' HORIZ. / 1" = 3' VERT.



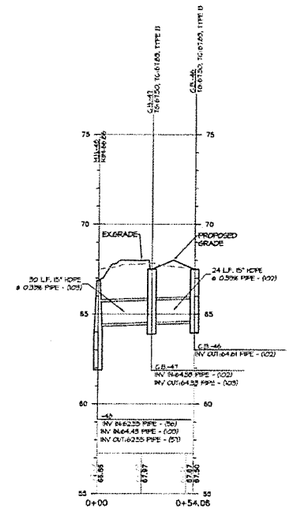
PROFILE OF C.B.-83 ~ H.W.-84
1" = 30' HORIZ. / 1" = 3' VERT.



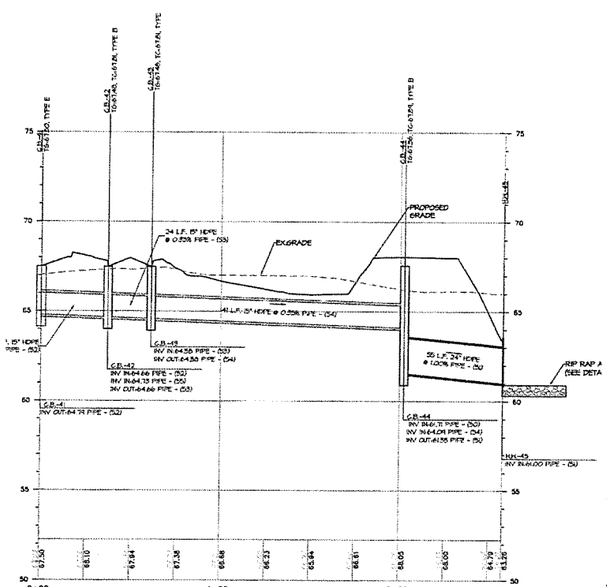
PROFILE OF DOT C.B.-22 ~ H.W.-24
1" = 30' HORIZ. / 1" = 3' VERT.



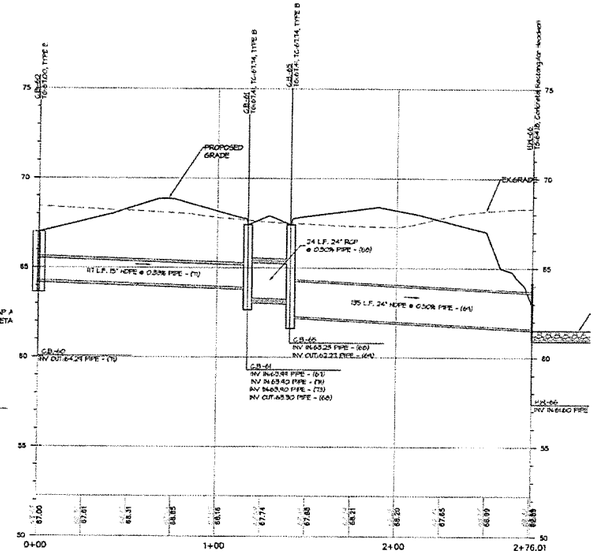
PROFILE OF DOT C.B.-15 ~ H.W.-18
1" = 30' HORIZ. / 1" = 3' VERT.



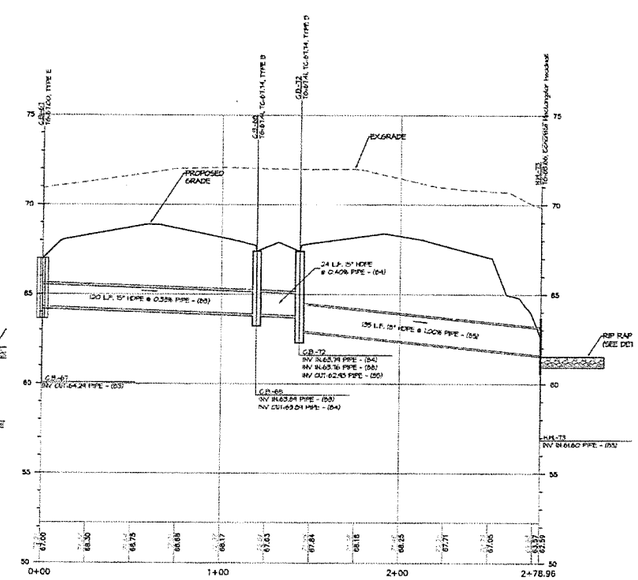
PROFILE OF C.B.-48 ~ C.B.-46
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF C.B.-41 ~ H.W.-45
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF C.B.-60 ~ C.B.-66
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF C.B.-67 ~ H.W.-73
1" = 30' HORIZ. / 1" = 3' VERT.

GRAPHIC SCALE 1"=30'
0 30 60 90

VERTICAL SCALE 1"=3'
0 3 6 9

DATE	REVISION	DRAWN	CHECKED	RELEASED

OFFROAD PROFILES

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
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Brian P. Murphy
8/21/18
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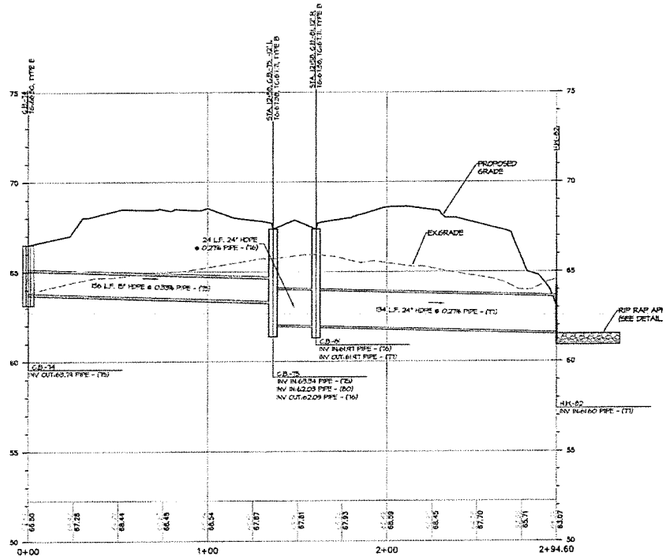
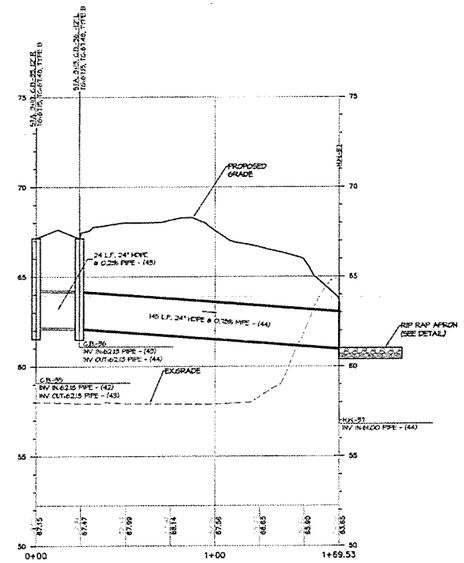
N.J. LIC. NO. 42000

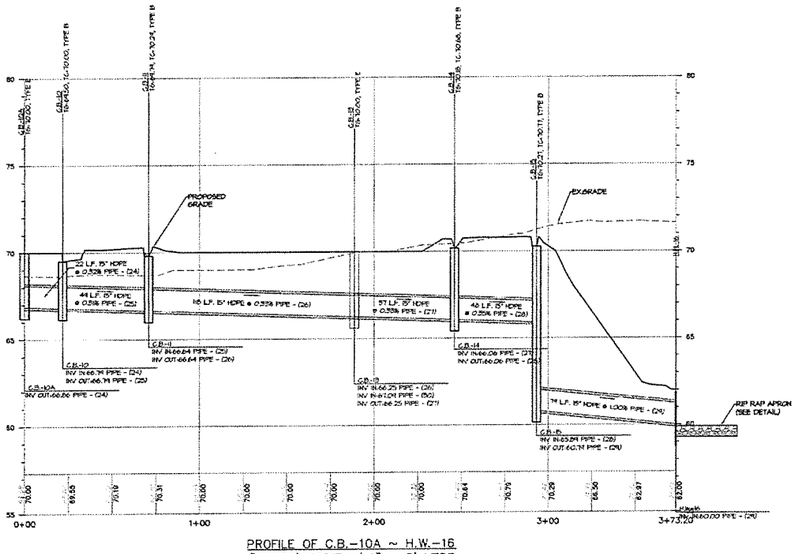
DRAWN BY: CSM	DATE: 8/10/18
DESIGNED BY: JS	SCALE: 1"=30'H,1"=3'V
CHECKED BY: JS	DRAWING NO.: PD-170
REVIEWED BY: BPM	PROJECT NO.: 1423.0016
SHEET NO.: 33	OF: 39



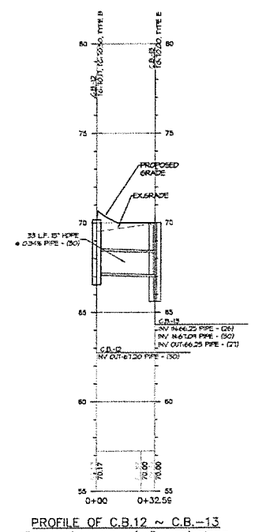
PROFILE OF C.B.-74 ~ H.W.-82
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF C.B.-37 ~ H.W.-35
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF C.B.-10A ~ H.W.-16
1" = 30' HORIZ. / 1" = 3' VERT.



PROFILE OF C.B.12 ~ C.B.-13
1" = 30' HORIZ. / 1" = 3' VERT.

GRAPHIC SCALE 1"=30'
0 30 60 90

VERTICAL SCALE 1"=3'
0 3 6 9

DATE	REVISION	DRAWN	CHECKED	RELEASED

OFFROAD PROFILES

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
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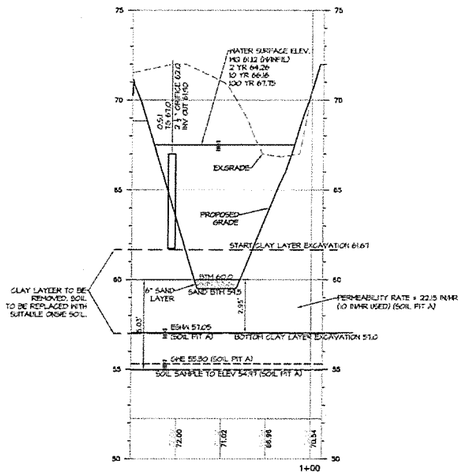
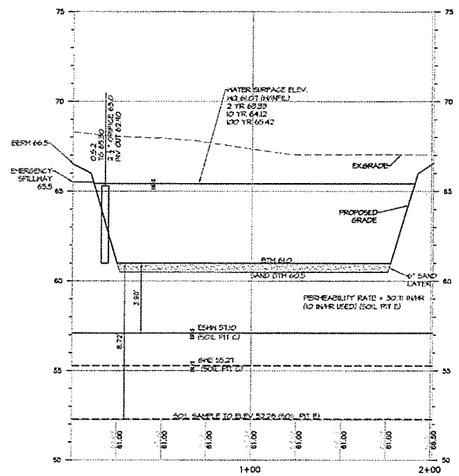
Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

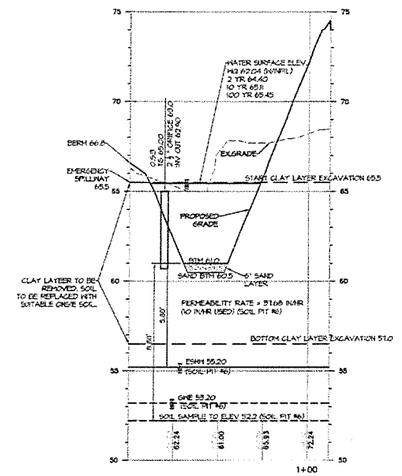
DRAWN BY CSM	DATE 8/10/18
DESIGNED BY JS	SCALE 1"=30'H, 1"=3'V
CHECKED BY JS	DRAWING NO. PO-170
RECORDED BY DFM	PROJECT NO. 1423.0016
SHEET NO. 34 OF 39	



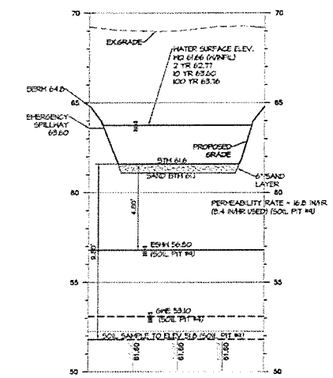
CROSS-SECTION OF INFILTRATION-DETENTION BASIN 1
1" = 30' HORIZ. / 1" = 3' VERT.



CROSS-SECTION OF INFILTRATION-DETENTION BASIN 2
1" = 30' HORIZ. / 1" = 3' VERT.



CROSS-SECTION OF INFILTRATION-DETENTION BASIN 3
1" = 30' HORIZ. / 1" = 3' VERT.



CROSS-SECTION OF INFILTRATION-DETENTION BASIN 4
1" = 30' HORIZ. / 1" = 3' VERT.

GRAPHIC SCALE 1"=30'
0 30 60 90

VERTICAL SCALE 1"=3'
0 3 6 9

DATE	REVISION	DRAWN	CHECKED	RELEASED

BASIN CROSS SECTIONS

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
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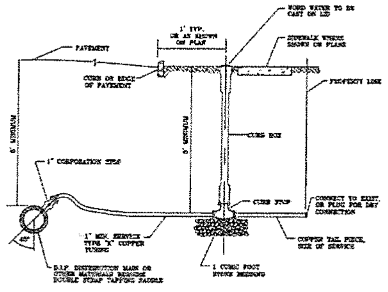
Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY CSM	DATE 8/10/18
DESIGNED BY JS	SCALE 1"=30'&1"=3'V
CHECKED BY JS	DRAWING NO. FD-170
RELEASED BY PPM	PROJECT NO. 1423.0016
SHEET NO. 35 OF 39	



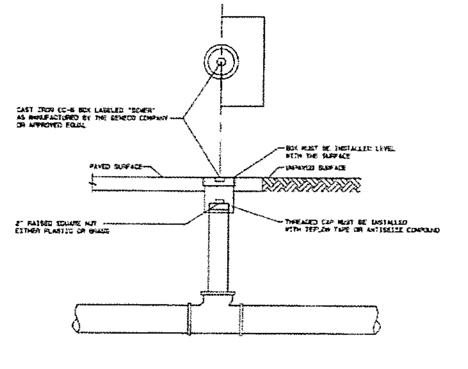
LINE DIA.	CURB BOX	WITH STATIONARY ROD	LID
1"	MUELLER H-10314	YES	MUELLER 87081
1 1/2"	MUELLER H-10314	YES	MUELLER 87081
2"	MUELLER H-10310	YES	MUELLER 89081

NOTES:

1. CURB BOX SHALL NOT BE LOCATED IN THE SIDEWALK, ROADWAY OR CURB.
2. CURB BOX SHALL BE LOCATED BEHIND THE SIDEWALK FOR INTEGRAL CURB AND SIDEWALK.
3. IN GENERAL, THE CURB BOX SHOULD BE LOCATED BETWEEN THE CURB AND SIDEWALK.
4. DESIGNER MUST RESEARCH ANY PROPOSED WIDENING OF EXISTING ROADWAYS AND LOCATE BOXES TO COMPLY WITH NOTES 1,2 & 3.
5. THE AUTHORITY'S RESPONSIBILITY FOR MAINTENANCE SHALL BE LIMITED TO THE WATER MAIN, CORPORATION STOP, SERVICE LINE TO AND INCLUDING THE CURB STOP. THE MAINTENANCE OF THE CONNECTION OF THE SERVICE TIE TO THE CURB STOP TO THE BUILDING SHALL BE THE RESPONSIBILITY OF THE OWNER.
6. THE CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS AND NOTIFICATION OF ALL APPROPRIATE AGENCIES.
7. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE AUTHORITY AND THE TOWNSHIP PLUMBING DEPARTMENT FOR INSPECTION AT LEAST 48 HOURS IN ADVANCE OF THE WORK BEING PERFORMED.
8. SERVICE CONNECTION LARGER THAN 2 INCHES SHALL BE DUCTILE IRON PIPE WITH STANDARD GATE VALVE AND BOX.
9. SERVICE LINE SHALL BE A MINIMUM OF 1 INCH TYPE "K" COPPER FROM THE WATER MAIN TO THE OUTLET SIDE OF THE CURB STOP.

WATER SERVICE CONNECTION

NOT TO SCALE

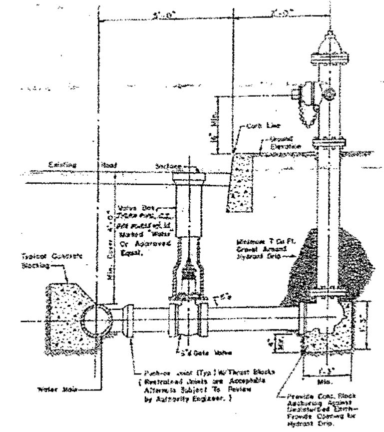


NOTES:

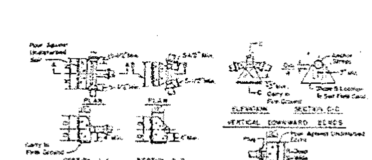
1. AT LEAST ONE CLEANOUT MUST BE PROVIDED ON EACH LATERAL.
2. A CLEANOUT WILL BE PROVIDED FOR EACH LATERAL BETWEEN THE CURB AND THE SIDEWALK.
3. IN GENERAL, OWNERSHIP AND MAINTENANCE OF LATERALS AND CLEANOUTS WILL BE THE RESPONSIBILITY OF THE PROPERTY OWNER.
4. THE LOCATION OF ALL CLEANOUTS MUST BE APPROVED BY THE TOWNSHIP PLUMBING DEPARTMENT.
5. ALL CLEANOUTS LOCATED WITHIN PAVEMENT OR CONCRETE MUST BE PROTECTED WITH A CC-6 BOX.

STANDARD CLEANOUT

N.T.S.

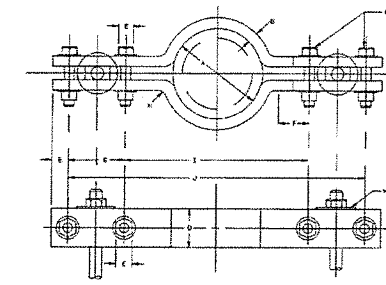


TYPICAL HYDRANT DETAIL

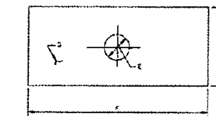


THRUST BLOCKS FOR TEES, HORIZONTAL & VERTICAL BENDS & PLUGS							
DESCRIPTION	DIMENSION	4"ø	6"ø	8"ø	10"ø	12"ø	16"ø
Tees	H	0'-6"	0'-9"	1'-0"	1'-5"	1'-8"	1'-11"
	G	0'-5"	0'-8"	0'-10"	1'-0"	1'-2"	1'-5"
Hor. & Vert. Upward 90° Bends	P	1'-4"	2'-1"	2'-10"	3'-4"	3'-8"	4'-8"
	G	0'-5"	0'-8"	0'-10"	1'-2"	1'-6"	1'-8"
Hor. & Vert. Upward 45° Bends	F	0'-10"	1'-5"	1'-8"	2'-2"	2'-5"	3'-0"
	G	0'-5"	0'-5"	0'-10"	1'-0"	1'-3"	1'-4"
Hor. & Vert. Upward 22-1/2° Bends	P	0'-9"	0'-10"	1'-0"	1'-4"	1'-10"	2'-0"
	G	0'-6"	0'-7"	0'-8"	0'-10"	0'-11"	1'-0"
Hor. & Vert. Upward 11-1/4° Bends	P	0'-5"	0'-6"	0'-8"	0'-11"	1'-0"	1'-6"
	G	0'-4"	0'-7"	0'-8"	0'-9"	0'-10"	1'-0"
Vert. Downward 45° Bends	Min. Conc. Anchorage	16 c.f.	37 c.f.	56 c.f.	92 c.f.	133 c.f.	170 c.f.
Vert. Downward 22-1/2° Bends	Min. Conc. Anchorage	8 c.f.	16 c.f.	28 c.f.	46 c.f.	65 c.f.	89 c.f.
Vert. Downward 11-1/4° Bends	Min. Conc. Anchorage	4 c.f.	8 c.f.	14 c.f.	23 c.f.	33 c.f.	45 c.f.
Plugs	H	1'-10"	1'-5"	1'-10"	2'-0"	2'-4"	2'-10"
	G	1'-0"	1'-4"	1'-10"	2'-10"	3'-4"	3'-10"

TYPICAL BLOCKING DETAILS



PIPE SIZE	ROD DIA.	CLAMP DIMENSIONS (INCHES)									
		A	B	C	D	E	F	G	H	I	J
6"	3/4"	7-1/16	1/2	1/2x3-1/2	2	.75	.880	3.1	1.13	10.64	18.34
8"	3/4"	9-3/16	1/2	1/2x3-1/2	2	.75	.880	3.1	1.13	12.78	20.45
10"	3/4"	11-3/8	1/2	1/2x3-1/2	2	.75	.880	3.1	1.13	14.96	22.68
12"	3/4"	13-1/2	1/2	1/2x3-1/2	2	.75	.880	3.1	1.13	17.09	24.78
16"	1"	17-7/8	3/4"	5/8x4-1/2	4	.938	.790	4.14	1.50	22.80	32.96
18"	1"	20	3/4"	3/4x5	4	1.125	.950	4.14	1.60	25.20	35.91
20"	1"	22-1/8	3/4"	3/4x5	4	1.125	.950	4.14	1.39	27.40	37.93
24"	1-1/4"	26-3/8	3/4"	3/4x5-1/2	5	1.125	.950	5.18	1.60	31.68	42.19

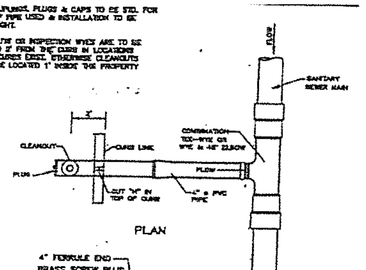


WASHERS			
D	E	F	G
WIDTH	HOLE DIAMETER	LENGTH	THICKNESS
3"	7/8"	6"	3/8"
3"	1 1/8"	7"	1/2"
4"	1 3/8"	7"	5/8"

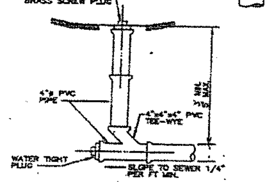
TIE ROD CLAMP

N.T.S.

1. ALL COUPLINGS, PLUGS & CAPS TO BE STD. FOR TYPE OF PIPE USED & INSTALLATION TO BE WATERTIGHT.
2. CLEANOUTS OR INSPECTION WYES ARE TO BE LOCATED 2' FROM THE CURB IN LOCATIONS WHERE CURBS EXIST. OTHERWISE CLEANOUTS SHALL BE LOCATED 1' INSIDE THE PROPERTY LINE.



PLAN

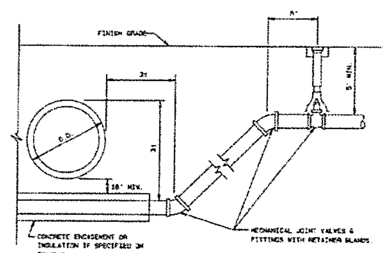


SECTION

TYPICAL 4" HOUSE CONNECTION DETAIL

NOT TO SCALE

MANCHESTER TOWNSHIP
DEPARTMENT OF UTILITIES
DIVISION OF SEWER
MARCH, 1994

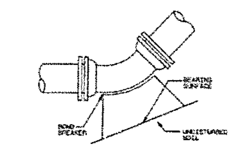


NOTES:

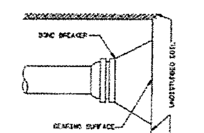
1. CONCRETE ENCASEMENT OR INSULATION WILL ONLY BE INSTALLED IF SPECIFICALLY REQUIRED ON THE CONSTRUCTION DRAWINGS.
2. CONCRETE ENCASEMENT WILL BE IN ACCORDANCE WITH THE STANDARD DETAIL FOR ENCASEMENT UNLESS OTHERWISE SPECIFIED.
3. IF PIPE IS ENCASED THE LOWER FITTINGS WILL BE RODDED TO RETAINER CLAMP 10 FEET INSIDE OF CONCRETE ENCASEMENT.
4. IF PIPE IS NOT ENCASED THE PIPE BETWEEN LOWER FITTINGS SHALL HAVE RESTRAINED JOINTS.
5. ALL RETAINER GLANDS OR RESTRAINED JOINTS SHALL BE WRAPPED IN POLYETHYLENE.
6. ALL PIPE SHALL BE WRAPPED IN POLYETHYLENE IF CORROSIVE SOILS ARE ENCOUNTERED.
7. THE MINIMUM DISTANCE FROM THE OUTSIDE WALL OF THE UTILITY BEING CROSSED TO THE CENTER OF THE LOWER BEND SHALL BE EQUAL TO THE DISTANCE FROM THE TOP OF THE UPPER UTILITY TO THE TOP OF THE WATER MAIN. THIS MINIMUM DISTANCE SHALL BE AS MEASURED PERPENDICULAR TO THE UPPER UTILITY.
8. LOWER FITTING SHALL BE RODDED TO UPPER FITTING IF A PIPE JOINT EXISTS BETWEEN THESE FITTINGS.
9. UPPER FITTINGS SHALL BE RODDED TO VALVE.
10. VALVE SHALL BE RODDED A MINIMUM OF 20 FEET FROM THE CROSSING.

VERTICAL DEFLECTION

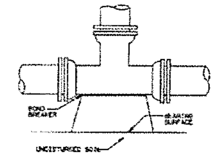
N.T.S.



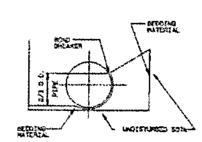
11¼?, 22½?, 45? AND 90? BENDS



DEAD END



TEE



TYPICAL CROSS SECTION

% MINIMUM BEARING SURFACE AREA (FT²)

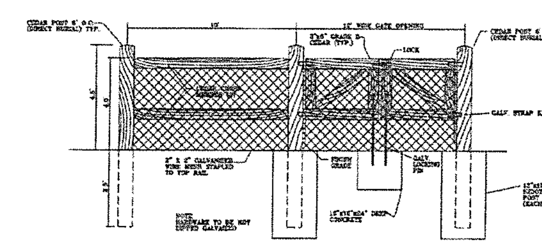
PIPE SIZE	B 11 1/4?	E 12-22 1/2?	N 23-45?	D 46-90?	S TEE OR DEAD END
6"	1.0	1.5	2.5	4.5	3.5
8"	1.0	2.5	4.5	8.0	5.5
10"	2.0	3.5	7.0	12.5	6.0
12"	2.5	5.0	9.5	17.5	12.5
16"	4.5	8.5	17.0	31.0	22.5
18"	5.5	11.0	21.5	39.5	28.5
20"	7.0	13.5	27.0	49.0	35.0
24"	10.0	19.5	38.5	70.5	50.0

NOTES:

1. ON 16" AND LARGER TRANSMISSION MAINS BENDS SHALL BE BOTH RODDED AND THRUST BLOCKED.
2. BEARING SURFACES SHOWN IN CHART ARE MINIMUM.
3. BASED ON 150 PSI INTERNAL PIPE PRESSURE PLUS WATER HAMMER = 150PSI.
   12" WATER HAMMER = 110 PSI.
   16" AND LARGER WATER HAMMER = 70 PSI.
4. SOIL BEARING CAPACITY = 3,000 LB./SQ. FT.
5. ALL 90 DEGREE BENDS SHALL BE RODDED AND THRUST BLOCKED.
6. NA = NOT APPLICABLE.

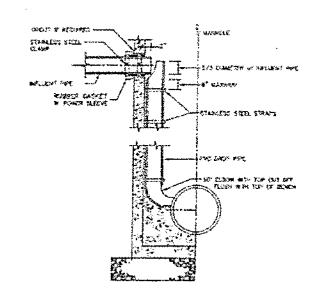
CONCRETE THRUST BLOCK DETAIL

N.T.S.



POST AND RAIL FENCE AND GATE DETAIL

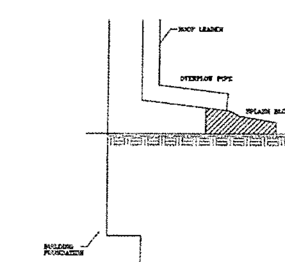
N.T.S.



TYPICAL INSIDE DROP CONNECTION

NOTES:

1. INCLUDE PLAN VIEW OF EXISTING LADDER IN RELATION TO INSIDE DROP CONNECTION.
2. NOMINAL DIAMETER OF PVC DROP SECTION TO BE EQUAL TO THE INFLUENT PIPE I.D.
3. ALL JOINTS ON THE DROP SECTION TO BE OF THE RUBBER GASKET OR FRICTION TYPE (SOLVENT CEMENT JOINTS PROHIBITED) TO FACILITATE REMOVAL AND/OR REPLACEMENT.
4. IN THE CONSTRUCTION OF THE 90° ELBOW, THE CONTRACTOR SHALL HAVE THE OPTION OF EITHER CHIPPING THE BENCH TO PROVIDE A CHANNEL FOR THE 90° ELBOW, OR LAYING THE ELBOW FLUSH ON TOP OF THE BENCH AND BUILDING UP ALL BENCHES IN THE MANHOLE TO THE SPRINGLINE OF THE ELBOW. IN EITHER CASE, THE TOP HALF OF THE 90° ELBOW SHALL BE CUT OFF SO THAT THE SPRING LINE OF THE ELBOW IS AT THE SAME ELEVATION AS THE TOP OF BENCH, WITH A MINIMUM OF 3 STRAPS PER DROP.
5. STAINLESS STEEL STRAPS ARE TO BE BOLTED TO THE MANHOLE WALL IN SUCH A MANNER AS TO ALLOW FOR FUTURE REMOVAL. THE FIRST STRAP IS TO BE PLACED WITHIN A MAXIMUM DISTANCE OF 4 INCHES BELOW THE INLET PIPE INVERT. REMAINING STRAPS ARE TO BE 4 INCHES ON CENTER WITH A MINIMUM OF 3 STRAPS PER DROP.
6. THE CONNECTION MUST BE MADE WITH A CORING MACHINE AND A WATERTIGHT RUBBER GASKET SUITABLE FOR USE WITH SANITARY SEWERAGE, USING A POWER SLEEVE AND TAKE-UP CLAMPS. GASKET MATERIALS, CLAMPS, ETC. SHALL BE MANUFACTURED BY THE PRESS SEAL GASKET CORPORATION, OR AN AUTHORITY-APPROVED EQUAL. THE USE OF PNEUMATIC HAMMERS, CHIPPING GUNS, SLEDGE HAMMERS, OR OTHER MEANS OF PROVIDING A CONNECTION, ARE NOT ACCEPTABLE TO THE TOMS RIVER MUA.
7. SANITARY SEWER LINE SHALL BE BULKHEADED AND REMAIN BULKHEADED UNTIL A PERMIT TO OPERATE IS ISSUED BY THE TOMS RIVER MUA.
8. THE MAXIMUM HEIGHT OF ANY INSIDE DROP FROM THE EXISTING INVERT SHALL BE 5 FEET.



ROOF LEADER DETAIL

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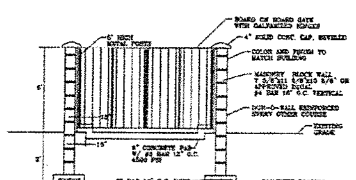
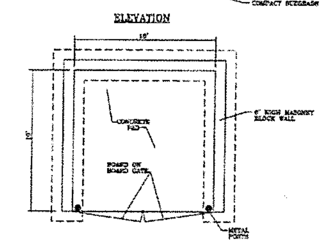


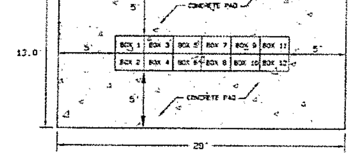
ELEVATION



PLAN VIEW

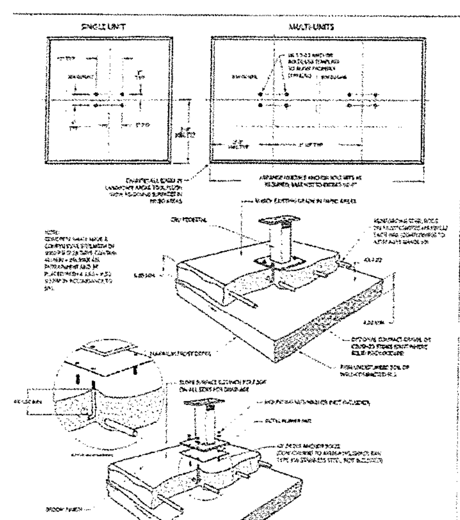
DUMPSTER ENCLOSURE

N.T.S.



COMMUNITY MAILBOX DETAIL

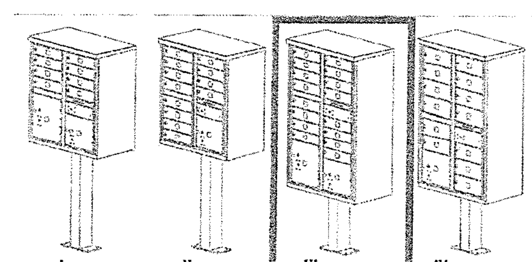
N.T.S.



SITE PREPARATION AND PEDESTAL INSTALLATION
METAL CBU TYPES I, II, III, AND IV
1570 "F" SERIES

PEDESTAL INSTALLATION DETAILS

N.T.S.



	TYPE I	TYPE II	TYPE III	TYPE IV
INSTALLED HEIGHT	62"	62"	62"	62"
DEPTH	17-7/8"	17-7/8"	17-7/8"	17-7/8"
WIDTH	30-1/2"	30-1/2"	30-1/2"	30-1/2"
WEIGHT (WITHOUT PEDESTAL)	107 LBS	111 LBS	147 LBS	137 LBS
WEIGHT (WITH PEDESTAL)	125 LBS	129 LBS	162 LBS	152 LBS
QTY OF STANDARD COMPARTMENTS	8	12	16	13
QTY OF PARCEL COMPARTMENTS	2	1	2	1
PARCEL COMPARTMENT HEIGHT	10", 13"	10"	10", 13"	10"

COMMUNITY MAILBOX DETAIL

N.T.S.

DATE	REVISION	DRAWN	CHECKED	RELEASED

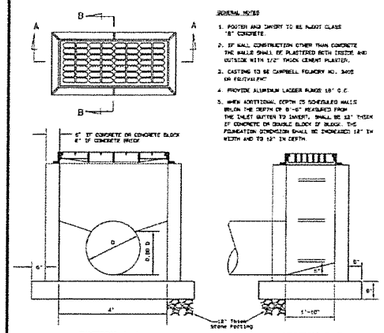
CONSTRUCTION DETAILS

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

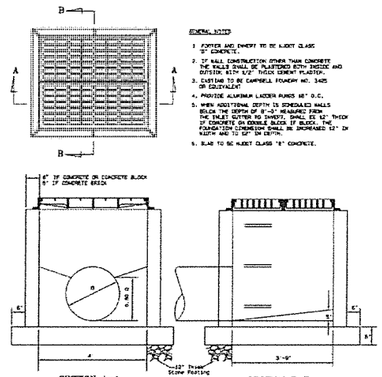
FWH ASSOCIATES, P.A.
CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESERVE SPECIALISTS
ARCHITECTS
FWHASSOCIATES.COM
1856 Rt. 9, Toms River, NJ 08755 T: 732.797.3100 F: 732.797.3223

Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY: CSM	DATE: 8/10/18
DESIGNED BY: JS	SCALE: N.T.S.
CHECKED BY: JS	DRAWING NO.: PD-170
RELEASED BY: BPM	PROJECT NO.: 1423.0016
SHEET NO.: 36	OF: 39



TYPE "A" INLET
N.T.S.



TYPE "E" INLET
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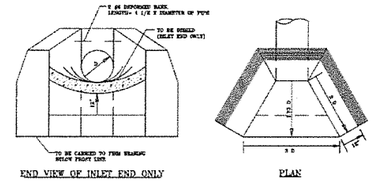
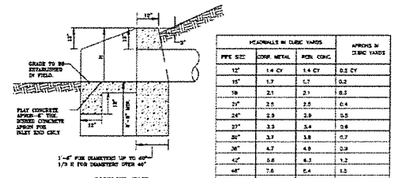
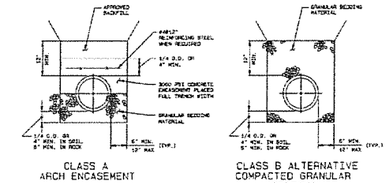


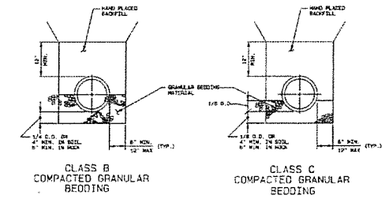


HEADWALLS IN CUBIC YARDS			APRONS IN CUBIC YARDS
PIPE SIZE	CORR. METAL	MON. CONC.	
12"	1.4 CY	1.4 CY	0.3 CY
15"	1.7	1.7	0.3
18"	2.1	2.1	0.3
21"	2.5	2.5	0.4
24"	2.9	2.9	0.5
27"	3.3	3.4	0.6
30"	3.7	3.8	0.7
36"	4.7	4.9	0.9
42"	5.6	6.3	1.2
48"	7.6	8.4	1.5
54"	8.7	10.7	1.8
60"	12.2	13.4	2.1
66"	15.0	16.4	2.5
72"	18.1	19.9	3.0

GENERAL NOTES
1. ALL EDGES TO BE CHAMFERED 1"
2. CONCRETE TO BE 4,000 P.S.I. CLASS "C"
3. APRONS TO BE 4" REF. CONC. PLAT AT OUTLET END, DOWEL AT BELL END
4. EXPOSED PORTIONS OF WALL TO BE FORMED AND FLOATED.
5. FOR ARCH PIPE, THIS SPAN SHALL BE SUBSTITUTED FOR D.

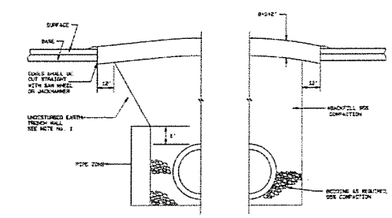
CONCRETE HEADWALL
N.T.S.





NOTES:
THERE SHALL BE A MINIMUM OF 24" OF BACKFILL OVER THE PIPE BEFORE HEAVY COMPACTION EQUIPMENT IS USED.

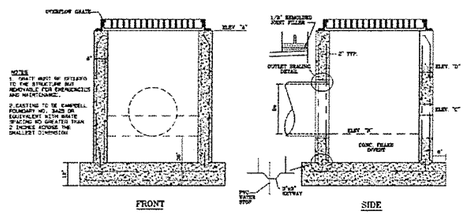
BEDDING DETAIL
N.T.S.



NOTES:
1. TRENCH TO BE SLOPED OR BRACED AND SHEETED AS NECESSARY FOR THE SAFETY OF THE WORKMEN AND THE PROTECTION OF OTHER UTILITIES.
2. TACK COAT ALL PAVEMENT SURFACES PRIOR TO INSTALLATION OF NEW PAVEMENT.
3. THE PATCH SHALL BE FULL DEPTH ASPHALT AND EXTEND 12" BEYOND THE EDGE OF TRENCH. DEPTH OF ASPHALT SHALL BE THE DEPTH OF EXISTING BASE PLUS THE DEPTH OF EXISTING SURFACE PLUS (2) INCHES.
4. PIPE ZONE OF TRENCH TO BE BACKFILLED IN 9(4 (6) INCH LIFTS. THESE SIZE 3(3 INCH LIFTS ARE TO BE HAND TAMPED.
5. TRENCH TO BE BACKFILLED IN TWELVE (12) INCH LIFTS ABOVE PIPE ZONE.
6. BACKFILL TO BE COMPACTED TO 95% IN ACCORDANCE WITH AASHTO T180 AND AASHTO T99. COMPACTION TESTS TO BE PERFORMED EVERY 24" OF VERTICAL TRENCH HEIGHT. HORIZONTAL DISTANCES BETWEEN TESTS NOT TO EXCEED 200'. A MINIMUM OF TWO TESTS TO BE PERFORMED FOR EVERY 24" OF VERTICAL TRENCH HEIGHT.

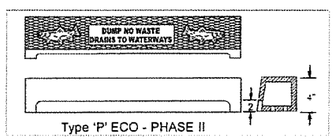
COMPACTION	SOIL (ASTM D2487)
AASHTO T180	ALL "S" & "S" SOILS
AASHTO T99	ML, CL, ML CL

TYPICAL TRENCH DETAILS
N.T.S.

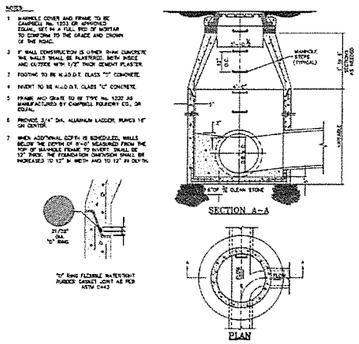


OUTLET STRUCTURE
N.T.S.

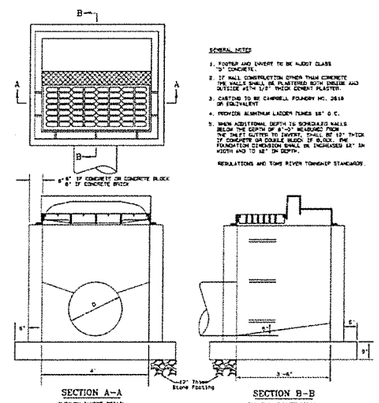
	ELEV. A	ELEV. B	ELEV. C	Do
O.S.-1	67.5	61.50	62.00(2-1/2')	24"
O.S.-2	61.5	62.00	63.00(3-1/2')	24"
O.S.-3	65.0	62.90	63.00(2-1/2')	30"



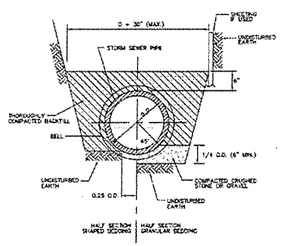
EMERGENCY SPILLWAY DETAIL
N.T.S.



STORM DRAINAGE MANHOLE
N.T.S.



TYPE B INLET



STORM SEWER PIPE BEDDING
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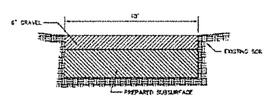

BASIN ACCESS DRIVE
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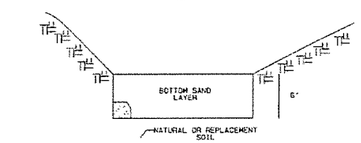
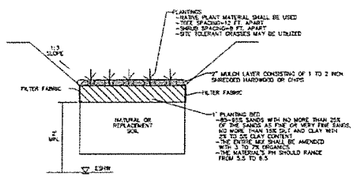
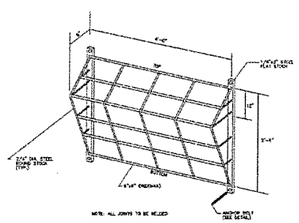


NOTES:
1. 6" THICK BOTTOM SAND LAYER SHALL CONSIST OF KS SAND WITH NO MORE THAN 15% FINES AND SHALL HAVE A MINIMUM INFILTRATION RATE OF 20 INCHES PER HOUR.
2. BASIN CONSTRUCTION MUST NOT COMPACT SOILS BELOW BASIN BOTTOM.
3. THE BASIN BOTTOM IS NOT TO BE FULLY EXCAVATED TO ACCOMODATE THE USE OF THE K-S SAND UNTIL A MAJORITY OF THE CONTRIBUTING AREA IS PERMANENTLY STABILIZED.

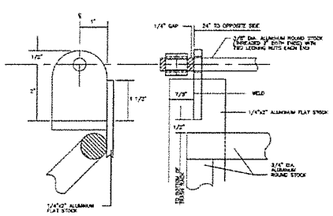
INFILTRATION BASIN
N.T.S.



RAIN GARDEN DETAIL
N.T.S.
NOTE: NO CONSTRUCTION EQUIPMENT PERMITTED IN THE AREA OF THE RAIN GARDEN BOTTOM



WEIR ORIFICE
TRASH RACK DETAIL
N.T.S.



HINGE ASSEMBLY
N.T.S.

DATE	REVISION	DRAWN	CHECKED	RELEASED

CONSTRUCTION DETAILS

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
Civil Engineers
Land Surveyors
Planners
Landscape Architects
Reserve Specialists
Architects
FWHASSOCIATES.COM
1856 Rt. 9, Toms River, NJ 08755 T: 732.797.3100 F: 732.797.3223

Brian P. Murphy
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY: CSM	DATE: 8/10/16
DESIGNED BY: JS	SCALE: N.T.S.
CHECKED BY: JS	PROJECT NO.: PO-170
REVIEWED BY: BPM	PROJECT NO.: 1423.0016
SHEET NO.: 37	OF: 39

1. CHECK WALLS

- CHECK WALLS ARE PERMITTED WHEN ADJACENT TO NON-WALK AREAS OR ELEVATION DIFFERENCES CANNOT BE ACCOMMODATED BY FLARES OR GRADING.
- AVOID THE USE OF CHECK WALLS IN SIDEWALK AND CURB DESIGN. APPROVAL FROM THE TOMS RIVER ENGINEERING DEPARTMENT IS REQUIRED.

2. CROSSWALKS

- FOR CURB RAMPS THAT LEAD TO A SINGLE CROSSWALK, THE RAMP (EXCLUDING FLARES) TO BE FULLY INSIDE OF MARKED CROSSWALK LINES
- SHOULD BE PLACED A MINIMUM DISTANCE OF 4'-0" FROM STOP AND YIELD LINES
- FOR UN-SIGNALIZED AREAS, CROSSWALKS SHOULD BE PLACED A MINIMUM DISTANCE OF 20'-0" AWAY FROM ON ROAD PARKING ZONES. FOR SIGNALIZED AREAS, CROSSWALKS SHOULD BE PLACED A MINIMUM DISTANCE OF 30'-0" FROM ON ROAD PARKING ZONES.
- PEDESTRIAN CROSSWALK IS 6'-0" MINIMUM MEASURED FROM INSIDE THE PAINTED EDGE TO INSIDE PAINTED EDGE AND THE INSIDE LINES MUST BE OUTSIDE THE PROJECTED CURB LINES
- AVOID USING THE PARALLEL LINE CROSSWALK DESIGN. INSTEAD USE THE LONGITUDINAL LINES AT 8'-0" LONG AND 1'-2" WIDE WITH A SPACING OF 1'-2" APART. SPACING SHOULD BE DESIGNED SO THE PAINTED AREAS AVOID THE WHEEL PATHS.

3. CURB RAMPS

- CONSTRUCT CURB RAMPS WITH A MINIMUM 4'-0" X 4'-0" CLEAR SPACE BEFORE THE CURB FACE, WITHIN THE WIDTH OF THE CROSSWALK.
- SLOPES THAT EXCEED 1:12 WILL NOT BE ACCEPTED AND WILL BE RECONSTRUCTED.
- PROVIDE SLIP RESISTANT TEXTURE ON CURB RAMP BY COARSE BROOMING TRANSVERSE TO THE SLOPE OF THE RAMP. EXTEND TEXTURE THE FULL WIDTH AND LENGTH OF THE CURB RAMP INCLUDING FLARED SIDE RAMPS.
- TO AVOID CHASING GRADE INDEFINITELY WHEN TRAVERSING THE HEIGHT OF CURB, RAMP LENGTH NOT TO EXCEED 15'-0". ADJUST RAMP SLOPE AS NEEDED TO PROVIDE ACCESS TO THE MAXIMUM EXTENT FEASIBLE.
- FOR NEW CONSTRUCTION AND ALTERATIONS, CONSTRUCT CURB RAMP AND FLARE SLOPES WITH THE FLATTEST SLOPE POSSIBLE.
- FOR NEW CONSTRUCTION, ATTEMPT TO KEEP THE CROSS SLOPE AS FLAT AS POSSIBLE. DO NOT EXCEED 2.00% CROSS SLOPE ON THE CURB RAMP OR PEDESTRIAN ACCESSIBLE ROUTE (MEASURED PERPENDICULAR TO THE DIRECTION OF TRAVEL).
- CURB RAMP AND SIDE FLARE LENGTHS ARE VARIABLE AND BASED ON CURB HEIGHT AND THE SIDEWALK SLOPE
- CURB RAMP WIDTH IS 4'-0" MINIMUM
- AVOID CURB RAMP DESIGNS WHERE THE WIDTH OF THE CROSSWALK WILL NEED TO BE GREATER THAN 10'-0" WIDE
- ALL SLOPES ARE MEASURED WITH RESPECT TO A LEVEL PLANE. THEREFORE, THE LENGTH OF RAMP IS NOT SOLELY DEPENDANT ON THE HEIGHT OF CURB. (FOR EXAMPLE, A 6" CURB DOES NOT NECESSARILY MEAN A RAMP LENGTH OF 6'-0" FOR A 12:1 SLOPE.
- THE CHANGE IN GRADE AT THE BOTTOM OF THE CURB RAMP AND ADJOINING ROAD SURFACE IS NOT TO EXCEED AN ALGEBRAIC DIFFERENCE OF 11.00%. THE COUNTER SLOPE OF THE GUTTER OR ROAD AT THE FOOT OF A CURB RAMP, TURNING SPACE OR BLENDED TRANSITION IS NOT TO EXCEED 5.00% AND IT IS NOT NECESSARY TO HAVE THE LENGTH GREATER THAN 15'-0".
- FOR BLENDED TRANSITION CURB RAMPS (TYPE 3), THE MAXIMUM RUNNING SLOPE IS 5% WITH A MAXIMUM 2% CROSS SLOPE. BLENDED TRANSITION CURB RAMPS REQUIRE THE OCEAN COUNTY ENGINEER'S APPROVAL.

4. FLUSH CURB

- CONSTRUCT TOP OF FLUSH CEMENT CONCRETE FLUSH CURB TO BE FLUSH WITH ADJACENT SURFACES (RAMPS, SIDEWALKS, FLARES)
- CONSTRUCT FLUSH CURB FOR CURB RAMPS FLUSH TO ADJACENT ROADWAY. GRADE EDGE OF ROAD ELEVATIONS AT THE FLOW LINE TO ENSURE POSITIVE DRAINAGE AND PREVENT PONDING. FOR LEVEL TURNING SPACES BEHIND FLUSH CURB, ADJUST SLOPES TO PROVIDE POSITIVE DRAINAGE. THE VERTICAL ALIGNMENT OF A CURB RAMP, EXCLUDING FLARES, SHALL BE PLANAR. GRADE BREAKS SHALL BE FLUSH AND PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN. RAMP TRANSITIONS BETWEEN WALKS, GUTTERS, TURNING SPACES, OR STREETS SHALL BE FLUSH AND FREE OF ABRUPT VERTICAL CHANGES (1/4" MAXIMUM).
- FOR TYPE 3 RAMPS AND BLENDED TRANSITIONS, THE FLUSH CURB MUST EXTEND FROM THE OUTER MOST EDGE OF EACH CROSSWALK.

5. DETECTABLE WARNING SURFACES

- NO SEPARATION BETWEEN DETECTABLE WARNING SURFACES FOR MEDIANS LESS THAN 6'-0" BETWEEN BACK OF CURBS
- PROVIDE DETECTABLE WARNING SURFACES (DWS) 24" MINIMUM IN THE DIRECTION OF PEDESTRIAN TRAVEL ACROSS FULL WIDTH OF RAMP AT THE GRADE BREAK NEAR STREET EDGE. PROVIDE DWS THAT CONTRAST VISUALLY WITH ADJACENT WALKWAY SURFACES EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT FOR THE FULL WIDTH OF RAMP
- ALIGN DETECTABLE WARNING SURFACE TRUNCATED DOMES ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF THE RAMP AND PERPENDICULAR TO CURB WHEN APPROPRIATE
- THE PUBLIC SIDEWALK CURB RAMP DETECTABLE WARNING SURFACES (SHADED AREA) SHALL BE SAFETY RED COLOR, EXCEPT IF THE MUNICIPALITIES HAVE ESTABLISHED AN ALTERNATIVE COLOR SCHEME.
- FOR TYPE 3 RAMPS AND BLENDED TRANSITIONS, THE DETECTABLE WARNING SURFACE MUST BE PLACED ALONG THE ENTIRE FLUSH CURB AND THE DOMES MUST BE PLACED IN SUCH A WAY THAT THE DIRECTION OF TRAVEL IS ORIENTED INTO THE CROSSWALK.

6. JOINTS

- PROVIDE EXPANSION JOINT MATERIAL 1/2" THICK WHERE CURB RAMP ADJOINS ANY RIGID PAVEMENT, SIDEWALK OR STRUCTURE WITH THE TOP OF JOINT FILLER FLUSH WITH ADJACENT CONCRETE SURFACE
- SEAL JOINTS WITH AN APPROVED SEALING MATERIAL

7. TURNING SPACES

- TURNING SPACE, APPROACH SIDEWALK TRANSITIONS, AND CURB RAMP SHALL BE KEPT CLEAR OF OBSTRUCTIONS, UNLESS AN EXCEPTION IS GRANTED.
- DO NOT EXCEED 2.00% SLOPE IN ANY DIRECTION
- TURNING SPACE SHOULD BE 4'-0" X 4'-0" MINIMUM CLEAR SPACE. IF THE TURNING SPACE IS CONSTRAINED ON 2 OR MORE SIDES, IT MUST BE 4'-0" WITH THE 5' LENGTH ALONG THE UNOBSTRUCTED SIDE. FOR TYPE 1 RAMPS AND BLENDED TRANSITIONS, THE TURNING SPACE MUST HAVE A MINIMUM OF A 5'-0" DEPTH (INCLUDING THE DETECTABLE WARNING SURFACE) ALONG THE FLUSH CURB/ROADWAY
- TOMS RIVER ENGINEERING DEPARTMENT APPROVAL REQUIRED IF TURNING SPACE FOR TURNING MANEUVER IS NOT ON THE SIDEWALK, I.E. IF THE TURNING SPACE "CLEAR SPACE" IS IN THE ROADWAY.
- 4'x4' TURNING SPACES ARE REQUIRED AT EVERY ACCESSIBLE PEDESTRIAN SIGNAL/PUSHBUTTON LOCATION
- TURNING SPACES SHALL BE CONSTRUCTED AT THE TOP OF EVERY PERPENDICULAR RAMP AND AT THE BOTTOM OF EVERY PARALLEL RAMP.

8. NON-WALK SURFACES

- NON-WALK AREA IS AN OBSTRUCTION OR GRASS/NON PAVED AREA ADJACENT TO THE PEDESTRIAN ACCESS ROUTE THAT IS NOT USED BY THE PEDESTRIAN FOR ACCESS

9. PEDESTRIAN PUSH-BUTTONS

- THE DETAILS DEPICT PEDESTRIAN PUSHBUTTON POLES TO ILLUSTRATE THE RECOMMENDED PLACEMENT OF PEDESTRIAN PUSHBUTTONS. FOR ALTERATION PROJECTS, PROVIDE ACCESS TO EXISTING PEDESTRIAN PUSHBUTTONS TO THE MAXIMUM EXTENT FEASIBLE. INSTALL PEDESTRIAN PUSHBUTTON STUB POLES, WHERE APPLICABLE, SO AS NOT TO CREATE PEDESTRIAN OBSTRUCTIONS
- NEW CONSTRUCTION MUST COMPLY WITH RECOMMENDED LOCATIONS. FOR ALTERATION PROJECTS LOCATE PEDESTRIAN PUSHBUTTONS TO THE MAXIMUM EXTENT FEASIBLE (SEE 2009 MUTCD FIG 4E-?)
- ADJACENT TO A LEVEL NON-SLIP SURFACE TO PROVIDE ACCESS FROM A WHEELCHAIR, AND WHERE THERE IS A NON-SLIP WHEELCHAIR ACCESSIBLE ROUTE TO THE RAMP
- WITHIN 5'-0" OF THE CROSSWALK EXTENDED
- BETWEEN 1'-6" AND 10'-0" OF THE EDGE OF CURB, SHOULDER OR PAVEMENT
- PARALLEL TO THE CROSSWALK TO BE USED
- MOUNT PEDESTRIAN PUSH BUTTON 42" ABOVE THE SIDEWALK OR FINISHED GRADE TO THE CENTER OF THE PUSHBUTTON AND 10" MAXIMUM LATERALLY FROM TURNING SPACE. IN ADDITION, THE PEDESTRIAN PUSHBUTTON MUST ALSO BE 5'-0" MAXIMUM DISTANCE FROM THE CURB RAMP AND 2'-0" MINIMUM DISTANCE BETWEEN A CATCH BASIN AND THE PEDESTRIAN PUSHBUTTON

10. SIDE FLARES

- ALL SLOPES ARE MEASURED WITH RESPECT TO A LEVEL PLANE. THEREFORE, THE LENGTH OF RAMP IS NOT SOLELY DEPENDANT ON THE HEIGHT OF CURB. (FOR EXAMPLE, A 6" CURB DOES NOT NECESSARILY MEAN A RAMP LENGTH OF 6'-0" FOR A 12:1 SLOPE.
- SIDE FLARES 10.00% MAXIMUM SLOPE WHERE THE PEDESTRIAN PATH CROSSES THE CURB RAMP
- SIDE FLARES MUST BE PARALLEL TO THE CURB LINE.
- CURB RAMP AND SIDE FLARE LENGTHS ARE VARIABLE AND BASED ON CURB HEIGHT AND THE SIDEWALK SLOPE.
- GRADE GRASS AREAS OR OTHER NON-WALK AREAS AT 3:1 (33%) MAXIMUM. DO NOT INSTALL CHECK WALLS THAT INTERSECT THE PEDESTRIAN ACCESS ROUTE
- SIDE FLARE WIDTH IS TYPICALLY 24" AND A MAXIMUM OF 12'

11. SIDEWALKS

- NOTES THE AREA CONSIDERED TO BE THE "PEDESTRIAN ACCESSIBLE ROUTE"
- THE MAXIMUM SIDEWALK CROSS SLOPE IS 2.00% (MEASURED PERPENDICULAR TO THE DIRECTION OF TRAVEL). THE MAXIMUM GRADE IS 5.00%. FOR SIDEWALKS ALONG STREETS, HOWEVER, THE LONGITUDINAL GRADE OF THE SIDEWALK SHOULD BE CONSISTENT WITH THE GRADE OF THE ADJACENT ROADWAY. IF THE 5.00% GRADE IS NOT FEASIBLE DUE TO TOPOGRAPHY AND OTHER PHYSICAL CONSTRAINTS, THE LOWEST PRACTICAL GRADE GREATER THAN 5.00% SHOULD BE USED
- SIDEWALK WIDTH MAY BE REDUCED TO 4'-0", WHEN PASSING AREAS 5'-0" X 5'-0" ARE PROVIDED EVERY 200'

12. TRAVEL LANES

THE TRAVEL LANE IS DEFINED BY THE OUTSIDE EDGE OF THE WHITE PAVEMENT MARKING LINE. IF A WHITE PAVEMENT MARKING LINE DOES NOT EXIST, THE TRAVEL LANE IS DEFINED BY THE CONTRACT DOCUMENTS

13. MODIFY CONSTRUCTION DETAILS TO ADAPT DIMENSIONS TO EXISTING CURB HEIGHTS WHERE THE CURB IS LESS OR MORE THAN THE STANDARD 6" HEIGHT.

14. CONSTRUCTION MUST MEET THE STANDARDS CONTAINED HEREIN UNLESS OTHERWISE NOTED OR DIRECTED.

15. PREFERRED AND ALTERNATE TREATMENTS SHOULD NOT BE INTERMIXED WITHIN THE SAME INTERSECTION.

16. ALL HANDICAP RAMPS CONSTRUCTED IN THIS CONTRACT SHALL MEET ACCESSIBILITY REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT AND THE PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDELINES.

17. THE CONTRACTOR IS REQUIRED TO CONTACT THE TOMS RIVER ENGINEERING TRAFFIC DEPARTMENT ABOUT THE CONSTRUCTION OF ALL HANDICAP CURB RAMPS AT SIGNALIZED INTERSECTIONS AND VERIFY THE STRIPING PLAN IS IN ACCORDANCE WITH THE MOST RECENT NO PASSING ZONE PLAN.

18. GRADE BREAKS

- GRADE BREAKS AT THE TOP AND BOTTOM OF THE CURB RAMP SHALL BE PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN
- GRADE BREAKS ARE NOT PERMITTED ON THE SURFACE OF RAMP RUNS OR TURNING SPACES
- SURFACE SLOPES THAT MEET AT THE GRADE BREAKS SHALL BE FLUSH.

19. FOR NEW CONSTRUCTION AND ALTERATIONS, CONSTRUCT CURB RAMP AND FLARE SLOPES WITH THE FLATTEST SLOPE POSSIBLE.

20. ALL VERTICAL SURFACE DISCONTINUITIES SHALL NOT EXCEED 1/4" IN HEIGHT. ANY VERTICAL SURFACE DISCONTINUITY BETWEEN 1/4" AND 1/2" SHALL BE BEVELED AT A SLOPE NO GREATER THAN 50% ACROSS THE ENTIRE DISCONTINUITY.

21. HORIZONTAL OPENINGS IN GRATES AND JOINTS SHALL NOT EXCEED 1/2" IN DIAMETER AND THE GRATES SHALL BE PLACED SO THE LONG DIMENSION IS PERPENDICULAR TO THE DIRECTION OF TRAVEL.

22. THE CROSS SLOPE FOR CURB RAMPS, BLENDED TRANSITIONS, AND TURNING SPACES SHALL BE 2% MAXIMUM. AT PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL, THE CROSS SLOPE SHALL BE PERMITTED TO MATCH THE STREET GRADE. PEDESTRIAN STREET CROSSINGS WITHOUT YIELD OR STOP CONTROL ARE CROSSINGS WHERE THERE IS NO YIELD OR STOP SIGN, OR WHERE THERE IS A TRAFFIC SIGNAL THAT IS DESIGNED FOR THE GREEN PHASE.

INSTALLATION INSTRUCTIONS

1. SAW CUT EXISTING CURB RAMP SURFACE WHERE THE DWS WILL BE PLACED.
2. REMOVE EXISTING CONCRETE FROM THIS AREA.
3. REPLACE AND COMPACT ANY DISTURBED AGGREGATE SUBBASE.
4. PLACE NEW CEMENT CONCRETE AND LEVEL TO A 4 INCH DEPTH SO THAT THE TOP OF THE CONCRETE IS LOWER THAN THE ADJOINING SIDEWALK, EQUIVALENT TO THE EXISTING DEPTH OF THE DWS MATERIAL.
5. LAY OUT AND PROPERLY FIT EACH UNIT PRIOR TO SETTING IN WET CONCRETE.
6. CUT UNITS AS NECESSARY ALONG PERIMETER OF DETECTABLE WARNING SURFACE.
7. PLACE UNITS ACROSS THE ENTIRE WIDTH OF THE CURB RAMP SURFACE AND/OR WHERE THE CURB IS FLUSH.
8. PRESS UNITS INTO FULL CONTACT WITH THE FRESH CONCRETE.
9. ADJUST HEIGHT OF EACH UNIT EDGE TO BE LEVEL WITH ADJACENT RAMP SURFACES.
10. ONLY TRUNCATED DOMES SHOULD BE ABOVE THE ADJACENT FINISHED CONCRETE.
11. FILL ANY SAW CUT GAPS WITH APPROVED JOINT SEALANT MATERIAL.

DWS NOTES:

- THE DETAILS PROVIDED ARE NOT DRAWN TO SCALE. THE QUANTITY OF DOMES DEPICTED ON THE DETECTABLE WARNING UNIT (THE DOMES AND THE ENTIRE 24" LEVEL SURFACE) IS FOR ILLUSTRATION ONLY.

DETECTABLE WARNING UNIT DIMENSIONS:

- THE SIZE OF THE DETECTABLE WARNING FIELD SHALL BE 24" IN THE DIRECTION OF TRAVEL AND SHALL EXTEND THE FULL WIDTH OF THE CURB RAMP OR FLUSH SURFACE, EXCLUSIVE OF SIDE FLARES.

DOME ALIGNMENT:

- THE ROWS OF DOMES SHALL BE ALIGNED TO BE PERPENDICULAR OR RADIAL TO THE GRADE BREAK BETWEEN THE RAMP TURNING SPACE OR CURB RAMP AND THE STREET.
- WHERE DOMES ARE ARRAYED RADIALLY THEY MAY DIFFER IN DOME DIAMETER AND CENTER-TO-CENTER SPACING WITHIN THE RANGES SPECIFIED ON THIS SHEET.

COLOR REQUIREMENTS:

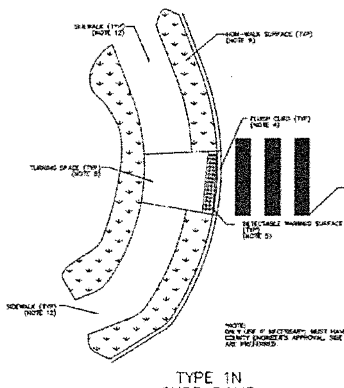
- THE DETECTABLE WARNING FIELD SHALL BE THE COLOR "SAFETY RED" UNLESS NOTED OTHERWISE IN THE CONTRACT DOCUMENTS AND MUST MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS.

DETECTABLE WARNINGS LOCATIONS:

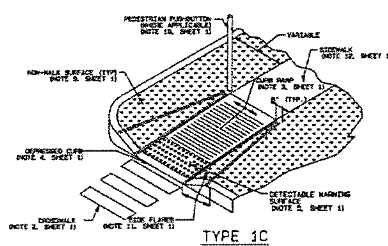
- DETECTABLE WARNINGS SHALL BE LOCATED SO THAT THE EDGE OR CORNER OF THE WARNING FIELD NEAREST TO THE ROADWAY IS 5" TO 6" FROM THE FRONT OF THE CURB OR THE ROADWAY EDGE (12" WHERE TRAVERSABLE CURB IS USED).
- THE EDGE OF THE DETECTABLE WARNING FIELD NEAREST TO A RAILROAD CROSSING SHALL BE 6'-0" MINIMUM AND 15'-0" MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL.

EQUIVALENT SLOPES

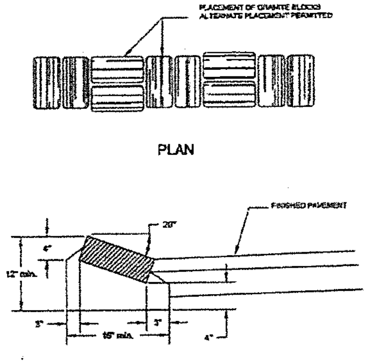
PERCENT SLOPE	EQUIVALENT SLOPE
10.00%	10:1
8.33%	12:1
7.14%	14:1
5.00%	20:1
2.00%	50:1
1.00%	100:1



TYPE 1N
CURB RAMP



TYPE 1C
CURB RAMP



MOUNTABLE CURB DETAIL

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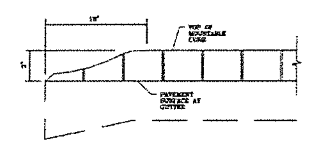

END OF GRANITE CURB DETAIL

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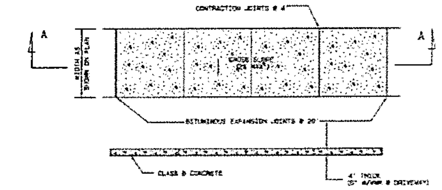

SIDEWALK NOTES

1. A PREFORMED, BITUMINOUS EXPANSION JOINT 1/2" THICK, 4" WIDE, AND EXTENDING THE FULL WIDTH OF THE WALK UNBROKEN, SHALL BE INSTALLED EVERY 20 FEET. CONTRACTION JOINTS SHALL BE INSTALLED EVERY MAXIMUM 4 FEET THE FULL WALK WIDTH
2. THERE SHALL BE A BROOM FINISH TO ENSURE A SLIP RESISTANT WEARING SURFACE IN ACCORDANCE WITH ADA.

SIDEWALK DETAIL

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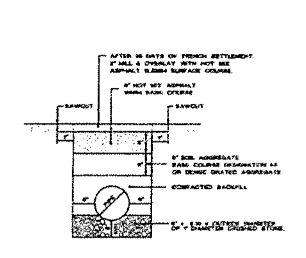
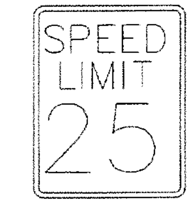


SURFACE REPAIR

NOT TO SCALE

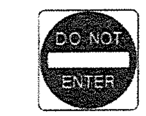


SPEED LIMIT 25 SIGN

N.T.S.

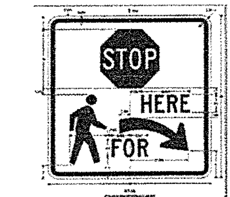
ONE WAY SIGN

R6-1
36"x 12"

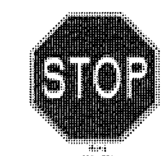


DO NOT ENTER SIGN

R5-1
30"x 30"



PEDESTRIAN CROSSING SIGN



STOP SIGN DETAIL

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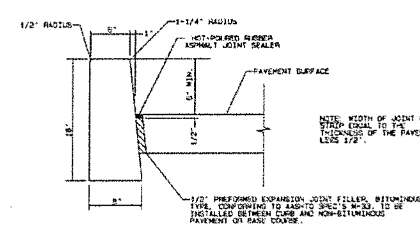


NOTES:

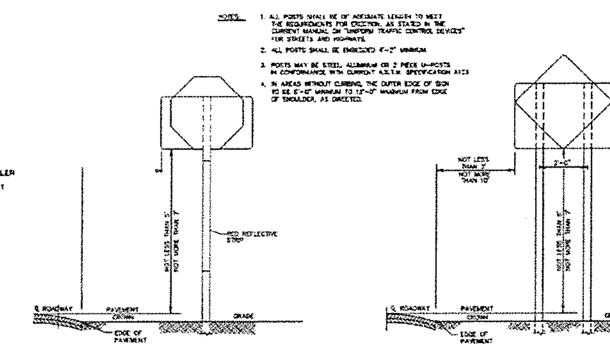
1. CONCRETE TO BE NJDOT CLASS "B" (AIR ENTRAINED).
2. TRANSVERSE JOINTS 1/2" WIDE SHALL BE INSTALLED IN THE CURB 20'-0" APART AND SHALL BE FILLED WITH PREFORMED, BITUMINOUS-IMPREGNATED FIBER JOINT FILLER, COMPLYING WITH THE REQUIREMENTS OF AASHTO M-213, RECESSED 1/4" FROM THE FRONT FACE AND TOP OF THE CURB.
3. DUMMY JOINTS (FORMED) SHALL BE INSTALLED MIDWAY BETWEEN EXPANSION JOINTS.

CONCRETE VERTICAL CURB

N.T.S.

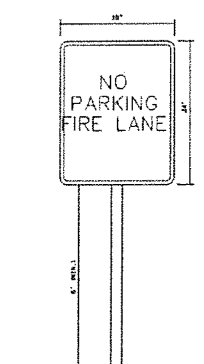
NOTES:

1. ALL POSTS SHALL BE OF ADEQUATE LENGTH TO MEET THE REQUIREMENTS FOR ERECTION, AS STATED IN THE CURRENT MANUAL ON "UNIFORM TRAFFIC CONTROL DEVICES" FOR STREETS AND HIGHWAYS.
2. ALL POSTS SHALL BE EMBEDDED 4'-2" MINIMUM.
3. POSTS MAY BE STEEL, ALUMINUM OR 2 PIECE U-POSTS IN CONFORMANCE WITH CURRENT A.S.T.M. SPECIFICATION A123.
4. IN AREAS WITHOUT CURBING, THE OUTER EDGE OF SIGN TO BE 6'-0" MINIMUM TO 12'-0" MAXIMUM FROM EDGE OF SHOULDER, AS DIRECTED.



TYPICAL SIGN MOUNTING DETAIL

N.T.S.

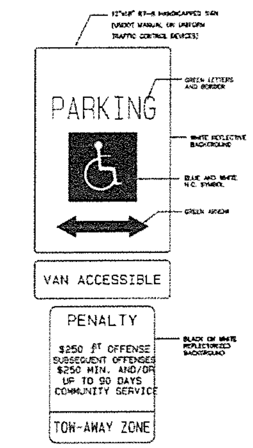


NOTES:

1. SIGN IS TO BE METAL WITH A WHITE BACKGROUND AND RED LETTERING.
2. LETTERING TO BE THE FOLLOWING SIZES: LINE ONE - THREE INCH LETTERS; LINE TWO - THREE INCH LETTERS; LINE THREE - THREE INCH LETTERS

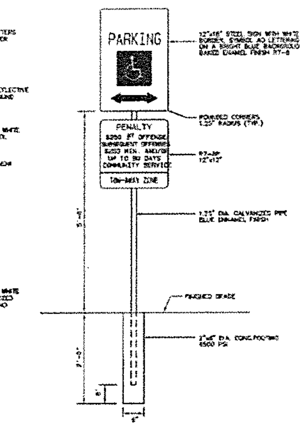
NO PARKING FIRE LANE

N.T.S.



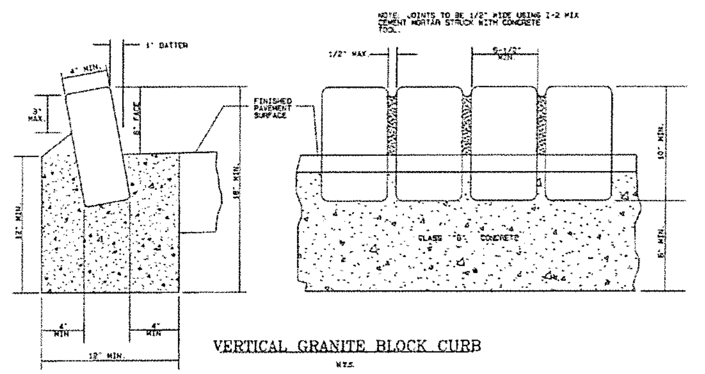
HANDICAPPED SIGN DETAIL

N.T.S.



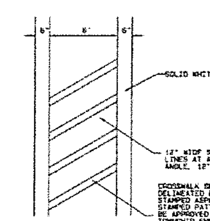
HANDICAP SIGN MOUNTING DETAIL

N.T.S.



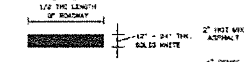
VERTICAL GRANITE BLOCK CURB

N.T.S.



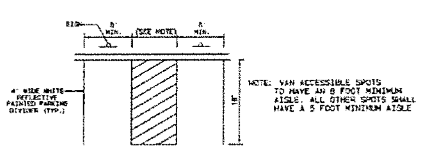
CROSSWALK STRIPING DETAIL

N.T.S.



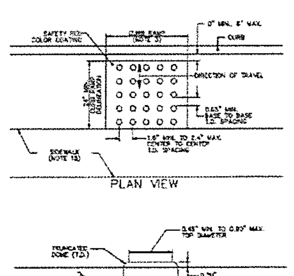
STOP BAR DETAIL

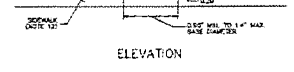
N.T.S.



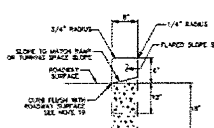
HANDICAP PARKING SPACE STRIPING DETAIL

N.T.S.

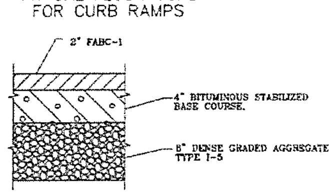




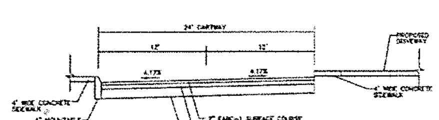
DETECTABLE WARNING SURFACE
TRUNCATED DOME DETAILS



TYPICAL FLUSH CURB
FOR CURB RAMPS

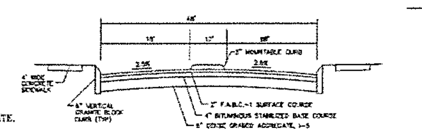


PARKING LOT PAVEMENT SECTION



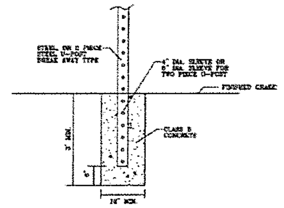
RESIDENTIAL ROAD CROSS-SECTION

N.T.S.



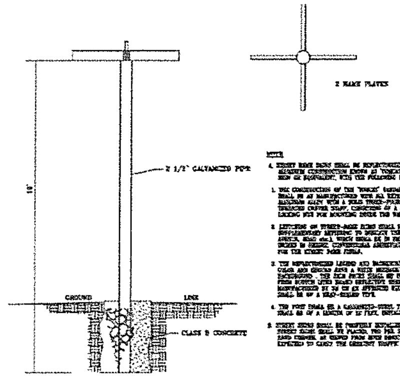
BLVD. AVE. SECTION

N.T.S.



TYPICAL TRAFFIC SIGN
FOOTING DETAIL

N.T.S.



STREET SIGN DETAIL

N.T.S.

DATE	REVISION	DRAWN	CHECKED	RELEASED

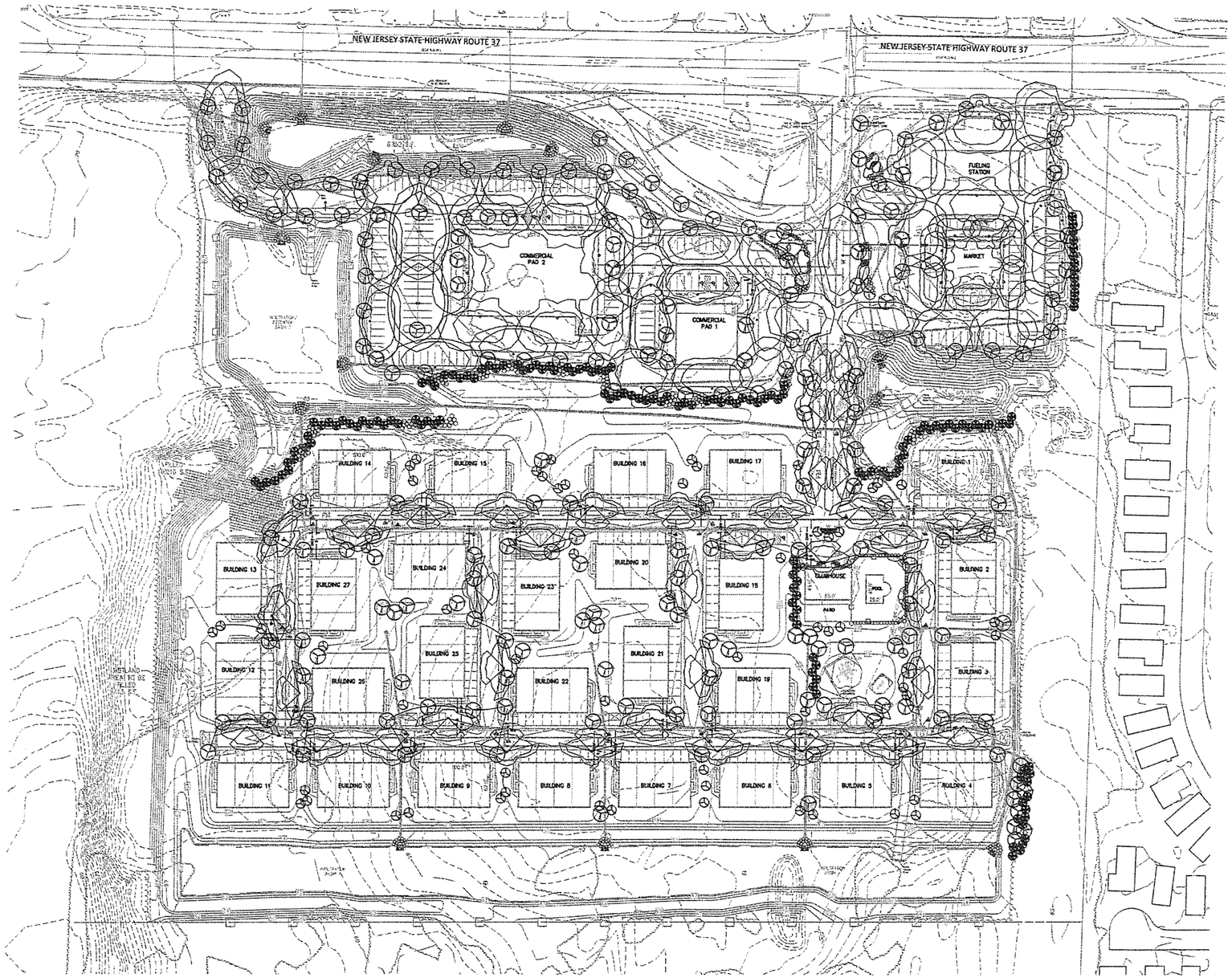
CONSTRUCTION DETAILS

PRELIMINARY AND FINAL MAJOR SITE PLAN
LOT 15.01 ~ BLOCK 44
TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

FWH ASSOCIATES, P.A.
CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
LANDSCAPE ARCHITECTS
RESERVE SPECIALISTS
ARCHITECTS
FWHASSOCIATES.COM
1856 Rt. 9, Toms River, NJ 08755 T: 732.797.3100 F: 732.797.3223

Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY: CSM	DATE: 8/10/18
DESIGNED BY: JS	SCALE: N.T.S.
CHECKED BY: JS	DRAWING NO.: PO-170
RELEASED BY: BPM	PROJECT NO.: 1423.0016
SHEET NO.: 38	OF: 39



GRAPHIC SCALE 1" = 60'

0 60 120 180

DATE	REVISION	DRAWN	CHECKED	RELEASED

NON STRUCTURAL STRATEGIES PLAN

PRELIMINARY AND FINAL MAJOR SITE PLAN

LOT 15.01 ~ BLOCK 44

TAX MAP SHEET NO. 8
SITUATED IN
MANCHESTER TOWNSHIP, OCEAN COUNTY, NEW JERSEY

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1800 Rt. 9, Toms River NJ 08755 T: 732.797.3100 F: 732.797.3233

Brian P. Murphy
8/21/18
PROFESSIONAL ENGINEER
N.J. LIC. NO. 42000

DRAWN BY: MVM	DATE: 8/10/16
DESIGNED BY: MVM	SCALE: 1"=60'
CHECKED BY: MVM	SHEET NO.
REVISED BY: LCW	PROJECT NO. 1423.0016
SHEET NO. 39 OF 39	