Sussex County
DELAWARE
sussexcountyde.gov
302-855-7878 T
302-854-5079 F
JAMIE WHITEHOUSE, AICP, MRTPI
DIRECTOR OF PLANNING & ZONING

PLANNING AND ZONING AND COUNTY COUNCIL INFORMATION SHEET
Planning Commission Public Hearing Date April 8th, 2021.

Application:	(2019-29) Scenic Manor (F.K.A. Estates at Mulberry Knoll)
Applicant:	MKR Land Investment, LLC (Attention: Mr. John Richardson) 260 Hopewell Road Churchville, MD 21028
Owner:	Thomas Best & Sons, Inc. 32258 Janice Road Lewes, DE 19958
Site Location:	Located on the east and west sides of Mulberry Knoll Road (S.C.R. 284), approximately 0.67 mile south of John J. Williams Highway (Route 24).
Current Use:	Agricultural/Vacant
Proposed Use:	Residential – 319 Single Family Lots as a Cluster Subdivision.
Comprehensive Land Use Plan Reference:	Coastal Area
Councilmanic District:	Mr. Hudson
School District:	Cape Henlopen School District
Fire District:	Rehoboth Beach Fire District
Sewer:	Sussex County
Water:	Tidewater Utilities
Site Area:	166.80 acres +/-
Tax Map ID.:	334-18.00-43.00

Sussex County

PIN:	334-18.00-43.00
Owner Name	BEST THOMAS & SONS INC
Book	0
Mailing Address	20110 MULBERRY KNOLL R
City	LEWES
State	DE
Description	LEWESREHOBOTH RD
Description 2	FP
Description 3	N/A
Land Code	

polygonLayer

Override 1

polygonLayer

Override 1

Tax Parcels

Streets

County Boundaries

DOE School Districts

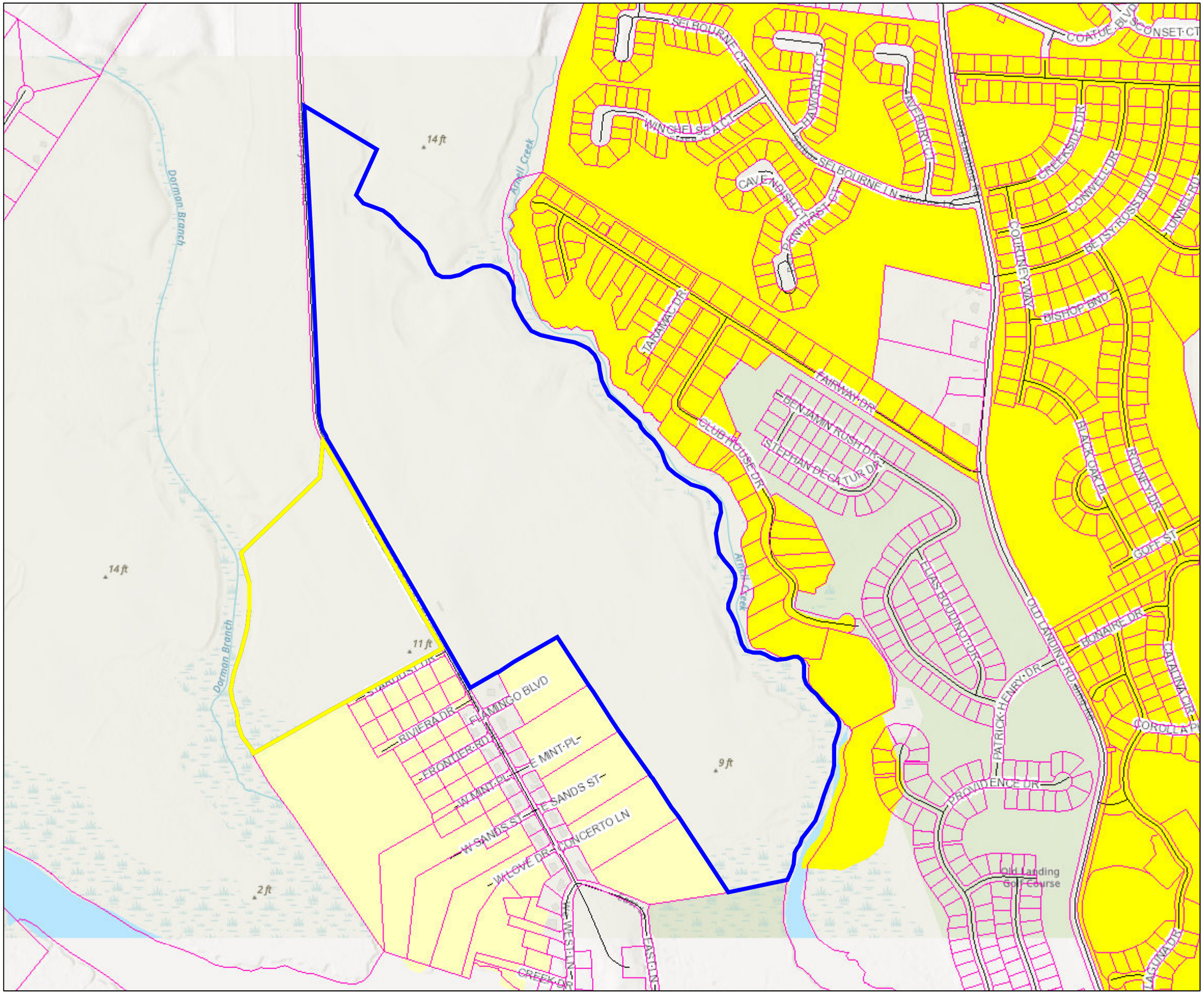
March 18, 2021

1:9,028

0 0.1 0.2 0.4 mi

0 0.175 0.35 0.7 km

Sussex County



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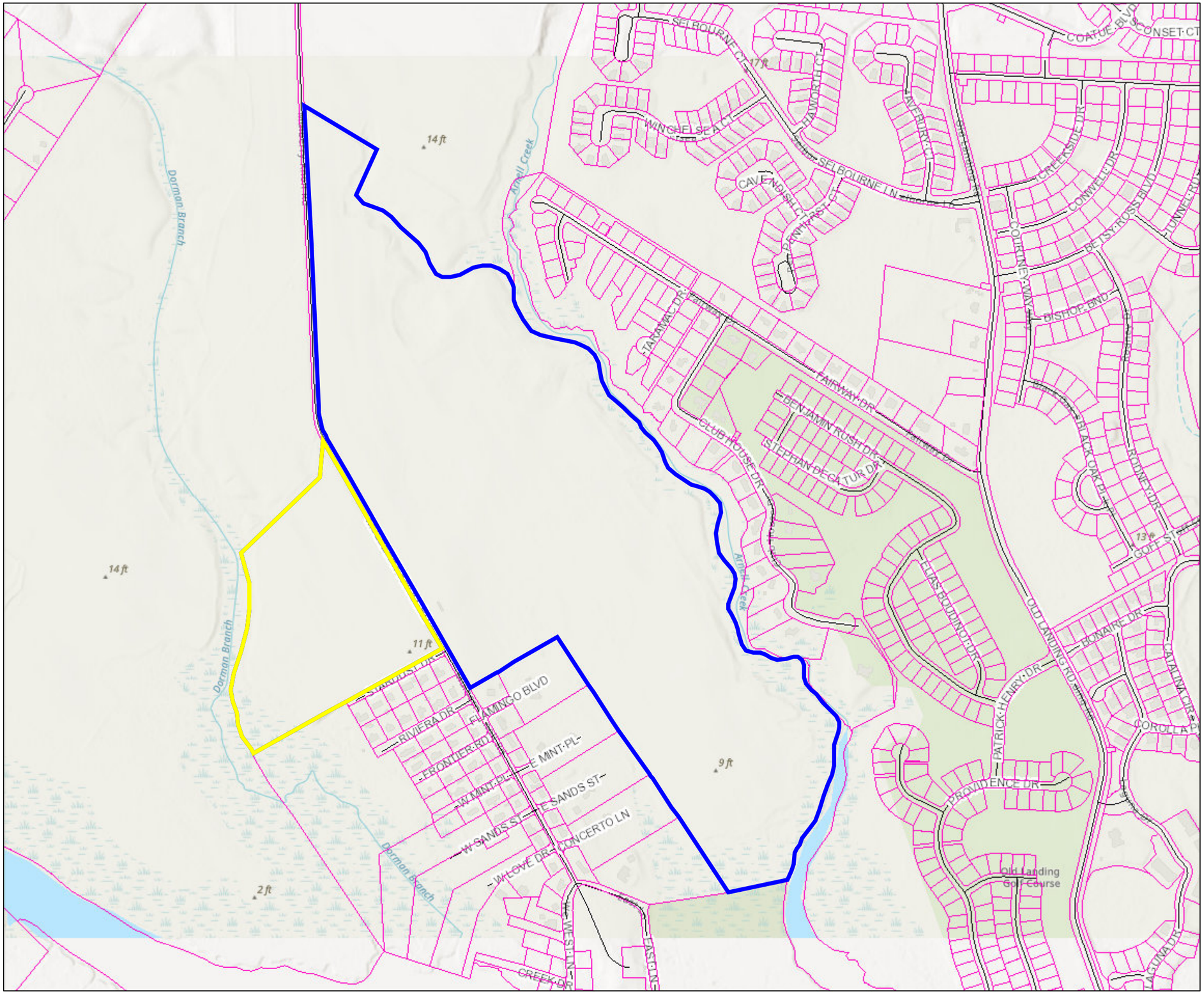

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March 18, 2021

File #: 2019-29
20191403 2

Sussex County Major Subdivision Application

Sussex County, Delaware

Sussex County Planning & Zoning Department
2 The Circle (P.O. Box 417) Georgetown, DE 19947
302-855-7878 ph. 302-854-5079 fax

Type of Application: (please check applicable)
Standard: ___
Cluster: ✓
ESDDOZ: ✓

Location of Subdivision:
Both sides of Mulberry Knoll Road, approx. 6,300 LF south of intersection with John J. Williams Hwy (Route 24)

Proposed Name of Subdivision:
Scenic Manor (formerly Estates at Mulberry Knoll)

Tax Map #: 334-18.00-43.00 **Total Acreage:** 166.8 +/-

Zoning: AR-1 **Density:** 1.9 **Minimum Lot Size:** 7,500 **Number of Lots:** 319

Open Space Acres: 78.8 +/-

Water Provider: Tidewater Utilities, Inc. **Sewer Provider:** Sussex County

Applicant Information

Applicant Name: MKR Land Investment, LLC (Attn: Mr. John Richardson)
Applicant Address: 260 Hopewell Road
City: Churchville State: MD ZipCode: 21028
Phone #: (410) 838-2030 E-mail: jrichardson@dxiconstruction.com

Owner Information

Owner Name: Thomas Best & Sons, Inc
Owner Address: 32258 Janice Road
City: Lewes State: DE Zip Code: 19958
Phone #: _____ E-mail: _____

Agent/Attorney/Engineer Information

Agent/Attorney/Engineer Name: Morris & Ritchie Associates, Inc. (Attn: Mr. Phillip L. Tolliver, P.E.)
Agent/Attorney/Engineer Address: 18 Boulden Circle, Suite 36
City: New Castle State: DE Zip Code: 19720
Phone #: (302) 326-2200 E-mail: ptolliver@mragta.com

Check List for Sussex County Major Subdivision Applications

The following shall be submitted with the application

✓ **Completed Application**

✓ **Provide fifteen (15) copies of the Site Plan or Survey of the property and a PDF (via e-mail)**

- Plan shall show the existing conditions, setbacks, roads, floodplain, wetlands, topography, proposed lots, landscape plan, etc. **Per Subdivision Code 99-22, 99-23 & 99-24**
- Provide compliance with Section 99-9.
- Deed or Legal description, copy of proposed deed restrictions, soil feasibility study

✓ **Provide Fee $500.00**

✓ **Optional - Additional information for the Commission to consider** (ex. photos, exhibit books, etc.) If provided submit seven (7) copies and they shall be submitted a minimum of ten (10) days prior to the Planning Commission meeting.

* To be provided under separate cover in advance of Planning Commission meeting

✓ **Please be aware that Public Notice will be sent to property owners within 200 feet of the subject site and County staff will come out to the subject site, take photos and place a sign on the site stating the date and time of the Public Hearings for the application.**

✓ **PLUS Response Letter** (if required)

✓ **51% of property owners consent if applicable**

The undersigned hereby certifies that the forms, exhibits, and statements contained in any papers or plans submitted as a part of this application are true and correct.

I also certify that I or an agent on by behalf shall attend all public hearing before the Planning and Zoning Commission and any other hearing necessary for this application and that I will answer any questions to the best of my ability to respond to the present and future needs, the health, safety, morals, convenience, order, prosperity, and general welfare of the inhabitants of Sussex County, Delaware.

Signature of Applicant/Agent/Attorney

_____ Date: 12/5/19

Signature of Owner

_____ Date: 11/30/19

For office use only:

Date Submitted: 12/5/19 Fee: $500.00 Check #: 2445

Staff accepting application: Coh Application & Case #: 2019 14032

Location of property: _____

Date of PC Hearing: _____ Recommendation of PC Commission: _____

SUSSEX COUNTY ENGINEERING DEPARTMENT
UTILITY PLANNING & DESIGN REVIEW DIVISION
C/U & C/Z COMMENTS

TO: **Jamie Whitehouse**

REVIEWER: **Chris Calio**

DATE: **3/25/2021**

APPLICATION: **2019-29 Scenic Manor (FKA) Estates at Mulberry Knoll**

APPLICANT: **MKR Land Investment, LLC**

FILE NO: **MK-1.07**

TAX MAP & PARCEL(S): **334-18.00-43.00**

LOCATION: **Located on the east and west sides of Mulberry Knoll Road (SCR 284) approximately 0.67 mile south of John J. Williams Hwy. (Route 24).**

NO. OF UNITS: **319 single family lots as a Cluster Subdivision**

GROSS ACREAGE: **166.80**

SYSTEM DESIGN ASSUMPTION, MAXIMUM NO. OF UNITS/ACRE: **2**

SEWER:

(1). Is the project in a County operated and maintained sanitary sewer and/or water district?

Yes ☐ No ☒

a. If yes, see question (2).
b. If no, see question (7).

(2). Which County Tier Area is project in? **Tier 2**

(3). Is wastewater capacity available for the project? **Yes** If not, what capacity is available? **N/A**.

(4). Is a Construction Agreement required? **Yes** If yes, contact Utility Engineering at (302) 855-7717.

(5). Are there any System Connection Charge (SCC) credits for the project? **No** If yes, how many? **N/A**. Is it likely that additional SCCs will be required? **Yes** If yes, the current System Connection Charge Rate is **Unified $6,360.00** per EDU. Please contact **Christine Fletcher** at **302-855-7719** for additional information on charges.

(6). Is the project capable of being annexed into a Sussex County sanitary sewer district? **Yes**

☒ Attached is a copy of the Policy for Extending District Boundaries in a Sussex County Water and/or Sanitary Sewer District.

(7). Is project adjacent to the Unified Sewer District? **Yes**

(8). Comments: **The proposed Subdivision is in a Tier 2 planning area and is contiguous to the current Sussex County Unified Sanitary Sewer District boundary and connection is mandatory.**

(9). Is a Sewer System Concept Evaluation required? **Already Completed, See Attached**

(10). Is a Use of Existing Infrastructure Agreement Required? **Yes**

UTILITY PLANNING APPROVAL:

John J. Ashman
Director of Utility Planning

Xc: Hans M. Medlarz, P.E.
Lisa Walls
Christine Fletcher

ENGINEERING DEPARTMENT

ADMINISTRATION	(302) 855-7718
AIRPORT & INDUSTRIAL PARK	(302) 855-7774
ENVIRONMENTAL SERVICES	(302) 855-7730
PUBLIC WORKS	(302) 855-7703
RECORDS MANAGEMENT	(302) 854-5033
UTILITY ENGINEERING	(302) 855-7717
UTILITY PERMITS	(302) 855-7719
UTILITY PLANNING	(302) 855-1299
FAX	(302) 855-7799

Sussex County
DELAWARE
sussexcountyde.gov

HANS M. MEDLARZ, P.E.
COUNTY ENGINEER

JOHN J. ASHMAN
DIRECTOR OF UTILITY PLANNING

SEWER SERVICE CONCEPT EVALUATION (SSCE)

UTILITY PLANNING DIVISION

Applicant: Morris & Ritchie Associates, Inc

Date: 11/25/2019

Reviewed by: **Chris Calio**

Agreement #:**1141**

Project Name: **Estates At Mulberry Knoll**

Tax Map & Parcel(s): **334-18.00-43.00**

Sewer Tier: Tier 2 - Sussex County Planning Area

Proposed EDUs: **319**

Pump Station(s) Impacted: **Mulberry Knoll pump station, PS193 & PS 210**

List of parcels to be served, created from the base parcel: **N/A**

List of additional parcels to be served (Parcels required for continuity must be served with infrastructure):**N/A**

Connection Point(s): **Mulberry Knoll Pump Station to be constructed off Mulberry Knoll Road**

Use of Existing Infrastructure Agreement required? Yes ☒ or No ☐

Annexation Required? Yes ☒ or No ☐

Easements Required? Yes ☒ or No ☐

Fee for annexation (based on acreage):**$2,500 (Greater than 150.00 Acres)**

Current Zoning: **AR-1** Zoning Proposed: **AR-1**

Acreage: **166.83 +/-**

Additional Information: **Sussex County is currently in design of a new pump station off Mulberry Knoll Road.**

* No capacity is guaranteed until System Connection Fees are paid

All gravity sewers with three (3) or more minor branches shall be designed at minimum slope and maximum depth.

Once Construction Drawings are completed with all of the above information satisfied, please submit to:

Sussex County Public Works Department
2 The Circle
P.O. Box 589
Georgetown DE 19947

CC: John Ashman
Jayne Dickerson
Michael Brady
Noell Warren

Policy for Extending District Boundaries

1. Property owner (developer) and/or his representative shall make a request to the Utility Planning Division for a Sewer System Concept Evaluation.

2. Property owner (developer) and/or his representative shall meet with the applicable planning and zoning agency to determine if zoning is appropriate for the development being planned.

3. With appropriate zoning, property owner (developer) and/or his representative shall send a letter (with appropriate application fee as listed below) requesting the Sussex County Council to consider extending the water and/or sanitary sewer district boundaries. (Sussex County Code)

Application Fees	
Less than 2 acres	**$500.00**
2.1 -9.99 acres	**$750.00**
10 - 150.00 acres	**$1,500.00**
Greater than 150.00 acres	**$2,500.00**

4. The Sussex County Engineering Department shall present, for Sussex County Council's consideration, posting of notices for the proposed extension of the district boundaries.

5. The Sussex County Council approves posting notices for the proposed extension of the boundaries. (If approval to post the notices is not given, the appropriate fee is refunded.)

6. Within ninety days of the posting of the notices, the Sussex County Council approves/disapproves extending the boundaries.

7. The Sussex County Council approves/disapproves of the extension of the water and/or sanitary sewer pipelines under the appropriate Sussex County Ordinance.

PLANNING & ZONING
JANELLE M. CORNWELL, AICP
DIRECTOR
(302) 855-7878 T
(302) 854-5079 F

Sussex County
DELAWARE
sussexcountyde.gov

Memorandum

To: Sussex County Technical Advisory Committee
From: Christin Headley, Planning Technician
Date: December 19, 2019
RE: Major Subdivision

The Sussex County Planning and Zoning Office has received two (2) applications for a major subdivision that requires review by the Sussex County Technical Advisory Committee. Please review the application and provide comments back to the Planning and Zoning Office on or before **Thursday, February 20, 2020.**

1.) **2019-29 – Scenic Manor** - This is a cluster subdivision. The cluster subdivision is for the creation of three-hundred nineteen (319) single family lots. The property is located on both sides of Mulberry Knoll Rd, south of the intersection with Rt. 24. Tax Parcel: 334-18.00-43.00 Zoning: AR-1 (Agricultural Residential District). Owner: Thomas Best & Sons, Inc.

2.) **2019-30 – Pelican Point (Phases 4-5)** - This is a cluster subdivision. The cluster subdivision is for the creation of two-hundred nineteen (219) single family lots. The property is located on Cannon Rd., adjacent to Pelican (Point Phases 1-3). Tax Parcels: 234-16.00, Parcels 21.03, 21.07, P/O 23.00, & 1509 through 1697 Zoning: AR-1 (Agricultural Residential District). Owner: Cannon Road Investments, LLC.

Please feel free to send your comments via e-mail. Please feel free to contact me with any questions at (302) 855-7878 during normal business hours 8:30am-4:30pm Monday through Friday or e-mail me at christin.headley@sussexcountyde.gov.

DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health

Office of Engineering
Phone: (302) 741-8640
Fax: (302) 741-8641

December 30, 2019

Ms. Christin Headley
Sussex County Planning & Zoning Commission
PO Box 417
Georgetown, DE 19947

Re: Sussex County Technical Advisory Committee

Dear Ms. Headley:

The Division of Public Health Office of Engineering is in receipt of the following applications:

1. ***Application:*** ***2019-29 Scenic Manor***

This application indicates central water will be supplied by Tidewater Utilities, Inc. *This project requires an Approval to Construct and an Approval to Operate from the Office of Engineering when constructing a new water system or altering an existing water system.* In order to obtain an Approval to Construct, plans and specifications must be prepared by a registered Delaware professional engineer. Plans for the system, including water mains or extensions thereto, storage facilities, treatment works, and all related appurtenances, must be approved by the Office of Engineering prior to construction. It is the owner's responsibility to ensure as-built drawings are maintained throughout all phases of construction.

Prior to receiving an Approval to Operate for this project, the Office of Engineering requires one set of as-built drawings, including profile markups, for all plans approved for construction. An Approval to Operate will be issued after all applicable requirements are met.

2. ***Application:*** ***2019-30 Pelican Point (Phases 4-5)***

This application indicates central water will be supplied by Artesian Water Company, Inc. *This project requires an Approval to Construct and an Approval to Operate from the Office of Engineering when constructing a new water system or altering an existing water system.* In order to obtain an Approval to Construct, plans and specifications must be prepared by a registered Delaware professional engineer. Plans for the system, including water mains or extensions thereto, storage facilities, treatment works, and all related appurtenances, must be approved by the Office of Engineering prior to construction. It is the owner's responsibility to ensure as-built drawings are maintained throughout all phases of construction.

Prior to receiving an Approval to Operate for this project, the Office of Engineering requires one set of as-built drawings, including profile markups, for all plans approved for construction. An Approval to Operate will be issued after all applicable requirements are met.

Please do not hesitate to contact me at 302-741-8646 with questions or comments.

Sincerely,

William J. Milliken, Jr.
Engineer III
Office of Engineering

ENGINEERING DEPARTMENT

ADMINISTRATION	(302) 855-7718
AIRPORT & INDUSTRIAL PARK	(302) 855-7774
ENVIRONMENTAL SERVICES	(302) 855-7730
PUBLIC WORKS	(302) 855-7703
RECORDS MANAGEMENT	(302) 854-5033
UTILITY ENGINEERING	(302) 855-7717
UTILITY PERMITS	(302) 855-7719
UTILITY PLANNING	(302) 855-1299
FAX	(302) 855-7799

Sussex County
DELAWARE
sussexcountyde.gov

HANS M. MEDLARZ, P.E.
COUNTY ENGINEER

MICHAEL E. BRADY
DIRECTOR OF PUBLIC WORKS

January 13, 2020

REF: **T. A. C. COMMENTS**
SCENIC MANOR
SEWER TIER 2
SUSSEX COUNTY ENGINEERING DEPARTMENT
SUSSEX COUNTY TAX MAP NUMBER
334-18.00 PARCEL 43.00
AGREEMENT NO. 1141

The following comments are the result of the Sussex County Engineering Department's review of the preliminary site plan for the above referenced project:

PUBLIC WORKS DIVISION COMMENTS

1. Proposed developments with private roads or projects required by the County to conform to the County street design requirements shall be regulated by and conform to Sussex County Code and the comments here listed.

2. This project is not located within the limits of a Ground Water Management Zone (GMZ). Projects located within a GMZ must be forwarded to the County Engineer for review and comment.

3. Project Construction Drawings shall show, in detail, the proposed improvements. The work required includes preparation and delivery of an AutoCAD 2012 digitized plan showing existing and proposed lines, grades, topography and features in a given area, which was utilized in preparing plans for construction. The individual sheet types will be in a separate design to show plan views on sheets separate from profile views. In addition, each sheet of the plans shall be submitted in a PDF format.

4. All work shall be geo-referenced to the Delaware State Grid System NAD-83 (HARN) and provided in an AutoCAD 2012 format. North will always be shown in an up direction on all plans.

5. Topographic contours at one-foot intervals shall be shown and referenced to United States Geological Survey Mean Sea Level Datum NAVD 1988 Datum.

6. The plans shall be provided on 24" x 36" drawing sheets at a scale of 1" = 50'.

The plans shall show and address the following items at minimum:

7. The project requires professional land surveying services to accurately delineate, and show the following items but is not limited to the following: all property and right-of-

way lines, established at a minimum, two (2) horizontal and vertical control concrete project benchmarks, survey monuments, easements, existing and proposed topographic contours at 1-foot vertical intervals and spot elevations as necessary to establish grades, the locations of all existing structures, highway and roadway pavements, shoulders, curbs, driveways, sidewalks, lighting structures, traffic control signs, and all public and private utilities, including, but not limited to, electric power and telephone lines, poles and boxes, underground electric, telephone, and communication lines, potable water lines, fire hydrants and valve boxes, gas lines, wells, sanitary sewers including septic systems, rim and invert elevations of manholes and cleanouts, and the rims and invert elevations and type of storm water structures, drainage ditches, ponds, streams and waterways, flood zones and flood zone boundaries and elevations, and State and Federal wetlands, trees, cemeteries and historic features, and the finished floor elevations of buildings.

8. Plans shall show the seal and signature of a registered Delaware land surveyor or registered Delaware professional engineer.

9. The plan requires a Certification Signature and/or a Certification Block for the Delaware Professional Engineer or Delaware Land Surveyor.

10. The plan requires a Certification Signature and/or a Certification Block for the Owner or Representative of the Owner.

11. The plan requires a Certification Signature and/or a Certification Block for the Professional Wetlands Delineator.

12. The name, address, phone number and contact person's name of the Owner of Record, the Developer and the Engineer or Surveyor preparing the plan.

13. Indicate the location of all wetlands (both state and federal), to facilitate compliance with County, State and Federal requirements.

14. Define the courses and distances of the property perimeter and the approximate acreage contained therein. Establish and set in the field two (2) CONCRETE MONUMENT project bench marks, preferably at property perimeter corners, geo-referenced to the Delaware State Plane Coordinate system NAD 83 and show the location including the North and East coordinates of the marks on the plans.

15. Indicate the development construction phases proposed showing the boundaries of each phase. Phasing boundaries shall include buildings, residential units, amenities, roads, storm water management facilities, wastewater systems and all other improvements and utilities required to service each phase.

16. Show the layout, width and names of all streets, alleys, crosswalks and easements proposed to be dedicated for private or public use. Street names shall not duplicate nor closely resemble existing street names in the same hundred or postal district, except for extensions of existing streets.

17. When on site individual septic tank systems are to be used and the lot topography is to be modified by cuts and fills it is required that the Design Engineer contact the Delaware Department of Natural Resources and Environmental Control, Division of Groundwater Water Discharge Section, 20653 DuPont Boulevard, Unit 5,

Georgetown, DE 19947, phone number 302-856-4561 subject to mass grading operations for documented approval.

18. Provide the limits and elevations of the one-hundred (100) year flood. This may require the design engineer to complete an analysis and provide a report including the depiction of the subject watershed(s), calculations and other technical data necessary to determine the base flood limits and elevations. The design engineer must resolve discrepancies, if any, between surveyed topography and the FEMA Flood Insurance Rate Maps.

19. The road shall meet or exceed the requirements of Sussex County Code, Chapter 99, Section 99-18, Street Design Standards.

20. “Dead end” or “stub” roads greater than three-hundred (300) feet in length shall have a vehicular turn-around meeting or exceeding the requirements of State Fire Marshall and Sussex County.

21. False berms shall not be utilized to create roadside drainage swale back slopes.

22. For parking lots and drives, provide spot elevations at the edge of pavement, right-of-way or travel way centerline, at changes in grade, and high points and low points, to the nearest drainage facilities. Show the limits of the various surface materials and provide construction sections.

23. Provide and show the locations and details of all ADA compliant accessible routes and ramp features.

24. If the site has a cemetery located on it the Developer shall contact the Delaware State Historic Preservation Office and satisfy the requirements of that Office prior to beginning any construction activity. This area shall not be disturbed by this project. Adequate access to the site and buffers to protect the site, shall be provided.

25. Private rights-of-way adjacent to and abutting parcels not part of the project shall be located and designed to provide adequate buffer so that construction activities do not encroach onto adjacent properties.

26. Provide statements explaining how and when the developer proposes to provide and install the required water supply, sewers or other means of sewage disposal, street pavement, drainage structures and any other required improvements.

27. Provide statements concerning any proposed deed restrictions to be imposed by the owner.

28. Where special physical conditions exist, which may act as constraints on normal development or may preclude development, the developer may be required to submit special technical data, studies or investigations. This information must be prepared by individuals technically qualified to perform such work. Additional information may include but is not limited to the following: on-site sanitary sewage disposal feasibility, water supply surveys, such as test well drilling, storm water runoff computations and identification of areas subject to periodic flooding.

29. If special conditions are found to exist, the Engineering Department may elect to withhold approval of a construction plan until it is determined that it is technically

feasible to overcome such conditions. The Engineering Department may then require the developer to incorporate specific improvement design criteria into the plat as a condition to its approval.

30. When special studies or investigations pertain to a regulatory program of another public agency, the developer shall submit the results of these studies or investigations to said public agencies for technical review and approval. Approvals and/or written comments from these agencies shall be supplied to Sussex County by the developer.

UTILITY PLANNING DIVISION COMMENTS

REVIEWER: **Chris Calio**

APPLICATION: **2019-29 – Scenic Manor**

APPLICANT: MKR Land Investment, LLC

FILE NO: MK-1.07

TAX MAP & PARCEL(S): **334-18.00-43.00**

LOCATION: **Both sides of Mulberry Knoll Road, south of John J. Williams Hwy.**

NO. OF UNITS: 319

GROSS ACREAGE: 170 +/-

SYSTEM DESIGN ASSUMPTION, MAXIMUM NO. OF UNITS/ACRE: 4

SEWER:

(1). Is the project in a County operated and maintained sanitary sewer and/or water district?

Yes ☐ No ☒

a. If yes, see question (2).
b. If no, see question (7).

(2). Which County Tier Area is project in? Tier 2

(3). Is wastewater capacity available for the project? Yes, As Proposed If not, what capacity is available? N/A.

(4). Is a Construction Agreement required? Yes If yes, contact Utility Engineering at (302) 855-7717.

(5). Are there any System Connection Charge (SCC) credits for the project? No If yes, how many? N/A. Is it likely that additional SCCs will be required? **Yes** If yes, the current System Connection Charge Rate is $6,360.00 per EDU. Please contact **Christine Fletcher** at **302-855-7719** for additional information on charges.

(6). Is the project capable of being annexed into a Sussex County sanitary sewer district? **Yes**

☒ Attached is a copy of the Policy for Extending District Boundaries in a Sussex County Water and/or Sanitary Sewer District.

(7). Is project adjacent to the Unified Sewer District? **Yes**

(8). Comments: **Must have subdivision approvals prior to beginning the annexation process.**

(9). Is a Sewer System Concept Evaluation required? **Already Completed, See Attached**

(10). Is a Use of Existing Infrastructure Agreement Required? **Yes**

If the above items, as applicable, are incorporated into the development plans, then preliminary approval is recommended. However, final plan approval should be withheld pending the approval of the construction plans by the Sussex County Engineering Department.

2019-29
TM #334-18.00-43.00
Scenic Manor

2019-29
TM #334-18.00-43.00
Scenic Manor

USDA
United States Department of Agriculture

Natural Resources
Conservation Service

Georgetown
Service Center

21315 Berlin Road
Unit 3
Georgetown, DE 19947

Voice 302.856.3990
Fax 855.306.8272

February 3, 2020

Janelle M. Cornwell, Director
Sussex County Planning & Zoning
Sussex County Courthouse
Georgetown, DE 19947

RE: Scenic Manor
Lewes & Rehoboth Hundred
319 single family lots

Dear Ms. Cornwell:

Soils within the delineated area on the enclosed map are:

Br	Broadkill mucky peat, very frequently flooded, tidal
DoA	Downer sandy loam, 0 to 2 percent slopes
DoB	Downer sandy loam, 2 to 5 percent slopes
FgA	Fallsington loam, 0 to 2 percent slopes
GrA	Greenwich loam, 0 to 2 percent slopes
HnA	Hammonton sandy loam, 0 to 2 percent slopes
HvA	Hurlock sandy loam, 0 to 2 percent slopes
IeA	Ingleside loamy sand, 0 to 2 percent slopes
Ma	Manahawkin muck, frequently flooded
TP	Transquaking and Mispillion soils, very frequently flooded, tidal

Soil Interpretation Guide

Soil Limitation Class

Buildings

Map Symbol	Urbanizing Subclass	With Basement	Without Basement	Septic Filter Fields
Br	R5	Very limited	Very limited	Very limited
DoA	G1	Not limited	Not limited	Not limited
DoB	G1	Not limited	Not limited	Not limited
FgA	R2	Very limited	Very limited	Very limited
GrA	G1	Not limited	Not limited	Very limited
HnA	Y2	Very limited	Somewhat limited	Very limited
HvA	R2	Very limited	Very limited	Very limited
IeA	Y2	Somewhat limited	Not limited	Very limited
Ma	R5	Very limited	Very limited	Very limited
TP	R5	Very limited	Very limited	Very limited

Definition of soil limitation ratings classes:

Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development.

"**Not limited**" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected.

"**Somewhat limited**" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected.

"Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

G1:
These soils are on nearly level to strongly sloping (0-10% slopes), well drained, mostly permeable soils. As sites for large commercial, industrial, institutional, and residential developments, these soils have fewer limitations than any other soils in the state. Slopes are favorable, and grading can be done without difficulty. Foundation conditions are generally good. Grasses, trees, and do well. Principal soil limitations: No apparent soil limitations for conventional uses.

R2:
The soils in this classification are nearly or gently sloping, very poorly, poorly, and somewhat poorly drained. Seasonal high water tables, local ponding, and high potential frost action severely limit these soils for residential developments. The principal soil limitations are: 1) soil is highly susceptible to frost action, 2) excavations are likely to fill with water in late winter or early spring, 3) wet foundations or basements probable, and 4) hazard of temporary ponding of water in areas lacking outlets. Loose running sand commonly encountered in deep excavations.

R5:
Areas of tidal marsh, swamp, and shallow muck which remain extremely wet all or most of the year. Excavations are likely to fill with water in late winter or early spring. Delayed construction in the spring - slow to dry out. Wet basements or foundations probable. Hazard of temporary ponding of water in areas lacking outlets. Potential flood damage, or subject to wave and tidal action.

Y2:
The soils in this classification are nearly level or gently sloping, moderately well drained or well drained with ground water between four to six feet from the surface, and are subject to seasonal high water tables. Seasonal wetness and seepage around foundations moderately limits these soils for residential use. The principal soil limitations are: 1) lateral seepage in subsoil causes concentration of water around foundations, 2) soil is highly susceptible to frost action, 3) excavations are likely to fill with water in late winter or early spring, and 4) wet basements or foundations are probable.

The soil interpretations above do not eliminate the need for detailed investigations at each proposed construction site. However, the interpretations can serve as a guide to planning more detailed investigations. No consideration was given in these interpretations regarding the size and shape of the soil area; nor to the pattern they form with other soils in the landscape. Also, because of the scale of the maps used, small areas of other kinds of soils may be included within some delineations of the soil map. Thus, an individual lot or building site could occupy a small area that would not fit the interpretations given for the soils symbol representing the entire delineation of the map. Interpretations apply to the soils in their natural state and not for areas that may have been altered through grading, compacting, and the like.

Sincerely,

Thelton D. Savage
District Conservationist
USDA, Natural Resources Conservation Service

TDS/bh

Jamie Whitehouse

From: SARAH OBERLE <sally.bluehen@comcast.net>
Sent: Thursday, October 1, 2020 10:45 AM
To: Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear elected official,

At a a meeting with Sussex 2030 discussion was held regarding the potential development of the Farmland adjacent to our Community of Mulberry Knoll. The proposed development is called Scenic Manor. The proposal for this site is for *a 319 home* subdivision on Mulberry Knoll Road south of Rt. 24, between Arnell Creek and the Dorman Branch of Love Creek. The 170-acre site presently includes farmland, 27 acres of forest, 18 acres of tidal wetlands and 5 acres of non-tidal wetlands.

I have lived there for 20 years and already there is too much traffic on that Rt 24 . Its a nightmare trying to get out of Mulberry Knoll rd and onto Rt 24 towards Rt 1!
The additional development would only increase the traffic and cause decrease in services to the existing homes and offices in the area.

I oppose the new development and ask that you do not give the builder permission to proceed with another housing subdivision of Scenic Manor.
Traffic congestion impedes **fire, police and EMS services**, increasing response time and lengthening ambulance trip time to hospitals. This is a public safety issue.

Regards,

Opposition Exhibit

Sally Oberle,
21374 West Lane
Lewes, DE 19958
2 Danvers Way, Newark, DE 19702
cell # 302-463-3800
email: sally.bluehen@comcast.net

Jamie Whitehouse

From: Jeff Kietzmann <jkfiction@gmail.com>
Sent: Wednesday, January 6, 2021 7:00 AM
To: Jamie Whitehouse
Cc: Doug Hudson; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; mspan56@comcast.net
Subject: Re: "Scenic Manor" & the American Kestrel - Letter of Concern
Attachments: Scenic_Manor_Petition_2020(B).pdf

Good Morning and Happy New Year Mr. Hudson,

Please find enclosed another batch of signed petitions with regards to the Scenic Manor subdivision. I kindly request these be added to the record for the application.

Very Respectfully,

Jeff Kietzmann

Concerned Sussex County Citizen

954-743-9504

On Thu, Oct 22, 2020 at 10:08 AM Jeff Kietzmann <jkfiction@gmail.com> wrote:

> Good Morning Mr. Whitehouse and Esteemed Council Members,
>
> Please find enclosed a batch of signed petitions with regards to the Scenic Manor subdivision. I kindly request these be added to the record for the application.
>
> Very Respectfully,
>
> Jeff Kietzmann
>
> Concerned Sussex County Citizen
>
> 954-743-9504

On Thu, Sep 24, 2020 at 9:37 AM Jamie Whitehouse <jamie.whitehouse@sussexcountyde.gov> wrote:

> Mr. Kietzman, good morning.

Dear Mr. Whitehouse & Esteemed Council Members,

Please find enclosed a formal letter of concern regarding the proposed development "Scenic Manor"

I kindly request you review the letter and consider it as part of the formal hearing records.

Very Respectfully,

Jeff Kietzmann

Concerned Sussex County Citizen

954-743-9504

FILE COPY

Opposition Exhibit

RECEIVED
OCT 22 2020
SUSSEX COUNTY
PLANNING & ZONING

Petition In Opposition of 'Scenic Manor' Subdivision -

a proposed 319-home subdivision located on Mulberry Knoll Road, Lewes, north of Love Creek Fishing Access and Boat Launch.

As residents of Sussex County and Delaware, we the undersigned declare our opposition to the proposed 319-home subdivision, 'Scenic Manor', formerly known as 'Estates of Mulberry Knoll'.

A subdivision is not suitable at this site for the following reasons:

- 5,700 homes have already been approved on the Rt. 24 corridor; this subdivision will *further increase traffic problems* on Rt 24, slowing emergency response services and hampering emergency evacuations. This is a matter of public safety.
- The amount of land within the floodplain will require substantial fill to build homes, roads, and a clubhouse. Filling in the floodplain causes an *increased risk of flooding to current Sussex residents*, resulting in greater storm damage and costly remediation. Another public safety matter.
- Stormwater will be directly released into Arnell Creek causing *decreased water quality* in Love Creek and Rehoboth Bay.
- This land supports an,*endangered species, American Kestrel, and several birds on Delaware's list of species most in need of conservation.* The surrounding property has already been approved for housing developments, placing an even greater need to preserve this land.

PLEASE ONLY SIGN ONE PETITION

Date	Printed Name	Address	Signature
9/29/20	Pamela Cebulski	22 fairway Dr Rehoboth DE 19971	
9/29/20	Vincent Pompo	28 Clubhouse Drive Rehoboth Beach DE 19971	
9/29/20	Robert Youngman	28 Clubhouse Dr. Rehoboth Beach, DE 19971	
9/29/20	GAIL M. JACKSON	7 CLUBHOUSE DE 19971	
9/29/20	Ann Garvey	21 Fairway Dr Rehoboth Beach DE 19971	
9/26/20	EDWARD McHALE	13 CLUBHOUSE DR REHOBOTH BEACH DE 19971	
9/26/20	Donna DAVIS	7 Clubhouse Dr. Rehoboth Beach, DE 19971	

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PLEASE ONLY SIGN ONE PETITION

Date	Printed Name	Address	Signature
9/26/20	Velina D Britton	19 Clubhouse Dr	Velina D Britton
9/26/20	Patricia Riggin	8 Clubhouse Dr. Rehoboth	Patricia Riggin
11	Sandra Roberts	5 Clubhouse Dr., RB	Sandra L. Roberts
9/26/20	Nancy Dickell	17 Fairway Dr, RB	Nancy Dickell
9/26/2020	Rita Connolly	11 Fairway Dr, RB	R Connelly
9/26/2020	Richard (MORGANTE) Morgante	13 Club House Dr. RB	Richard Morgante

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PLEASE ONLY SIGN ONE PETITION

Date	Printed Name	Address	Signature
10/21	VINCENT DE CERCHIO	212 SAMANTHA DR., LEWES, DE	Vincent DeCerchio
10/21	DONNA DE CERCHIO	212 SAMANTHA DR., LEWES, DE.	Donna E. DeCerchio
10/21	Michael Whitehouse	216 SAMANTHA Dr LEWES, DE	M A Whitehouse
10/21	Marjorie Franklin	210 Samantha Dr Lewes DE.	Marjorie Franklin
10/21	CALVIN FRANKLIN	210 SAMANTHA DR LEWES DE	Calvin Franklin
10/22	MARY H. Abbott	226 SAMANTHA Drive Lewes, DE	Mary H. Abbott
10/22	Johnette HARTNETT	226 SAMANTHA Drive Lewes, DE	Johnette Hartnett

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PLEASE ONLY SIGN ONE PETITION

Date	Printed Name	Address	Signature
10/23/2020	Claudia Belgard	30009 Eagle Pt Dr. Millsboro DE	
11-3-2020	ROB FELECIA	224 SAMANTHA DR.	
11-3/2020	Arlene Felecia	224 SAMANTHA DR LEWES	
11/3	PATRICIA HALL	115 CARTER WAY LEWES	
11/3	Joyce Mills	109 Carter Way, Lewes	
11/6	KATHRYN MARSH	402 Samantha Dr Lewes 19958	
11/6	ERIC DAMMEYER	213 SAMANTHA DR LEWES 19958	

Petition In Opposition of 'Scenic Manor' Subdivision -

a proposed 319-home subdivision located on Mulberry Knoll Road, Lewes, north of Love Creek Fishing Access and Boat Launch.

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PLEASE ONLY SIGN ONE PETITION

Date	Printed Name	Address	Signature
9/26/20	SUSAN BALL	15 FAIRWAY DR. REHOBOTH. 19971	Susan L Ball
9/26/20	Patricia VENTRESCA	9 Clubhouse Dr. Rehoboth 19971	Patricia Ventresca
9/26/20	John Steinmann	22 Fairway D Rehoboth Beach 19971	
9-26-20	Dennis V Karol	2 Club House Drive Rehoboth Bch DE 19971	Dennis Karol
9/26	K.J. Ventresca	#9 CLUBHOUSE DR - 19971	
9/26	Jeffrey Kietzmann	32 CLUB HOUSE DR 19971	
9/26	Lisa DeCarchio	26545 Tributary Blvd. 19966	Lisa DeCarchio

Jamie Whitehouse

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Friday, October 16, 2020 8:56 AM
To: Jamie Whitehouse
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Mr.Whitehouse,

My name is Benjamin Berman, I live in the Mulberry Knoll subdivision in Lewes, DE. I wrote to you earlier about my concerns on the proposal in place to build a new subdivision (Scenic Manor) on Mulberry Knoll Road. As I mentioned the proposal is for a 319-home subdivision on Mulberry Knoll Road south of Rt. 24. The 170-acre site currently includes farmland, many acres of forest, 18 acres of tidal wetlands and 5 acres of non-tidal wetlands!

Besides the flood plain impact, I am also concerned for the impact this will have on the environment. I have heard that the developer is proposing a 50' cushion to the wetlands while the state says there should be100'. The owner has refused to allow the DNREC to inspect the property. I am concerned that this will cause major devastation to the wetlands and wildlife.

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Opposition Exhibit

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

Jamie Whitehouse

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Friday, October 16, 2020 8:57 AM
To: Jamie Whitehouse
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Mr.Whitehouse,

My name is Benjamin Berman, and I live in the Mulberry Knoll subdivision in Lewes, DE. I am following up on my concerns regarding the proposal of building a subdivision (Scenic Manor) on Mulberry Knoll Road.

From what I am told, the building of this subdivision will increase traffic by approximately over 3,200 vehicle trips per day at the intersection of Rt. 24 and Mulberry Knoll. That would mean that the traffic on Rt. 24 would increase by over 70,000!

I'm concerned for my family's safety, as overcrowding delays fire, police and EMS services. We have aging family members and need to have the peace of mind in knowing we can be reached quickly if needed.

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Opposition Exhibit

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

Jamie Whitehouse

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Friday, October 16, 2020 8:58 AM
To: Jamie Whitehouse
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Mr.Whitehouse,

My name is Benjamin Berman, and I live in the Mulberry Knoll subdivision in Lewes, DE. I have written to you with several concerns regarding the proposal of building a subdivision (Scenic Manor) on Mulberry Knoll Road.

As a follow up to that I stress that we need to preserve the Habitat for the Delaware Endangered American Kestrels. This will destroy their home, and American Kestrels are already endangered in Delaware. This land is a well-preserved environment for kestrels: farmland for hunting and established forest with dead trees for nesting holes. We need to preserve their home!

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Opposition Exhibit

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

Jamie Whitehouse

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Friday, October 16, 2020 8:58 AM
To: Jamie Whitehouse
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Mr.Whitehouse,

My name is Benjamin Berman, and I live in the Mulberry Knoll subdivision in Lewes, DE. I am once again writing to you with my apprehensions regarding the proposal of building a subdivision (Scenic Manor) on Mulberry Knoll Road.

If the plans for this subdivision go through, then access to the State Fishing Area and MKBH Common Area will become near impossible for residents. Traffic will flood our development due to the Scenic Manor homeowners traveling to public access areas, such as the State Fishing Area on East Lane. This may also cause non-residents to use our private community common area and dock.

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Opposition Exhibit

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

Jamie Whitehouse

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Friday, October 16, 2020 8:55 AM
To: Jamie Whitehouse
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Mr.Whitehouse,

My name is Ben Berman, I live in the Mulberry Knoll subdivision in Lewes, DE. It has been brought to my attention that there is a proposal in place to build a new subdivision (Scenic Manor) on Mulberry Knoll Road. The proposal for this site is for a 319-home subdivision on Mulberry Knoll Road south of Rt. 24. The 170-acre site currently includes farmland, many acres of forest, 18 acres of tidal wetlands and 5 acres of non-tidal wetlands!

I fear for my family's safety when it comes to the flood plain impact this development would cause. Our home sits directly on the water! Building this subdivision would increase the amount of devastating flooding, in which our home is in the direct path of.

The stormwater management they are proposing is in areas where the water table is 0-3' below the surface. This would not be effective in the least.

Please consider putting a stop to this, for the safety of my home and my family!

Thank you.

Sincerely,

Opposition Exhibit

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

Jamie Whitehouse

From: Doug Hudson
Sent: Friday, October 16, 2020 10:33 AM
To: Jamie Whitehouse
Subject: Fwd: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Get Outlook for iOS

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Friday, October 16, 2020 8:52 AM
To: Doug Hudson
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Councilman Hudson,

My name is Benjamin Berman, and I live in the Mulberry Knoll subdivision in Lewes, DE. I am following up on my concerns regarding the proposal of building a subdivision (Scenic Manor) on Mulberry Knoll Road.

From what I am told, the building of this subdivision will increase traffic by approximately over 3,200 vehicle trips per day at the intersection of Rt. 24 and Mulberry Knoll. That would mean that the traffic on Rt. 24 would increase by over 70,000!

I'm concerned for my family's safety, as overcrowding delays fire, police and EMS services. We have aging family members and need to have the peace of mind in knowing we can be reached quickly if needed.

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Opposition Exhibit

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

Jamie Whitehouse

From: Doug Hudson
Sent: Friday, October 16, 2020 10:32 AM
To: Jamie Whitehouse
Subject: Fwd: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Get Outlook for iOS

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Friday, October 16, 2020 8:53 AM
To: Doug Hudson
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Councilman Hudson,

My name is Benjamin Berman, and I live in the Mulberry Knoll subdivision in Lewes, DE. I have written to you with several concerns regarding the proposal of building a subdivision (Scenic Manor) on Mulberry Knoll Road.

As a follow up to that I stress that we need to preserve the Habitat for the Delaware Endangered American Kestrels. This will destroy their home, and American Kestrels are already endangered in Delaware. This land is a well-preserved environment for kestrels: farmland for hunting and established forest with dead trees for nesting holes. We need to preserve their home!

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Opposition Exhibit

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

Jamie Whitehouse

From: Doug Hudson
Sent: Friday, October 16, 2020 10:32 AM
To: Jamie Whitehouse
Subject: Fwd: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Get Outlook for iOS

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Friday, October 16, 2020 8:53 AM
To: Doug Hudson
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Councilman Hudson,

My name is Benjamin Berman, and I live in the Mulberry Knoll subdivision in Lewes, DE. I am once again writing to you with my apprehensions regarding the proposal of building a subdivision (Scenic Manor) on Mulberry Knoll Road.

If the plans for this subdivision go through, then access to the State Fishing Area and MKBH Common Area will become near impossible for residents. Traffic will flood our development due to the Scenic Manor homeowners traveling to public access areas, such as the State Fishing Area on East Lane. This may also cause non-residents to use our private community common area and dock.

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Opposition Exhibit

Benjamin Berman
34881 Creek Dr
Lewes DE 19958

212-517-1836

Jamie Whitehouse

From: Lisa K <lkiraco@gmail.com>
Sent: Sunday, October 11, 2020 9:00 PM
To: Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Opposed to Scenic Manor - Dredge Hole Access

My name is Lisa Kiracofe and I am a full time resident in Mulberry Knoll Bayshore Hills, located off of Route 24 on Mulberry Knoll Road. Our community is adjacent to the proposed 319 home development called Scenic Manor (formerly known as Estates at Mulberry Knoll).

I am opposed to the building of 319 more homes on Mulberry Knoll Road.

Mulberry Knoll Bayshore Hills sits on Love Creek. Mulberry Knoll Road ends in a Y intersection. The right Y goes to West Lane. At the end of West Lane is a community Common Area and Dock. West Lane, the Common Area and the Dock are all private. To the left of the Y is a State Fishing Area, commonly referred to as the Dredge Hole. Many people put their power boats, kayaks and paddle boards in at the Dredge Hole.

Our small community has worked hard and incurred significant expense to maintain our Common Area and Dock. We have posted signs indicating that this area is private and for residents only, but of course non-residents occasionally trespass.

The State Fishing Area is public. We frequently have boaters driving through out community to access the Dredge Hole. Unfortunately, many of these folks disregard the speed limit and the stop signs. Over ten years ago, our community explored speed humps and bumps, believing them to be far more effective than the stop signs are, but our requests were denied. Perhaps we should revisit this.

Now there is a possibility of 319 homeowners driving through our quiet little community in order to access the water. If need be, we can take more aggressive action to protect our private Common Area and Dock by installing a fence or a gate across the road, but that is expensive and cumbersome for the residents. However, there is no action we can take to control the speed and aggressive behavior of some of the boaters who are travelling to the Dredge Hole. Stopping the building of 319 homes adjacent to our Community would be a good start!

I respectfully request that the application for development of this beautiful farmland be denied.

Please oppose Scenic Manor.

Thank you!!

Opposition Exhibit

Warm regards,

Lisa Kiracofe

Jamie Whitehouse

From: Lisa K <lkiraco@gmail.com>
Sent: Monday, October 19, 2020 2:05 PM
Subject: American Kestral - Stop theProposed Development of Scenic Manor on Mulberry Knoll Road

My name is Lisa Kiracofe and I am a full time resident in Mulberry Knoll Bayshore Hills, located off of Route 24 on Mulberry Knoll Road. Our community is adjacent to the proposed 319 home development called Scenic Manor (formerly known as Estates at Mulberry Knoll).

I oppose the building of 319 more homes on Mulberry Knoll Road.

The American Kestrels are endangered in Delaware. American Kestrels have been sited on the land of this proposed community. The development of Scenic Manor would destroy the habitat for the Kestrels. This land is a perfect habitat for the Kestrels: it provides farmland for hunting and the mature forest provides dead trees for nesting holes. Two other large farmland properties adjacent to this one already have subdivisions approved, making the preservation of this habitat even more important. Additionally, hundreds of other birds of various species use this property during migration.

We cannot afford further destruction of wetlands and wildlife habitat in Sussex County.

Once forests, fields, plants and animals are gone, they will never return. We need to protect the American Kestrels from the impact of this explosive growth. It is important to maintain green space!! We need to protect and preserve this 170 acres of farmland, wetland and forest!

I respectfully request that the application for development of this beautiful farmland be denied.

Please oppose Scenic Manor.

Opposition Exhibit

Thank you!!

Warm regards,

Lisa Kiracofe

Jamie Whitehouse

From: Doug Hudson
Sent: Monday, October 12, 2020 7:29 AM
To: Todd F. Lawson; Gina Jennings; Michael H. Vincent; IG Burton; John Rieley; Samuel R Wilson Jr; Jamie Whitehouse
Subject: Fwd: Opposed to Scenic Manor - Dredge Hole Access

Get Outlook for iOS

From: Lisa K <lkiraco@gmail.com>
Sent: Sunday, October 11, 2020 9:00 PM
To: Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Opposed to Scenic Manor - Dredge Hole Access

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I respectfully request that the application for development of this beautiful farmland be denied.

Please oppose Scenic Manor.

Thank you!!

Opposition Exhibit

Jamie Whitehouse

From: Doug Hudson
Sent: Thursday, October 8, 2020 4:25 PM
To: Jamie Whitehouse
Subject: Fwd: Concerning Scenic Manor (formerly Estates at Mulberry Knoll
Attachments: Flood Concerns - Secnic Manor Development.docx

Get Outlook for iOS

From: klsandcpa@aol.com <klsandcpa@aol.com>
Sent: Thursday, October 8, 2020 2:06 PM
To: Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Concerning Scenic Manor (formerly Estates at Mulberry Knoll

See Attached letter

Korie L Sandridge
34743 Frontier Road
Lewes, DE 19958
610-741-9609

Subject: Scenic Manor (formerly know as Estates at Mulberry Knoll)

I am a homeowner in Mulberry Knoll for more than 12 years and have many concerns as the area sees significant growth and construction.

Our community is fortunate in that we have an abundance of animals and birds in the nearby farmland. The Delaware Endangered American Kestrel has even made the farmland and adjacent woods it home. This land is perfect to protect and preserve this species which is endangered. This parcel of land is home to many different animals and birds. Development will destroy the farmland and forests that they need to exist and thrive.

Please help to protect our endangered habitat by not allowing this community which will have such a negative impact on all wildlife in this area.

Regards

Korie L Sandridge

Jamie Whitehouse

From: Lisa K <lkiraco@gmail.com>
Sent: Thursday, October 8, 2020 7:02 PM
Subject: Opposed to Scenic Manor - Flooding Impact!!

My name is Lisa Kiracofe and I am a full time resident in Mulberry Knoll Bayshore Hills, located off of Route 24 on Mulberry Knoll Road. Our community is adjacent to the proposed 319 home development called Scenic Manor (formerly known as Estates at Mulberry Knoll).

I oppose the building of 319 more homes on Mulberry Knoll Road.

Mulberry Knoll Bayshore Hills is a small community that sits beside Love Creek. Many of the houses in this community are in or close to the flood plain. The creation of a subdivision right next to our community will increase the impermeable surfaces. It will also remove forested areas and their soils which function to absorb water. Since some of the homes will be built in the floodplain zone (AE), they are required to be elevated. This means fill can be brought in which would also increase the risk of flooding in our community by forcing the water to go further inland.

Given that many of our homes are already at risk of flooding, we cannot afford to increase that risk with landfill and impermeable surfaces.

It is critically important to stop the proposed building of these 319 homes. We need to keep the farmland, forests and wetlands to protect the existing homes in Mulberry Knoll and Bayshore Hills. There are two other large farmland properties adjacent to this one that already have subdivisions approved, making the preservation of this land even more important. This is a huge environmental impact!!

We certainly don't want to be like the Glenville Community near Newport, Delaware that flooded so often, that the state of Delaware, DelDOT, New Castle County and FEMA bought out the homeowners and demolished the 172 homes so the land could be used for flood and wetland mitigation.

We need to protect and preserve this 170 acres of farmland, wetland and forest! Perhaps conservation organizations along with Sussex County and the State of Delaware could purchase this land and put it into a preservation trust. It would be money very very well spent!

I respectfully request that the application for development of this beautiful farmland be denied.

Please oppose Scenic Manor.

Thank you!!

Opposition Exhibit

Warm regards,

Lisa Kiracofe

Jamie Whitehouse

From: Doug Hudson
Sent: Thursday, October 8, 2020 4:25 PM
To: Jamie Whitehouse
Subject: Fwd: Concerning Scenic Manor (formerly Estates at Mulberry Knoll
Attachments: Traffic Concerns - Secnic Manor Development.docx

Get Outlook for iOS

From: klsandcpa@aol.com <klsandcpa@aol.com>
Sent: Thursday, October 8, 2020 2:06 PM
To: Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Concerning Scenic Manor (formerly Estates at Mulberry Knoll

Please see attached letter

Korie L Sandridge
34743 Frontier Road
Lewes, DE 19958
610-741-9609

Subject: Scenic Manor (formerly know as Estates at Mulberry Knoll)

I am a homeowner in Mulberry Knoll for more than 12 years and have many concerns as the area sees significant growth and construction.

The main street of our community is Mulberry Knoll Road. Stop signs were installed several years back to help with the excessive speeding problem. The amount of traffic will increase significantly due to Scenic Manor homeowners travelling to the public access State Fishing Area on East Lane. We are also concerned about non-resident use of our private common area and dock area.

Please help to protect our small community by not allowing this community of 319 homes which will have a negative impact on our roads, traffic, safety, and security.

Regards

Korie L Sandridge

Jamie Whitehouse

From: klsandcpa@aol.com
Sent: Thursday, October 8, 2020 2:06 PM
To: Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Concerning Scenic Manor (formerly Estates at Mulberry Knoll
Attachments: Flood Concerns - Secnic Manor Development.docx

See Attached letter

Korie L Sandridge
34743 Frontier Road
Lewes, DE 19958
610-741-9609

Subject: Scenic Manor (formerly know as Estates at Mulberry Knoll)

I am a homeowner in Mulberry Knoll for more than 12 years and have many concerns as the area sees significant growth and construction.

Our community is always aware of the flood plain and the impact on our community. Building more homes in or near the flood zone could cause catastrophic impact on Mulberry Knoll. Elevating the area will force water to go where it did not previously go and could cause flooding in new areas

Please help to keep all existing communities safe by not allowing this community which will have such a negative impact on our community and the flood plain.

Regards

Korie L Sandridge

Jamie Whitehouse

From: klsandcpa@aol.com
Sent: Thursday, October 8, 2020 2:06 PM
To: Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Concerning Scenic Manor (formerly Estates at Mulberry Knoll
Attachments: Traffic Concerns - Secnic Manor Development.docx

Please see attached letter

Korie L Sandridge
34743 Frontier Road
Lewes, DE 19958
610-741-9609

Subject: Scenic Manor (formerly know as Estates at Mulberry Knoll)

I am a homeowner in Mulberry Knoll for more than 12 years and have many concerns as the area sees significant growth and construction.

The traffic and congestion accessing and on route 24 is excessive. There are delays getting onto route 24 even in the off season. Public safety is an issue not only driving but receiving emergency services. The current roads can not handle a new development at route 24 and Mulberry Knoll Road without serious safety concerns. Emergency response teams will be delayed and lives could be lost.

Please help to keep all existing communities safe by not allowing this community which will have such a negative impact on our roads and safety.

Regards

Korie L Sandridge

Jamie Whitehouse

From:	klsandcpa@aol.com
Sent:	Thursday, October 8, 2020 2:07 PM
To:	Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject:	Concerning Scenic Manor (formerly Estates at Mulberry Knoll
Attachments:	Concern for our Environment - Secnic Manor Development.docx

Please see attached letter

Korie L Sandridge
34743 Frontier Road
Lewes, DE 19958
610-741-9609

Subject: Scenic Manor (formerly know as Estates at Mulberry Knoll)

I am a homeowner in Mulberry Knoll for more than 12 years and have many concerns as the area sees significant growth and construction.

The impact on the environment is obvious as the precious wetlands will be destroyed. This will hurt the wildlife habitat that depend on and live in these wetlands.

The developer is posing a 50' buffer to the wetlands while the state suggests a 100' buffer. My understanding is that the owner has denied DNREC the opportunity to inspect the property.

Please protect our wetlands and wildlife by not allowing this community which will have such a negative impact on our precious environment.

Regards

Korie L Sandridge

Jamie Whitehouse

From: klsandcpa@aol.com
Sent: Thursday, October 8, 2020 2:06 PM
To: Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Concerning Scenic Manor (formerly Estates at Mulberry Knoll
Attachments: Habitat Concerns - Secnic Manor Development.docx

Please see attached letter

Korie L Sandridge
34743 Frontier Road
Lewes, DE 19958
610-741-9609

Subject: Scenic Manor (formerly know as Estates at Mulberry Knoll)

I am a homeowner in Mulberry Knoll for more than 12 years and have many concerns as the area sees significant growth and construction.

Our community is fortunate in that we have an abundance of animals and birds in the nearby farmland. The Delaware Endangered American Kestrel has even made the farmland and adjacent woods it home. This land is perfect to protect and preserve this species which is endangered. This parcel of land is home to many different animals and birds. Development will destroy the farmland and forests that they need to exist and thrive.

Please help to protect our endangered habitat by not allowing this community which will have such a negative impact on all wildlife in this area.

Regards

Korie L Sandridge

Jamie Whitehouse

From: Claire Wade <clairewade50@gmail.com>
Sent: Monday, October 5, 2020 12:02 PM
To: Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Scenic Manor

This letter is in reference to the Access to the State Fishing Area on East Lane at the end of Mulberry Knoll Rd. in Lewes. The traffic on Mulberry Knoll Rd has been increasing over the past few years and we have great concern over this. There are too many who disregard any speed limit. We have had 2 stop signs installed on Mulberry Knoll in our community, as there are a lot of children who ride their bicycles or skateboards in the street. It's quite surprising how many do not stop at the stop signs.
We are also having a problem with strangers in our private MKBH common area. It seems like our quiet little street is becoming a major thoroughfare. All of this now, without the added volume a development would create in the future.
I hold a strong opposition to the thought of any new development on Mulberry Knoll Rd. Does the county plan to turn every square foot of available space over to developers? It's the wooded areas and open fields that make this county so breathtakingly beautiful.

Claire Wade
34947 E. Sand St
Lewes, DE 19958
302-727-5102

Opposition Exhibit

From: Beth Berman <beth@compellications.com>
Sent: Friday, March 19, 2021 3:19 PM
To: Beth Perl Berman
Cc: Ben Berman; Ken Berman; Brittany Linn
Subject: Scenic Manor Subdivision

Opposition Exhibit

Hi. I am writing to you because I am extremely concerned about the Scenic Manor development plan.

My concerns:

- **Traffic:** estimated to add an additional 3,200 car trips per day onto Rt 24, and further development is planned along Rt 24:
  - The Residence Inn hotel adds 453 vehicle trips per day and was NOT included in the traffic impact study for Scenic Mano
  - Beebe Medical Center is being constructed off Rt 24 (Warrington Road) with an estimated additional 4,392 vehicle trips per day and was NOT included in the traffic impact study for Scenic Manor
- **Impact on First Responders** : Rapid increase in number of residents will stress volunteer fire department, EMS services, police, infrastructure and schools
- **Road Costs**: Adds costs to all county services and roads, which are paid for by Sussex County residents
- **Flooding and Water-related Impacts**, including but not limited to:
  - Insufficient stormwater management capacity on site – stormwater system is designed on land that is

    only marginally above the water table, discharge will be to Arnell Creek
  - Increased risk of flooding – the clubhouse, 96 out of 320 lots, and neighborhood roads are designed

    within the 100-year floodplain
  - Decreased water quality; pollution from pesticide and fertilizer application will drain into Arnell Creek

    and Rehoboth Bay
  - Loss of habitat for migrating birds and for rare, threatened and endangered species
  - Loss of 9 acres of mature forest out of 27 acres present
  - Damage to the hydric soils which filters our waters and prevents flooding

Specific Requests:

Opposition Exhibit

Jamie Whitehouse

From: Beth Berman <beth@compellications.com>
Sent: Friday, March 19, 2021 3:19 PM
To: Beth Perl Berman
Cc: Ben Berman; Ken Berman; Brittany Linn
Subject: Scenic Manor Subdivision

Hi. I am writing to you because I am extremely concerned about the Scenic Manor development plan.

My concerns:

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    only marginally above the water table, discharge will be to Arnell Creek
  - Increased risk of flooding – the clubhouse, 96 out of 320 lots, and neighborhood roads are designed

    within the 100-year floodplain
  - Decreased water quality; pollution from pesticide and fertilizer application will drain into Arnell Creek

    and Rehoboth Bay
  - Loss of habitat for migrating birds and for rare, threatened and endangered species
  - Loss of 9 acres of mature forest out of 27 acres present
  - Damage to the hydric soils which filters our waters and prevents flooding

Specific Requests:

1. To determine the risk of flooding, we want to see the site topography, soils mapping, estimated pre- and post-development runoff, and proposed method(s) and location(s) of stormwater management
2. To conduct a current Traffic Impact Study that includes traffic from Beebe out-patient medical center, Residence Inn, and Saddle Ridge development.

Opposition Exhibit

From: James Krawczyk <james.krawczyk3@gmail.com>
Sent: Friday, March 19, 2021 3:36 AM
To: Doug Hudson
Subject: American Kestrel endangered in Mullberry Knoll | Cape Gazette

Greetings,

I would concur with this article.

https://www.capegazette.com/article/american-kestrel-endangered-mullberry-knoll/216865

Jamie Whitehouse

Opposition Exhibit

From: lovinglewes@aol.com
Sent: Tuesday, November 17, 2020 9:57 PM
To: Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: safety and over development of sussex co

I have many concerns regarding the over development in Sussex County. And one of my biggest concern is the safety of the residents particularly off of Rt. 24.
I live in Mulberry Knoll and now they are trying to get approval of another neighborhood Scenic Manor (the proposed 319 home community on the farmland next to Mulberry Knoll). Rt 24 isn't able to handle the day to day traffic even in the off season. And there are several neighborhoods that are still in the building stage. I can't imagine how much worse the traffic is going to be once these neighborhoods are completed. So how are emergency vehicles paramedics, ambulance and fire trucks going to be able to help people in need off of Rt. 24 when most of the time Rt. 24 is like a parking lot? Valuable time will be lost and lives will be lost because the emergency vehicles can't get through all the traffic. The development has to STOP. Sussex County is being ruined by over development. If this keeps up lives will be lost and no one will want to move here because of traffic and over development. At one time part of the charm was once you got out town there was open spaces, little traffic and wildlife but no more.

Mary Ann Bell
20656 Mulberry Knoll Rd
Lewes, DE. 19958
302-229-4126

Jamie Whitehouse

From: Jeff Kietzmann <jkfiction@gmail.com>
Sent: Wednesday, January 6, 2021 7:00 AM
To: Jamie Whitehouse
Cc: Doug Hudson; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; mspan56@comcast.net
Subject: Re: "Scenic Manor" & the American Kestrel - Letter of Concern
Attachments: Scenic_Manor_Petition_2020(B).pdf

Good Morning and Happy New Year Mr. Hudson,

Please find enclosed another batch of signed petitions with regards to the Scenic Manor subdivision. I kindly request these be added to the record for the application.

Very Respectfully,

Jeff Kietzmann

Concerned Sussex County Citizen

954-743-9504

On Thu, Oct 22, 2020 at 10:08 AM Jeff Kietzmann <jkfiction@gmail.com> wrote:

> Good Morning Mr. Whitehouse and Esteemed Council Members,
>
> Please find enclosed a batch of signed petitions with regards to the Scenic Manor subdivision. I kindly request these be added to the record for the application.
>
> Very Respectfully,
>
> Jeff Kietzmann
>
> Concerned Sussex County Citizen
>
> 954-743-9504

On Thu, Sep 24, 2020 at 9:37 AM Jamie Whitehouse <jamie.whitehouse@sussexcountyde.gov> wrote:

> Mr. Kietzman, good morning.

Dear Mr. Whitehouse & Esteemed Council Members,

Please find enclosed a formal letter of concern regarding the proposed development "Scenic Manor"

I kindly request you review the letter and consider it as part of the formal hearing records.

Very Respectfully,

Jeff Kietzmann

Concerned Sussex County Citizen

954-743-9504

Jamie Whitehouse

From: Jeff Kietzmann <jkfiction@gmail.com>
Sent: Thursday, October 22, 2020 10:08 AM
To: Jamie Whitehouse
Cc: Doug Hudson; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; mspan56@comcast.net
Subject: Re: "Scenic Manor" & the American Kestrel - Letter of Concern
Attachments: Scenic_Manor_Petition_2020.pdf

Good Morning Mr. Whitehouse and Esteemed Council Members,

Please find enclosed a batch of signed petitions with regards to the Scenic Manor subdivision. I kindly request these be added to the record for the application.

Very Respectfully,

Jeff Kietzmann

Concerned Sussex County Citizen

954-743-9504

On Thu, Sep 24, 2020 at 9:37 AM Jamie Whitehouse <jamie.whitehouse@sussexcountyde.gov> wrote:

> Mr. Kietzman, good morning.
>
> Thank you for your email and the attached letter. I can confirm that these have been added to the record for the application.
>
> If we can be of further assistance, please feel free to contact me
>
> Thank you,
>
> *Mr. Jamie Whitehouse,* AICP, MRTPI

Very Respectfully,

Jeff Kietzmann

Concerned Sussex County Citizen

954-743-9504

Jamie Whitehouse

From: Doug Hudson
Sent: Friday, October 9, 2020 6:53 AM
To: Jamie Whitehouse
Subject: Fwd: Opposed to Scenic Manor - Flooding Impact!!

Get Outlook for iOS

From: Lisa K <lkiraco@gmail.com>
Sent: Thursday, October 8, 2020 7:02 PM
Subject: Opposed to Scenic Manor - Flooding Impact!!

My name is Lisa Kiracofe and I am a full time resident in Mulberry Knoll Bayshore Hills, located off of Route 24 on Mulberry Knoll Road. Our community is adjacent to the proposed 319 home development called Scenic Manor (formerly known as Estates at Mulberry Knoll).

I oppose the building of 319 more homes on Mulberry Knoll Road.

Mulberry Knoll Bayshore Hills is a small community that sits beside Love Creek. Many of the houses in this community are in or close to the flood plain. The creation of a subdivision right next to our community will increase the impermeable surfaces. It will also remove forested areas and their soils which function to absorb water. Since some of the homes will be built in the floodplain zone (AE), they are required to be elevated. This means fill can be brought in which would also increase the risk of flooding in our community by forcing the water to go further inland.

Given that many of our homes are already at risk of flooding, we cannot afford to increase that risk with landfill and impermeable surfaces.

It is critically important to stop the proposed building of these 319 homes. We need to keep the farmland, forests and wetlands to protect the existing homes in Mulberry Knoll and Bayshore Hills. There are two other large farmland properties adjacent to this one that already have subdivisions approved, making the preservation of this land even more important. This is a huge environmental impact!!

We certainly don't want to be like the Glenville Community near Newport, Delaware that flooded so often, that the state of Delaware, DelDOT, New Castle County and FEMA bought out the homeowners and demolished the 172 homes so the land could be used for flood and wetland mitigation.

We need to protect and preserve this 170 acres of farmland, wetland and forest! Perhaps conservation organizations along with Sussex County and the State of Delaware could purchase this land and put it into a preservation trust. It would be money very very well spent!

I respectfully request that the application for development of this beautiful farmland be denied.

Please oppose Scenic Manor.

Thank you!!

Opposition Exhibit

Korie L Sandridge
34743 Frontier Road
Lewes, DE 19958
610-741-9609

Subject: Scenic Manor (formerly know as Estates at Mulberry Knoll)

I am a homeowner in Mulberry Knoll for more than 12 years and have many concerns as the area sees significant growth and construction.

The traffic and congestion accessing and on route 24 is excessive. There are delays getting onto route 24 even in the off season. Public safety is an issue not only driving but receiving emergency services. The current roads can not handle a new development at route 24 and Mulberry Knoll Road without serious safety concerns. Emergency response teams will be delayed and lives could be lost.

Please help to keep all existing communities safe by not allowing this community which will have such a negative impact on our roads and safety.

Regards

Korie L Sandridge

Jamie Whitehouse

From: Doug Hudson
Sent: Thursday, October 8, 2020 4:25 PM
To: Jamie Whitehouse
Subject: Fwd: Concerning Scenic Manor (formerly Estates at Mulberry Knoll
Attachments: Habitat Concerns - Secnic Manor Development.docx

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From: klsandcpa@aol.com <klsandcpa@aol.com>
Sent: Thursday, October 8, 2020 2:06 PM
To: Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Concerning Scenic Manor (formerly Estates at Mulberry Knoll

Please see attached letter

Korie L Sandridge
34743 Frontier Road
Lewes, DE 19958
610-741-9609

Subject: Scenic Manor (formerly know as Estates at Mulberry Knoll)

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Our community is always aware of the flood plain and the impact on our community. Building more homes in or near the flood zone could cause catastrophic impact on Mulberry Knoll. Elevating the area will force water to go where it did not previously go and could cause flooding in new areas

Please help to keep all existing communities safe by not allowing this community which will have such a negative impact on our community and the flood plain.

Regards

Korie L Sandridge

Jeff Kietzmann
32 Club House Dr.
Rehoboth Beach, DE 19971

September 21, 2020

Mr. Jamie Whitehouse
Director,
Sussex County Planning and Zoning Commission
2 The Circle
P.O. Box 417
Georgetown, DE 19947

Opposition Exhibit

RE: Proposed Subdivision "Scenic Manor" & the American Kestrel (Endangered Species, Delaware)

Dear Mr. Whitehouse,

This letter is written in regards to the proposed development "Scenic Manor". I am a new resident to Delaware and in turn Sussex County. One of the primary drivers of my relocation to Delaware is how impressed I was with the natural spaces available for public enjoyment.

When I moved here last year, I made the choice not to purchase a home in a new development, but to invest in an older property and renovate it, so as not to add additional pressure on the natural resources and wildlife.

When I discovered that the "Scenic Manor" development application was proposing to develop on Level 4 land (40% of the Parcel), adding fill to build 96 lots within the existing 100-Year flood plain, discounting the Delaware State recommendation of a 100 foot buffer to existing marshland and proposing the removal of 33% of the trees on the property, paired with the fact that there are consistent reports over a three year period of American Kestrel's (Delaware Endangered Species) on the proposed land, I felt compelled to take action.

Figure 1- American Kestrel flying over "Scenic Manor"

To that end, while driving solely on public roads, I successfully captured a photograph of an American Kestrel as it was flying into the woods on the property. My photograph was merely taken to document that this species exists on the proposed land. The sighting was reported via eBird, hosted by the Cornell Lab of Ornithology as a citizen science platform. The photo can be seen in Figure 1.

American Kestrels nest in cavities usually created by woodpeckers in mature or even dead trees. They also require open areas with short ground vegetation. The parcel in question is essentially the perfect habitat for the American Kestrel. Figure 2 shows the locations of the sightings of American Kestrel's in the 2020 calendar year recorded on eBird (https://ebird.org/). What is most striking, although not surprising, is that the most sightings have been made in State Parks, State Forests or National Wildlife Refuges. One of the very few spots

they have been seen regularly outside of those area near the coastal shore of Sussex County is in the area of the proposed subdivision "Scenic Manor".

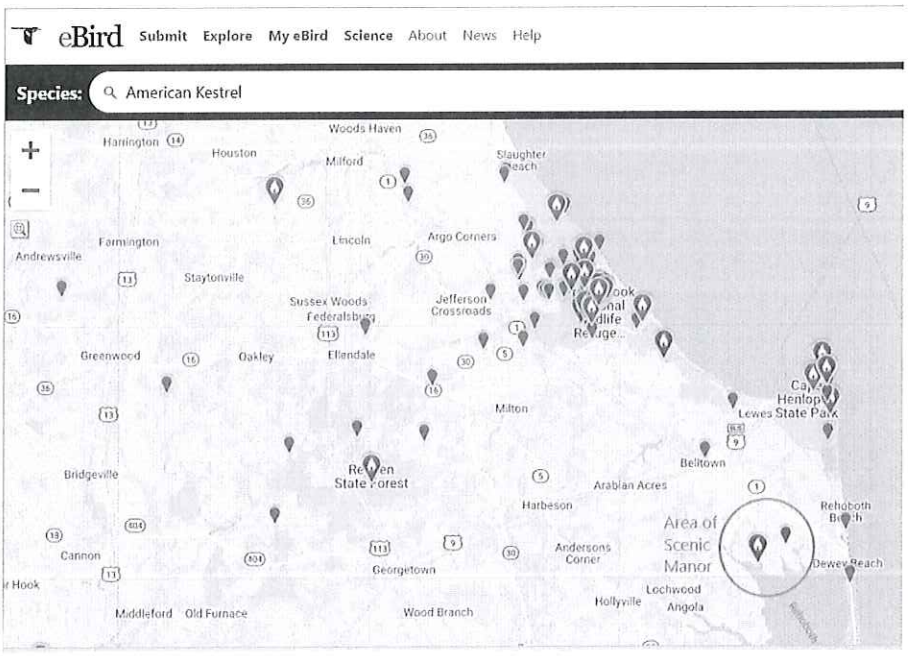

Figure 2- eBird 2020 sightings of American Kestrel

Although I realize the need for land development in Sussex County, I do however recommend sustainable and thoughtful development with a focus on the environment. The "Scenic Manor" land is adjacent to the Love Creek Natural Area and Arnell Creek. The surrounding property has already been approved for housing developments, creating an even greater need to preserve some of this land.

Perhaps a portion of this land, its trees, and marshland could be incorporated with the Love Creek Natural Area ecosystem as a means to both protect the American Kestrel and the natural ecosystem around Love and Arnell Creeks.

There is an opportunity here to balance development initiatives with the preservation of the natural beauty of Sussex county. I hope you as our esteemed representatives will take a good hard look at the legacy your decisions today will have on the future of tomorrow.

I am not asking that the development application for "Scenic Manor" be rejected, only that the developer amend the development plan to be compatible with the above considerations for preservation and protection of an endangered species in Delaware and for protecting the natural land for the enjoyment of our growing base of residents and visitors.

Thank you for your time and consideration.

Jeff Kietzmann
Concerned Citizen

Jamie Whitehouse

From: SARAH OBERLE <sally.bluehen@comcast.net>
Sent: Thursday, October 1, 2020 10:38 AM
To: Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear sirs,

Recently a meeting of Sussex 2030 discussed regarding the potential development of the Farmland adjacent to our Community of Mulberry Knoll . The proposed development is called **Scenic Manor**. The proposal for this site is for *a **319 home*** subdivision on Mulberry Knoll Road south of Rt. 24, between Arnell Creek and the Dorman Branch of Love Creek. The 170-acre site presently includes farmland, 27 acres of forest, 18 acres of tidal wetlands and 5 acres of non-tidal wetlands.

I strongly opposed this development for the reason concerning the Environmental Impact on this area .This development will become the de struction of wetlands and wildlife habitat. The developer is proposing a 50' buffer to wetlands, while the State suggests a 100' buffer. The owner has denied DNREC inspection of the property.

Either way, this area does not need another development.

Opposition Exhibit

Regards,

Sally Oberle,
21374 West Lane,
Lewes, DE 19958
2 Danvers Way, Newark, DE 19702
cell # 302-463-3800
email: sally.bluehen@comcast.net

Jamie Whitehouse

From: Doug Hudson
Sent: Thursday, October 1, 2020 12:40 PM
To: Jamie Whitehouse
Subject: Fwd: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Get Outlook for iOS

From: SARAH OBERLE <sally.bluehen@comcast.net>
Sent: Thursday, October 1, 2020 10:56 AM
To: Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear sirs,

Recently a meeting of Sussex 2030 discussed regarding the potential development of the Farmland adjacent to our Community of Mulberry Knoll . The proposed development is called **Scenic Manor**. The proposal for this site is for *a **319 home*** subdivision on Mulberry Knoll Road south of Rt. 24, between Arnell Creek and the Dorman Branch of Love Creek. The 170-acre site presently includes farmland, 27 acres of forest, 18 acres of tidal wetlands and 5 acres of non-tidal wetlands.

I strongly opposed this development for the reason concerning the public Access to the State FIshing Area and MKBH Common Area – Traffic will increase in our community due to Scenic Manor homeowners traveling to the public access State Fishing Area on East Lane (aka the Dredge Hole). There are also concerns about non-residents using our private community common area and dock. floodplain into new areas. We are already erecting new signage to discourage non residents from taking over our private dock, damaging our boats, and robbing from our crab traps.

We have lived in this area for 20+ years, and have seen too many trucks, cars, & boats crowding to the public access area all trying to get into the water and getting in each other's way.

Definitely this area does not need another development. Please oppose this new development.

Regards,

Opposition Exhibit

Sally Oberle,
21374 West Lane,
Lewes, DE 19958
2 Danvers Way, Newark, DE 19702
cell # 302-463-3800
email: sally.bluehen@comcast.net

Jamie Whitehouse
Planning and Zoning
2 The Circle
P.O. Box 417
Georgetown, DE 19947

Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Mr.Whitehouse,

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I fear for my family's safety when it comes to the flood plain impact this development would cause. Our home sits directly on the water! Building this subdivision would increase the amount of devastating flooding, in which our home is in the direct path of.

The stormwater management they are proposing is in areas where the water table is 0-3' below the surface. This would not be effective in the least.

Please consider putting a stop to this, for the safety of my home and my family!

Thank you.

Sincerely,

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

Councilman Doug Hudson
P.O. Box 589
Georgetown, DE 19947

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Opposition
Exhibit

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

RECEIVED

OCT 27 2020

SUSSEX COUNTY
PLANNING & ZONING

Jamie Whitehouse
Planning and Zoning
2 The Circle
P.O. Box 417
Georgetown, DE 19947

Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Mr.Whitehouse,

My name is Brittany Linn, and I live in the Mulberry Knoll subdivision in Lewes, DE. I have written to you with several concerns regarding the proposal of building a subdivision (Scenic Manor) on Mulberry Knoll Road. I have more concerns to bring up!

We need to preserve the Habitat for the Delaware Endangered American Kestrels. If we destroy their home, we may no longer have these. American Kestrels are endangered in Delaware. This land is an unspoiled habitat for kestrels: farmland for hunting and established forest with dead trees for nesting holes. We need to preserve their home and it would be destroyed with this development!

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Opposition
Exhibit

Brittany Linn
34881 Creek Dr
Lewes DE 19958
484-788-1168

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If the plans for this subdivision go through, then access to the State Fishing Area and MKBH Common Area will become very difficult for residents to obtain. Traffic will surge in our community due to the Scenic Manor homeowners traveling to public access areas, such as the State Fishing Area on East Lane.

I also have worries about non-residents using our private community common area and dock!

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Brittany Linn
34881 Creek Dr
Lewes DE 19958
484-788-1168

RECEIVED
OCT 27 2020
SUSSEX COUNTY
PLANNING & ZONING

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Brittany Linn
34881 Creek Dr
Lewes DE 19958
484-788-1168

Opposition Exhibit

RECEIVED

OCT 26 2020

SUSSEX COUNTY
PLANNING & ZONING

Jamie Whitehouse
Planning and Zoning
2 The Circle
P.O. Box 417
Georgetown, DE 19947

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From what I am told, the building of this subdivision will increase traffic by approximately over 3,200 vehicle trips per day at the intersection of Rt. 24 and Mulberry Knoll.

That would mean that the traffic on Rt. 24 would increase by over 70,000!

I'm concerned for my family's safety, as overcrowding delays fire, police and EMS services. We have aging family members and need to have the peace of mind in knowing we can be reached quickly if needed.

Once again, please consider putting a stop to this, and thank you for your time.

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Besides the flood plain impact, I am also concerned for the impact this will have on the environment. I have heard that the developer is proposing a 50' cushion to the wetlands while the state says there should be100'. The owner has refused to allow the DNREC to inspect the property. I am concerned that this will cause major devastation to the wetlands and wildlife.

Once again, please consider putting a stop to this, and thank you for your time.

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One of my concerns is regarding the flood plain impact. Our home sits directly on the water. Building this subdivision would increase the amount of very damaging flooding. Our home is in the direct path of this flooding. I am worried for continual damage on our home and our cars.

I believe they have proposed some stormwater management, but they are proposing them in areas where the water table is 0-3' below the surface. Therefore, I do not believe these will be effective at all.

Please consider putting a stop to this, for the safety of my home and my family.

Thank you.

Opposition
Exhibit

Sincerely,

Brittany Linn
34881 Creek Dr
Lewes DE 19958
484-788-1168

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PLANNING & ZONING

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Opposition Exhibit

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34881 Creek Dr
Lewes DE 19958
484-788-1168

RECEIVED
OCT 23 2020
SUSSEX COUNTY
PLANNING & ZONING

Councilman Doug Hudson
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Georgetown, DE 19947

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Opposition Exhibit

Benjamin Berman
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Lewes DE 19958
212-517-1836

RECEIVED

OCT 23 2020

SUSSEX COUNTY
PLANNING & ZONING

Jamie Whitehouse

From: Judy Rose Seibert <judyrose.seibert@gmail.com>
Sent: Thursday, August 6, 2020 5:51 PM
To: Jamie Whitehouse
Subject: Scenic Manor/Mulberry Knoll Public Hearing

Dear Mr. Whitehouse,

We have many concerns about the proposed plans for the subdivision 'Scenic Manor' (formerly called 'The Estates of Mulberry Knoll'), PLUS #2019-08-06. Our main concerns about this subdivision are its impacts on local traffic, preservation of existing property from flood damage, and environmental issues.

We are requesting that the public hearing for this subdivision be in a larger venue, as we anticipate that the turnout for this hearing will not be accommodated at 2 Georgetown Circle.

We are also requesting that the public hearing not be held until there is a functional call-in system for public participation. I believe that P&Z uses the same system as the County Council. I, Judy-Rose, was on the Council meeting call on July 28, and although I received a prompt that my "hand was raised", the operator reported that there were no public call-ins. We know of 2 others who had the same problem.

We would like Planning & Zoning Commissioners to consider that by the time that this subdivision is completed (~2027), the Sussex County property tax system will be changed, since Delaware's property tax system has been ruled to be unconstitutional. Reliance on real estate transfer tax for county income is unsustainable; and with good planning, the County will not be as reliant on transfer taxes. We hope that P&Z will discuss how the future Sussex County taxes may change with the Council Members.

This letter was also sent to the Commissioners. Thank you for your consideration of our requests.

Sincerely,

Opposition Exhibit

Judy-Rose Seibert
22463 Ocala Way
Lewes, DE 19958

Valerie Wood
29661 Franklin Roosevelt Lane
Millsboro, DE 19966

Jamie Whitehouse

From: Doug Hudson
Sent: Thursday, October 1, 2020 7:48 AM
To: Jamie Whitehouse
Subject: Fwd: Scenic Manor (formerly known as Estates at Mulberry Knoll) public safety

Get Outlook for iOS

From: Scott Schoenfeld <scott.schoenfeld@icloud.com>
Sent: Wednesday, September 30, 2020 8:57 PM
To: Jamie Whitehouse; Doug Hudson; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson
Subject: Scenic Manor (formerly known as Estates at Mulberry Knoll) public safety

Subject: Scenic Manor (formerly known as Estates at Mulberry Knoll) public safety.

Gentlemen -
I am writing to you in stark opposition to the Scenic Manor (formerly known as Estates at Mulberry Knoll) development project. I live on Mulberry Knoll road and am concerned regarding the increased traffic and recreational use of the State Fishing Area on East Lane. This will increase traffic directly in front of my home, and along the route to access common area of the Mulberry Knoll Home owners on west lane. In addition, i have great concern regarding unauthorized usage of (private) west lane; such unauthorized use is a persistent problem that will only increase with more homes along Mulberry Knoll.

I would like to be notified directly of all community hearings associated with this development and would request to be given the opportunity to voice my concerns.

Please feel free to contact me if you have any questions.

Opposition Exhibit

respectfully,

Scott E. Schoenfeld
20683 Mulberry Knoll Rd, Lewes De 19958
443-206-6887

Anna Biggs
20690 Mulberry Knoll Road Lewes Delaware 19958
302 753 4425

Honorable Douglas Hudson - District 4
PO Box 589, Georgetown, DE 19947

September 7th, 2020

Dear Mr. Hudson,

I am writing to you to express my concern about the magnitude of the proposed 'Scenic Manor' development (Formerly known as The estates at Mulberry Knoll) and how it will impact the nesting pair of American Kestrels that live on these parcels of farm land and forested areas. My hope is that your committee will not approve the development as planned. The American Kestrel is an endangered species in the State of Delaware. Experts need to be consulted about how much open lands and forested areas the nesting Kestrels need to survive. I would be very happy if all or a portion of the Thomas Best property could become " Kestrel Park". This land adjoins the Delaware Fish and Wildlife property at the end of Mulberry Knoll Road and would be would be a great addition to our public lands.

Beginning in the spring of 2018, I saw the most beautiful blue and orange miniature falcon sitting on the electronic speed monitoring apparatus on the Thomas Best property right before the stop sign at the beginning of our neighborhood, Mulberry Knoll. I was so amazed at the birds exquisite blue and orange colors and it checker board patterning as it flew away, that I called my friend Karol Schmiegel in Wilmington and told her about it. That how I became aware that it was an American Kestrel. That entire spring and summer I saw the male and the female hunting in the fallow farm fields all along Mulberry Knoll Road from the intersection at Rt. 24 all the way down along the Best property down to the entrance to our community.

Every year for the past 3 years, my family and I have seen both the male and the female a minimum of once a day in the weeks and months we have lived at our house 20690 Mulberry Knoll Road. We have seen the kestrels most frequently in the morning or late afternoon/early evening hunting on the fields.

On August 11 2019, I contacted Jacque Williamson at the Wilmington Zoo to tell her about the Kestrels. The intent was to locate the pair and provide a nesting box if it was needed and begin the monitoring of the birds.

I hope this letter finds you well and you will take into consideration the needs of this endangered species. Having the Kestrels as a part of our community gives us all great joy and enhance our quality of life.

Opposition
Exhibit

Respectfully Submitted,

Anna Biggs

Thank you for your time and consideration in this matter. A

FILE COPY

Jamie Whitehouse

From: ANN SPILLANE <littleann78@aol.com>
Sent: Sunday, October 25, 2020 9:20 PM
To: Jamie Whitehouse
Subject: Housing

Opposition Exhibit

CAUTION: This email originated from outside of the organization. Do not click links, open attachments, or reply unless you recognize the sender and know the content is safe. Contact the IT Helpdesk if you need assistance.

Please, enough is already TOO MUCH. PLEASE NO MORE HOUSES R-TEXAS 24 cannot take it. Already we can't even get to the beach on weekends or even week days in the summer. You are ruining a good thing by approving so much building. YOU APPARENTLY DON'Y LIVE OFF OF RT 24.
Sent from my iPhone

Jamie Whitehouse

From: lovinglewes@aol.com
Sent: Wednesday, October 28, 2020 2:57 PM
To: Doug Hudson; ernesto.lopez@delaware.gov; Jamie Whitehouse; peter.schwartzkopf@state.de.us; Todd F. Lawson
Subject: Scenic Manor (formerly known as Estates at Mulberry Knoll)

One of my biggest concern about Scenic Manor and all of the development is Sussex County is Flooding. Not flooding by storms or from the coast but from over development and developing on wetlands or marsh.

Please let me share a personal experience and what happened to the neighborhood I grew but is no longer there because of over developing of marsh and wetlands. You can also verify all the information online for those who aren't from northern Delaware.

My parents bought their house in 1959 in a development called Glenville in New Castle County the Stanton area. On one side of Glenville was Red Clay Creek on the other side was marshland. The creek was a small one. If you look it up it says it was prone to flooding. I lived there with my parents until from 1959 to 1976. And my mother lived there until after the first flood in 1999. If there was any flooding prior to it was when the creek would rise but it never even came close to any homes.

But in 1987 they build a small shopping center First State Plaza on the wetlands/marsh. And then in 1989 they build First State Industrial Park on the wetlands/marsh. This wetlands/marsh bordered Glenville on one side.

Then 10 years later at 1999 Hurricane Floyd pasted over Delaware and there was major flooding in Glenville. Many homes were damaged and destroyed. Lucky the flood came during the day when most people were at work and the kids were in school. They had said if it happened during the night many lives would have been lost. Because the flooding came so fast that the people that were there barely had time to get out.
My mothers house was damaged we helped her repair the home but she was a senior and didn't have it in her to stay in case it happened again. And the water came so fast she was to scare to stay in her home. She put the house up for sale and didn't get what it was worth before the flood. A young girl just 20 years old bought the house. But 2 days before settlement she was told that she had to have flood insurance. We couldn't believe it my mom never had or was required to have flood insurance.
But unfortunately in 2003 Tropical Storm Henri passed over Delaware and again Glenville flooded again but worst then in 1999.

In 2004 homeowners were bought out by state and local government. And they were paid peanuts for their houses compared to what they could haven't gotten prior to the first flood. So in 2005 demolition began on Glenville. That was the end of Glenville which was a great thriving neighborhood until they built on the wetland and marsh. And this neighborhood wasn't a even a near any tidal water just a small creek and wetland/marsh.

When we have storms we already have a threat of flooding because of Love Creek and Rehoboth Bay. Whenever it rains the water needs to go some where. And when you continue to over develop and build on wetlands/marsh that is when flooding occurs. Wetlands/Marsh are natures way to protect surrounding area from flooding. And the ways they are letting the laws to be changed in Sussex county where there is marsh or wetlands. Is very concerning. Right now there is 2 large neighborhoods and a medical center on Warrington Rd. Which runs parallel with Mulberry Knoll Rd. Some of that development is also on wetlands/marsh.

In my senior years I don't want to relive what my poor mother had to go through in her senior years. We build our house in 1996 and I have been a full time resident since 2011. We love our home and have invested a lot in our home and hope that my children and grandchildren can enjoy it as much as we have. So my main concern if protecting lives and property in our neighborhood.

Opposition Exhibit

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Wednesday, March 17, 2021 8:36 AM
To: Doug Hudson
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Councilman Hudson,

My name is Benjamin Berman, and I live in the Mulberry Knoll subdivision in Lewes, DE. I have written to you with several concerns regarding the proposal of building a subdivision (Scenic Manor) on Mulberry Knoll Road.

As a follow up to that I stress that we need to preserve the Habitat for the Delaware Endangered American Kestrels. This will destroy their home, and American Kestrels are already endangered in Delaware. This land is a well-preserved environment for kestrels: farmland for hunting and established forest with dead trees for nesting holes. We need to preserve their home!

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

Opposition Exhibit

Jamie Whitehouse

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Wednesday, March 17, 2021 8:30 AM
To: Jamie Whitehouse
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Jamie,

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I fear for my family's safety when it comes to the flood plain impact this development would cause. Our home sits directly on the water. Building this subdivision would increase the amount of devastating flooding, in which our home is in the direct path of.

The stormwater management they are proposing is in areas where the water table is 0-3' below the surface. This would not be effective in the least.

Please consider putting a stop to this, for the safety of my home and my family!

Thank you.

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Lewes DE 19958
212-517-1836

Opposition Exhibit

Jamie Whitehouse

From: Ben Berman <janine.kirsch@gmail.com>
Sent: Wednesday, March 17, 2021 8:32 AM
To: Jamie Whitehouse
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Sent: Wednesday, March 17, 2021 8:31 AM
To: Jamie Whitehouse
Subject: Re: Scenic Manor (formerly known as Estates at Mulberry Knoll)

Dear Jamie,

My name is Benjamin Berman, and I live in the Mulberry Knoll subdivision in Lewes, DE. I have written to you with several concerns regarding the proposal of building a subdivision (Scenic Manor) on Mulberry Knoll Road.

As a follow up to that I stress that we need to preserve the Habitat for the Delaware Endangered American Kestrels. This will destroy their home, and American Kestrels are already endangered in Delaware. This land is a well-preserved environment for kestrels: farmland for hunting and established forest with dead trees for nesting holes. We need to preserve their home!

Once again, please consider putting a stop to this, and thank you for your time.

Sincerely,

Benjamin Berman
34881 Creek Dr
Lewes DE 19958
212-517-1836

Opposition Exhibit

Petition In Opposition of 'Scenic Manor' Subdivision -

a proposed 319-home subdivision located on Mulberry Knoll Road, Lewes, north of Love Creek Fishing Access and Boat Launch.

As residents of Sussex County and Delaware, we the undersigned declare our opposition to the proposed 319-home subdivision, 'Scenic Manor', formerly known as 'Estates of Mulberry Knoll'.

A subdivision is not suitable at this site for the following reasons:

- 5,700 homes have already been approved on the Rt. 24 corridor; this subdivision will *further increase traffic problems* on Rt 24, slowing emergency response services and hampering emergency evacuations. This is a matter of public safety.
- The amount of land within the floodplain will require substantial fill to build homes, roads, and a clubhouse. Filling in the floodplain causes an *increased risk of flooding to current Sussex residents*, resulting in greater storm damage and costly remediation. Another public safety matter.
- Stormwater will be directly released into Arnell Creek causing *decreased water quality* in Love Creek and Rehoboth Bay.
- This land supports an,*endangered species, American Kestrel, and several birds on Delaware's list of species most in need of conservation.* The surrounding property has already been approved for housing developments, placing an even greater need to preserve this land.

PLEASE ONLY SIGN ONE PETITION

Date	Printed Name	Address	Signature
9/29/20	Pamela Cebulski	22 Fairway Dr Rehoboth DE 19971	
9/29/20	Vincent Pompo	28 Clubhouse Drive Rehoboth Beach DE 19971	
9/29/20	Robert Yungman	28 Clubhouse Dr. Rehoboth Beach, DE 19971	
9/29/20	GAIL M. JACKSON	7 CLUBHOUSE DE 19971	
9/29/20	ANN Garvey	21 FAIRWAY DR Rehoboth Beach DE 19971	
9/26/20	EDWARD McHALE	13 CLUBHOUSE DR REHOBOTH BEACH DE 19971	
9/26/20	Donna DAVIS	7 Clubhouse Dr. Rehoboth Beach, DE 19971	

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9/26/20	Velina D Britton	19 Clubhouse Dr	Velina D Britton
9/26/20	Patricia Riggin	8 Clubhouse Dr. Rehoboth	Patricia Riggin
11	Sandra Roberts	5 Clubhouse Dr., RB	Sandra L. Roberts
9/26/20	Nancy Dickell	17 Fairway Dr, RB	Nancy Dickell
9/26/2020	Rita Connolly	11 Fairway Dr, RB	R Connelly
9/26/2020	RICHARD MORGANTE Richard Morgante	13 Club House Dr. RB	Richard Morgante

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9/26/20	SUSAN BALL	15 FAIRWAY DR. REHOBOTH. 19971	Susan L Ball
9/26/20	PHYLLIS VENTRESCA	9 Clubhouse Dr Rehoboth 19971	Phyllis Ventresca
9/26/20	John Steinmann	22 Fairway D Rehoboth Beach 19971	
9-26-20	Dennis V Karol	2 Club House Drive Rehoboth Bch DE 19971	Dennis Karol
9/26	R.J. Ventresca	#9 CLUBHOUSE DR - 19971	
9/26	Jeffrey Kietzmann	32 CLUB HOUSE DR 19971	
9/26	Lisa DeCarchio	26545 Tributary Blvd. 19966	Lisa DeCarchio

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9/26	Lisa DeCarchio	26545 Tributary Blvd. 19966	Lisa DeCarchio

2019-24

October 30, 2020

Subject: Stop the Proposed Development of Scenic Manor on Mulberry Knoll Road

My name is Jewel Levering and I am a long time resident in Mulberry Knoll Bayshore Hills, located off of Route 24 on Mulberry Knoll Road. Our community is adjacent to the proposed 319 home development called Scenic Manor (formerly known as Estates at Mulberry Knoll).

Because of my concerns regarding flooding, I oppose the building of 319 more homes on Mulberry Knoll Road.

Mulberry Knoll Bayshore Hills is a small community that sits beside Love Creek. Many of the houses in this community are in or close to the flood plain. The creation of a subdivision right next to our community will increase the impermeable surfaces. It will also remove forested areas and their soils which function to absorb water. Since some of the homes will be built in the floodplain zone (AE), they are required to be elevated. This means fill can be brought in which would also increase the risk of flooding in our community by forcing the water to go further inland.

We don't want our homes to be flooded! It is extremely important to stop the proposed building of these 319 homes. We need to keep the farmland, forests and wetlands to protect the existing homes in Mulberry Knoll and Bayshore Hills. There are two other large farmland properties adjacent to this one that already have subdivisions approved, making the preservation of this land even more important. This is a huge environmental impact!!

We need to protect and preserve this 170 acres of farmland, wetland and forest! Perhaps conservation organizations along with Sussex County and the State of Delaware could purchase this land and put it into a preservation trust. It would be money very very well spent!

I respectfully request that the application for development of this beautiful farmland be denied.

Please oppose Scenic Manor.

Thank you!!

Sincerely,

Jewel Levering

Jewel Levering

Opposition
Exhibit

October 30, 2020

Subject: Stop the Proposed Development of Scenic Manor on Mulberry Knoll Road
My name is Jewel Levering and I am a long time resident in Mulberry Knoll Bayshore Hills, located off of Route 24 on Mulberry Knoll Road. I have lived in my home for over 50 years! Our community is adjacent to the proposed 319 home development called Scenic Manor (formerly known as Estates at Mulberry Knoll).
I am concerned about increased traffic to the Dredge Hole, as well as non Mulberry Knoll residents using our private Community Common Area, if 319 more homes are built on Mulberry Knoll Road.
Our small community has worked hard to maintain our Common Area and Dock. We have posted signs indicating that this area is private and for residents only, but of course non-residents occasionally trespass.
The State Fishing Area is public. We frequently have boaters driving through our community, at high speed, to access the Dredge Hole. Unfortunately, many of these folks disregard the speed limit and the stop signs. Over ten years ago, our community explored speed humps and bumps, believing them to be far more effective than the stop signs are, but our requests were denied.
Please oppose the building of Scenic Manor. We do not want increased traffic in our small community which is what will happen if 319 homes are built next to us!
I respectfully request that the application for development of this beautiful farmland be denied.
Please oppose Scenic Manor.
Thank you!!

Sincerely,
Jewel Levering
Jewel Levering

Jamie Whitehouse

From: klsandcpa@aol.com
Sent: Thursday, October 8, 2020 2:07 PM
To: Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Concerning Scenic Manor (formerly Estates at Mulberry Knoll
Attachments: Access Concerns - Secnic Manor Development.docx

See attached Letter

Korie L Sandridge
34743 Frontier Road
Lewes, DE 19958
610-741-9609

Subject: Scenic Manor (formerly know as Estates at Mulberry Knoll)

I am a homeowner in Mulberry Knoll for more than 12 years and have many concerns as the area sees significant growth and construction.

The traffic and congestion accessing and on route 24 is excessive. There are delays getting onto route 24 even in the off season. Public safety is an issue not only driving but receiving emergency services. The current roads can not handle a new development at route 24 and Mulberry Knoll Road without serious safety concerns. Emergency response teams will be delayed and lives could be lost.

Please help to keep all existing communities safe by not allowing this community which will have such a negative impact on our roads and safety.

Regards

Korie L Sandridge

Anna Biggs
20690 Mulberry Knoll Road Lewes Delaware 19958
302 753 4425

Mr. Jamie Whitehouse
Sussex Planning and Zoning Commission
PO Box 417, Georgetown, DE 19947

September 7th, 2020

Dear Mr. Whitehouse,

I am writing to you to express my concern about the magnitude of the proposed 'Scenic Manor' development (Formerly known as The estates at Mulberry Knoll) and how it will impact the nesting pair of American Kestrels that live on these parcels of farm land and forested areas. My hope is that your committee will not approve the development as planned. The American Kestrel is an endangered species in the State of Delaware. Experts need to be consulted about how much open lands and forested areas the nesting Kestrels need to survive. I would be very happy if all or a portion of the Thomas Best property could become " Kestrel Park". This land adjoins the Delaware Fish and Wildlife property at the end of Mulberry Knoll Road and would be would be a great addition to our public lands.

Beginning in the spring of 2018, I saw the most beautiful blue and orange miniature falcon sitting on the electronic speed monitoring apparatus on the Thomas Best property right before the stop sign at the beginning of our neighborhood, Mulberry Knoll. I was so amazed at the birds exquisite blue and orange colors and it checker board patterning as it flew away, that I called my friend Karol Schmiegel in Wilmington and told her about it. That how I became aware that it was an American Kestrel. That entire spring and summer I saw the male and the female hunting in the fallow farm fields all along Mulberry Knoll Road from the intersection at Rt. 24 all the way down along the Best property down to the entrance to our community.

Every year for the past 3 years, my family and I have seen both the male and the female a minimum of once a day in the weeks and months we have lived at our house 20690 Mulberry Knoll Road. We have seen the kestrels most frequently in the morning or late afternoon/early evening hunting on the fields.

On August 11 2019, I contacted Jacque Williamson at the Wilmington Zoo to tell her about the Kestrels. The intent was to locate the pair and provide a nesting box if it was needed and begin the monitoring of the birds.

I hope this letter finds you well and you will take into consideration the needs of this endangered species. Having the Kestrels as a part of our community gives us all great joy and enhance our quality of life.

Respectfully Submitted,

Anna Biggs

Opposition
Exhibit

Korie L Sandridge
34743 Frontier Road
Lewes, DE 19958
610-741-9609

Subject: Scenic Manor (formerly know as Estates at Mulberry Knoll)

I am a homeowner in Mulberry Knoll for more than 12 years and have many concerns as the area sees significant growth and construction.

The main street of our community is Mulberry Knoll Road. Stop signs were installed several years back to help with the excessive speeding problem. The amount of traffic will increase significantly due to Scenic Manor homeowners travelling to the public access State Fishing Area on East Lane. We are also concerned about non-resident use of our private common area and dock area.

Please help to protect our small community by not allowing this community of 319 homes which will have a negative impact on our roads, traffic, safety, and security.

Regards

Korie L Sandridge

Jamie Whitehouse

From: Doug Hudson
Sent: Thursday, October 8, 2020 4:24 PM
To: Jamie Whitehouse
Subject: Fwd: Concerning Scenic Manor (formerly Estates at Mulberry Knoll
Attachments: Access Concerns - Secnic Manor Development.docx

Get Outlook for iOS

From: klsandcpa@aol.com <klsandcpa@aol.com>
Sent: Thursday, October 8, 2020 2:06 PM
To: Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson; Doug Hudson; Jamie Whitehouse
Subject: Concerning Scenic Manor (formerly Estates at Mulberry Knoll

See attached Letter

2019-29

Jack Seiffert

20690 Mulberry Knoll Road

Lewes De 19958

Opposition Exhibit

Dear Mr. Whitehouse,

My name is Jack Seiffert, and I'm the 19 year old son of Anna Biggs and John Seiffert. Over the past three years living at 20690 Mulberry Knoll Road, I have sporadically seen what I am confident is an American Kestrel flying over the farm fields to my house as I drive along Mulberry Knoll Road. The birds I've seen are about a foot in size and have the unmistakable orange-brown and white coat, spotted with black dots. We believe there to be a monogamous nesting pair in residence near our neighborhood, using the forest and fields to both nest and to hunt for prey. Seeing as this bird is listed as a State Endangered Species in Delaware[1], I believe it would be wise to consider some form of conservation for their habitat while developing the land around my neighborhood.

Thank you so much for your time and consideration.

Sincerely,

Jack Seiffert

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1 https://brandywinezoo.org/learn-delaware-kestrel-partnership/#:~:text=The%20American%20Kestrel%20in%20Delaware,listing%20to%20their%20Endangered%20status.

9/17/2020

Jack Seiffert
20690 Mulberry Knoll Road
Lewes De 19958

RECEIVED
OCT 01 2020
SUSSEX COUNTY
PLANNING & ZONING

Honorable Douglas Hudson
District 4
PO Box 589
Georgetown DE 19947

Opposition Exhibit

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Sincerely, Jack Seiffert

Jack Seiffert

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Anna Biggs
20690 Mulberry Knoll Road Lewes Delaware 19958
302 753 4425

Robert C. Wheatley, Chairman - District 5
Planning & Zoning Commission
PO Box 417, Georgetown, DE 19947

Opposition Exhibit

September 7th, 2020

Dear Mr. Wheatley,

I am writing to you to express my concern about the magnitude of the proposed 'Scenic Manor' development (Formerly known as The estates at Mulberry Knoll) and how it will impact the nesting pair of American Kestrels that live on these parcels of farm land and forested areas. My hope is that your committee will not approve the development as planned. The American Kestrel is an endangered species in the State of Delaware. Experts need to be consulted about how much open lands and forested areas the nesting Kestrels need to survive. I would be very happy if all or a portion of the Thomas Best property could become " Kestrel Park". This land adjoins the Delaware Fish and Wildlife property at the end of Mulberry Knoll Road and would be would be a great addition to our public lands.

Beginning in the spring of 2018, I saw the most beautiful blue and orange miniature falcon sitting on the electronic speed monitoring apparatus on the Thomas Best property right before the stop sign at the beginning of our neighborhood, Mulberry Knoll. I was so amazed at the birds exquisite blue and orange colors and it checker board patterning as it flew away, that I called my friend Karol Schmiegel in Wilmington and told her about it. That how I became aware that it was an American Kestrel. That entire spring and summer I saw the male and the female hunting in the fallow farm fields all along Mulberry Knoll Road from the intersection at Rt. 24 all the way down along the Best property down to the entrance to our community.

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I hope this letter finds you well and you will take into consideration the needs of this endangered species. Having the Kestrels as a part of our community gives us all great joy and enhance our quality of life.

Respectfully Submitted,

Anna Biggs

A Biggs

Thank you for your time and consideration in this matter. - A

Anna Biggs
20690 Mulberry Knoll Road Lewes Delaware 19958
302 753 4425

Mr. Jamie Whitehouse
Sussex Planning and Zoning Commission
PO Box 417, Georgetown, DE 19947

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Respectfully Submitted,

Anna Biggs

Thank you so much for your time and consideration. A

Jamie Whitehouse

From: Fetterman Jayne <Jayne.Fetterman@cape.k12.de.us>
Sent: Tuesday, September 29, 2020 9:31 PM
To: Jamie Whitehouse
Subject: Scenic Estates on Mulberry Knoll Rd

Traffic! My concern is Traffic! I leave my home at 7a.m I can barely get into the stream of traffic. When I come home at the end of the day and I need to turn left..I block traffic all the way to Plantation road...one car...making a turn. It causes people to take unnecessary risks. We have lots of development happening down by Dorman Rd. We have two new developments, on Warrington Rd and now Scenic Estates with over 300 homes. We need to say enough is enough! Traffic is a problem, Love Creek Bridge is not meant to be widen for years. We hold each of you responsible for taking a hard look at the current situation. A hold on development! Money talks, it is hard to ignore...but traffic is our concern. Thank you! Jayne - 302 645 9091!
Riviera Dr.lewes De 19958

Sent from my iPad

Opposition Exhibit

From: Beth Berman <beth@compellications.com>
Sent: Tuesday, September 29, 2020 4:44 PM
To: Todd F. Lawson <tlawson@sussexcountyde.gov>
Subject: Scenic Manor (formerly known at Estates at Mulberry Knoll)

Dear Sir,

Please halt development on this project.
There will be damage to wildlife due to an inadequate buffer (50% below the state's recommendation).
Route 24 is already too heavily trafficked - and increased traffic will meped fire, police and EMS service.
There are major flood plain issues.
And, I've regularly spotted American Kestrels in the area.
And, increased demand for fishing decreases security to our neighborhood and invites uninvited guests to our docks and common areas.

Sincerely,

Opposition
Exhibit

Beth Berman
34881 Creek Drive Lewes, DE 19958

Stay focused,
Beth

Jamie Whitehouse

From:	Beth Berman <beth@compellications.com>
Sent:	Tuesday, September 29, 2020 4:49 PM
To:	Jamie Whitehouse
Subject:	STOP Scenic Manor (Formerly known as Estates at Mulberry Knoll)

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Opposition Exhibit

Beth Berman
34881 Creek Drive Lewes, DE 19958

Stay focused,
Beth

The EOS Story / The EOS Entrepreneur
Tractionville Podcast - Learn from Top Entrepreneurs!
Beth Perl Berman
Professional EOS® Implementer
Speaker | Peer-Group Facilitator | Coach

240-560-8946 240.560.UWIN
LinkedIn: GrowthDC
www.compellications.com
Potomac, MD
and Lewes, DE

Jamie Whitehouse

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Sent: Tuesday, September 29, 2020 9:31 PM
To: Jamie Whitehouse
Subject: Scenic Estates on Mulberry Knoll Rd

Traffic! My concern is Traffic! I leave my home at 7a.m I can barely get into the stream of traffic. When I come home at the end of the day and I need to turn left..I block traffic all the way to Plantation road...one car...making a turn. It causes people to take unnecessary risks. We have lots of development happening down by Dorman Rd. We have two new developments, on Warrington Rd and now Scenic Estates with over 300 homes. We need to say enough is enough! Traffic is a problem, Love Creek Bridge is not meant to be widen for years. We hold each of you responsible for taking a hard look at the current situation. A hold on development! Money talks, it is hard to ignore...but traffic is our concern. Thank you! Jayne - 302 645 9091!
Riviera Dr.lewes De 19958

Sent from my iPad

Opposition
Exhibit

Jamie Whitehouse

From:	Doug Hudson
Sent:	Thursday, September 24, 2020 11:43 AM
To:	Todd F. Lawson; Gina Jennings; Michael H. Vincent; IG Burton; John Rieley; Jamie Whitehouse
Subject:	Fwd: PROPOSAL ON "SCENIC MANOR SUBDIVISION" (MULBERRY KNOLL)

Get Outlook for iOS

From: ELEANOR MAZZIO <eleanor.mazzio@comcast.net>
Sent: Thursday, September 24, 2020 6:50 AM
To: Doug Hudson; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson
Subject: PROPOSAL ON "SCENIC MANOR SUBDIVISION" (MULBERRY KNOLL)

I own a home on Mulberry Knoll Road and am totally against putting homes in the proposed 'Scenic Manor' subdivision (Mulberry Knoll farmland owned by Thomas Best). Traffic On RT 24 is already horrendous. The overbuilding in lower Sussex County is awful. I have tried going to the beach on a busy weekend, only to be turned away because they have reached their capacity.

Eleanor Mazzio
20614 Mulberry Knoll Rd
Lewes, De 19958

Opposition Exhibit

Jamie Whitehouse

From: Todd F. Lawson
Sent: Thursday, September 24, 2020 8:32 AM
To: Jamie Whitehouse
Subject: FW: PROPOSAL ON "SCENIC MANOR SUBDIVISION" (MULBERRY KNOLL)

From: ELEANOR MAZZIO <eleanor.mazzio@comcast.net>
Sent: Thursday, September 24, 2020 6:51 AM
To: Doug Hudson <doug.hudson@sussexcountyde.gov>; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Todd F. Lawson <tlawson@sussexcountyde.gov>
Subject: PROPOSAL ON "SCENIC MANOR SUBDIVISION" (MULBERRY KNOLL)

I own a home on Mulberry Knoll Road and am totally against putting homes in the proposed 'Scenic Manor' subdivision (Mulberry Knoll farmland owned by Thomas Best). Traffic On RT 24 is already horrendous. The overbuilding in lower Sussex County is awful. I have tried going to the beach on a busy weekend, only to be turned away because they have reached their capacity.

Eleanor Mazzio
20614 Mulberry Knoll Rd
Lewes, De 19958

Opposition Exhibit

Lauren DeVore

From: webmaster@sussexcountyde.gov on behalf of Sussex County DE <webmaster@sussexcountyde.gov>
Sent: Monday, September 21, 2020 6:15 PM
To: Planning and Zoning
Subject: Submission from: Planning & Zoning Commission contact form

Categories: Lauren

RECIPIENTS: Jamie Whitehouse

Submitted on Monday, September 21, 2020 - 6:14pm

Name: Michelle Flowers
Email address: michelleflowers930@gmail.com Phone number: 3025848962
Subject: Opposition of Proposed Subdivision Scenic Manor
Message:
Hello Council Representatives and Elected Officials,

We want to take a moment to express our strong opposition of the proposed subdivision off Mulberry Knoll, Scenic Manor.

Not only is the current Rt 24, Plantation Road, Warrington Road, and Kings Highway infrastructure not feasible for additional housing in the area from a traffic perspective, there is a huge risk in increasing destructive flooding if the forested trees are removed and soils are upset. It is my understanding that the soils haven't even been tested for ability to percolate, yet the Sussex Planning and Zoning is entertaining a developer's proposal. To make the situation worse, a good 1/3 of the proposed homes are within the 100-year known and understood floodplain. Mother nature and water, in general, can be extremely damaging and with the climate changes that we have already seen over the last several years, it can be devastating. It is also our understanding that the stormwater management areas being proposed are in areas that are 0-3' below the surface. How is that even an option?

>From an environmental perspective, the proposed subdivision would totally destruct natural wetlands and the abundance of wildlife (hundreds of bird species including the American Kestrel and our almighty Eagle, deer, wild turkey, fox, etc.) that utilize the land and waters as their habitats. Exactly why would a developer be permitted to propose a 50' buffer to the wetlands when the State already requires a 100' buffer? Is it a matter of underestimating so they can be assured a pass on the minimum requirement versus what makes sense for a given area? And, in good faith, this proposal should have already included an archeological survey to ensure that no remains are on the site.

Thanks for your attention to this matter.
Mulberry Knoll Concerned Residents
Michelle & William Flowers

Opposition Exhibit

Jamie Whitehouse

From: tkiraco <tkiraco@gmail.com>
Sent: Monday, October 19, 2020 6:30 PM
To: Doug Hudson; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Jamie Whitehouse; Todd F. Lawson
Subject: Oppose Scenic Manor at Mulberry Knoll Road / American Kestrel

My name is Tom Kiracofe. I am a long term resident of Mulberry Knoll/Bay Shore Hills.

I oppose the addition of 300+ new homes on Mulberry Knoll Road in Eastern Sussex County.

This development would eliminate important forest and meadow which provide habitat for the American Kestrel. This species is listed as endangered in Delaware. It is my understanding the land owner will not allow DNREC on the property to evaluate for Kestrel presence. If find the landowners position to be self serving with total disregard for environmental impact.

Green space is becoming increasingly important in Eastern Sussex county as the pace of development intensifies. Quality of life for both animals and humans is degraded by uncontrolled intense development.

I understand that development can provide jobs and certainly wealth for some individuals. But I believe development must be tempered by the need for preservation. Preservation of habitat for the American Kestrel and other specie is important. Saving green space and preserving quality of life should be considered. Once forests, fields, plants and animals are gone, they will never return.

Please oppose the Scenic Manor on Mulberry Knoll Road.

Opposition Exhibit

Sincerely,
Thomas Kiracofe
34810 West Mint Place
Lewes, DE 19958
(302)379-2745

Jamie Whitehouse

From: tkiraco <tkiraco@gmail.com>
Sent: Monday, October 19, 2020 6:21 PM
To: Doug Hudson; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Jamie Whitehouse; Todd F. Lawson
Subject: Opposition to Scenic Manor on Mulberry Knoll Road / Green Space

My name is Tom Kiracofe. I am a long term resident of Mulberry Knoll/Bay Shore Hills.

I oppose the addition of 300+ new homes on Mulberry Knoll Road in Eastern Sussex County.

This development would eliminate important green space which provides habitat for various wild animals. Green space is becoming increasingly important in Eastern Sussex county as the pace of development intensifies. Quality of life for both animals and humans is degraded by uncontrolled intense development.

I understand that development can provide jobs and certainly wealth for some individuals. But I believe development must be tempered by the need for preservation. Preservation of habitat, green space and quality of life. Once forests, fields, plants and animals are gone, they will never return.

Please oppose the Scenic Manor on Mulberry Knoll Road.

Opposition Exhibit

Sincerely,
Thomas Kiracofe
34810 West Mint Place
Lewes, DE 19958
(302)379-2745

Jamie Whitehouse

From: tkiraco <tkiraco@gmail.com>
Sent: Monday, October 19, 2020 6:20 PM
To: Doug Hudson; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Jamie Whitehouse; Todd F. Lawson
Subject: Opposition To Scenic Manor On Mulberry Knoll Road / Traffic Concerns

My name is Tom Kiracofe. I am a long term resident of Mulberry Knoll/Bay Shore Hills.

I oppose the addition of 300+ new homes on Mulberry Knoll Road in Eastern Sussex County because of traffic concerns.

The volume of traffic has steadily increased on Route 24 in the area between Route 1 and Route 5. This area has seen intense development with very little change in road infrastructure. Now two new developments and a new Beebe hospital building are being added to the Warrington Road area. There are plans to widen Route 24, but I fear this will be to little and too late. As an older citizen, I am very concerned fire, police and ambulance services will not be able to reach me in time if I need them. Now, there are more than 300 more homes to be added to Mulberry Knoll Road! I can't imagine the congestion which could occur at the intersection of Route 24 and Mulberry Knoll Road with the addition the new homes.

Please consider traffic concerns and oppose or at the least reduce the planned size of Scenic Manor on Mulberry Knoll Road.

Opposition Exhibit

Sincerely,
Thomas Kiracofe
34810 West Mint Place
Lewes, DE 19958
(302)379-2745

Jamie Whitehouse

From: tkiraco <tkiraco@gmail.com>
Sent: Monday, October 19, 2020 6:19 PM
To: Doug Hudson; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Jamie Whitehouse; Todd F. Lawson
Subject: Opposition To Scenic Manor on Mulberry Knoll Road / Flooding & Water Quality

My name is Tom Kiracofe and I am a long term resident of Mulberry Knoll/Bay Shore Hills.

I oppose the addition of 300+ new homes on Mulberry Knoll Road in Eastern Sussex County.

I am concerned that the planned development will fill in floodplains, reduce wet lands and add hard surfaces increasing flood potential. With reduced floodplains water backing up in Love Creek could increase flooding in Mulberry Knoll. Our community is already close to being flooded during very high tides.

I also fear water quality in Love Creek and Rehoboth Bay would also suffer from increased uncontrolled run off. Efforts to protect water quality in Rehoboth Bay have been successful and it is important these efforts not be undermined.

I understand that development can provide jobs and certainly wealth for some individuals. But I believe development must be tempered by the need for preservation. Preservation of water quality and supporting wet lands are equally important. It is critical that significant wetland buffers be maintained to ease flooding and protect water quality.

Please oppose the Scenic Manor development on Mulberry Knoll Road.

Opposition Exhibit

Sincerely,
Thomas Kiracofe
34810 West Mint Place
Lewes, DE 19958
(302)379-2745

Jamie Whitehouse

From: tkiraco <tkiraco@gmail.com>
Sent: Monday, October 19, 2020 6:17 PM
To: Doug Hudson; Ernesto.Lopez@delaware.gov; Peter.Schwartzkopf@delaware.gov; Jamie Whitehouse; Todd F. Lawson
Subject: Opposition To Scenic Manor On Mulberry Knoll Road

My name is Tom Kiracofe. I am a long term resident of Mulberry Knoll/Bay Shore Hills.

I oppose the addition of 300+ new homes on Mulberry Knoll Road in Eastern Sussex County.

The Mulberry Knoll / Bay Shore Hills development is located at the end of Mulberry Knoll Road which has no outlet. Mulberry Knoll Road Ends at the intersection with West Lane and East Lane.

The community maintains a dock and common area at the end of West Lane. West Lane is private but it is constantly visited by uninvited guests looking to crab, launch water craft or use the dock and patio. There are liability as well as overcrowding concerns with uninvited guests. Adding 300+ home on Mulberry Knoll Road will add to these problems faced by the community.

Additionally, a state fishing area is located at the end of East Lane. There is a constant stream of traffic day and night to this area. Much of this traffic is from boaters. However, there have also been arrests made in the fishing area as police try to control criminal activity there. The fishing area imposes additional traffic and safety concerns on the Mulberry Knoll/ Bay Shore Hills development.

I am greatly concerned that adding 300+ Homes on Mulberry Knoll Road will add to the problems already facing Mulberry Knoll/ Bay Shore Hills. Additionally, ongoing development on Route 24 and Warrington Road are already affecting the community.

Please oppose or at the least reduce the planned size of Scenic Manor on Mulberry Knoll Road.

Sincerely,
Thomas Kiracofe
34810 West Mint Place
Lewes, DE 19958
(302)379-2745

Opposition Exhibit

Jeff Kietzmann
32 Club House Dr.
Rehoboth Beach, DE 19971

September 21, 2020

Mr. Jamie Whitehouse
Director,
Sussex County Planning and Zoning Commission
2 The Circle
P.O. Box 417
Georgetown, DE 19947

RE: Proposed Subdivision "Scenic Manor" & the American Kestrel (Endangered Species, Delaware)

Dear Mr. Whitehouse,

This letter is written in regards to the proposed development "Scenic Manor". I am a new resident to Delaware and in turn Sussex County. One of the primary drivers of my relocation to Delaware is how impressed I was with the natural spaces available for public enjoyment.

When I moved here last year, I made the choice not to purchase a home in a new development, but to invest in an older property and renovate it, so as not to add additional pressure on the natural resources and wildlife.

When I discovered that the "Scenic Manor" development application was proposing to develop on Level 4 land (40% of the Parcel), adding fill to build 96 lots within the existing 100-Year flood plain, discounting the Delaware State recommendation of a 100 foot buffer to existing marshland and proposing the removal of 33% of the trees on the property, paired with the fact that there are consistent reports over a three year period of American Kestrel's (Delaware Endangered Species) on the proposed land, I felt compelled to take action.

Figure 1- American Kestrel flying over "Scenic Manor"

To that end, while driving solely on public roads, I successfully captured a photograph of an American Kestrel as it was flying into the woods on the property. My photograph was merely taken to document that this species exists on the proposed land. The sighting was reported via eBird, hosted by the Cornell Lab of Ornithology as a citizen science platform. The photo can be seen in Figure 1.

American Kestrels nest in cavities usually created by woodpeckers in mature or even dead trees. They also require open areas with short ground vegetation. The parcel in question is essentially the perfect habitat for the American Kestrel. Figure 2 shows the locations of the sightings of American Kestrel's in the 2020 calendar year recorded on eBird (https://ebird.org/). What is most striking, although not surprising, is that the most sightings have been made in State Parks, State Forests or National Wildlife Refuges. One of the very few spots

they have been seen regularly outside of those area near the coastal shore of Sussex County is in the area of the proposed subdivision "Scenic Manor".

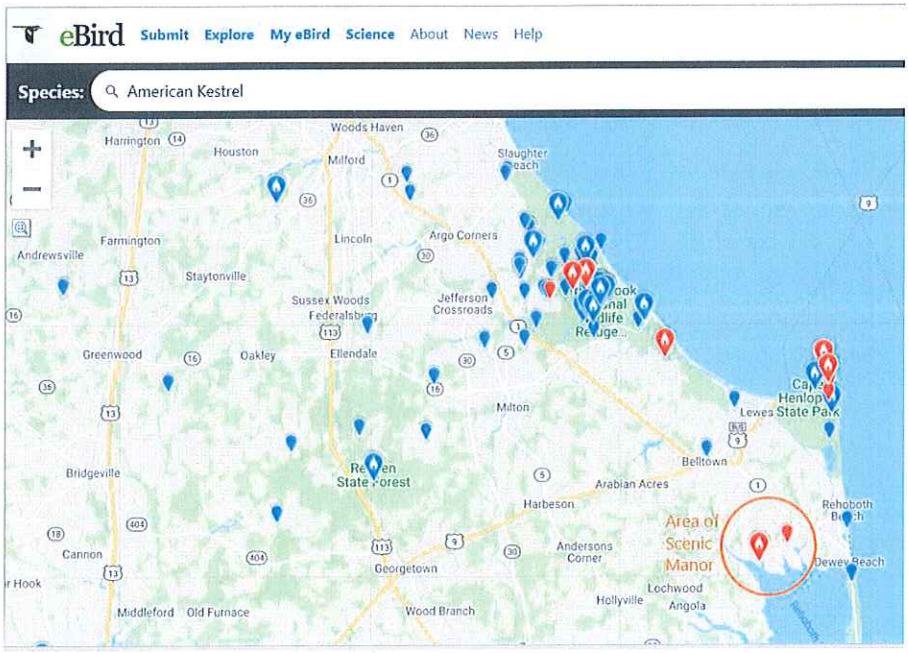


Figure 2- eBird 2020 sightings of American Kestrel

Although I realize the need for land development in Sussex County, I do however recommend sustainable and thoughtful development with a focus on the environment. The "Scenic Manor" land is adjacent to the Love Creek Natural Area and Arnell Creek. The surrounding property has already been approved for housing developments, creating an even greater need to preserve some of this land.

Perhaps a portion of this land, its trees, and marshland could be incorporated with the Love Creek Natural Area ecosystem as a means to both protect the American Kestrel and the natural ecosystem around Love and Arnell Creeks.

There is an opportunity here to balance development initiatives with the preservation of the natural beauty of Sussex county. I hope you as our esteemed representatives will take a good hard look at the legacy your decisions today will have on the future of tomorrow.

I am not asking that the development application for "Scenic Manor" be rejected, only that the developer amend the development plan to be compatible with the above considerations for preservation and protection of an endangered species in Delaware and for protecting the natural land for the enjoyment of our growing base of residents and visitors.

Thank you for your time and consideration.

Jeff Kietzmann
Concerned Citizen

Vincent De Cerchio
212 Samantha Drive
Lewes, DE. 19958

September 12, 2020

Mr. Jamie Whitehouse
Director,
Sussex County Planning and Zoning Commission
2 The Circle
P.O. Box 417
Georgetown, DE> 19947

RE: Proposed Subdivision "Scenic Manor"

Dear Mr. Whitehouse,

This letter is written in response to the above development application. Most residents of Sussex County would agree that environmental conservation and quality of life preservation in our region should be a priority. Intelligent people know that to suspend development after they have moved into the County (e.g. NIMBY – not in my backyard) is not reasonable or fair. But residents would agree with the idea that planning for future development, which considers the preservation of the environment and the quality of life, is intelligent development. With that in mind, when a prospective development is considered, residents, developers and public officials should consider the following questions/considerations. Residents should demand the proper responses to these questions. Failure to answer each question adequately should be considered a basis for denying applications for new developments or construction projects.

1. Will the development be compatible with the environment so as not to disturb indigenous animal and plant life? Is there adequate consideration given to the established wildlife in the area of the development that should not be disturbed or displaced. Established plant life and tree lines should be preserved. The developer is proposing a 50' buffer to wetlands while the State recommends a 100' buffer. The owner has denied DNREC inspection of the property. State policy does not support spending on Level 4 land which is about 40% of the parcel. The State Strategies for Policy and Spending defines Level 4 land as "rural and agricultural areas suitable for natural resources protection, open space and agricultural use, including agricultural industries."
2. Will there be preservation of the existing waterways without encroachment? A new development should not add pollution to a waterway or unnecessary traffic that disturbs or pollutes the marine life. There should be no erosion or increased storm water runoff or flooding as a result of the development. Subdivision development increases impermeable surfaces and removes top spoils; compacted soils do not percolate; removal of forested areas and their soils greatly reduces proper water absorption; 96 of the proposed 320 lots, 6 portions of the roads

and half of the clubhouse are within the 100 year flood plain (43 lots are entirely within the floodplain, 53 lots are partially within the floodplain). Some of the propose storm water management areas may not be effective because they are located where the water table is 0-3' below the surface.

3. The traffic on the highways and roads in southern Sussex County presently exceeds the capacity for which they were designed. Until the highways and roads in the County are redesigned and enlarged, any increase in regular traffic will create gridlock that will adversely affect both residents and businesses.
4. Some travel and utility infrastructures and intersection designs in the County are antiquated, hazardous, and long overdue for upgrading to make them more efficient and safer. Until this occurs, any increases in traffic will result in the unsafe deterioration of the existing infrastructures.
5. Aesthetics are an important aspect of the beauty and the quality of life and business in Sussex County, and should be given the appropriate, important consideration in any development application.
6. Public officials entrusted with the authority to approve or deny new development applications should require certified environmental, storm water runoff, traffic, infrastructure and aesthetic studies by impartial engineering and consultant firms, and the charges passed on to the prospective developer.

There is a great concern on the part of residents and business owners in Sussex County that the above listed necessities have not always been given the appropriate consideration in the past. If these considerations are not engaged, we will see a decline in the quality of life in our region. We are not asking that the development application be disapproved, only that the developer amend the development plan to be compatible with the above environmental and quality of life considerations. Thank you for your time and consideration.

Very Truly Yours,

Vincent De Cerchio

Vincent De Cerchio

Jeffrey Kietzmann

Jeffrey Kietzmann (Old Landing Woods)

cc: file
HOA.

Jack Seiffert
20690 Mulberry Knoll Road
Lewes De 19958

Robert C. Wheatley
Chairman - District 5
PO Box 417
Georgetown De 19947

Dear Mr. Wheatley,

My name is Jack Seiffert, and I'm the 19 year old son of Anna Biggs and John Seiffert. Over the past three years living at 20690 Mulberry Knoll Road, I have sporadically seen what I am confident is an American Kestrel flying over the farm fields to my house as I drive along Mulberry Knoll Road. The birds I've seen are about a foot in size and have the unmistakable orange-brown and white coat, spotted with black dots. We believe there to be a monogamous nesting pair in residence near our neighborhood, using the forest and fields to both nest and to hunt for prey. Seeing as this bird is listed as a State Endangered Species in Delaware[1], I believe it would be wise to consider some form of conservation for their habitat while developing the land around my neighborhood.

Thank you so much for your time and consideration.

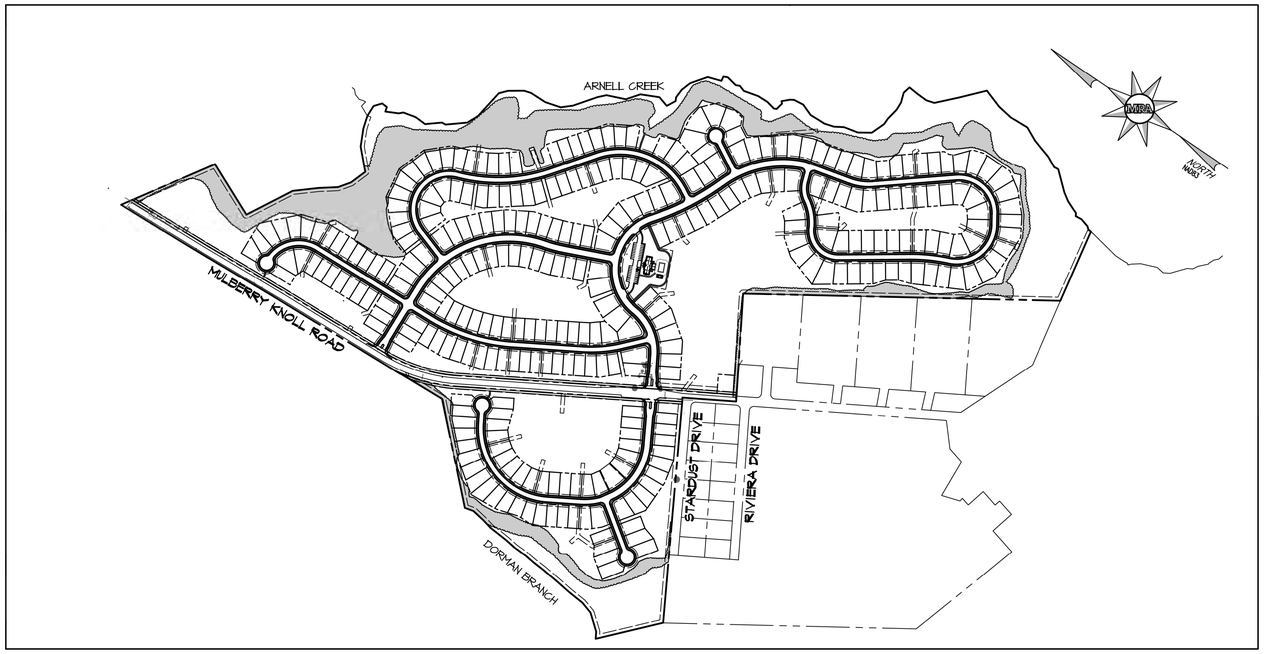
Sincerely,

Jack Seiffert

1 https://brandywinezoo.org/finam-delaware-kestrel-partnership/#:~:text=The%20American%20Kestrel%20in%20Delaware,listing%20to%20their%20Endangered%20status.

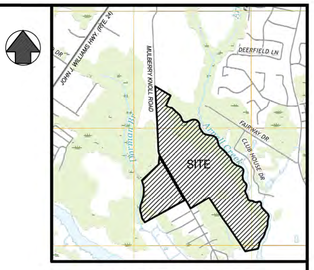
SCENIC MANOR

SUSSEX COUNTY, DELAWARE
PRELIMINARY PLANS
AR-1 CLUSTER
SUSSEX COUNTY PLANNING # XXXX



SITE OVERVIEW
SCALE: 1" = 400'

400 200 0 200 400 800
SCALE: 1" = 400'



LOCATION MAP
SCALE: 1" = 2000'

LEGEND

- EXISTING PROPERTY LINE
- PROPOSED R/W LINE
- PROPOSED LOT LINE
- PROPOSED BUILDING SETBACK LINE
- 44 EXISTING CONTOURS
- 44 PROPOSED CONTOURS
- (7) PROPOSED LOT NUMBER
- EXISTING WOODLANDS LINE
- WOODLAND PRESERVATION LINE

PROJECT TEAM

DEVELOPER:
MKR LAND INVESTMENT, LLC
MR. JOHN RICHARDSON
260 HOPENELL ROAD
CHURCHVILLE, MD 21028

LAND PLANNERS, CIVIL ENGINEER:
MORRIS & RITCHIE ASSOCIATES, INC.
18 BOULDEN CIRCLE, SUITE 36
NEW CASTLE, DE 19720
ATTN: MR. PHILLIP L. TOLLIVER, P.E.

SURVEYOR:
MORRIS & RITCHIE ASSOCIATES, INC.
8 WEST MARKET STREET
GEORGETOWN, DE 19947
ATTN: MR. GARY POWERS

ENVIRONMENTAL CONSULTANT:
GEO-TECHNOLOGY ASSOCIATES, INC.
3445 BOX HILL CORPORATE CENTER DRIVE, SUITE A
ABINGDON, MD 21009
ATTN: MR. ANDY STANSFIELD

GEOTECHNICAL ENGINEER:
GEO-TECHNOLOGY ASSOCIATES, INC.
21133 STERLING AVENUE, SUITE 7
GEORGETOWN, DE 19947
ATTN: MR. GREG SAUTER

TRAFFIC CONSULTANT:
THE TRAFFIC GROUP
9900 FRANKLIN SQUARE DR. - SUITE H
BALTIMORE, MD 21236
ATTN: MR. JOE CALOGGERO, P.E.

ATTORNEY:
FUGUA, HILLARD, STEVENS & SCHAB, P.A.
20245 BAY VISTA ROAD #203
REHOBOTH BEACH, DE 19971
ATTN: MR. JAMES A. FUGUA, JR.

INDEX OF DRAWINGS

OWNER / DEVELOPER CERTIFICATION

I, UNDERSIGNED, AS OWNER AND DEVELOPER OF THE PROPERTY SHOWN, HEREBY APPROVE THESE PLANS FOR DEVELOPMENT AS SHOWN OR OTHERWISE NOTED.

MR. JOHN RICHARDSON — DATE
MKR LAND INVESTMENT, LLC

WETLANDS STATEMENT

GEO-TECHNOLOGY ASSOCIATES, INC. (GTA) HAS CONDUCTED A FIELD REVIEW WITHIN THE BOUNDARIES OF THIS PLAT TO EVALUATE THE PRESENCE OR ABSENCE OF POTENTIAL STATE AND FEDERAL JURISDICTIONAL WETLANDS FOR THE PURPOSES OF DELAWARE WETLAND AND SUBAQUEOUS LAND REGULATIONS AND SECTION 404 OF THE CLEAN WATER ACT. GTA'S REVIEW WAS CONDUCTED IN GENERAL ACCORDANCE WITH THE TECHNIQUES AND CRITERIA PROVIDED IN THE 1987 CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL: ATLANTIC AND GULF COSTAL PLAN REGION (VERSION 2.0), DATED NOVEMBER 2010. THE LIMITS OF THE WETLANDS WERE EVALUATED IN THE FIELD BY GTA PERSONNEL USING BEST PROFESSIONAL JUDGEMENT. NO WETLANDS OR WATERWAYS WERE OBSERVED WITHIN THE BOUNDARIES OF THIS PLAT. NO STATE OR FEDERAL JURISDICTIONAL APPROVAL WAS OBTAINED FOR THIS PROPERTY.

ANDY STANSFIELD — DATE
GEO-TECHNOLOGY ASSOCIATES, INC.

ENGINEER'S CERTIFICATION

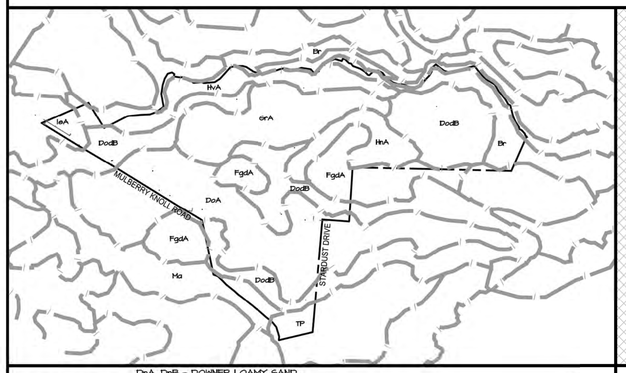
I, THE UNDERSIGNED, HEREBY CERTIFY THAT I AM A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF DELAWARE AND THAT THE PLAN SHOWN AND DESCRIBED HEREON, IS TRUE AND CORRECT TO THE ACCURACY REQUIRED BY ACCEPTED STANDARDS AND PRACTICES AND BY THE SUSSEX COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS TO THE EXTENT THAT IT DESCRIBES THE PROPOSED MANNER AND LAYOUT OF THE SUBDIVISION.

PHILLIP L. TOLLIVER, P.E. — DATE
DE LICENSE NO. #12489

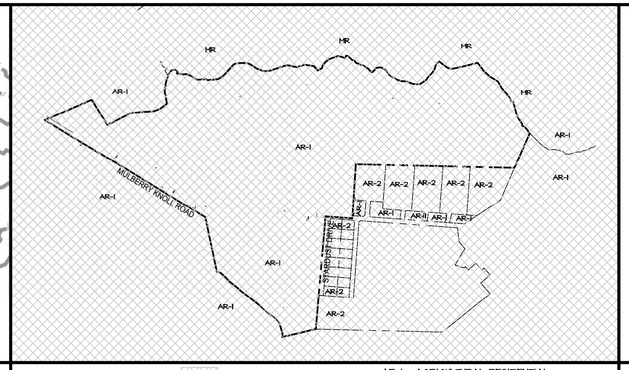
PLAN APPROVALS

APPROVED BY: _____ DATE _____
CHAIRMAN OR SECRETARY
SUSSEX COUNTY PLANNING AND ZONING COMMISSION

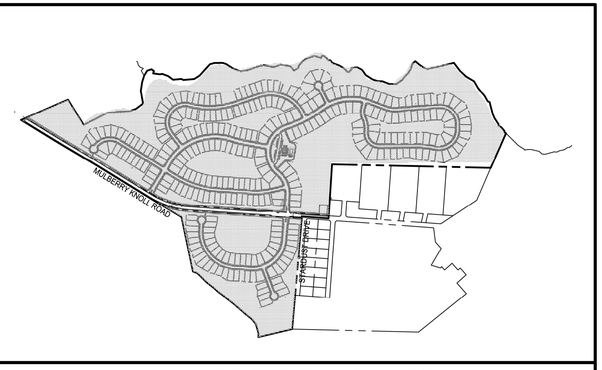
APPROVED BY: _____ DATE _____
PRESIDENT
SUSSEX COUNTY PLANNING



SOILS MAP
SCALE: 1" = 800'
DnA, DnB - DOWNER LOAMY SAND
FmA - FORT MOTT LOAMY SAND
LO - LONGMARSH AND INDIANTOWN SOILS
PpA - PERPPERBOX LOAMY SAND



ZONING MAP
SCALE: 1" = 800'
COASTAL AREA (FORMERLY ESDDOZ)
AR-1 - AGRICULTURAL RESIDENTIAL
AR-2- AGRICULTURAL RESIDENTIAL
MR - MEDIUM RESIDENTIAL



PHASING MAP
SCALE: 1" = 800'
THE PROJECT WILL BE APPROVED AS A SINGLE PHASE PROJECT WITH SIX (6) OPERATIONAL BREAKS FOR PURPOSES OF BONDING, BENEFICIAL OCCUPANCY INSPECTION, RELEASE OF USE AND OCCUPANCY PERMITS.

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE 36
NEW CASTLE, DELAWARE 19720
(302) 326-2200
FAX: (302) 326-2399
WWW.MRAGTA.COM

PHILLIP L. TOLLIVER — REGISTERED — No. 12489 — PROFESSIONAL ENGINEER — DELAWARE — 03/25/21
ENGINEER'S SEAL

TITLE SHEET
PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS	
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION	JOB NO.: 20572
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP	SCALE: AS NOTED
		DATE: 12/02/19
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 1 OF 15

CONSTRUCTION NOTES

1. CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT (1-800-282-8555) AT LEAST (3) WORKING DAYS PRIOR TO EXCAVATION, TO HAVE EXISTING UNDERGROUND UTILITIES LOCATED AND MARKED.
2. ALL MATERIALS & WORKMANSHIP SHALL MEET THE STATE OF DELAWARE STANDARDS & SPECIFICATIONS.
3. ALL MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, AND PROJECT SPECIFICATIONS.
4. THE CONTRACTOR SHALL NOTIFY THE FOLLOWING TWO WEEKS PRIOR TO THE START OF CONSTRUCTION AND SHALL APPRISE AND COORDINATE DURING ALL PHASES OF CONSTRUCTION:

A.	SCHIFF LAND DEVELOPMENT CO., LLC	302-348-8014
B.	SUSSEX COUNTY ENGINEERING DEPARTMENT	302-855-7718
C.	TIDEWATER UTILITIES	302-445-8880
D.	SUSSEX CONSERVATION DISTRICT	302-856-2105
G.	DNREC	302-856-5488
H.	COMCAST	804-562-3409
I.	DELAWARE ELECTRIC COOPERATIVE	302-344-5891
J.	DELMARVA POWER	678-831-2444
K.	MEDIACOM	804-562-3409
L.	VERIZON	302-422-1464

5. CONTRACTOR SHALL DETERMINE THE LOCATION OF ALL RIGHT-OF-WAY LINES AND PROPERTY LINES TO HIS OWN SATISFACTION. ALL PROPOSED UTILITIES ARE TO BE CONSTRUCTED WITHIN THE ROADWAY OR EASEMENT RIGHT-OF-WAY. DISTURBED AREAS BEYOND THE EASEMENT LINES SHALL BE RESTORED IMMEDIATELY TO THEIR ORIGINAL CONDITION.
6. INFORMATION SHOWN HEREON IS BASED UPON GIS DATA OBTAINED THROUGH THE STATE OF DELAWARE GIS WEBSITE (FIRSTMAP.DELAWARE.OPENDATA.ARCGIS.COM) AND DOES NOT REPRESENT FIELD RUN TOPOGRAPHIC OR BOUNDARY SURVEY. SITE LAYOUT IS SUBJECT TO REVISION PENDING FIELD SURVEY.
7. EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE BASED UPON THE BEST AVAILABLE INFORMATION AND ARE SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. NO GUARANTEE IS MADE OR IMPLIED REGARDING THE ACCURACY OR COMPLETENESS THEREOF. CONTRACTOR IS RESPONSIBLE FOR THE VERIFICATION OF DEPTH, SIZE AND MATERIAL OF ALL UNDERGROUND UTILITIES TO HIS OWN SATISFACTION BEFORE BEGINNING ANY EXCAVATION OR UTILITY INSTALLATION. THE OWNER AND ENGINEER DISCLAIM ANY RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF SAID INFORMATION. IF THE CONTRACTOR RELIES ON SAID INFORMATION, HE DOES SO AT HIS OWN RISK. THE GIVING OF THE INFORMATION ON THE PLANS WILL NOT RELIEVE THE CONTRACTOR OF HIS OBLIGATIONS TO SUPPORT AND PROTECT ALL SHOWN OR NOT SHOWN EXISTING UTILITIES AND APPURTENANCES. SHOULD ANY EXISTING UTILITIES BE DAMAGED BY THE CONTRACTOR, THE CONTRACTOR SHALL REPAIR THE DAMAGE CAUSED TO THE UTILITY OWNER'S SATISFACTION, AT THE CONTRACTOR'S EXPENSE.
8. DRAWINGS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. ALL CONSTRUCTION MUST BE PERFORMED IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, AS AMENDED AND ALL RULES AND REGULATIONS THERETO APPURTENANT.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF TRAFFIC IN ALL WORK AREAS.
10. ROUGH GRADING SHALL BE COMPLETE PRIOR TO THE CONSTRUCTION OF WATER & SEWER SYSTEMS.
11. USE ONLY SUITABLE AND APPROVED GRANULAR MATERIAL IN ACCORDANCE WITH SECTION 209 OF THE DELAWARE DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS STANDARD SPECIFICATIONS AND REFERENCED BY SUSSEX COUNTY ORDINANCE 38 SECTION 5-05 EXCAVATION AND BACKFILL FOR PIPE TRENCHES SUBSECTION B MATERIALS
12. CONTRACTOR SHALL ADJUST TO FINISH GRADE AS NECESSARY ANY VALVE BOXES, MANHOLES, CATCH BASINS ETC., PRIOR TO PLACING PAVING.
13. CONTRACTOR SHALL PROVIDE STAKEOUT NECESSARY FOR THE INSTALLATION OF UTILITIES, STORMDRAINS, PAVING AND ALL OTHER SITE WORK INCLUDED IN THESE PLANS. ALL STAKEOUT WORK IS TO BE PERFORMED UNDER THE DIRECT SUPERVISION OF A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF DELAWARE.
14. CONTRACTOR TO MAINTAIN MINIMUM OF 3.0 FEET OF COVER OVER ALL NEW WATER LINES AS MEASURED FROM TOP OF PIPE TO FINISHED GRADE, UNLESS OTHERWISE NOTED.
15. SEWER LINES SHALL HAVE MINIMUM VERTICAL CLEARANCE OF 18 INCHES FROM WATER MAINS AT CROSSINGS. MAINTAIN A 10 FOOT MINIMUM PLAN SEPARATION BETWEEN SEWER AND WATER MAINS. SEWER LINES SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 12 INCHES FROM OTHER UTILITIES. IF THESE CLEARANCES CANNOT BE MAINTAINED, THEN PROVISIONS FOR PROPERLY ENCASING THE PIPE IN CONCRETE MUST BE PROVIDED.
16. LATERALS SHALL BE 6 INCHES IN DIAMETER, WITH VERTICAL CLEANOUTS OF 6 INCHES IN DIAMETER, AND TO HAVE A MINIMUM OF 3' OF COVER FROM SUSSEX COUNTY CLEANOUT TO MAIN LINE. CLEANOUTS SHALL BE LOCATED AT EDGE OF RIGHT-OF-WAY.
17. ALL GRAVITY SEWER PIPES SHALL BE PVC SDR 35. FOR PIPE SLOPES SEE FINAL CONSTRUCTION DRAWINGS FOR SANITARY SEWER PROFILES.
18. MATERIAL OF CONSTRUCTION FOR SEWER FORCE MAINS SHALL BE AS NOTED ON THE FINAL CONSTRUCTION DRAWINGS. FORCE MAIN SHALL BE INSTALLED AS PROFILED TO PREVENT FORMATION OF UNANTICIPATED HIGH POINTS IN THE INSTALLATION.
19. ALL SEWER LINES MUST BE SUCCESSFULLY TESTED ACCORDING TO SUSSEX COUNTY ORDINANCE 38, SECTION 5.04, E, 1-4, ON PAGE 515 THROUGH 518, ACCEPTANCE TESTING, PRIOR TO FINAL ACCEPTANCE.
20. ALL SANITARY SEWER SYSTEM CONSTRUCTION PERFORMED SHALL BE IN ACCORDANCE WITH SUSSEX COUNTY ORDINANCE 38, THESE PLANS AND ALL APPLICABLE CONSTRUCTION PERMITS.
21. ALL DROP MANHOLES TO BE 5'-0" IN DIAMETER.
22. FITTINGS SHOWN ON THE PLANS ILLUSTRATE ANTICIPATED ANGLE OF DEFLECTION. THIS INFORMATION IS SHOWN FOR GENERAL INFORMATION AND IS NOT GUARANTEED. ACTUAL ANGLE MAY VARY DUE TO FIELD CONDITIONS. USE OF ADDITIONAL FITTINGS SHALL BE AUTHORIZED BY THE ENGINEER.
23. THE CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR ANY DEVIATION FROM THESE PLANS UNLESS WRITTEN APPROVAL HAS BEEN PROVIDED BY THE ENGINEER.
24. ALL DISTURBED AREAS IN THE STATED RIGHT OF WAY, BUT NOT IN THE PAVEMENT SECTION MUST BE TOPSOILED (6" MINIMUM), FERTILIZED, MULCHED, AND SEEDED.
25. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE PLACED IN ACCORDANCE WITH THE M.U.T.C.D. MANUAL, MOST CURRENT EDITION.
26. ALL PROPOSED STORM DRAIN DESIGNATED AS "RCCP" IS TO BE REINFORCED CONCRETE CIRCULAR PIPE, MEETING AASHTO M-170 SPECIFICATIONS. SEE FINAL CONSTRUCTION PLAN & PROFILES FOR SPECIFIC PIPE CLASS.
27. ALL LENGTHS OF SANITARY SEWER PIPE ARE MEASURED HORIZONTALLY FROM CENTER LINES OF INLETS, MANHOLES OR FITTINGS. ALL LENGTHS OF STORM DRAIN PIPE ARE MEASURED HORIZONTALLY FROM EDGE OF STRUCTURE TO EDGE OF STRUCTURE. ACTUAL TRUE LENGTHS OF PIPES ARE TO BE DETERMINED IN THE FIELD.
28. WHERE SPECIFIED, HDPE STORM DRAIN PIPE SHALL BE ADS N-12 (SMOOTH INTERIOR) PIPE WITH ADS PRO-LINK MT (BELL/BELL COUPLER) FOR WATER TIGHT CONNECTIONS. REFER TO PLAN AND PROFILES FOR MATERIALS USED.
29. ALL EMBEDMENT MATERIALS USED FOR BEDDING, HAUNCHING, AND INITIAL BACKFILL FOR HDPE PIPE SHALL CONFIRM TO AASHTO SECTION 30 AND ASTM D-2321 AS PER MANUFACTURER INSTALLATION REQUIREMENTS. CONTRACTOR SHALL ENSURE THAT PROPER LINE AND GRADE IS ESTABLISHED WITHIN TRENCH BEDDING PRIOR TO PLACEMENT OF PIPE AND THAT PROPER MATERIALS ARE USED AND COMPACTION IS ACHIEVED DURING HAUNCHING AND INITIAL BACKFILL. A GEOTECHNICAL ENGINEER SHALL BE RETAINED TO VERIFY SUITABILITY OF MATERIALS USED AND PROPER COMPACTION. ANY DEVIATION IN LINE AND GRADE OR OBVIOUS JOINT SEPARATION SHALL BE CORRECTED PRIOR TO ESTABLISHMENT OF FINAL SUBGRADE AND PAVEMENT SURFACE. THE CONTRACTOR SHALL TAKE EVERY CARE TO ENSURE CORRECT PIPE INSTALLATION.
30. UNLESS OTHERWISE SPECIFIED ALL ROADWAY INLETS SHALL HAVE A TYPE I INLET GRATE AND TYPE S TOP UNIT PER DELDOT STANDARDS, CURRENT REVISION.
31. IT IS THE CONTRACTORS RESPONSIBILITY TO INSURE THAT PAVING IS INSTALLED TO THE ELEVATIONS SHOWN AND THAT NO PONDING OF WATER EXISTS AFTER PAVING IS COMPLETE.

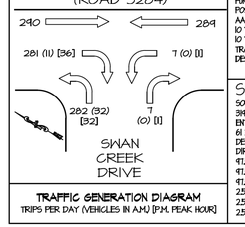
SUSSEX COUNTY CONSTRUCTION NOTES:

1. ROADWAY STAKEOUTS:
   - A. RIGHT-OF-WAY STAKES SHALL BE OFFSET A MINIMUM OF FIVE (5) FEET OUTSIDE THE RIGHT-OF-WAY.
   - B. STATION NUMBERS TO BE INDICATED ON EACH SIDE OF THE STAKE.
   - C. THE CENTERLINE ROADWAY CUT AND CUT-LINE SHALL BE LOCATED ON THE SIDE OF THE STAKE WHICH FACES THE CENTERLINE, ALSO A "CL" DESIGNATION SHALL BE INCLUDED.
   - D. THE SHALE CUT AND CUT-LINE SHALL BE INDICATED ON THE OUTSIDE OF THE STAKE, WHILE ALSO CONTAINING A "SH" DESIGNATION.
2. THE CONTRACTOR SHALL PROVIDE TWO (2) WORKING DAYS NOTICE TO THE COUNTY INSPECTOR PRIOR TO PAVING. AT THIS TIME, THE INSPECTOR MAY REQUIRE THE CONTRACTOR COMPLETE RELATED OR UNRELATED WORK ITEMS BEFORE PAVING MAY BEGIN.
3. SURFACE TREATMENT SHALL NOT BE APPLIED: (SURFACE TREATMENT NOT USED)
   - A. AFTER NOVEMBER 1 OR PRIOR TO APRIL 1; OR
   - B. WHEN THE TEMPERATURE IS BELOW 50° F; OR
   - C. ON ANY WET OR FROZEN SURFACE.
4. HOT MIX SHALL NOT BE APPLIED:
   - A. WHEN THE TEMPERATURE IS BELOW 40° F; OR
   - B. ON ANY WET OR FROZEN SURFACE.
5. FOR ALL WOODED AREAS, A SUFFICIENT AREA BEYOND THE RIGHT-OF-WAY SHALL BE CLEARED AND GRUBBED TO ALLOW PROPER GRADING OF THE ROADWAY SWALE BACKSLOPES.
6. ALL DISTURBED AREAS MUST BE STABILIZED WITH 4 INCHES OF TOPSOIL, SEED, AND MULCH.

DELDOT RECORD PLAN NOTES:

1. ALL ENTRANCES SHALL CONFORM TO THE DELAWARE DEPARTMENT OF TRANSPORTATIONS (DELDOT'S) CURRENT DEVELOPMENT COORDINATION MANUAL AND SHALL BE SUBJECT TO ITS APPROVAL.
2. NO LANDSCAPING SHALL BE ALLOWED WITHIN THE RIGHT-OF-WAY UNLESS THE PLANS ARE COMPLIANT WITH SECTION 3.7 OF THE DEVELOPMENT COORDINATION MANUAL.
3. SHRUBBERY, PLANTINGS, SIGNS AND/OR OTHER VISUAL BARRIERS THAT COULD OBSTRUCT THE SIGHT DISTANCE OF A DRIVER PREPARING TO ENTER THE ROADWAY ARE PROHIBITED WITHIN THE DEFINED DEPARTURE SIGHT TRIANGLE AREA ESTABLISHED ON THIS PLAN. IF THE ESTABLISHED DEPARTURE SIGHT TRIANGLE AREA IS OUTSIDE THE RIGHT-OF-WAY OR PROJECTS ONTO AN ADJACENT PROPERTY OWNER'S LAND, A SIGHT EASEMENT SHOULD BE ESTABLISHED AND RECORDED WITH ALL AFFECTED PROPERTY OWNERS TO MAINTAIN THE REQUIRED SIGHT DISTANCE.
4. UPON COMPLETION OF THE CONSTRUCTION OF THE SIDEWALK OR SHARED-USE PATH ACROSS THIS PROJECT'S FRONTAGE AND PHYSICAL CONNECTION TO ADJACENT EXISTING FACILITIES, THE DEVELOPER, THE PROPERTY OWNERS OR BOTH ASSOCIATED WITH THIS PROJECT, SHALL BE RESPONSIBLE TO REMOVE ANY EXISTING ROAD TIE-IN CONNECTIONS LOCATED ALONG ADJACENT PROPERTIES, AND RESTORE THE AREA TO GRASS. SUCH ACTIONS SHALL BE COMPLETED AT DELDOT'S DISCRETION, AND IN CONFORMANCE WITH DELDOT'S DEVELOPMENT COORDINATION MANUAL.
5. PRIVATE STREETS CONSTRUCTED WITHIN THIS SUBDIVISION SHALL BE MAINTAINED BY THE DEVELOPER, THE PROPERTY OWNERS WITHIN THIS SUBDIVISION OR BOTH (TITLE 17 §131). DELDOT ASSUMES NO RESPONSIBILITIES FOR THE FUTURE MAINTENANCE OF THESE STREETS.
6. THE SIDEWALK AND SHARED-USE PATH SHALL BE THE RESPONSIBILITY OF THE DEVELOPER, THE PROPERTY OWNERS OR BOTH WITHIN THIS SUBDIVISION. THE STATE OF DELAWARE ASSUMES NO RESPONSIBILITY FOR THE FUTURE MAINTENANCE OF THE SIDEWALK AND/OR SHARED-USE PATH.
7. ALL LOTS SHALL HAVE ACCESS FROM THE INTERNAL SUBDIVISION STREET.
8. THE DEVELOPER SHALL BE REQUIRED TO FURNISH AND PLACE RIGHT-OF-WAY MONUMENTS IN ACCORDANCE WITH DELDOT'S DEVELOPMENT COORDINATION MANUAL.
9. THE DEVELOPER SHALL BE REQUIRED TO FURNISH AND PLACE RIGHT-OF-WAY MARKERS TO PROVIDE A PERMANENT REFERENCE FOR RE-ESTABLISHING THE RIGHT-OF-WAY AND PROPERTY CORNERS ON LOCAL AND HIGHER ORDER FRONTAGE ROADS. RIGHT-OF-WAY MARKERS SHALL BE SET AND/OR PLACED ALONG THE FRONTAGE ROAD RIGHT-OF-WAY AT PROPERTY CORNERS AND AT EACH CHANGE IN RIGHT-OF-WAY ALIGNMENT IN ACCORDANCE WITH SECTION 3.2.4.2 OF THE DEVELOPMENT COORDINATION MANUAL.

TRIP GENERATION - SWAN CREEK DRIVE AT MULBERRY KNOLL ROAD (FULL MOVEMENT)

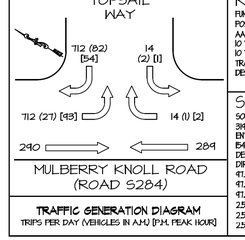


TRAFFIC GENERATION DIAGRAM
TRIPS PER DAY (VEHICLES IN A.M.) [P.M. PEAK HOUR]

ROAD TRAFFIC DATA:
FUNCTIONAL CLASSIFICATION - MAJOR COLLECTOR
POSTED SPEED LIMIT - 25 MPH
AADT = 491 (FROM 2018 DELDOT TRAFFIC SUMMARY)
10 YEAR PROJECTED AADT = 1.16 x 491 TRIPS = 571 TRIPS
10 YEAR PROJECTED AADT = SITE ADT = 3,602 TRIPS
TRAFFIC PATTERN GROUP - 7 (FROM 2018 DELDOT TRAFFIC SUMMARY)
DESIGN HOURLY VOLUME = 3,602 x 14.15% = 510 VPH

SITE TRIPS GENERATED:
SOURCE: ITE TRIP GENERATION MANUAL 10TH EDITION.
391 SINGLE FAMILY DETACHED HOUSING (210) = 3,023 ADT (OVERALL)
ENTRANCE 1 OF 3 - FULL MOVEMENT
61 D.U. / 391 D.U. * 3,023 ADT = 571 ADT ENTRANCE 1
DESIGN VEHICLES: MD-50
DIRECTIONAL DISTRIBUTION:
47.5% TO AND FROM THE NORTH ADT = 563 TRIPS (281 ENTER / 282 EXIT)
47.5% TO AND FROM THE NORTH AM = 43 TRIPS (11 ENTER / 32 EXIT)
47.5% TO AND FROM THE NORTH PM = 68 TRIPS (36 ENTER / 32 EXIT)
2.5% TO AND FROM THE SOUTH ADT = 14 TRIPS (7 ENTER / 7 E EXIT)
2.5% TO AND FROM THE SOUTH AM = 0 TRIPS (0 ENTER / 0 EXIT)
2.5% TO AND FROM THE SOUTH PM = 2 TRIPS (1 ENTER / 1 EXIT)

TRIP GENERATION - TOPSAIL WAY AT MULBERRY KNOLL ROAD (FULL MOVEMENT)



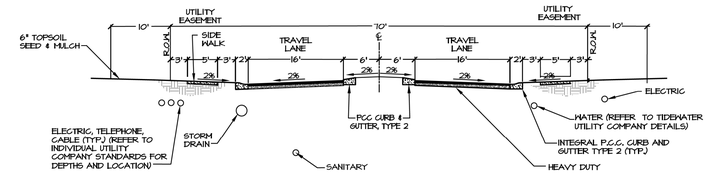
TRAFFIC GENERATION DIAGRAM
TRIPS PER DAY (VEHICLES IN A.M.) [P.M. PEAK HOUR]

ROAD TRAFFIC DATA:
FUNCTIONAL CLASSIFICATION - MAJOR COLLECTOR
POSTED SPEED LIMIT - 25 MPH ASSUMED (NOT POSTED)
AADT = 491 (FROM 2018 DELDOT TRAFFIC SUMMARY)
10 YEAR PROJECTED AADT = 1.16 x 491 TRIPS = 571 TRIPS
10 YEAR PROJECTED AADT = SITE ADT = 3,602 TRIPS
TRAFFIC PATTERN GROUP - 7 (FROM 2018 DELDOT TRAFFIC SUMMARY)
DESIGN HOURLY VOLUME = 3,602 x 14.15% = 510 VPH

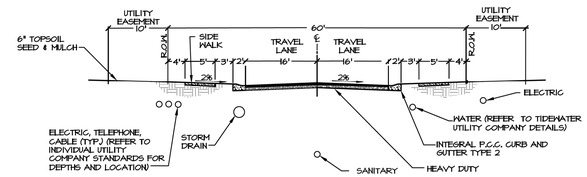
SITE TRIPS GENERATED:
SOURCE: ITE TRIP GENERATION MANUAL 10TH EDITION.
391 SINGLE FAMILY DETACHED HOUSING (210) = 3,023 ADT (OVERALL)
ENTRANCE 2 OF 3 - FULL MOVEMENT
154 D.U. / 391 D.U. * 3,023 ADT = 1,459 ADT ENTRANCE 2
DESIGN VEHICLES: MD-50
DIRECTIONAL DISTRIBUTION:
47.5% TO AND FROM THE NORTH ADT = 1,424 TRIPS (712 ENTER / 712 EXIT)
47.5% TO AND FROM THE NORTH AM = 104 TRIPS (27 ENTER / 82 EXIT)
47.5% TO AND FROM THE NORTH PM = 141 TRIPS (93 ENTER / 54 EXIT)
2.5% TO AND FROM THE SOUTH ADT = 36 TRIPS (14 ENTER / 14 EXIT)
2.5% TO AND FROM THE SOUTH AM = 3 TRIPS (1 ENTER / 2 EXIT)
2.5% TO AND FROM THE SOUTH PM = 5 TRIPS (2 ENTER / 1 EXIT)

GENERAL NOTES:

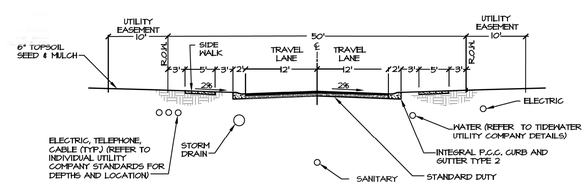
1. SUBDIVISION STREETS ARE TO REMAIN PRIVATE AND ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SUSSEX COUNTY REGULATIONS.
2. MAINTENANCE OF THE STREET WITHIN THIS SUBDIVISION WILL BE THE RESPONSIBILITY OF THE OWNER/DEVELOPER AND OR HOME OWNER'S ASSOCIATION. THE STATE AND SUSSEX COUNTY ASSUMES NO RESPONSIBILITY FOR FUTURE MAINTENANCE OF THE STREETS.
3. ACCESS TO ALL LOTS IS TO BE FROM SUBDIVISION STREETS OR DRIVE ACCESS LOOPS.
4. MAINTENANCE OF THE STORM WATER MANAGEMENT AREAS WILL BE THE RESPONSIBILITY OF THE OWNER/DEVELOPER AND OR HOMEOWNER'S ASSOCIATION.
5. THE PROPOSED ENTRANCES/EXITS ARE CONCEPTUAL ONLY AND ARE SUBJECT TO REVIEW AND APPROVAL BY THE DELAWARE DEPARTMENT OF TRANSPORTATION BEFORE A CONSTRUCTION PERMIT IS ISSUED.



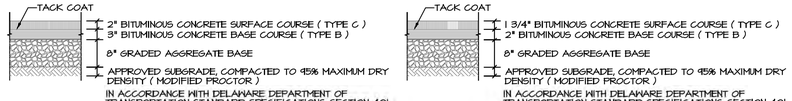
TYPICAL ENTRANCE BOULEVARD - 70' R.O.W.
NOT TO SCALE



TYPICAL ROAD SECTION - 60' R.O.W.
NOT TO SCALE

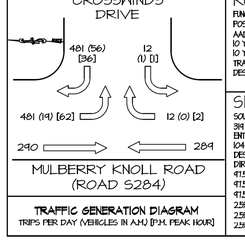


TYPICAL ROAD SECTION - 50' R.O.W.
NOT TO SCALE



PAVING SECTIONS
NOT TO SCALE

TRIP GENERATION - CROSSWINDS DRIVE AT MULBERRY KNOLL ROAD (FULL MOVEMENT)



TRAFFIC GENERATION DIAGRAM
TRIPS PER DAY (VEHICLES IN A.M.) [P.M. PEAK HOUR]

ROAD TRAFFIC DATA:
FUNCTIONAL CLASSIFICATION - MAJOR COLLECTOR
POSTED SPEED LIMIT - 45 MPH ASSUMED (NOT POSTED)
AADT = 491 (FROM 2018 DELDOT TRAFFIC SUMMARY)
10 YEAR PROJECTED AADT = 1.16 x 491 TRIPS = 571 TRIPS
10 YEAR PROJECTED AADT = SITE ADT = 3,602 TRIPS
TRAFFIC PATTERN GROUP - 7 (FROM 2018 DELDOT TRAFFIC SUMMARY)
DESIGN HOURLY VOLUME = 3,602 x 14.15% = 510 VPH

SITE TRIPS GENERATED:
SOURCE: ITE TRIP GENERATION MANUAL 10TH EDITION.
391 SINGLE FAMILY DETACHED HOUSING (210) = 3,023 ADT (OVERALL)
ENTRANCE 3 OF 3 - FULL MOVEMENT
104 D.U. / 391 D.U. * 3,023 ADT = 486 ADT ENTRANCE 3
DESIGN VEHICLES: MD-50
DIRECTIONAL DISTRIBUTION:
47.5% TO AND FROM THE NORTH ADT = 462 TRIPS (481 ENTER / 481 EXIT)
47.5% TO AND FROM THE NORTH AM = 76 TRIPS (14 ENTER / 56 EXIT)
47.5% TO AND FROM THE NORTH PM = 101 TRIPS (62 ENTER / 36 EXIT)
2.5% TO AND FROM THE SOUTH ADT = 24 TRIPS (12 ENTER / 12 EXIT)
2.5% TO AND FROM THE SOUTH AM = 1 TRIPS (0 ENTER / 1 EXIT)
2.5% TO AND FROM THE SOUTH PM = 3 TRIPS (2 ENTER / 1 EXIT)

PROJECT PHASING

PHASE 1 - 6 YEARS

TOTAL PROJECT BUILDOUT - 6 YEARS
ESTIMATED PROJECT COMPLETION DATE - DECEMBER 2026

THE PROJECT IS BE APPROVED AS A SINGLE PHASE PROJECT, WITH SIX (6) OPERATIONAL BREAKS FOR PURPOSES OF BONDING, BENEFICIAL OCCUPANCY INSPECTION, RELEASE OF USE AND OCCUPANCY PERMITS.

SITE DATA

1. PROJECT NAME: SCENIC MANOR
2. TAX PARCEL: 334-10.00-43.00
3. SITE ADDRESS: 20535 MULBERRY KNOLL ROAD
   32259 JANICE ROAD
   LEWES, DE 19958
4. OWNER INFORMATION: THOMAS BEST AND SONS, INC.
   32259 JANICE ROAD
   LEWES, DE 19958
5. DEVELOPER: MKR LAND INVESTMENT, LLC
   ATTN: MR. JOHN RICHARDSON
   260 HOPEWELL ROAD
   CHURCHVILLE, MD 21028
6. ZONING:
   EXISTING: AR-1 *
   PROP. ZONING: AR-1 *
   *NOTE: SITE IS LOCATED ENTIRELY WITH COASTAL AREA GROWTH ZONE
7. DEVELOPMENT OPTION: AR-1 - CLUSTER DESIGN
8. SITE ACREAGE: 166.83 AC. ±
9. LAND USE:
   EXISTING: AGRICULTURAL
   PROPOSE: RESIDENTIAL - SINGLE FAMILY DETACHED
   MIN. LOT AREA 7,500 SF
10. BULK AREA STANDARDS (AR-1 CLUSTER DEVELOPMENT OPTION)

MIN. FRONT YARD	25'
MIN. SIDE YARD	10'
MIN. REAR YARD	10'
MIN. LOT WIDTH	60'
MIN. LOT AREA	7,500 SF
MAX. BLDG. HT.:	42'
MIN. OPEN SPACE:	30%
MAX. DENSITY:	2.178 D.U./AC.

11. DEVELOPMENT DENSITY COMPUTATIONS:

GROSS SITE AREA:

BASE SITE AREA:	166.83 AC. ±
WETLANDS	20.19 AC. ±
GROSS SITE AREA:	146.64 AC. ±

ALLOWABLE DWELLING UNITS:
GROSS SITE AREA * ALLOWABLE DENSITY = ALLOWABLE D.U.
146.64 AC. X 2.178 D.U. / AC. = 319.4 D.U.

PROPOSED DENSITY:
314 D.U. / 146.64 AC. ± = 2.175 D.U./AC.

12. SITE AREA BREAKDOWN:

RESIDENTIAL LOTS =	65.04 AC. ±
DELDOT R.O.W. =	4.71 AC. ±
PRIVATE R.O.W. =	16.94 AC. ±
PUMP STATION * =	0.22 AC. ±
OPEN SPACE =	80.27 AC. ±
TOTAL SITE ACREAGE =	166.83 AC. ±

13. OPEN SPACE AREAS:
    REQUIRED [SECTION 115-25B.(2)]:
    30% X 166.83 AC ± = 50.05 AC.±
    PROPOSED:
    80.27 AC. ± / 166.83 AC. ± = 80.27 AC. ± / 48.1 %
14. WATER SERVICE: PUBLIC (TIDEWATER UTILITY COMPANY)
15. SANITARY SEWER: PUBLIC (SUSSEX COUNTY)
16. PROPOSED LOTS: 314 SINGLE FAMILY LOTS
17. PARKING ANALYSIS*:
    PARKING REQUIRED: 314 SFD X 2 SP/DU = 628 SP
    PARKING PROVIDED: 314 SFD X 2 SP/DU = 628 SP
    *NOTE: PARKING ANALYSIS PROVIDED FOR RESIDENTIAL LOT AREAS ONLY; ANALYSIS FOR ACTIVE RECREATION / CLUBHOUSE AREA TO BE INCLUDED AS PART OF SITE PLAN PACKAGE TO BE PROVIDED UNDER SEPARATE COVER.
18. A PRELIMINARY WETLAND EVALUATION WAS PERFORMED BY GEO-TECHNOLOGY ASSOCIATES, INC. (GTA) IN JULY 2019. BASED ON THIS REVIEW, IT IS GTA'S PROFESSIONAL OPINION THAT THERE ARE JURISDICTIONAL "WATERS OF THE U.S.", INCLUDING WETLANDS PRESENT WITHIN THE SUBJECT SITE AS SHOWN BY THIS PLAN.
19. A PORTION OF THIS SITE LIES WITHIN FLOOD ZONE AE (SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD) AND FLOOD ZONE X (AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT, OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM THE 1% ANNUAL CHANCE FLOOD) PER FEMA FLOOD INSURANCE RATE MAP MAP 10005C0334K EFFECTIVE MARCH 16, 2015.
20. NO CHURCHES, SCHOOLS, OR COMMERCIAL USE AREAS PROPOSED ON THIS SITE.

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE 36
NEW CASTLE, DELAWARE 19720
(302) 326-2200
FAX: (302) 326-2399
WWW.MRAGTA.COM

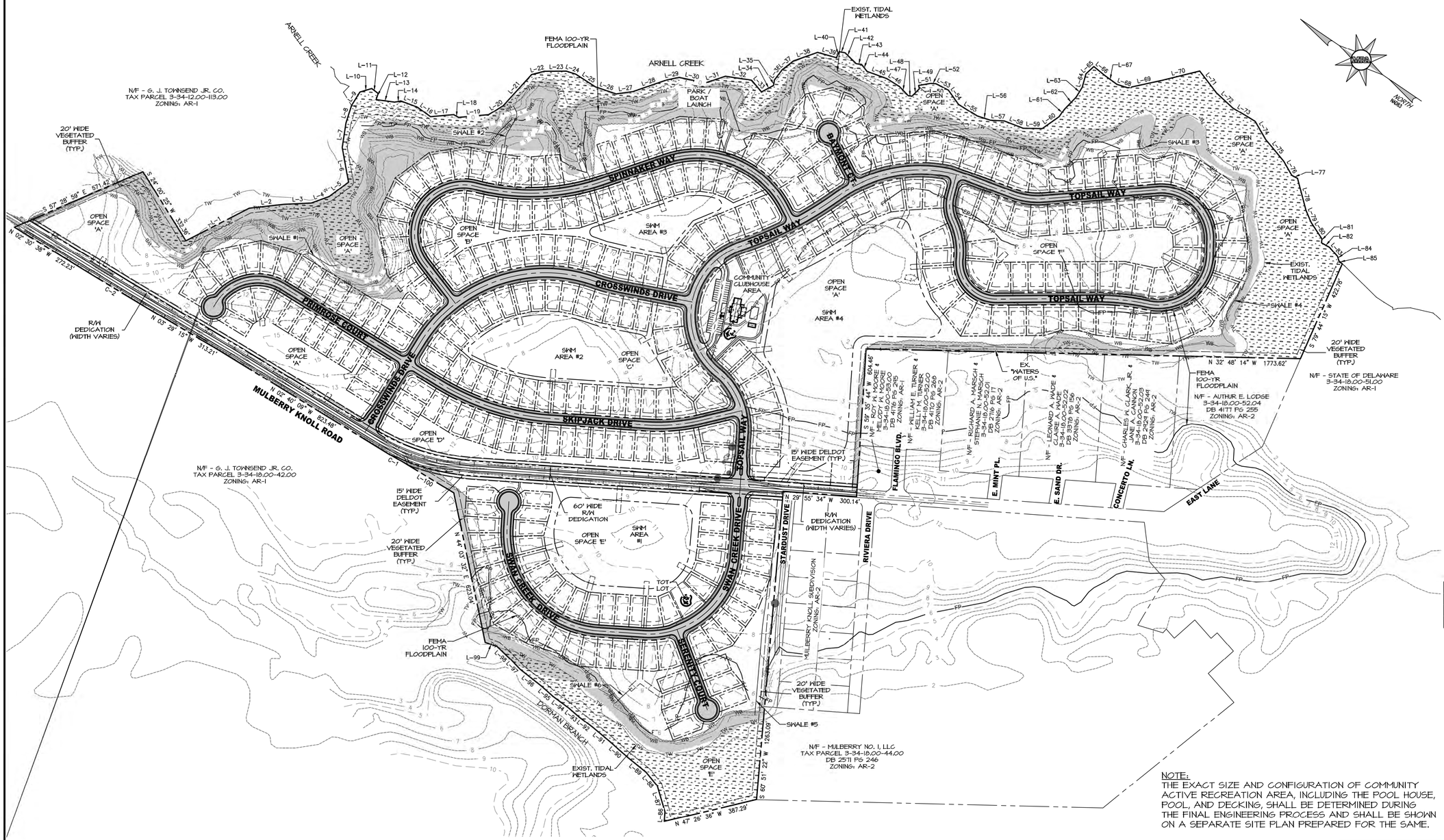
PHILIP LEE TOWNSEND — REGISTERED — No. 12489 — PROFESSIONAL ENGINEER — STATE OF DELAWARE — 05/25/21
ENGINEER'S SEAL

GENERAL NOTES & DETAILS PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: AS NOTED
DATE: 12/02/19
DRAWN BY: CJF
DESIGN BY: CJF
REVIEW BY:
SHEET: 2 OF 15



PROPERTY LINE TABLE		
LINE	BEARING	DISTANCE
L-1	S 61° 14' 44" E	240.83'
L-2	S 40° 26' 16" E	143.56'
L-3	S 36° 40' 08" E	110.60'
L-4	S 54° 06' 48" E	77.52'
L-5	S 70° 47' 04" E	98.61'
L-6	N 45° 38' 01" E	143.84'
L-7	N 64° 33' 20" E	100.72'
L-8	N 73° 23' 01" E	75.71'
L-9	N 87° 58' 14" E	64.32'
L-10	S 50° 37' 05" E	50.32'
L-11	S 03° 08' 35" W	33.08'
L-12	S 74° 35' 57" W	26.26'
L-13	S 26° 22' 36" E	76.34'
L-14	S 45° 00' 34" E	26.00'
L-15	S 13° 41' 03" E	72.04'
L-16	S 02° 34' 16" W	67.03'
L-17	S 39° 16' 48" E	94.64'
L-18	S 05° 07' 24" E	23.25'
L-19	S 39° 16' 12" E	122.90'
L-20	S 66° 16' 20" E	70.54'
L-21	S 81° 35' 38" E	171.27'
L-22	S 48° 35' 16" E	58.21'
L-23	S 34° 24' 44" E	90.11'
L-24	S 16° 34' 44" E	40.30'
L-25	S 01° 12' 56" E	94.90'
L-26	S 15° 24' 17" E	84.83'
L-27	S 41° 46' 14" E	64.64'
L-28	S 53° 05' 38" E	146.15'
L-29	S 45° 54' 44" E	50.46'
L-30	S 22° 20' 50" E	110.39'
L-31	S 52° 32' 58" E	65.62'
L-32	S 25° 35' 04" E	107.81'
L-33	S 15° 38' 26" W	63.00'
L-34	S 62° 16' 10" E	55.85'
L-35	N 64° 03' 44" E	22.42'
L-36	S 86° 34' 14" E	52.41'
L-37	S 11° 56' 17" E	58.55'
L-38	S 53° 31' 36" E	104.28'
L-39	S 18° 29' 50" E	74.75'
L-40	N 81° 00' 41" E	26.76'
L-41	S 24° 08' 14" E	24.63'
L-42	S 10° 28' 45" W	62.72'
L-43	S 24° 44' 32" E	23.04'
L-44	S 11° 37' 31" W	35.41'
L-45	S 14° 01' 36" E	85.48'
L-46	S 01° 52' 12" E	61.75'
L-47	S 12° 03' 31" W	50.64'
L-48	S 25° 35' 10" E	15.84'
L-49	S 78° 55' 43" E	42.45'
L-50	N 43° 33' 08" E	13.98'

PROPERTY LINE TABLE		
LINE	BEARING	DISTANCE
L-51	S 43° 44' 54" E	44.36'
L-53	S 06° 54' 41" E	57.28'
L-54	S 20° 18' 24" W	70.98'
L-55	S 01° 52' 03" E	90.04'
L-56	S 16° 14' 57" E	55.43'
L-57	S 31° 13' 21" E	56.42'
L-58	S 13° 00' 59" E	82.96'
L-59	S 33° 13' 45" E	77.44'
L-60	S 64° 06' 08" E	84.48'
L-61	S 84° 30' 57" E	37.05'
L-62	S 74° 53' 35" E	64.28'
L-63	N 87° 43' 18" E	47.14'
L-64	N 71° 14' 48" E	56.68'
L-65	S 76° 30' 23" E	43.78'
L-66	S 04° 54' 43" W	56.85'
L-67	S 01° 55' 12" W	61.35'
L-68	S 16° 14' 42" E	46.62'
L-69	S 46° 14' 35" E	142.70'
L-70	S 18° 21' 34" W	112.22'
L-71	S 08° 28' 54" W	90.54'
L-72	S 02° 55' 14" E	106.46'
L-73	S 25° 43' 08" W	86.41'
L-74	S 16° 04' 15" W	114.83'
L-75	S 26° 04' 55" W	61.72'
L-76	S 06° 57' 25" E	25.30'
L-77	S 41° 06' 01" W	134.27'
L-78	S 33° 02' 06" W	54.15'
L-79	S 22° 24' 30" W	74.64'
L-80	S 61° 00' 02" W	16.31'
L-81	S 04° 41' 44" E	31.25'
L-82	S 15° 06' 08" W	50.38'
L-83	S 84° 24' 42" W	18.66'
L-84	S 07° 15' 33" W	18.51'
L-85	N 54° 52' 00" E	40.00'
L-86	N 84° 16' 11" E	110.56'
L-87	N 16° 24' 25" E	71.61'
L-88	N 04° 41' 07" E	97.09'
L-90	N 07° 16' 24" E	95.11'
L-91	N 05° 46' 48" E	93.20'
L-92	N 08° 24' 31" E	67.65'
L-93	N 06° 24' 05" E	56.10'
L-94	N 02° 13' 34" E	78.75'
L-95	N 07° 41' 46" E	62.64'
L-96	N 04° 05' 42" E	85.41'
L-97	N 12° 27' 34" E	54.37'
L-98	N 09° 01' 50" E	77.80'
L-99	N 13° 59' 34" W	51.18'
L-100	N 02° 55' 25" W	252.24'

PROPERTY CURVE TABLE						
CURVE	DELTA	RADIUS	LENGTH	TANGENT	CHORD BEARING	CHORD
C-1	005° 08' 41"	477.93'	42.22'	21.12'	N 05° 12' 00" W	42.21'
C-2	000° 58' 36"	23,063.66'	393.17'	196.59'	N 02° 59' 56" W	393.16'

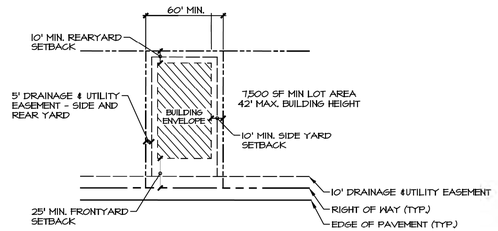
NOTE:
THE EXACT SIZE AND CONFIGURATION OF COMMUNITY ACTIVE RECREATION AREA, INCLUDING THE POOL HOUSE, POOL, AND DECKING, SHALL BE DETERMINED DURING THE FINAL ENGINEERING PROCESS AND SHALL BE SHOWN ON A SEPARATE SITE PLAN PREPARED FOR THE SAME.

200 100 0 100 200 400
SCALE: 1" = 200'

PROPOSED OPEN SPACE SUMMARY

AREA	SWM FACILITIES	ACTIVE OPEN SPACE	PASSIVE OPEN SPACE*
A	8.63 AC. ±	1.83 AC. ±	50.44 AC. ±
B	1.48 AC. ±	---	2.85 AC. ±
C	3.66 AC. ±	---	4.48 AC. ±
D	---	---	2.20 AC. ±
E	4.10 AC. ±	0.24 AC. ±	15.91 AC. ±
F	---	---	2.32 AC. ±
TOTAL	17.87 AC. ±	2.07 AC. ±	78.20 AC. ±

*NOTE: PASSIVE OPEN SPACE AREA ACREAGE ARE INCLUSIVE OF SWM FACILITY ACREAGE, WHERE APPLICABLE.



TYPICAL LAYOUT SINGLE FAMILY LOT (VARIABLE WIDTHS)

NOT TO SCALE

MRA

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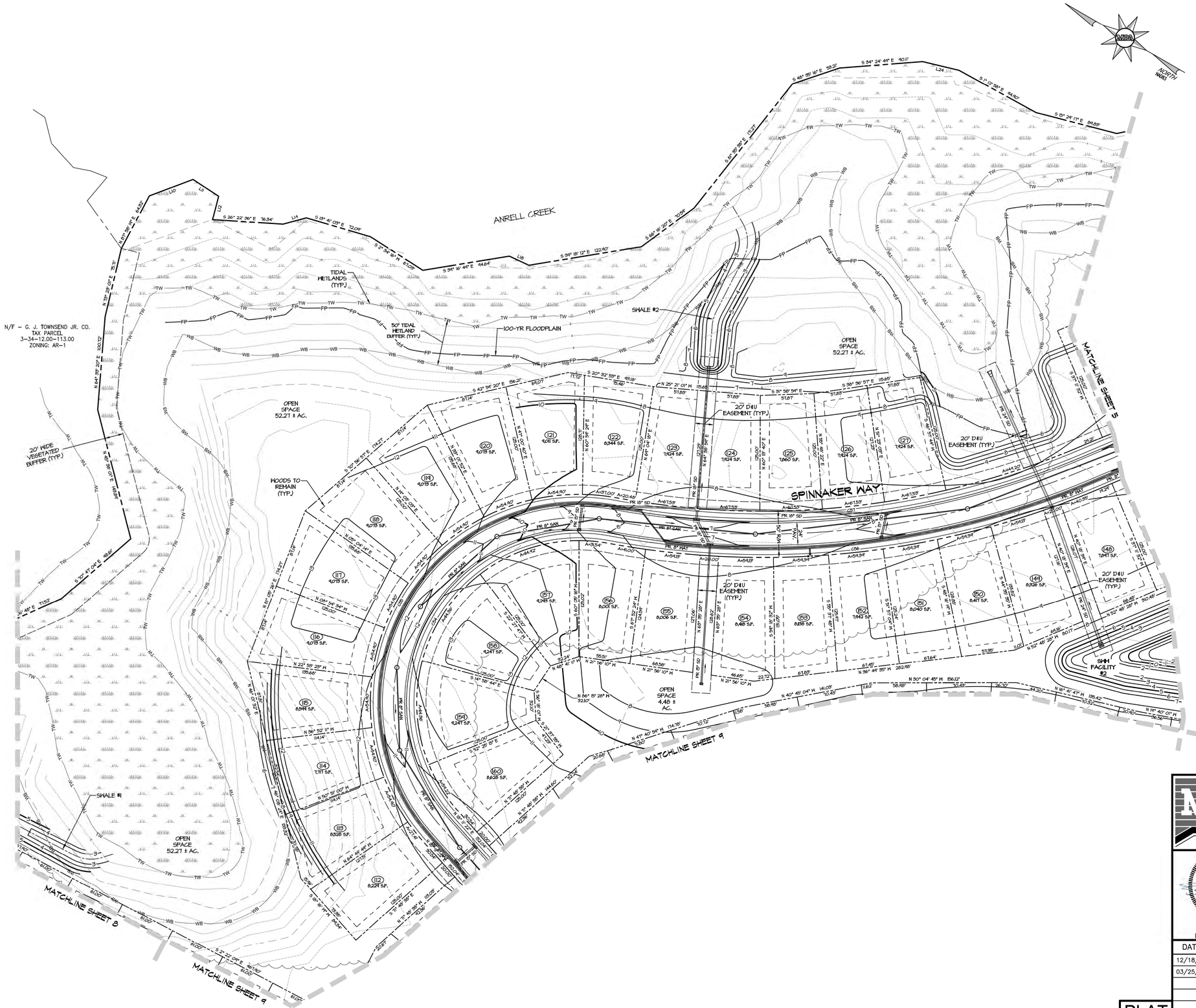
PHILIP J. LEE TOLLIVER — REGISTERED — No. 12489 — PROFESSIONAL ENGINEER — STATE OF DELAWARE
03/25/21
ENGINEER'S SEAL

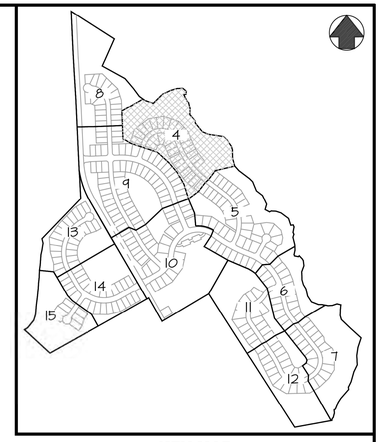
OVERALL PRELIMINARY PLAT FOR SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REVISED LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: 1"= 200'
DATE: 12/02/19
DRAWN BY: CJF
DESIGN BY: CJF
REVIEW BY: PLT
SHEET: 3 OF 15





KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C54	434.40'	175.00'	142.22	N 89° 18' 04" E	331.15'
C55	558.51'	225.00'	142.22	N 89° 18' 04" E	425.77'
C56	536.32'	925.00'	033.22	S 36° 11' 51" E	528.84'
C57	507.33'	875.00'	033.22	S 36° 11' 51" E	500.25'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L10	50.32	S 50° 37' 05" E
L11	33.08	S 03° 08' 35" W
L14	26.00	S 45° 00' 34" E
L18	23.25	S 05° 07' 24" E
L24	40.30	S 16° 34' 49" E

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE
- PROPOSED RIGHT OF WAY LINE
- PROPOSED STORMWATER MANAGEMENT AREA
- LINE OF SIGHT
- PROPOSED SETBACK LINE
- PROPOSED EASEMENT LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

MORRIS & RITCHIE ASSOCIATES, INC.
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PHILIP LEE TOLLIVER REGISTERED No. 12680 PROFESSIONAL ENGINEER STATE OF DELAWARE 03/25/21
ENGINEER'S SEAL

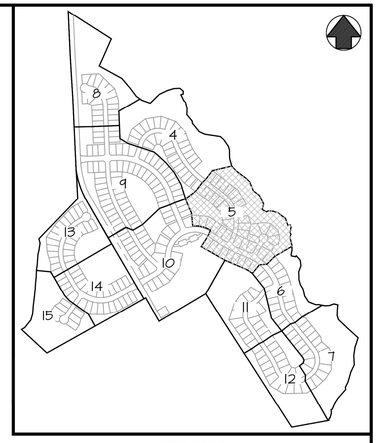
PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: 1"= 50'
DATE: 12/02/19
DRAWN BY: CJF
DESIGN BY: CJF
REVIEW BY: PLT
SHEET: 4 OF 15

PLAT



KEY MAP
SCALE: 1"=800'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L35	22.42	N 64° 03' 49" E
L36	52.41	S 86° 34' 19" E
L40	26.76	N 81° 00' 41" E
L41	24.63	S 24° 03' 19" E
L43	23.04	S 24° 49' 32" E
L44	35.47	S 17° 37' 31" W

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C31	573.33'	270.00'	121.66	S 66° 26' 53" W	471.52'
C33	297.46'	330.00'	051.65	N 78° 32' 34" W	287.49'
C58	531.62'	375.00'	081.23	S 12° 11' 43" E	488.21'
C59	602.50'	425.00'	081.23	S 12° 11' 43" E	553.30'
C79	429.15'	545.00'	045.12	S 47° 14' 55" E	418.15'
C80	372.07'	605.00'	035.24	S 39° 09' 33" E	366.24'
C81	37.28'	25.00'	085.45	S 14° 03' 13" E	33.92'
C82	37.28'	25.00'	085.45	N 71° 23' 40" E	33.92'
C83	21.03'	25.00'	048.19	N 04° 34' 32" E	20.41'
C84	241.19'	50.00'	276.38	S 61° 19' 46" E	66.67'
C85	21.03'	25.00'	048.19	S 52° 45' 55" W	20.41'
C86	41.45'	605.00'	003.93	S 67° 50' 39" E	41.44'
C88	40.24'	24.78'	093.03	S 17° 34' 27" E	35.96'
C89	40.24'	24.78'	093.03	N 74° 24' 31" E	35.96'
C90	456.28'	1530.00'	017.09	N 61° 15' 49" W	454.59'
C91	176.51'	1470.00'	006.88	N 56° 09' 36" W	176.40'

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
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- LINE OF SIGHT
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- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

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PHILIP LEE TOMLINSON, REGISTERED PROFESSIONAL ENGINEER, No. 12489, DELAWARE, 03/25/21
ENGINEER'S SEAL

PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
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DATE: 12/02/19
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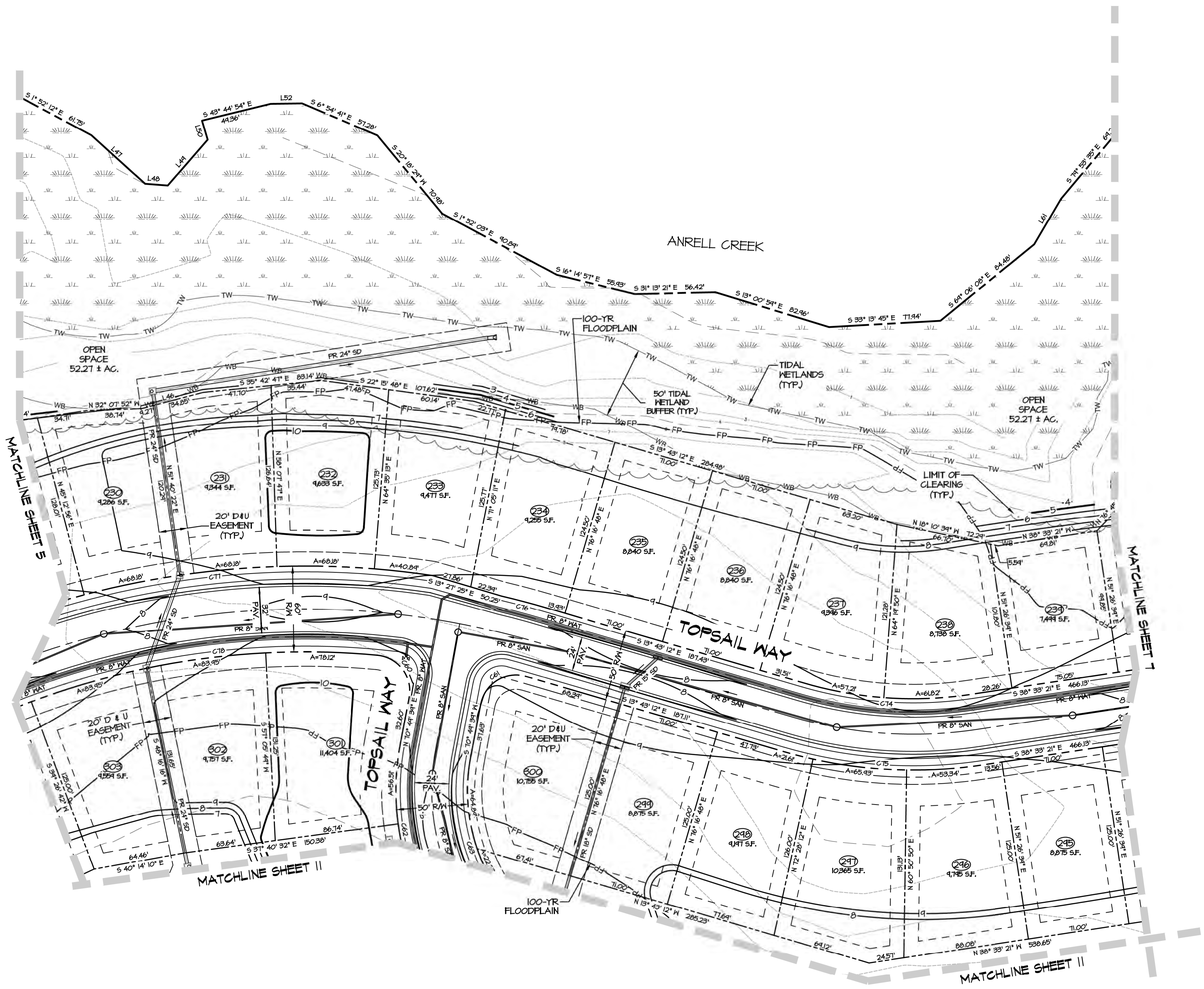
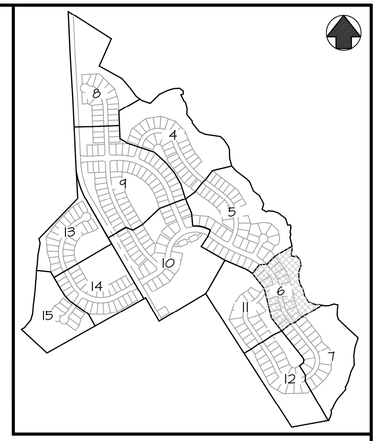
DESIGN BY: CJF
REVIEW BY: PLT
SHEET: 5 OF 15

PLAT





KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C60	41.68'	25.00'	095.52	N 23° 04' 07" E	37.02'
C61	41.65'	25.00'	095.45	N 61° 26' 47" W	37.00'
C62	121.96'	175.00'	039.93	N 50° 51' 42" E	119.51'
C63	87.12'	125.00'	039.93	N 50° 51' 42" E	85.36'
C74	119.04'	270.00'	025.26	S 26° 09' 33" E	118.07'
C75	140.88'	325.00'	024.84	S 26° 08' 16" E	139.78'
C76	32.09'	600.00'	003.06	S 15° 15' 08" E	32.09'
C77	372.07'	605.00'	035.24	S 39° 09' 33" E	366.24'
C78	429.15'	545.00'	045.12	S 47° 14' 55" E	418.15'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L47	50.69	S 12° 03' 31" W
L48	15.84	S 25° 35' 10" E
L50	13.99	N 43° 33' 08" E
L52	21.92	S 30° 50' 24" E
L61	37.05	S 89° 30' 57" E

LEGEND

- EXISTING PROPERTY LINE
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- ADJACENT PROPERTY LINE
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50 25 0 25 50 100
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PHILLEE TOLLER REGISTERED No. 12489 PROFESSIONAL ENGINEER DELAWARE
05/25/21
ENGINEER'S SEAL

PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS	
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION	JOB NO.: 20572
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP	SCALE: 1"= 50'
		DATE: 12/02/19
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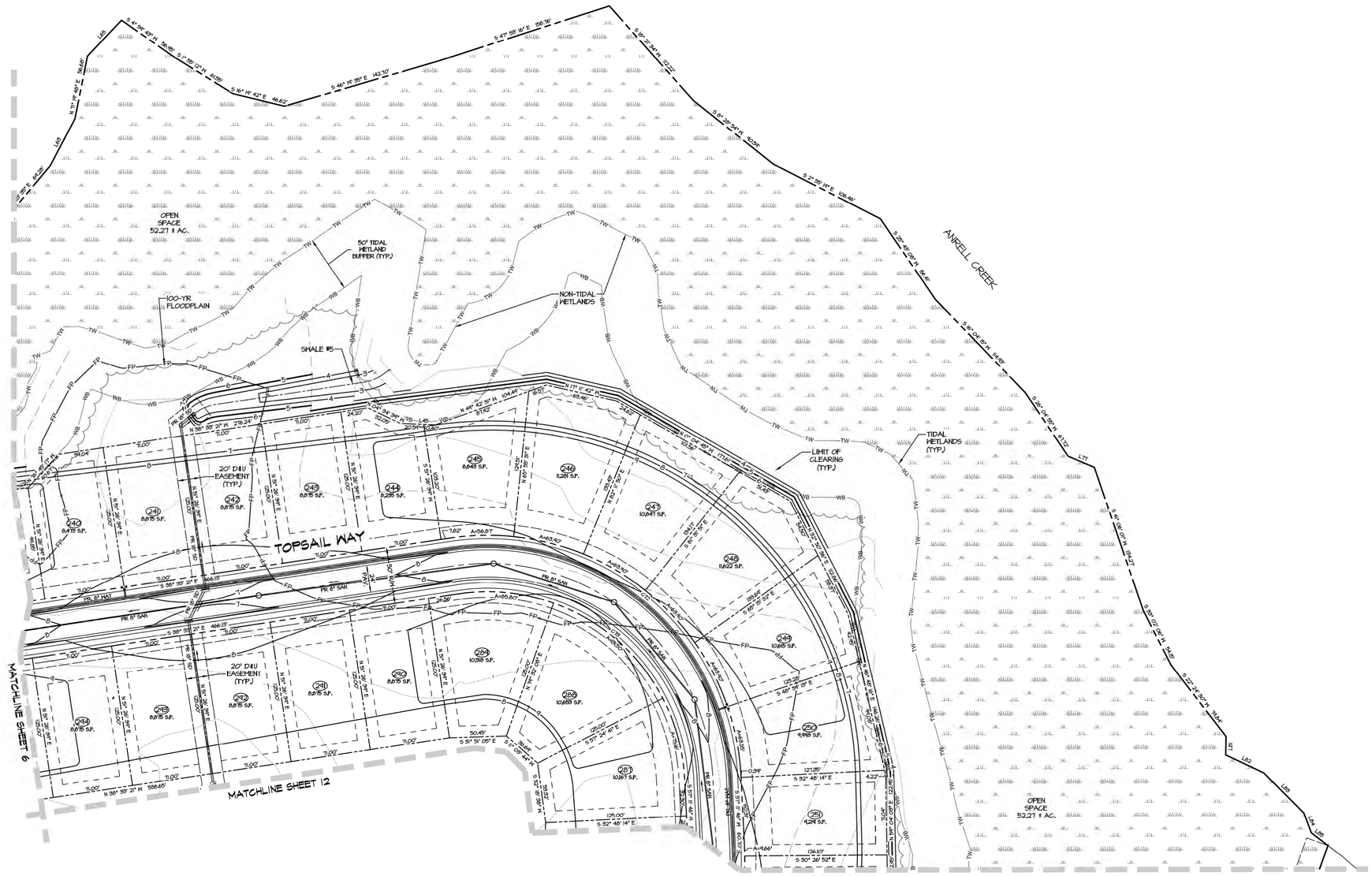
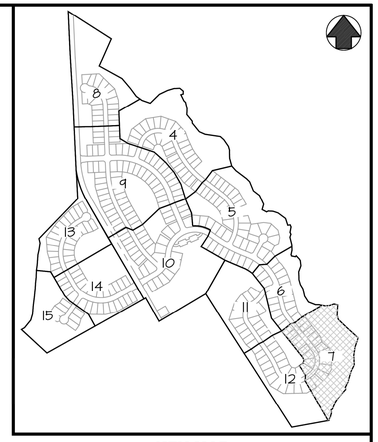
		REVIEW BY: PLT
		SHEET: 6 OF 15

PLAT





KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C72	376.02'	225.00'	095.75	S 09° 19' 13" W	333.76'
C73	292.46'	175.00'	095.75	S 09° 19' 13" W	259.59'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L63	47.19	N 87° 43' 18" E
L65	43.78	S 76° 30' 23" E
L77	25.30	S 06° 57' 25" E
L81	16.37	S 61° 00' 02" W
L82	37.25	S 04° 47' 44" E
L83	50.38	S 15° 06' 08" W
L84	18.66	S 39° 24' 42" W
L85	18.57	S 07° 15' 33" W

LEGEND

- EXISTING PROPERTY LINE
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- PROPOSED RIGHT OF WAY LINE
- PROPOSED STORMWATER MANAGEMENT AREA
- LINE OF SIGHT
- PROPOSED SETBACK LINE
- PROPOSED EASEMENT LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

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PRELIMINARY PLAT
FOR
SCENIC MANOR

ENGINEER'S SEAL
PHILIP C. LEE TOLLIVER — REGISTERED — No. 12489 — DELAWARE PROFESSIONAL ENGINEER — 05/25/21

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: 1"= 50'
DATE: 12/02/19
DRAWN BY: CJF
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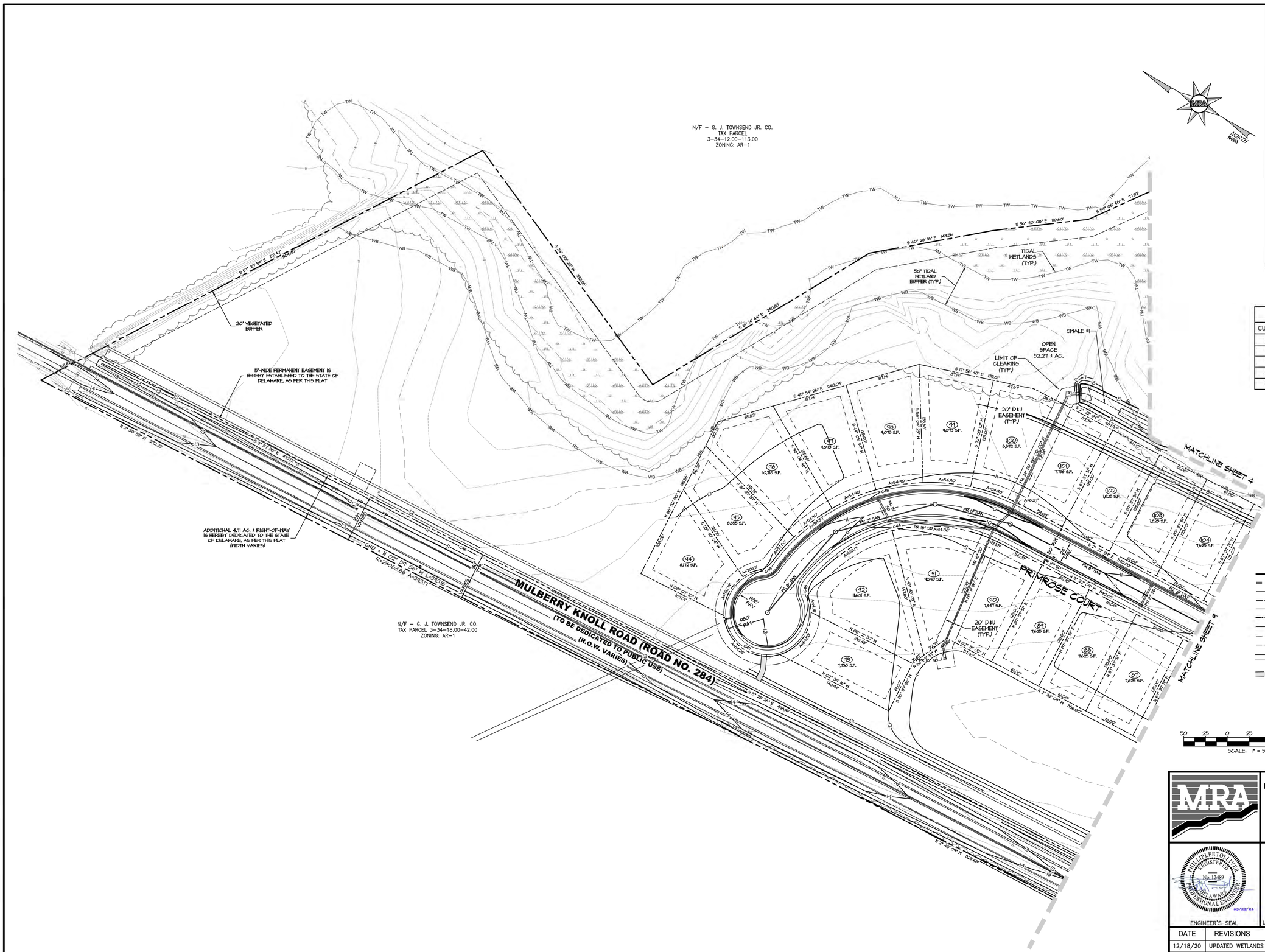
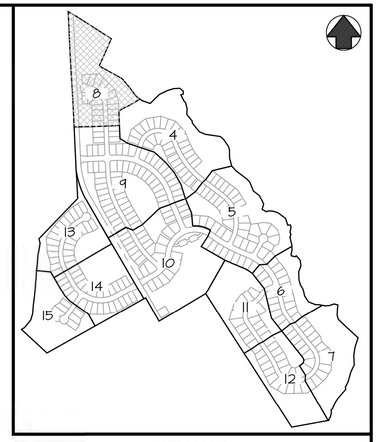
REVIEW BY: PLT
SHEET: 7 OF 15

PLAT





KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C44	236.08'	175.00'	077.29	S 41° 00' 57" E	218.58'
C45	318.37'	225.00'	081.07	N 42° 54' 18" W	292.47'
C46	24.95'	25.00'	057.18	N 71° 44' 55" E	23.93'
C47	240.46'	50.00'	275.54	N 00° 55' 55" E	67.21'
C48	18.39'	25.00'	042.15	N 62° 22' 06" W	17.98'

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE
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50 25 0 25 50 100
SCALE: 1" = 50'

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WILLIAM LEETOLLIVER REGISTERED No. 12489 DELAWARE PROFESSIONAL ENGINEER 03/25/21
ENGINEER'S SEAL

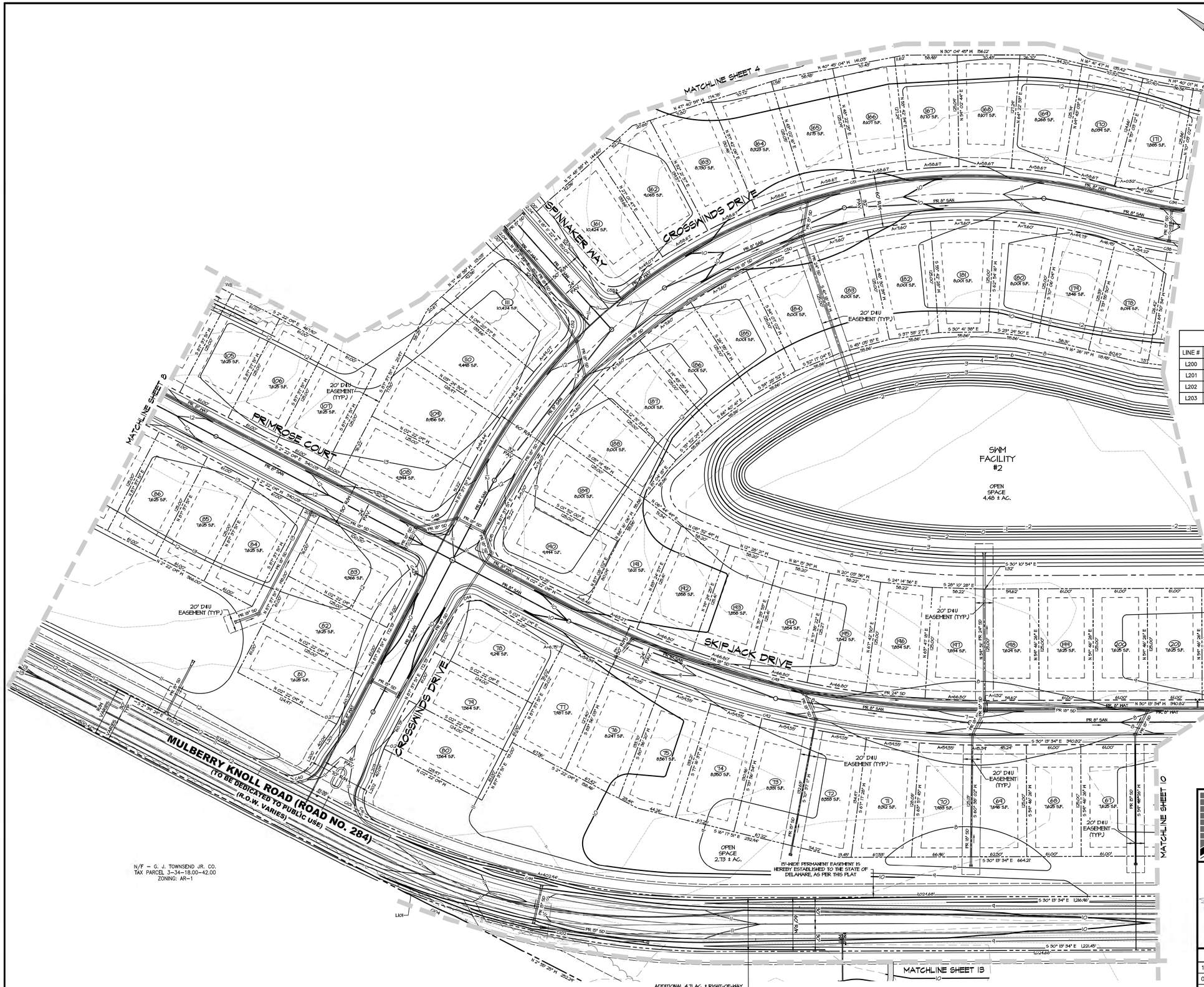
PRELIMINARY PLAT
FOR
SCENIC MANOR

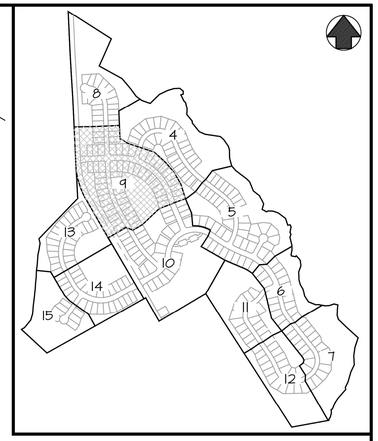
LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: 1"= 50'
DATE: 12/02/19
DRAWN BY: CJF
DESIGN BY: CJF
REVIEW BY: PLT
SHEET: 8 OF 15

PLAT





KEY MAP

SCALE: 1"=800'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L200	12.63	N 87° 37' 51" E
L201	40.31	S 85° 14' 38" E
L202	11.19	N 87° 37' 51" E
L203	40.31	N 80° 30' 21" E

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C38	121.37'	830.00'	008.38	S 19° 05' 20" E	121.27'
C39	112.60'	770.00'	008.38	N 19° 05' 20" W	112.50'
C40	39.14'	25.00'	089.71	S 47° 30' 49" E	35.27'
C41	40.48'	25.00'	092.76	N 41° 14' 58" E	36.20'
C42	39.27'	25.00'	090.00	S 42° 37' 51" W	35.36'
C43	39.27'	25.00'	090.00	S 47° 22' 09" E	35.36'
C49	177.91'	630.00'	016.18	S 84° 16' 43" E	177.32'
C50	770.70'	570.00'	077.47	N 53° 38' 03" W	713.32'
C51	577.63'	630.00'	052.53	N 41° 09' 58" W	557.61'
C52	37.29'	25.19'	084.83	N 61° 00' 02" E	33.98'
C53	37.29'	25.19'	084.83	S 24° 37' 17" E	33.98'
C92	498.35'	1025.00'	027.86	S 16° 17' 51" E	493.46'
C93	474.04'	975.00'	027.86	N 16° 17' 51" W	469.39'
C94	39.32'	24.88'	090.54	S 47° 22' 09" E	35.36'
C95	39.90'	23.70'	096.45	N 42° 37' 51" E	35.36'
C99	442.66'	920.00'	027.57	S 16° 26' 32" E	438.40'
C101	39.72'	920.00'	002.47	S 03° 53' 42" E	39.72'
C102	371.81'	980.00'	021.74	S 19° 21' 26" E	369.59'
C104	42.22'	477.93'	005.06	N 05° 12' 00" W	42.21'

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE
- PROPOSED RIGHT OF WAY LINE
- PROPOSED STORMWATER MANAGEMENT AREA
- LINE OF SIGHT
- PROPOSED SETBACK LINE
- PROPOSED EASEMENT LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100

SCALE: 1" = 50'

MORRIS & RITCHIE ASSOCIATES, INC.
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PHILIP LEE TOLLIVER — No. 12489 — REGISTERED PROFESSIONAL ENGINEER — 03/25/21

ENGINEER'S SEAL

PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: 1"= 50'
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DRAWN BY: CJF
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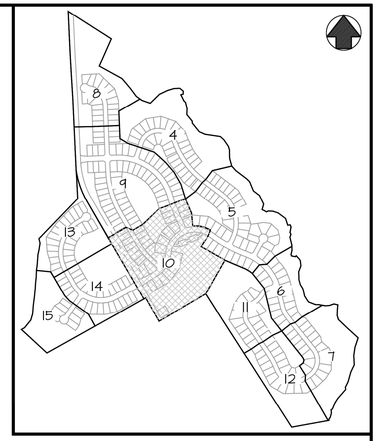
SHEET: 9 OF 15

PLAT

G:\20572--Mulberry Knoll\PLANNING\PRELIMINARY\PLOT\20572_PRELIM PLANS.dwg, 3/25/2021 2:38:48 PM, Copyright 2021 Morris & Ritchie Associates, Inc.

* NOTE:
THE EXACT SIZE AND CONFIGURATION OF COMMUNITY ACTIVE RECREATION AREA, INCLUDING CLUBHOUSE, POOL, AND DECKING, SHALL BE DETERMINED DURING THE FINAL ENGINEERING PROCESS AND SHALL BE SHOWN ON A SEPARATE SITE PLAN PREPARED FOR THE SAME.



KEY MAP
SCALE: 1"=800'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L204	30.00	S 59° 46' 26" W
L205	40.31	S 66° 53' 56" W
L206	30.00	S 59° 46' 26" W
L207	40.31	S 52° 38' 56" W
L208	36.49	S 59° 35' 44" W

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C24	39.27'	25.00'	090.00	S 14° 46' 26" W	35.36'
C25	39.27'	25.00'	090.00	N 75° 13' 34" W	35.36'
C26	30.45'	270.00'	006.46	S 56° 32' 35" W	30.43'
C27	43.97'	25.00'	100.77	S 02° 55' 40" W	38.52'
C28	44.85'	25.00'	102.79	S 81° 09' 00" W	39.07'
C29	311.93'	330.00'	054.16	S 32° 41' 42" W	300.44'
C30	116.66'	270.00'	024.76	S 17° 23' 36" W	115.76'
C31	573.33'	270.00'	121.66	S 66° 26' 53" W	471.52'
C32	297.72'	330.00'	051.69	S 31° 57' 50" W	287.72'
C33	297.46'	330.00'	051.65	N 78° 32' 34" W	287.49'
C34	35.38'	25.00'	081.09	S 17° 15' 56" W	32.50'
C35	35.38'	25.00'	081.09	S 63° 49' 18" E	32.50'
C36	233.07'	775.00'	017.23	S 38° 50' 30" E	232.19'
C37	218.03'	725.00'	017.23	N 38° 50' 30" W	217.21'
C38	121.37'	830.00'	008.38	S 19° 05' 20" E	121.27'
C39	112.60'	770.00'	008.38	N 19° 05' 20" W	112.50'

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE
- PROPOSED RIGHT OF WAY LINE
- PROPOSED STORMWATER MANAGEMENT AREA
- LINE OF SIGHT
- PROPOSED SETBACK LINE
- PROPOSED EASEMENT LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

MATCHLINE SHEET 9
MATCHLINE SHEET 5
MATCHLINE SHEET 11
MATCHLINE SHEET 10
MATCHLINE SHEET 13
CROSSWINDS DRIVE
SKIPJACK DRIVE
TOPSAIL WAY
SWAN CREEK DRIVE
STARDUST DR. (EX. PRIVATE R.O.W.)
MULBERRY KNOLL ROAD (ROAD NO. 284)
(TO BE DEDICATED TO PUBLIC USE)
(R.O.W. VARIES)
MULBERRY KNOLL ROAD
(EX. PERMANENT EASEMENT)
SWM FACILITY #2
SWM FACILITY #4
TOT LOT
*COMMUNITY ACTIVE RECREATION AREA
OPEN SPACE 2.20 ± AC.
OPEN SPACE 52.27 ± AC.
EX. BUILDING TO BE REMOVED
15'-WIDE PERMANENT EASEMENT IS HEREBY ESTABLISHED TO THE STATE OF DELAWARE, AS PER THIS PLAT
ADDITIONAL 4.71 AC. ± RIGHT-OF-WAY IS HEREBY DEDICATED TO THE STATE OF DELAWARE, AS PER THIS PLAT (WIDTH VARIES)
0.21 AC. ± TO BE DEDICATED TO SUSSEX COUNTY FOR SANITARY SEWER PUMP STATION
100-YR FLOODPLAIN
20' VEGETATED BUFFER (TYP.)
20' D4U EASEMENT (TYP.)
20' SEWER EASEMENT (TYP.)
N/F – WILLIAM E. TURNER & KELLY M. TURNER 3-34-18.00-52.00 DB 4170 PG 268 ZONING: AR-2
N/F – ROY W. MOORE & MELODY W. MOORE 3-34-18.00-53.00 DB 4176 PG 295 ZONING: AR-1

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ENGINEER'S SEAL

PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

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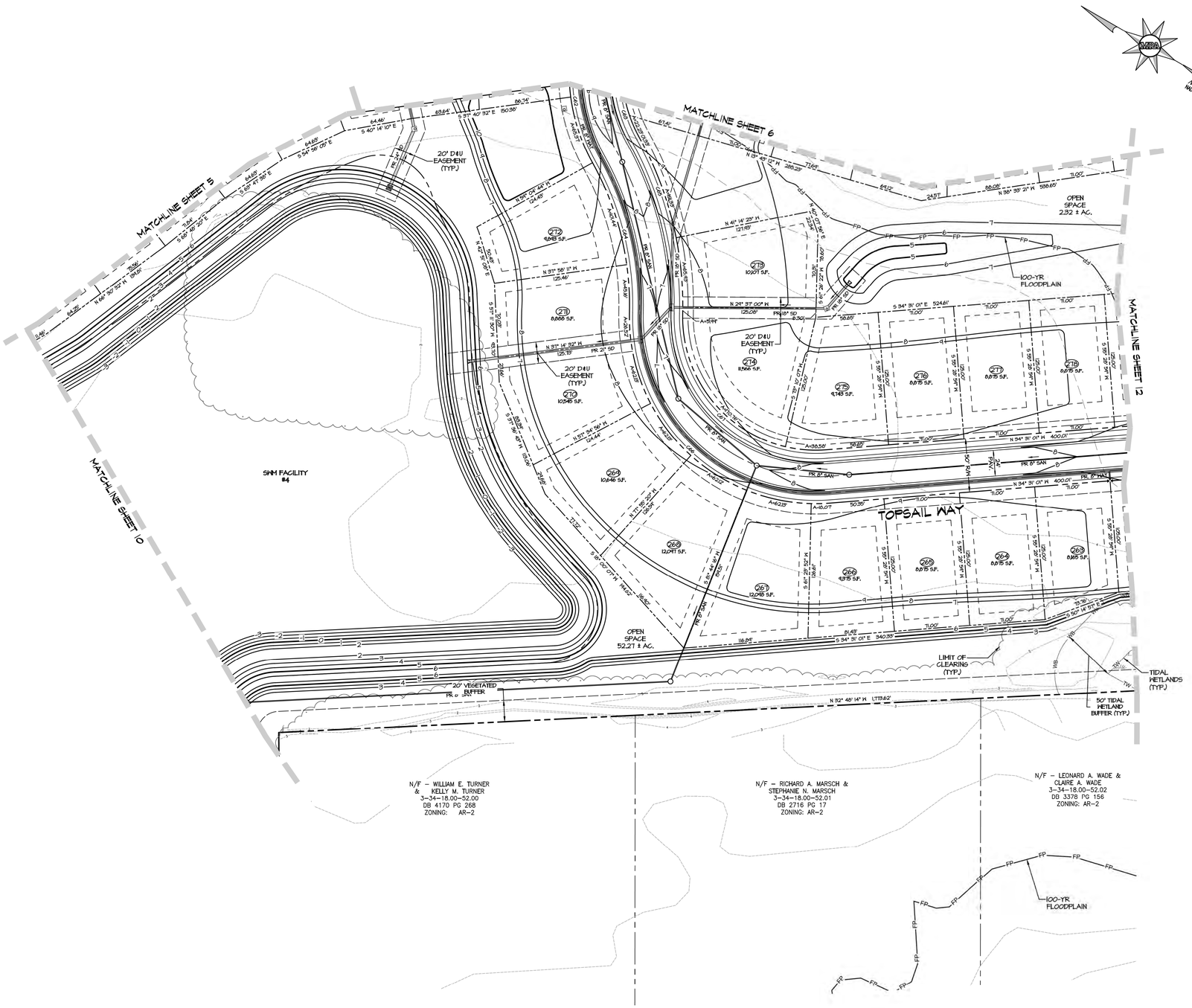
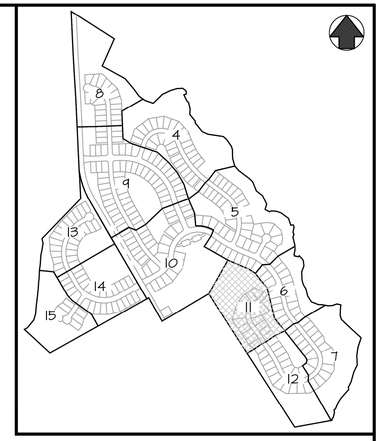
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: 1" = 50'
DATE: 12/02/19
DRAWN BY: CJF
DESIGN BY: CJF
REVIEW BY: PLT
SHEET: 10 OF 15

PLAT





KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C62	121.96'	175.00'	039.93	N 50° 51' 42" E	119.51'
C63	87.12'	125.00'	039.93	N 50° 51' 42" E	85.36'
C64	146.60'	275.00'	030.54	N 46° 10' 04" E	144.87'
C65	173.25'	325.00'	030.54	N 46° 10' 04" E	171.21'
C66	293.08'	175.00'	095.96	N 13° 27' 40" E	260.01'
C67	209.34'	125.00'	095.96	N 13° 27' 40" E	185.72'

LEGEND

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- LINE OF SIGHT
- PROPOSED SETBACK LINE
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- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

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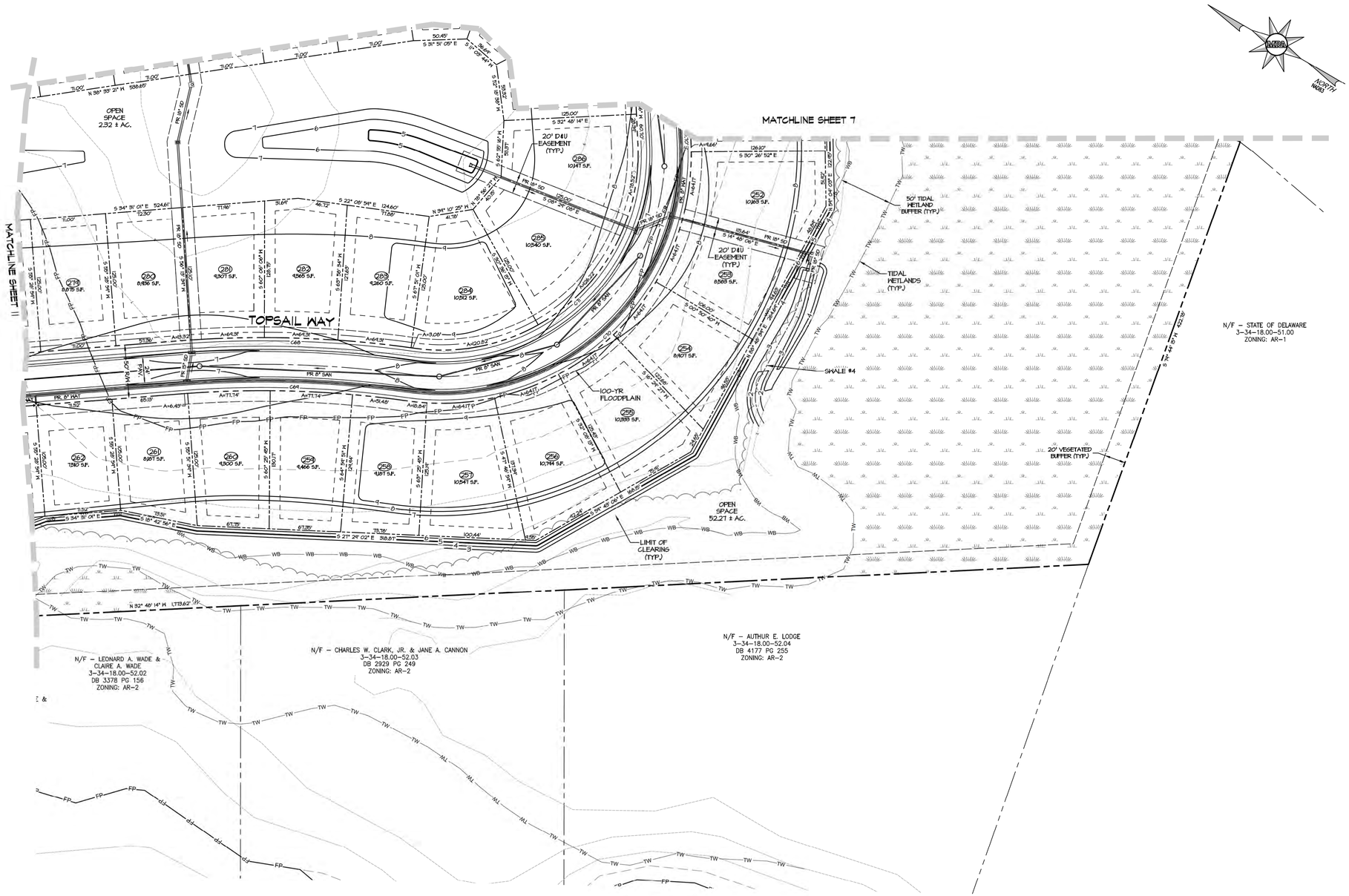

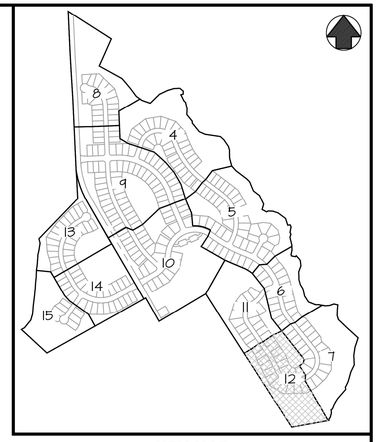

KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C68	224.33'	1025.00'	012.54	N 28° 14' 50" W	223.88'
C69	213.38'	975.00'	012.54	N 28° 14' 50" W	212.96'
C70	413.54'	235.00'	100.83	N 72° 23' 26" W	362.21'
C71	325.55'	185.00'	100.83	N 72° 23' 26" W	285.14'

LEGEND

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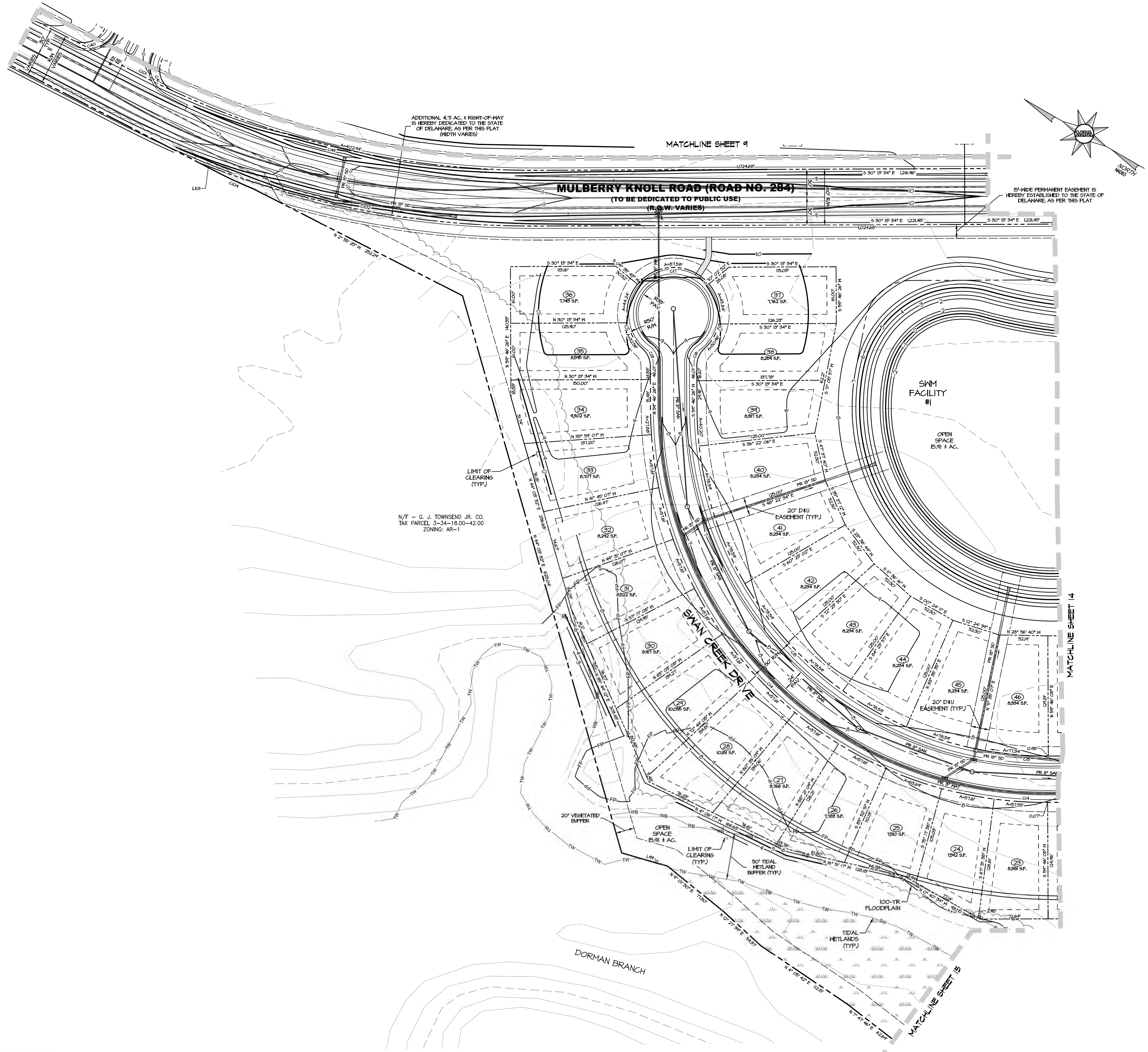

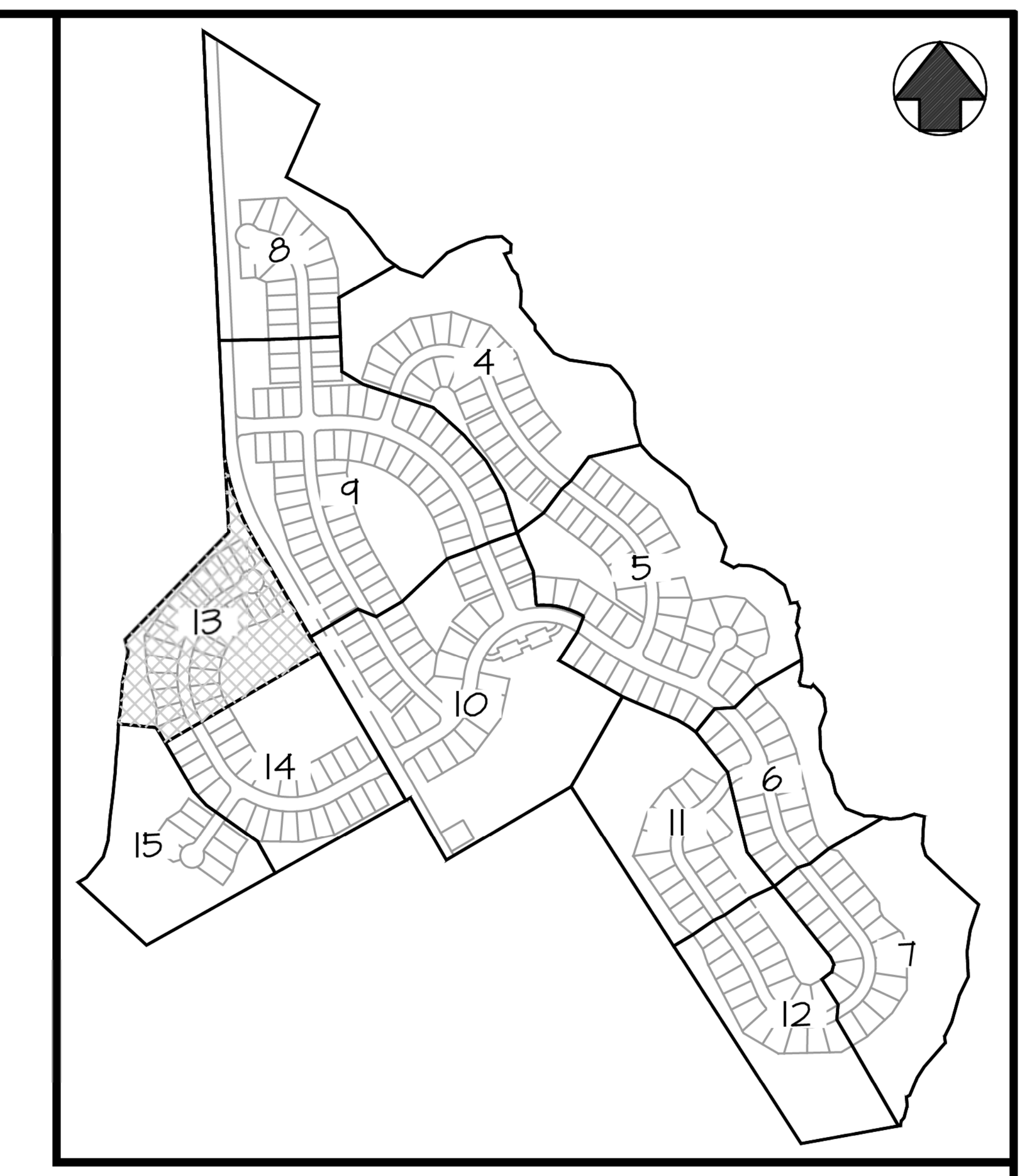

KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C14	667.62'	425.00'	090.00	N 14° 46' 17" E	601.07'
C15	589.08'	375.00'	090.00	N 14° 46' 17" E	530.35'
C16	21.03'	25.00'	048.19	S 83° 52' 07" W	20.41'
C17	241.19'	50.00'	276.38	S 30° 13' 34" E	66.67'
C18	21.03'	25.00'	048.19	N 35° 40' 44" E	20.41'
C40	39.14'	25.00'	089.71	S 47° 30' 49" E	35.27'
C41	40.48'	25.00'	092.76	N 41° 14' 58" E	36.20'
C99	442.66'	920.00'	027.57	S 16° 26' 32" E	438.40'
C101	39.72'	920.00'	002.47	S 03° 53' 42" E	39.72'
C102	371.81'	980.00'	021.74	S 19° 21' 26" E	369.59'
C104	42.22'	477.93'	005.06	N 05° 12' 00" W	42.21'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L99	51.18	N 13° 53' 34" W
L101	823.48	N 02° 40' 09" W

LEGEND

- EXISTING PROPERTY LINE
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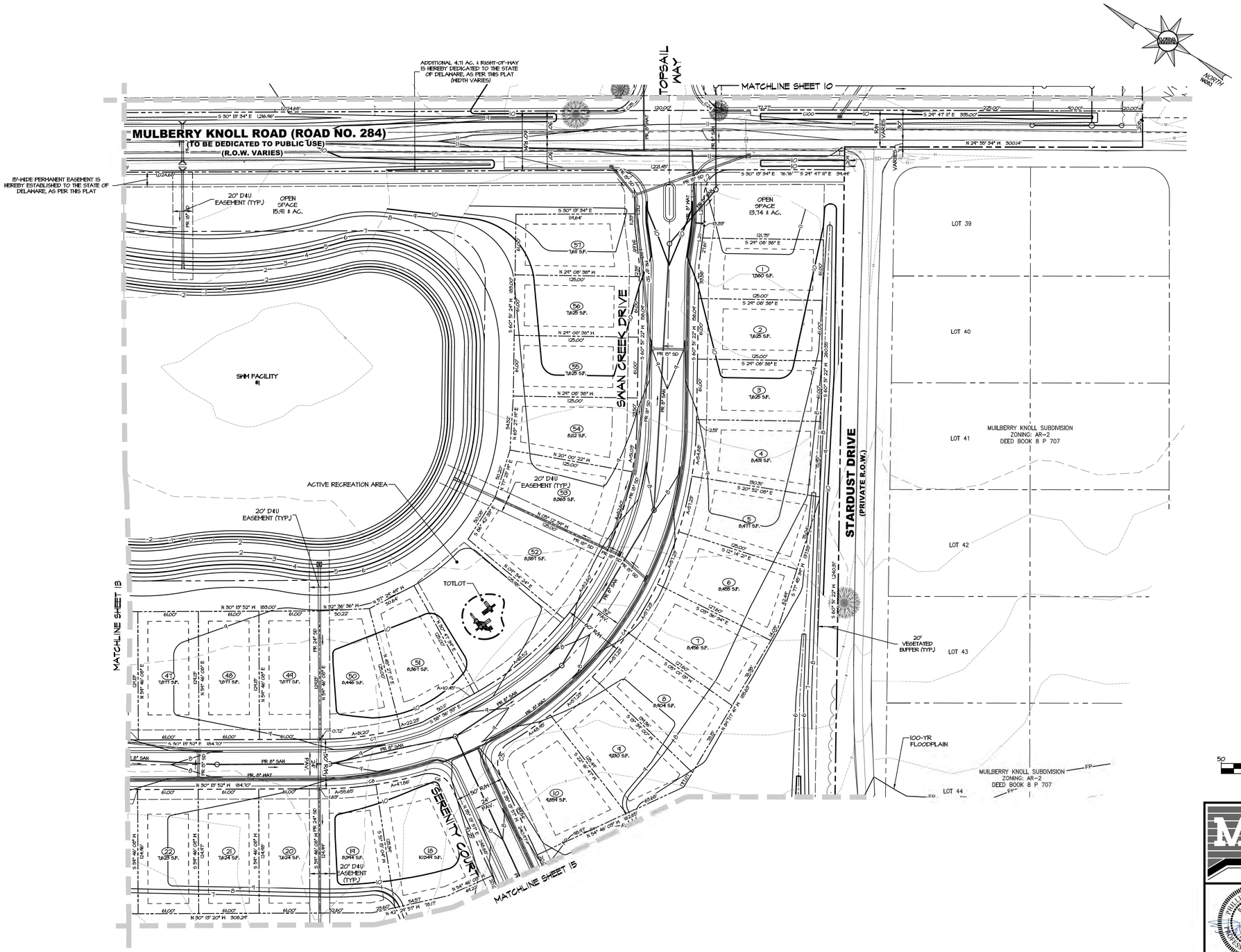

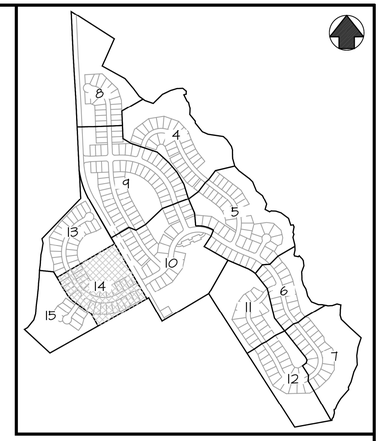

KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C1	39.27'	25.00'	090.00	N 14° 46' 26" E	35.36'
C2	39.17'	25.24'	088.90	N 75° 13' 34" W	35.36'
C4	390.00'	380.00'	058.80	N 89° 44' 31" W	373.11'
C5	36.84'	25.00'	084.43	S 77° 26' 46" W	33.59'
C6	35.50'	24.89'	081.72	N 05° 24' 19" W	32.56'
C7	103.44'	325.00'	018.24	N 39° 20' 55" W	103.00'
C8	103.51'	364.81'	016.26	N 38° 08' 14" W	103.16'
C14	667.62'	425.00'	090.00	N 14° 46' 17" E	601.07'
C15	589.08'	375.00'	090.00	N 14° 46' 17" E	530.35'
C24	39.27'	25.00'	090.00	S 14° 46' 26" W	35.36'
C25	39.27'	25.00'	090.00	N 75° 13' 34" W	35.36'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L208	36.49	S 59° 35' 44" W
L209	1263.09	S 60° 51' 22" W
L210	30.45	S 59° 46' 26" W
L211	40.94	S 67° 36' 36" W
L212	30.45	N 59° 46' 26" E
L213	39.68	S 53° 21' 57" W

LEGEND

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50 25 0 25 50 100
SCALE: 1" = 50'

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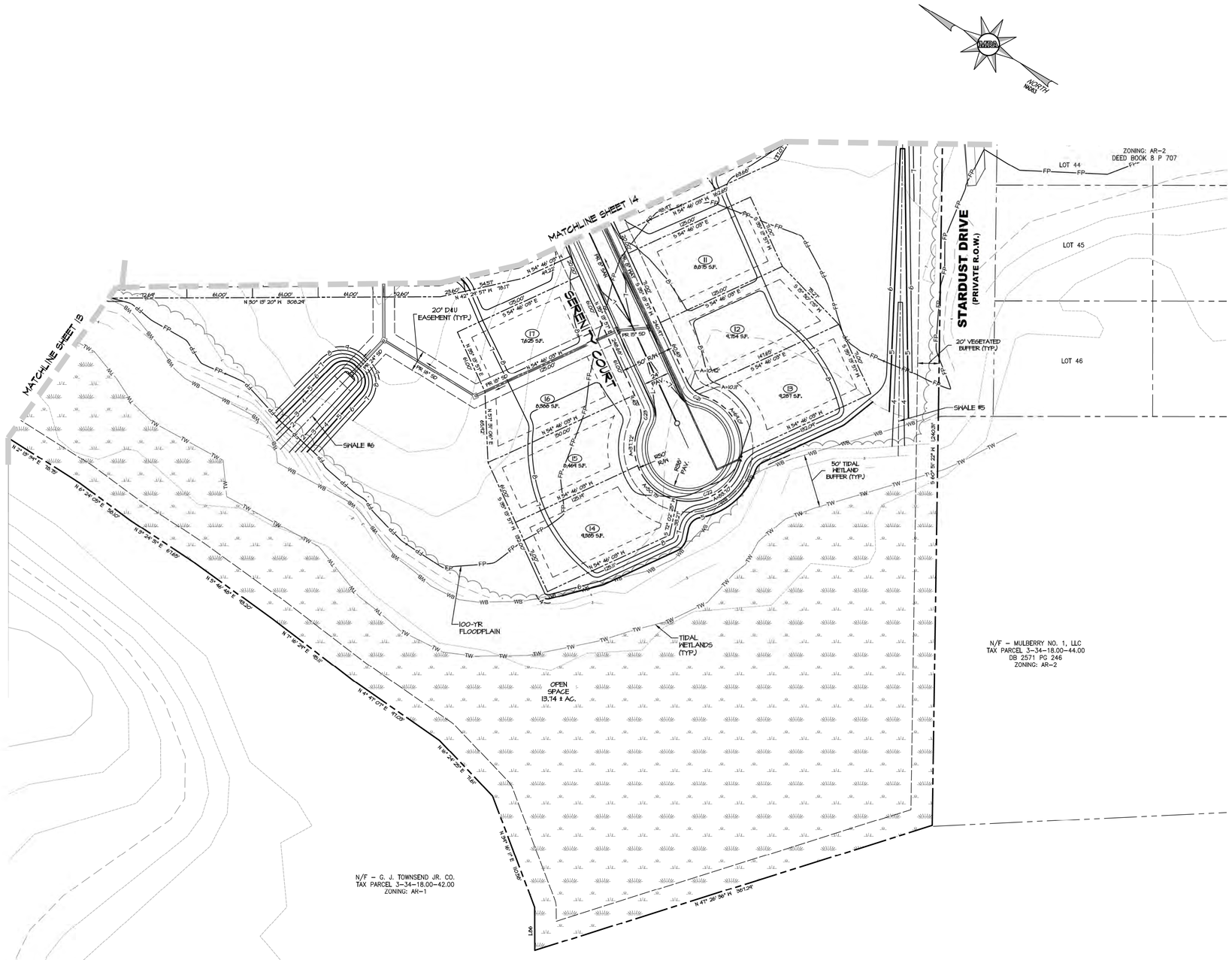

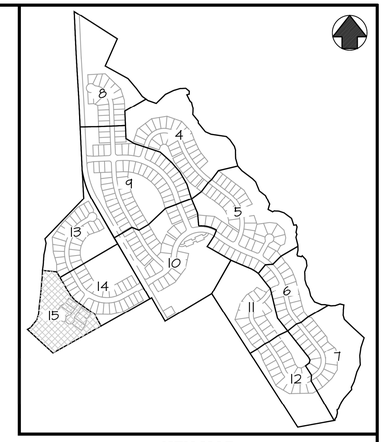

KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C21	21.03'	25.00'	048.19	S 11° 08' 16" W	20.41'
C22	241.19'	50.00'	276.38	N 54° 46' 03" W	66.67'
C23	21.03'	25.00'	048.19	N 59° 19' 39" E	20.41'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L86	40.00	N 59° 52' 00" E

LEGEND

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- PROPOSED EASEMENT LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
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PHILIP LEE TOLLIVER REGISTERED No. 12489 DELAWARE PROFESSIONAL ENGINEER 03/25/21
ENGINEER'S SEAL

PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: 1"= 50'
DATE: 12/02/19
DRAWN BY: CJF
DESIGN BY: CJF
REVIEW BY: PLT
SHEET: 15 OF 15

PLAT

ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS, AND
LANDSCAPE ARCHITECTS

SCENIC MANOR

A Residential AR-1 Cluster Community

Lewes & Rehoboth Hundred
Sussex County, Delaware

Developed By:

MKR Land Investment, LLC

Prepared By:
Morris & Ritchie Associates, Inc.
18 Boulden Circle, Suite 36
New Castle, DE 19720
Phone: (302) 326-2200
Attn: Christopher J. Flathers, P.E.

March 2021

20572

S C E N I C M A N O R

AR-1 CLUSTER COMMUNITY INFORMATION BOOKLET
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MR. JAMES A. FUQUA, ESQ.

L A N D U S E D A T A

Site Data:

Location:	Mulberry Knoll Road (Road 284) Approx. 6,300’ south of intersection with John J. Williams Hwy. (Route 24) Lewes, DE
Owner:	Thomas Best & Sons, Inc.
Tax Map Parcel Number:	334-18.00-43.00
Gross Acreage:	166.83 ± acres
Current Zoning:	AR-1
Proposed Zoning:	AR-1 Cluster

Floodplain: Portions of the site area are located within Zone AE (Special Flood Hazard Areas subject to inundation by the 1% annual chance flood with average depths of less than 1 foot).

Land Use Breakdown

Residential Lot Areas:	65.04 ± Acres 319 Detached Single Family Lots
Right-of-Way:	
Public R.O.W. (DelDOT Dedication)	4.71 ± Acres
Private R.O.W.	16.59 ± Acres
Open Space:	80.27 ± Acres 80.27 / 166.83 = 48.1 %
Dedicated to Sussex County:	0.22 ± Acres

Lot Compilation

	AR-1 Cluster
<u>Single Family</u>	
Min. Lot Area:	7,500 sf
Lot Width:	60 ft.
Front Yard Setback:	25 ft.
Side Yard Setback:	10 ft
Rear Yard Setback	10 ft.

Project Density

Gross Site Area	166.86 ± AC – 20.19 AC Wetlands = 146.64 ± ac.
319 d.u / 146.64 ac. =	2.175 d.u./ac.

E X E C U T I V E S U M M A R Y

Scenic Manor is a proposed AR-1 Cluster residential subdivision located on Mulberry Knoll Road, approximately 6,300 feet south of the intersection with John J. Williams Highway (Route 24) in an unincorporated portion of Sussex County, Delaware. The 166.83 acre site is located entirely within the Coastal Area, formerly referred to as the Environmentally Sensitive Development District Overlay Zone, as shown on the Sussex County Comprehensive Plan dated March 2019. Design and development concepts for Scenic Manor focused on creating a pedestrian friendly community of single-family detached dwellings with a community recreation area. The project site includes more than 80 acres of open space, with each of the residential lots connecting directly to open space.

The community recreation area is anticipated to include a community clubhouse building and outdoor pool and patio area. Sidewalks will be provided throughout the community along both sides of the vehicular thoroughfares to connect the residences to the community clubhouse area.

The majority of the development area is currently cleared and utilized for agricultural purposes. Due to high groundwater conditions anticipated on site, extended detention stormwater practices including wet ponds and/or created wetlands will be implemented to provide runoff management. Utilization of these facilities will provide a reduction in both runoff and nutrients (i.e. nitrogen, phosphorus) from the developed site.

The Scenic Manor site is currently located with the Goslee Creek Sewer Planning Area, immediately adjacent to the Mulberry Knoll Sanitary Sewer District. It is anticipated that the project will be annexed into the Mulberry Knoll Sanitary Sewer District, and the proposed on-site gravity system will connect to the Sussex County sewer infrastructure. The site is also located within an existing Certificate of Public Convenience and Necessity (CPCN) service area designated to Tidewater Utilities Inc. (TUI). Water mains will be extended from the existing TUI distribution mains located in the vicinity of Beacon Middle School and also interconnected to future infrastructure to be constructed as part of the Osprey Point residential project located on the easterly side of Arnell Creek.

Forested and/or landscaped buffer areas will be provided around the perimeter of the community in accordance with Section 99-5 of the Sussex County Code. The internal subdivision street system will be designed and constructed in accordance with Sussex County standards and will be privately owned and maintained upon completion. Consideration for pedestrian safety and convenience through traffic calming design techniques, sidewalks; unified street signage and lighting standards will be incorporated into the final design of the project.

Scenic Manor is anticipated to provide a vibrant community, with social and recreational benefits to the residents, economic benefits to the County and surrounding areas, while minimizing environmental impacts to the existing on-site resources and the neighboring properties.

A P P E N D I C E S

Appendix 1 – 99-9C Compliance

ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

Sussex County Code Chapter 99-9C Compliance

for

Scenic Manor

Lewes & Rehoboth Hundred
Sussex County, Delaware

Prepared By:
Morris & Ritchie Associates, Inc.
18 Boulden Circle, Suite 36
New Castle, DE 19720
Phone: (302) 326-2200
Attn: Christopher J. Flathers, P.E.

March 2021

SUSSEX COUNTY CODE
CHAPTER 99-9C COMPLIANCE

It is the intent of this submittal to demonstrate how the proposed Scenic Manor project meets, or exceeds, the regulatory requirements and follows the County growth objectives with regard to the Sussex County Code and Ordinances.

Located within the AR-1 Zoning District, and entirely within designated Coastal Area growth zone, the proposed residential community of Scenic Manor will include 319 single-family lots. Based upon an overall site area of 167+/- acres, and accounting for the presence of 20 +/- acres of tidal wetlands in accordance with Section 115-25A.(2) of the County Zoning Code, the resulting "gross area" density will be within the density permitted. The project will utilize the Cluster Development Option in an effort to efficiently utilize the available land areas, and promote a greater amount of preserved and usable open space areas within the site.

All infrastructure for the development (both on-site and off-site), will be designed and constructed at the developer's expense. The infrastructure will include roads, sidewalks, lighting within the project, off-site road improvements along road frontage, stormwater management, on-site sewer collection and transmission, on-site water distribution, and on-site community recreation facilities.

Water and sewer will both be centralized public systems. Water service for the community will be provided by Tidewater Utilities, Inc. (TUI). All water distribution will be designed to requirements of the State Fire Marshal's Office and DNREC and constructed in accordance with TUI standards. Sanitary sewer service for the community will be provided by Sussex County. All sanitary sewer systems will be designed in accordance with State and County requirements and constructed in accordance with Sussex County standards.

The Scenic Manor residential community is proposed to be developed as market rate single-family dwelling units. The nature of this development type is consistent with the existing development within the project area.

The information below is provided to address the requirements of Chapter 99-9C of the Sussex County Code:

1. Integration of the proposed subdivision into the existing terrain and surrounding landscape.

   The proposed development area is planned primarily within the limits of the parcel currently utilized for agricultural crops and will result in minimal clearing of existing wooded areas. Landscape buffers have been proposed around the entire perimeter of the site to provide buffering to the adjacent residential land uses. Proposed site grading is anticipated to maintain overall drainage patterns of the existing condition.

2. Minimal use of wetlands and floodplains.

   A Preliminary Wetlands Evaluation was performed by Geo-Technology Associates, Inc. (GTA) on the project site in July 2019. Based upon this investigation, it was determined that jurisdictional "Waters of the U.S", including wetlands were identified within the limits of the subject parcels in the professional opinion of GTA. As shown on the Preliminary Plan, a 50'-wide buffer area was provided adjacent to all tidal wetlands in accordance with Sussex County Code. No disturbance is anticipated to either the State regulated (tidal) or federally regulated (non-tidal) wetlands. If during the design process it is determined that disturbance to these resources is necessary, coordination with DNREC and/or the Army Corp of Engineers (ACOE) will be made in accordance with the applicable regulations.

   Review of the FEMA floodplain maps reveal that portions of the parcel are located within the limits of Zone AE, identified as "areas subject to inundation by the 1% annual chance flood." It is anticipated that the on-site grading will be revised to raise all roadway and lot areas above this base flood elevation, and the resulting floodplain will be revised through the CLOMR/LOMR process with FEMA. Due to the site's proximity to the tidal inland bays, the modification to the coastal floodplain is not anticipated to have an effect on any adjacent, or downstream, areas. The impacts to the floodplain as a result of the project, are therefore anticipated to be minor in nature.

3. Preservation of natural and historical features.

   As noted above, there are known natural environmental areas located on the project site. Rare and endangered plants, animals, and natural communities will be investigated during the course of design to better assist the preservation process in accordance with regulatory requirements. A Phase 1 Archaeological Survey was completed in February 2020; there are no existing historical structures located within the existing project boundary. There are no anticipated impacts to historical structures as a result of the proposed development.

4. Preservation of open space and scenic views.

   The implementation of cluster design option in the creation of the proposed Scenic Manor layout is anticipated to result in more than 80 acres (48%) to be utilized for passive and active open space purposes. Throughout much of the community, open space areas have been provided adjacent to almost all of the proposed residential lots, in addition to the perimeter buffers required by the Sussex County Zoning Code. The open space areas will be enhanced with new landscape plantings and perimeter landscape berms will be implemented where practical. A centralized community amenity area will be provided for the enjoyment and active recreation of the community residents.

The site is bordered to the northeast by Arnell Creek and the southwest by Dorman Branch. Preservation of tidal wetlands along both of these tidal streams will maintain scenic views throughout much of the community. Where the Scenic Manor project borders existing residential areas in the Mulberry Knoll community to the south, buffer areas will be provided to mitigate visual impacts to these areas as noted above.

5. Minimization of tree, vegetation and soil removal and grade changes.

   As noted above, much of the existing site has been previously cleared and is currently utilized for agricultural purposes. Of the existing 29 +/- acres of wooded areas on site, 21+/- acres are anticipated to remain undisturbed. It is anticipated that the new plantings proposed for the buffer areas and throughout the community open space areas will offset loss of trees due to clearing as a result of the proposed development.

   The design will follow the natural grade of the existing site to the greatest extent possible while maintaining proper drainage and stormwater flow within the project. Only those areas that are proposed for development are planned to be disturbed. Erosion and Sediment control BMPs will be employed in accordance with Sussex Conservation District (SCD) and Delaware Department of Natural Resources and Environmental Control (DNREC) guidelines in order to minimize erosion and loss of soil throughout the construction process.

6. Screening of objectionable features from neighboring properties and roadways.

   A 20'-wide landscaped buffer strip will be provided around the perimeter of the site adjacent to the neighboring residential parcels in accordance with Section 99-6 of the County Subdivision Code. Additionally, a 50' minimum building setback for residential use will be provided where the site abuts an existing agricultural use in accordance with Section 99-6G of the County Subdivision Code. As noted above, these areas will be enhance with landscape berms where feasible. A site landscape plan will be incorporated into the design documents with consideration given to the utilization of native Delaware plants and trees where practicable.

   Any proposed on-site sewer and water facilities, including the anticipated sanitary sewer pump station, will be screened with landscaping so that they are congruent with the surrounding areas.

7. Provision for water supply.

   Tidewater Utilities, Inc. (a certified PUC utility company) will provide central water service for the project. Plans will be submitted concurrently to both Sussex County and the State Department of Health and Human Services in order to obtain an Approval to Construct and an Approval to Operate with regard to all of the proposed water facilities.

As part of the water supply design, Fire Marshal requirements will be adhered to with regard to the water distribution system.

It is our understanding that public water facilities will likely be extended from to the project site along Mulberry Knoll Road from the intersection with John J. Williams Hwy (Rt. 24). An additional interconnection of the water system may be made to the TUI facilities proposed at the Osprey Point subdivision utilizing a crossing of Arnell Creek.

8. Provision for sewage disposal.

   Sussex County will provide central sewer service for the project. Plans will be submitted concurrently to both Sussex County Engineering and DNREC for ultimate approval of the plans and construction, in addition to the operation of the proposed wastewater collection, transmission, treatment, and disposal facilities.

   The Scenic Manor site is currently located within a Sussex County Planning District for sanitary sewer. It is anticipated that following the approval of the Preliminary Plan, that the site will be annexed into the Mulberry Knoll Sanitary Sewer District. The developer for the Scenic Manor site has been working with the County Public Works Engineering Section regarding the proposed Mulberry Knoll Sanitary sewer Pump Station. It is anticipated that the Scenic Manor site will utilize an on-site gravity collection system and discharge to this new County pump station facility.

9. Prevention of pollution of surface and groundwater.

   Stormwater faculties will be designed according to DNREC and SCD standards and regulations; as such, they will be designed to reduce impacts to surrounding natural water resources. Designs are anticipated to include the use of natural looking and functioning features like bio-swales, bio-retention, infiltration facilities, and/or extended detention wet pond facilities to allow the stormwater to receive pollutant removal prior to infiltration and/or discharge from the developed site.

10. Minimization of erosion and sedimentation, minimization of changes in groundwater levels, minimization of increased rates of runoff, minimization of potential for flooding and design of drainage so that the groundwater is maximized.

    Erosion and sediment control plans will be developed in accordance with regulatory requirements. Careful planning and construction phasing will allow the contractor to minimize the area of disturbance at any given time in order to limit the potential for sediment issues on-site.

    On-site stormwater facilities will be designed to filter and infiltrate or slowly release stormwater runoff to mimic existing conditions in order to not exacerbate downstream flooding issues. Infiltration and/or slow release facilities will be

employed in accordance with DNREC guidelines will help mimic recharge/discharge from the developed site for the Resource Protection Event Volume (RPv). Proximity of the site to the tidal portions of the Delaware inland bays will mitigate need for conveyance (Cv) and flood (Fv) management.

11. Provision for safe vehicular and pedestrian movement within the site and to adjacent roadways.

    Construction plans for the proposed site entrance and any off-site road improvements will be designed in accordance with DelDOT regulatory requirements. Modifications to the alignment of Mulberry Knoll Road have been proposed as part of the Preliminary Plan to address initial road geometer issues identified by DelDOT. Easement areas have been provided along the Mulberry Knoll Road frontages for the installation of a multimodal path in accordance with DelDOT's typical request. Final plans will be submitted to DelDOT for review and approval prior to construction.

    Construction plans for the interior private roads will be developed in accordance with the requirements of the Sussex County Code and Sussex County Engineering. Sidewalks are to be provided on both sides of all internal streets for enhanced pedestrian accessibility. Street lighting will also be provided along all private roads to promote safety within the development.

    All private roads and community parking lot areas will be designed in accordance with Fire Marshal requirements to ensure adequate lane widths, emergency access, and any additional safety features for fire / rescue vehicular movement.

12. Effect on area property values.

    The Scenic Manor project proposes a community comprised of market-rate, detached, single-family homes. This is consistent with the existing nearby communities of Mulberry Knoll, Old Landing Woods, Villages of Old Landing, and the recently approved Osprey Point subdivision. The extension of public utilities, (water and sanitary sewer) along Mulberry Knoll Road is anticipated to have a positive impact on surrounding property values.

13. Preservation and conservation of farmland.

    The subject parcel is located entirely within the Coastal Area designated growth zone as shown in the Sussex County Zoning Map and Comprehensive Development Plan. Utilization of a cluster type development configuration at the Scenic Manor Glen site will allow for the efficient utilization of land within the targeted growth areas, and reduce the development of agricultural areas outside of the growth areas.

14. Effect on schools, public buildings and community facilities.

The Scenic Manor site is located within the Cape Henlopen School District (CHSD). Based on similar projects within the area, an estimate of an one student per 6 homes may be anticipated as a result of this project. The proposed 319 single-family lots would therefore result in an increase of approximately 53 students being introduced to the CHSD. It is anticipated that the children of Scenic Manor would attend Love Creek Elementary School, Beacon Middle School, and Henlopen High School based on current distribution patterns within the district. Coordination with the school district will occur throughout the plan approval process to determine necessary school bus stop location(s) to serve the residents of Scenic Manor.

It is anticipated that additional local property taxes and the state contribution from income tax receipts will continue to support the school system to offset the impacts created by the additional student demand associated with this project.

15. Effect on area roadways and public transportation.

In accordance with DelDOT's recommendation, a Traffic Impact Study was prepared by The Traffic Group to analyze the impact the surrounding roadways and public transportation systems and submitted to DelDOT for review in April 2020. Based on the proposed 319 single-family homes, an estimated 3,023 average daily trips will be added to the existing road network surrounding the Scenic Manor site. During the TIS review process, Sussex County and DelDOT created the Henlopen Transportation Improvement District (TID) in order to better coordinate roadway improvements in the area. As a result of this TID coming online, the developer has opted to set aside the stand alone TIS analysis and participate in the TID program.

Through the DelDOT review and approval process related to the Site Entrance Plans and the Record Plats, the agreements establishing the TID contribution will be finalized and limits for road improvements for the project frontage on Mulberry Knoll Road will be determined in accordance with the TIS approval letter. References to these agreements and DelDOT improvements will be noted on the final Record Plan.

16. Compatibility with other area land uses.

The Scenic Manor residential project has been designed as a cluster subdivision under the provisions allocated by the Sussex County Zoning Code. The proposed single-family lots should blend in well with the surrounding land uses surrounding the project site as the area is dominated by residential uses, with surrounding properties comprised of a mixture of AR-1, AR-2, and MR Zoning classifications. The cluster development configuration and proposed lot sizes within the Scenic Manor community is similar in nature to the recently approved Osprey Point and the nearby community of Village of Old Landing.

17. Effect on area waterways.

Erosion and sediment control measures will be implemented during construction in accordance with DNREC requirements to minimize impact to surrounding waterways during the construction process. It is anticipated that permanent stormwater management facilities utilizing extended detention will be implemented where infiltration based practices are determined to not be practicable. These facilities will be provide slow release of the runoff to mimic pre-development hydrology in accordance with the State and Local requirements. Runoff from agricultural uses is often heavily loaded with sediment, nitrogen, and phosphorus. By developing the subject parcel, there is a potential improvement in water quality by converting the existing agricultural land with no stormwater practices into a residential community with stormwater facilities designed in accordance with current DNREC regulatory requirements.

Appendix 2 – Environmental Assessment and Public Utility Evaluation

115-194.3 Compliance

ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS, AND LANDSCAPE ARCHITECTS

Environmental Assessment & Public Facilities Evaluation

Sussex County Code Chapter 115-194.3 Compliance

for

Scenic Manor

Lewes & Rehoboth Hundred
Sussex County, Delaware

Prepared By:
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Phone: (302) 326-2200
Attn: Christopher J. Flathers, P.E.

March 2021

MRA Project 20572

E N V I R O N M E N T A L A S S E S S M E N T & P U B L I C F A C I L I T I E S E V A L U A T I O N

It is the intent of this submittal to demonstrate how the proposed Scenic Manor project meets, or exceeds, the regulatory requirements and follows the County growth objectives with regard to the Sussex County Code and Comprehensive Plan.

Located within the AR-1 Zoning District, and entirely within designated Coastal Area growth zone, the proposed residential community of Scenic Manor will include 319 single-family lots. Based upon an overall site area of 167+/- acres, and accounting for the presence of 20 +/- acres of tidal wetlands in accordance with Section 115-25A.(2) of the County Zoning Code, the resulting "gross area" density will be within the density permitted. The project will utilize the Cluster Development Option in an effort to efficiently utilize the available land areas, and promote a greater amount of preserved and usable open space areas within the site.

All infrastructure for the development (both on-site and off-site), will be designed and constructed at the developer's expense. The infrastructure will include roads, sidewalks, lighting within the project, off-site road improvements along road frontage, stormwater management, on-site sewer collection and transmission, on-site water distribution, and on-site community recreation facilities.

Water and sewer will both be centralized public systems. Water service for the community will be provided by Tidewater Utilities, Inc. (TUI). All water distribution will be designed to requirements of the State Fire Marshal's Office and DNREC and constructed in accordance with TUI standards. Sanitary sewer service for the community will be provided by Sussex County. All sanitary sewer systems will be designed in accordance with State and County requirements and constructed in accordance with Sussex County standards.

The Scenic Manor residential community is proposed to be developed as market rate single-family dwelling units. The nature of this development type is consistent with the existing development within the project area.

The information below is provided to address the requirements of Chapter 115-194.3.B(2) of the Sussex County Code:

a) *Proposed drainage design and the effect on stormwater quality and quantity leaving the site, including methods for reducing the amount of phosphorous and nitrogen in the stormwater runoff and the control of any other pollutants such as petroleum hydrocarbons or metals.*

   The grading of the developed site will attempt to maintain the drainage patterns of the pre-developed condition. Runoff from the developed site will be conveyed to on-site stormwater management (SWM) facilities through a combination of surficial sheet flow, open channel, and closed pipes.

   The permanent on-site SWM faculties will be designed in accordance with DNREC and Sussex Conservation District (SCD) standards to minimize potential impacts

to the receiving watershed. Designs are anticipated to include the use of infiltration based SWM practices including bio-swales, bio-retention, infiltration basins, as well as created wetlands and/or extended detention wet pond facilities. These facilities will achieve pollutant loading to the receiving watershed through a combination of sedimentation, nutrient uptake, and runoff reduction. All SWM facilities will be designed in accordance with DNREC standards to achieve pollutant reduction requirements.

Erosion and sediment control measures will be implemented during the construction phase in accordance with DNREC requirements to minimize impact of sediment laden runoff discharging to the watershed. Runoff from agricultural uses is often heavily loaded with sediment, nitrogen, and phosphorus. By developing the subject parcel, there is a potential improvement in water quality by converting the existing agricultural land with no stormwater practices into a residential community with stormwater facilities designed in accordance with current DNREC regulatory requirements.

b) *Proposed method of providing potable and, where appropriate, irrigation water and the effect on public or private water systems and groundwater, including an estimate of average and peak demands.*

The Scenic Manor project is located within the CPCN service area assigned to Tidewater Utilities, Inc. (TUI). The project will utilize public water supply to provide potable water and fire protection throughout the community. It is anticipated that the on-site distribution system will connect to the existing TUI water main located near the intersection of Mulberry Knoll Road and John J. Williams Hwy (Route 24); an additional interconnection may be made to the TUI facilities being constructed in the nearby Osprey Point project. No large scale irrigation is anticipated as a result of this project.

Plans will be developed in accordance with TUI and Sussex County standards. These plans will be submitted concurrently to both Sussex County and the State Department of Health and Human Services in order to obtain an Approval to Construct and an Approval to Operate with regard to all of the proposed water facilities.

The 319 single-family homes and community center proposed by this project are anticipated to result in an average daily water demand of 95,700 gallons, with a corresponding peak demand of 143,550 gallons per day. With no on-site wells proposed by this project, there is no anticipated direct impact to the groundwater at the site location due to the proposed water use.

c) *Proposed means of wastewater treatment and disposal with an analysis of the effect on the quality of groundwater and surface waters, including alternative locations for on-site septic systems.*

The Scenic Manor project is currently located within the County's Sewer Planning Area. The Developer has initiated discussions with Sussex County Engineering regarding the annexation of the project into the adjacent Mulberry Knoll Sanitary Sewer District (MKSSD). A Sewer Service Concept Evaluation (SSCE) was

prepared by the Sussex County Utility Planning Division in November 2019; it is anticipated that the proposed on-site gravity sewer system will connect to the County sanitary sewer pump station designed to serve the MKSSD in accordance with the SSCE recommendations.

Plans will be developed in accordance with Sussex County standards and submitted concurrently to both Sussex County Engineering and the Delaware Department of Natural Resources for ultimate approval of the plans and construction.

d) *Analysis of the increase in traffic and the effect on the surrounding roadway system.*

In accordance with DelDOT's recommendation, a Traffic Impact Study was prepared by The Traffic Group to analyze the impact the surrounding roadways and public transportation systems and submitted to DelDOT for review in April 2020. Based on the proposed 319 single-family homes, an estimated 3,023 average daily trips will be added to the existing road network surrounding the Scenic Manor site. During the TIS review process, Sussex County and DelDOT created the Henlopen Transportation Improvement District (TID) in order to better coordinate roadway improvements in the area. As a result of this TID coming online, the developer has opted to set aside the stand alone TIS analysis and participate in the TID program.

Through the DelDOT review and approval process related to the Site Entrance Plans and the Record Plats, the agreements establishing the TID contribution will be finalized and limits for road improvements for the project frontage on Mulberry Knoll Road will be determined in accordance with the TIS approval letter. References to these agreements and DelDOT improvements will be noted on the final Record Plan.

e) *The presence of any endangered or threatened species listed on federal or state registers and proposed habitat protection areas.*

No endangered or threatened species are known to exist on site. No protected critical habitat areas are known to exist on the site for federally threatened or endangered species based upon review of the US Fish & Wildlife Services Critical Habitat mapping tool.

(https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77)

DNREC has noted that the site may contain potential habitat for the Tiger Salamander, a state protected species. Scenic Manor plan does not propose any disturbance to the wooded wetland areas of the site, the most likely habitat and breeding area for the salamander. In accordance with DNREC recommendations: tree clearing will be limited, preserving approximately 72% of the wooded areas on-site, and subdivision streets will utilize rolled curbs to facilitate salamander crossing of roadway areas.

f) The preservation and protection from loss of any tidal or non-tidal wetlands on the site.

A Preliminary Wetlands Evaluation was performed by Geo-Technology Associates, Inc. (GTA) on the project site in July 2019. Based upon this investigation, it was determined that jurisdictional "Waters of the U.S", including both tidal and non-tidal wetlands were identified within the limits of the subject parcels in the professional opinion of GTA. As shown on the Preliminary Plan, a 50'-wide buffer area was provided adjacent to all tidal wetlands in accordance with Sussex County Code. No disturbance is anticipated to either the State regulated (tidal) or federally regulated (non-tidal) wetlands. If during the design process it is determined that disturbance to these resources is necessary, coordination with DNREC and/or the Army Corp of Engineers (ACOE) will be made in accordance with the applicable regulations.

g) Provisions for open space as defined in § 115-4.

The implementation of cluster design option in the creation of the proposed Scenic Manor layout is anticipated to result in more than 80 acres (48% of total site area) to be utilized for passive and active open space purposes. Throughout much of the community, open space areas have been provided adjacent to almost all of the proposed residential lots. In addition, buffer areas will be provided around the perimeter of the parcel boundary in accordance with requirements of the Sussex County Zoning Code. The open space areas will be enhanced with new landscape plantings and perimeter landscape berms will be implemented where practical. A centralized community amenity area will be provided for the enjoyment and active recreation of the community residents. Additional community features will include sidewalks on both sides of the roadways throughout the community, pedestrian linkages to amenity areas, pocket parks, tot-lots, and a kayak launch area.

h) A description of provisions for public and private infrastructure.

Public infrastructure will be utilized to provide sanitary sewer and water service for the proposed community, as noted above. The existing section of Mulberry Knoll Road that traverses the project site will be re-constructed to bring it up to current DelDOT standards and the associated right-of-way will be dedicated to public use for future maintenance by DelDOT. The internal community streets and associated storm drainage will be private infrastructure designed in accordance with current Sussex County standards, and will be owned and maintained by the Scenic Manor Homeowners Association (SMHOA).

Public water will be provided by TUI; all water mains will be designed and constructed in accordance with TUI and Sussex County standards as applicable. TUI will operate and maintain the water facilities throughout the community.

Public sanitary sewer will be provided by Sussex County; all sewers will be designed and constructed in accordance with Sussex County standards. Sussex County will operate and maintain the sewer facilities throughout the community.

The on-site stormwater management facilities will be designed and constructed in accordance with DRNEC and SCD standards as applicable. The TCHOA will be responsible for the long-term maintenance and operation of all on-site SWM facilities.

i) Economic, recreational or other benefits.

The architecture, housing styles, and proposed construction practices that are anticipated to be used for the proposed Scenic Manor community will likely mirror those practices employed at the nearby communities of Redden Ridge and Sawgrass South. Located along Old Landing Road to the northeast of the project site. The extension of public infrastructure (water, road improvements) to the neighboring properties is anticipated to have a positive impact on surrounding property values.

The Scenic Manor community will incorporate a central amenity feature that will provide an active recreation component for use by the community residents.

The subject parcel is located entirely within the Coastal Area growth zone (formerly ESDDOZ) as shown in the Sussex County Zoning Map and Comprehensive Development Plan. Utilization of a cluster type development configuration under the County Zoning Code will allow for the efficient utilization of land within the targeted growth areas, and reduce the development of agricultural areas outside of the growth area.

j) The presence of any historic or cultural resources that are listed on the National Register of Historic Places.

The Scenic Manor site contains no known historic or cultural resources that are listed on the National Register of Historic Places. In addition, a Phase I Archaeological Survey was completed, and no evidence of burial sites were discovered within the area of investigation.

k) An affirmation that the proposed application and proposed mitigation measures are in conformance with the current Sussex County Comprehensive Plan.

The entirety of the Scenic Manor site is located within the Coastal Area as shown on the current Sussex County Comprehensive Plan. The site has ready access to public utilities as noted above. Utilizing the cluster design approach afforded by the County Code will allow for efficient use of the project site.

l) Actions to be taken by the applicant to mitigate the detrimental impacts identified relevant to Subsection B(2)(a) through (k) above and the manner by which they are consistent with the Comprehensive Plan.

The Scenic Manor project, from site selection, to site layout, has resulted in a proposed project that will have minimal detrimental impact on the natural resources of the County, and the area surrounding the project site. The Scenic Manor site design aligns with the goals of the Sussex County Comprehensive Plan:

The Scenic Manor site is located within the Coastal Area growth zone; this is consistent with the County's strategy to "prioritize new development in designated Growth Areas to better preserve other areas".

The Scenic Manor project is located within Goslee Creek planning area, adjacent to both the Mulberry Knoll Sanitary Sewer District (SSD) and the West Rehoboth Expansion of the Dewey Beach SSD. Upon approval of the project, it is anticipated that the site area will be annexed into the Mulberry Knoll SSD. The project area is located within the Tidewater Utilities CPCN area, with easy access to existing Tidewater water mains north of the project site along Mulberry Knoll Road and at the intersection of Mulberry Knoll Road and Route 24. This is consistent with the County's objective for "planning that considers the efficient location of public services and infrastructure."

The project will be reviewed by DelDOT for impacts to the surrounding Road network. It is anticipated that the developer will contribute to DelDOT's Traffic Signal Revolving Fund to mitigate offsite impacts at selected intersections. This approach is consistent with the County's strategy for the coordination with "DelDOT on road improvements and other transportation projects."

The Scenic Manor site is impacted by both wetlands and delineated FEMA floodplains as noted above. Buffers to the tidal wetlands will provide protection of these resources in accordance with County Code requirements, the remaining non-tidal jurisdictional wetland areas are anticipated to remain undisturbed. Much of the site is surrounded by tidal wetland areas. In order to minimize impact of stormwater runoff to these areas, runoff will be conveyed to on-site BMPs to the maximum extent practicable. Where structural BMPs (i.e. ponds, bio-retention) are not provided, non-structural BMPs (i.e. sheet flow to buffers) will be provided to reduce impacts to wetland areas. Portions of the site, currently located within the FEMA delineated floodplain, are proposed to be elevated in order to raise the roadway access and lot areas above the base flood elevation. Due to the site's proximity to the tidal inland bay area, the on-site grading that will impact the floodplain are not anticipated to have a negative impact to the downstream, or neighboring properties. Through considerate clearing and grading, combined with the implementation of on-site BMPs to the maximum extent practicable, the impacts to the existing natural resources are consistent with the County's objective "for preserving environmental areas from development and the protection of wetlands and waterways."

The site area is boarded to the south and east (across Arnell Creek) by existing residential uses; the lands on the remaining boundaries are designated for future residential use. The overall project density is generally consistent with other existing residential communities in the surrounding area. The Scenic Manor project is proposing the implementation of a 20'-wide vegetative buffer surrounding the outer boundary of the project area bordering the neighboring residential properties in accordance with the County Code requirements. Where feasible, these buffer areas will be enhanced with berms in order to "minimize the adverse impacts of development on existing development."

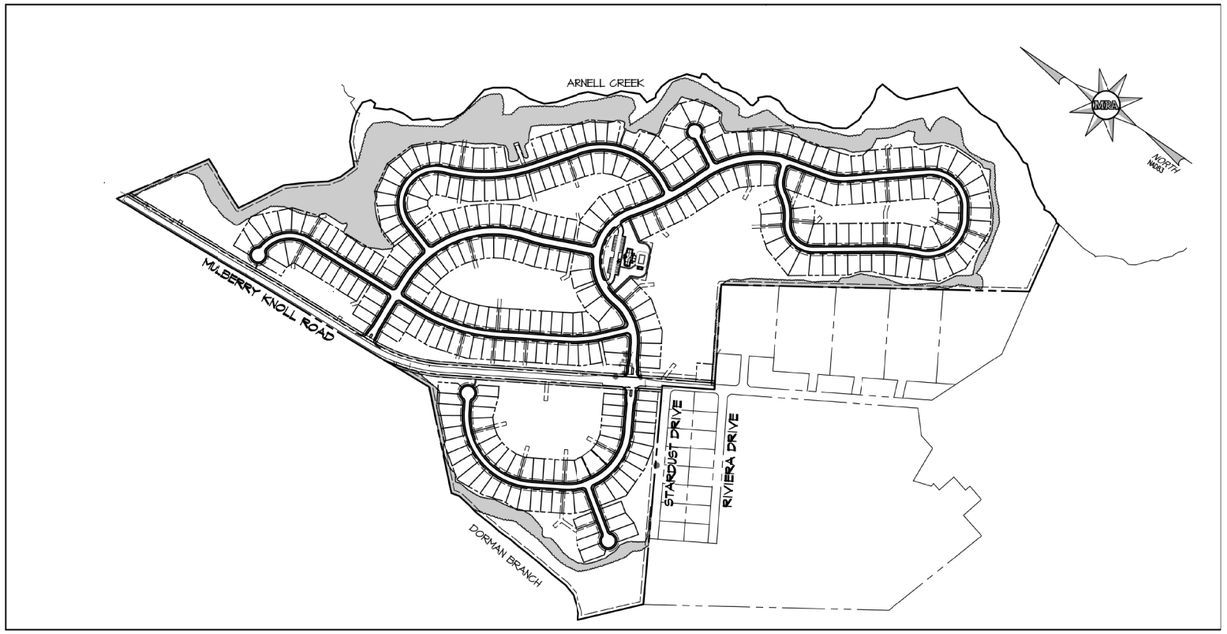
The implementation of the cluster style development under the County Code ordinance will allow for the efficient use of the Scenic Manor site, while also providing for increased open space areas within the community. The project area is currently zoned for residential use and has been identified by the County for development under the Coastal Area designation. The efficient utilization of this site will allow for the concentration of development within one of the growth areas, and allow for the preservation of the rural areas of the County to support the "importance of the agricultural land base of the County".

While the Scenic Manor site does not front directly on an inland bay, the close proximity does place the site within the Love Creek / Rehoboth Bay watershed. Additionally, boundaries of the project do include tidal wetland areas. As noted above, buffer areas will be provided in accordance with Sussex County Code requirements adjacent to all tidal wetland areas. Throughout the construction phase of the project, temporary erosion control measures will be utilized to minimize the discharge of sediment laden water off-site. In the final configuration of the site structural and no-structural SWM BMPs will be utilized to reduce the direct discharge of polluted runoff to the watershed. The practices will support the County's goal to "recognize the importance of the Inland Bays."

Appendix 3 – Preliminary Plan

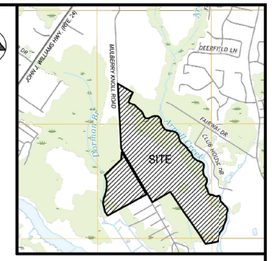
SCENIC MANOR

SUSSEX COUNTY, DELAWARE
PRELIMINARY PLANS
AR-1 CLUSTER
SUSSEX COUNTY PLANNING # XXXX



SITE OVERVIEW
SCALE: 1" = 400'

SCALE: 1" = 400'



LOCATION MAP
SCALE: 1" = 2000'

LEGEND

- EXISTING PROPERTY LINE
- PROPOSED R/W LINE
- PROPOSED LOT LINE
- PROPOSED BUILDING SETBACK LINE
- 44 EXISTING CONTOURS
- 44 PROPOSED CONTOURS
- (1) PROPOSED LOT NUMBER
- EXISTING WOODLANDS LINE
- WOODLAND PRESERVATION LINE

PROJECT TEAM

DEVELOPER:
MKR LAND INVESTMENT, LLC
MR. JOHN RICHARDSON
260 HOPEWELL ROAD
CHURCHVILLE, MD 21028

LAND PLANNERS, CIVIL ENGINEER:
MORRIS & RITCHIE ASSOCIATES, INC.
18 BOULDEN CIRCLE, SUITE 36
NEW CASTLE, DE 19720
ATTN: MR. PHILLIP L. TOLLIVER, P.E.

SURVEYOR:
MORRIS & RITCHIE ASSOCIATES, INC.
8 WEST MARKET STREET
GEORGETOWN, DE 19947
ATTN: MR. GARY POWERS

ENVIRONMENTAL CONSULTANT:
GEO-TECHNOLOGY ASSOCIATES, INC.
3445 BOX HILL CORPORATE CENTER DRIVE, SUITE A
ABINGDON, MD 21009
ATTN: MR. ANDY STANSFIELD

GEOTECHNICAL ENGINEER:
GEO-TECHNOLOGY ASSOCIATES, INC.
21183 STERLING AVENUE, SUITE 7
GEORGETOWN, DE 19947
ATTN: MR. GREG SAUTER

TRAFFIC CONSULTANT:
THE TRAFFIC GROUP
9900 FRANKLIN SQUARE DR. - SUITE H
BALTIMORE, MD 21236
ATTN: MR. JOE CALOGGERO, P.E.

ATTORNEY:
FUGUA, WILLARD, STEVENS & SCHAB, P.A.
20245 BAY VISTA ROAD #203
REHOBOTH BEACH, DE 19971
ATTN: MR. JAMES A. FUGUA, JR.

INDEX OF DRAWINGS

OWNER / DEVELOPER CERTIFICATION

I, UNDERSIGNED, AS OWNER AND DEVELOPER OF THE PROPERTY SHOWN, HEREBY APPROVE THESE PLANS FOR DEVELOPMENT AS SHOWN OR OTHERWISE NOTED.

MR. JOHN RICHARDSON — DATE
MKR LAND INVESTMENT, LLC

WETLANDS STATEMENT

GEO-TECHNOLOGY ASSOCIATES, INC. (GTA) HAS CONDUCTED A FIELD REVIEW WITHIN THE BOUNDARIES OF THIS PLAT TO EVALUATE THE PRESENCE OR ABSENCE OF POTENTIAL STATE AND FEDERAL JURISDICTIONAL WETLANDS FOR THE PURPOSES OF DELAWARE WETLAND AND SUBAQUEOUS LAND REGULATIONS AND SECTION 404 OF THE CLEAN WATER ACT. GTA'S REVIEW WAS CONDUCTED IN GENERAL ACCORDANCE WITH THE TECHNIQUES AND CRITERIA PROVIDED IN THE 1987 CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL: ATLANTIC AND GULF COSTAL PLAIN REGION (VERSION 2.0), DATED NOVEMBER 2010. THE LIMITS OF THE WETLANDS WERE EVALUATED IN THE FIELD BY GTA PERSONNEL USING BEST PROFESSIONAL JUDGEMENT. NO WETLANDS OR WATERWAYS WERE OBSERVED WITHIN THE BOUNDARIES OF THIS PLAT. NO STATE OR FEDERAL JURISDICTIONAL APPROVAL WAS OBTAINED FOR THIS PROPERTY.

ANDY STANSFIELD — DATE
GEO-TECHNOLOGY ASSOCIATES, INC.

ENGINEER'S CERTIFICATION

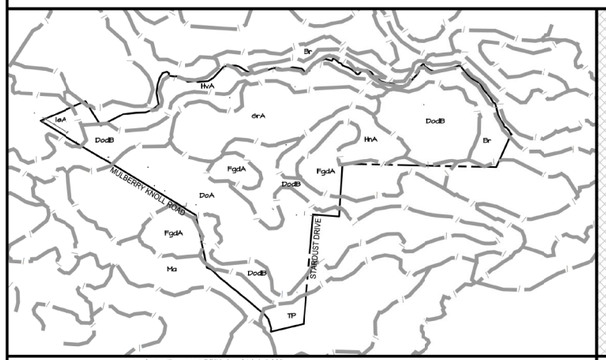
I, THE UNDERSIGNED, HEREBY CERTIFY THAT I AM A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF DELAWARE AND THAT THE PLAN SHOWN AND DESCRIBED HEREON, IS TRUE AND CORRECT TO THE ACCURACY REQUIRED BY ACCEPTED STANDARDS AND PRACTICES AND BY THE SUSSEX COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS TO THE EXTENT THAT IT DESCRIBES THE PROPOSED MANNER AND LAYOUT OF THE SUBDIVISION.

PHILLIP L. TOLLIVER, P.E. — DATE
DE LICENSE NO. #12489

PLAN APPROVALS

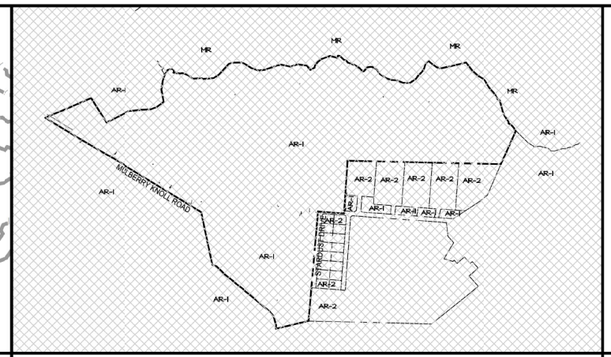
APPROVED BY: _____ DATE
CHAIRMAN OR SECRETARY
SUSSEX COUNTY PLANNING AND ZONING COMMISSION

APPROVED BY: _____ DATE
PRESIDENT
SUSSEX COUNTY PLANNING



SOILS MAP
SCALE: 1" = 800'

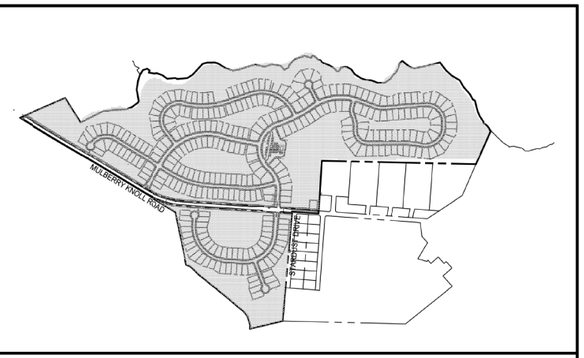
DnA, DnB - DONNER LOAMY SAND
FmA - FORT MOTT LOAMY SAND
LO - LONGMARSH AND INDIANTOWN SOILS
PpA - PEPPERBOX LOAMY SAND



ZONING MAP
SCALE: 1" = 800'

COASTAL AREA (FORMERLY ESDDOZ)

AR-1 - AGRICULTURAL RESIDENTIAL
AR-2- AGRICULTURAL RESIDENTIAL
MR - MEDIUM RESIDENTIAL



PHASING MAP
SCALE: 1" = 800'

THE PROJECT WILL BE APPROVED AS A SINGLE PHASE PROJECT WITH SIX (6) OPERATIONAL BREAKS FOR PURPOSES OF BONDING, BENEFICIAL OCCUPANCY INSPECTION, RELEASE OF USE AND OCCUPANCY PERMITS.

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE 36
NEW CASTLE, DELAWARE 19720
(302) 326-2200
FAX: (302) 326-2399
WWW.MRAGTA.COM

PHILLIP L. TOLLIVER — REGISTERED — No. 12489 — DELAWARE — PROFESSIONAL ENGINEER
03/25/21
ENGINEER'S SEAL

TITLE SHEET
PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS	
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION	JOB NO.: 20572
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP	SCALE: AS NOTED
		DATE: 12/02/'19
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 1 OF 15

G:\20572-Mulberry Knoll\PLANNING\PRELIMINARY\PLOT\20572_PRELIM TITLE SHEET.dwg, 3/25/2021 2:35:45 PM, Copyright 2021 Morris & Ritchie Associates, Inc.

CONSTRUCTION NOTES

1. CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT (1-800-282-8555) AT LEAS" (3) WORKING DAYS PRIOR TO EXCAVATION, TO HAVE EXISTING UNDERGROUND UTILITIES LOCATED AND MARKED.
2. ALL MATERIALS & WORKMANSHIP SHALL MEET THE STATE OF DELAWARE STANDARDS & SPECIFICATIONS.
3. ALL MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, AND PROJECT SPECIFICATIONS.
4. THE CONTRACTOR SHALL NOTIFY THE FOLLOWING TWO WEEKS PRIOR TO THE START OF CONSTRUCTION AND SHALL APPRISE AND COORDINATE DURING ALL PHASES OF CONSTRUCTION:

A.	SCHIFF LAND DEVELOPMENT CO., LLC	302-378-8014
B.	SUSSEX COUNTY ENGINEERING DEPARTMENT	302-855-7718
C.	TIDEWATER UTILITIES	302-445-8880
D.	SUSSEX CONSERVATION DISTRICT	302-856-2105
G.	DNREC	302-856-5488
H.	COMCAST	304-562-3401
I.	DELAWARE ELECTRIC COOPERATIVE	302-344-5191
J.	DELMARVA POWER	678-831-2444
K.	MEDIACOM	304-562-3401
L.	VERIZON	302-422-1464

5. CONTRACTOR SHALL DETERMINE THE LOCATION OF ALL RIGHT-OF-WAY LINES AND PROPERTY LINES TO HIS OWN SATISFACTION. ALL PROPOSED UTILITIES ARE TO BE CONSTRUCTED WITHIN THE ROADWAY OR EASEMENT RIGHT-OF-WAY. DISTURBED AREAS BEYOND THE EASEMENT LINES SHALL BE RESTORED IMMEDIATELY TO THEIR ORIGINAL CONDITION.
6. INFORMATION SHOWN HEREON IS BASED UPON GIS DATA OBTAINED THROUGH THE STATE OF DELAWARE GIS WEBSITE (FIRSTMAP.DELAWARE.OPENDATAARCGIS.COM) AND DOES NOT REPRESENT FIELD RUN TOPOGRAPHIC OR BOUNDARY SURVEY. SITE LAYOUT IS SUBJECT TO REVISION PENDING FIELD SURVEY.
7. EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE BASED UPON THE BEST AVAILABLE INFORMATION AND ARE SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. NO GUARANTEE IS MADE OR IMPLIED REGARDING THE ACCURACY OR COMPLETENESS THEREOF. CONTRACTOR IS RESPONSIBLE FOR THE VERIFICATION OF DEPTH, SIZE AND MATERIAL OF ALL UNDERGROUND UTILITIES TO HIS OWN SATISFACTION BEFORE BEGINNING ANY EXCAVATION OR UTILITY INSTALLATION. THE OWNER AND ENGINEER DISCLAIM ANY RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF SAID INFORMATION. IF THE CONTRACTOR RELIES ON SAID INFORMATION, HE DOES SO AT HIS OWN RISK. THE GIVING OF THE INFORMATION ON THE PLANS WILL NOT RELIEVE THE CONTRACTOR OF HIS OBLIGATIONS TO SUPPORT AND PROTECT ALL SEWERS OR NOT SHOWN EXISTING UTILITIES AND APPURTENANCES, SHOULD ANY EXISTING UTILITIES BE DAMAGED BY THE CONTRACTOR, THE CONTRACTOR SHALL REPAIR THE DAMAGE CAUSED TO THE UTILITY OWNER'S SATISFACTION, AT THE CONTRACTOR'S EXPENSE.
8. DRAWINGS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. ALL CONSTRUCTION MUST BE PERFORMED IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, AS AMENDED AND ALL RULES AND REGULATIONS THERETO APPURTENANT.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF TRAFFIC IN ALL WORK AREAS.
10. ROUGH GRADING SHALL BE COMPLETE PRIOR TO THE CONSTRUCTION OF WATER & SEWER SYSTEMS.
11. USE ONLY SUITABLE AND APPROVED GRANULAR MATERIAL IN ACCORDANCE WITH SECTION 204 OF THE DELAWARE DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS STANDARD SPECIFICATIONS AND REFERENCED BY SUSSEX COUNTY ORDINANCE 38 SECTION 5-05 EXCAVATION AND BACKFILL FOR PIPE TRENCHES SUBSECTION B MATERIALS
12. CONTRACTOR SHALL ADJUST TO FINISH GRADE AS NECESSARY ANY VALVE BOXES, MANHOLES, CATCH BASINS ETC., PRIOR TO PLACING PAVING.
13. CONTRACTOR SHALL PROVIDE STAKEOUT NECESSARY FOR THE INSTALLATION OF UTILITIES, STORMDRAINS, PAVING AND ALL OTHER SITE WORK INCLUDED IN THESE PLANS. ALL STAKEOUT WORK IS TO BE PERFORMED UNDER THE DIRECT SUPERVISION OF A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF DELAWARE.
14. CONTRACTOR TO MAINTAIN MINIMUM OF 3.0 FEET OF COVER OVER ALL NEW WATER LINES AS MEASURED FROM TOP OF PIPE TO FINISHED GRADE, UNLESS OTHERWISE NOTED.
15. SEWER LINES SHALL HAVE MINIMUM VERTICAL CLEARANCE OF 18 INCHES FROM WATER MAINS AT CROSSINGS. MAINTAIN A 10 FOOT MINIMUM PLAN SEPARATION BETWEEN SEWER AND WATER MAINS. SEWER LINES SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 12 INCHES FROM OTHER UTILITIES. IF THESE CLEARANCES CANNOT BE MAINTAINED, THEN PROVISIONS FOR ENCASING THE PIPE IN CONCRETE MUST BE PROVIDED.
16. LATERALS SHALL BE 6 INCHES IN DIAMETER, WITH VERTICAL CLEANOUTS OF 6 INCHES IN DIAMETER, AND TO HAVE A MINIMUM OF 3' OF COVER FROM SUSSEX COUNTY CLEANOUT TO MAIN LINE. CLEANOUTS SHALL BE LOCATED AT EDGE OF RIGHT-OF-WAY.
17. ALL GRAVITY SEWER PIPES SHALL BE PVC SDR 35. FOR PIPE SLOPES SEE FINAL CONSTRUCTION DRAWINGS FOR SANITARY SEWER PROFILES.
18. MATERIAL OF CONSTRUCTION FOR SEWER FORCE MAINS SHALL BE AS NOTED ON THE FINAL CONSTRUCTION DRAWINGS. FORCE MAIN SHALL BE INSTALLED AS PROFILED TO PREVENT FORMATION OF UNANTICIPATED HIGH POINTS IN THE INSTALLATION.
19. ALL SEWER LINES MUST BE SUCCESSFULLY TESTED ACCORDING TO SUSSEX COUNTY ORDINANCE 38, SECTION 5.04, E, 1-4, ON PAGE 515 THROUGH 518, ACCEPTANCE TESTING, PRIOR TO FINAL ACCEPTANCE.
20. ALL SANITARY SEWER SYSTEM CONSTRUCTION PERFORMED SHALL BE IN ACCORDANCE WITH SUSSEX COUNTY ORDINANCE 38, THESE PLANS AND ALL APPLICABLE CONSTRUCTION PERMITS.
21. ALL DROP MANHOLES TO BE 5'-0" IN DIAMETER.
22. FITTINGS SHOWN ON THE PLANS ILLUSTRATE ANTICIPATED ANGLE OF DEFLECTION. THIS INFORMATION IS SHOWN FOR GENERAL INFORMATION AND IS NOT GUARANTEED. ACTUAL ANGLE MAY VARY DUE TO FIELD CONDITIONS. USE OF ADDITIONAL FITTINGS SHALL BE AUTHORIZED BY THE ENGINEER.
23. THE CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR ANY DEVIATION FROM THESE PLANS UNLESS WRITTEN APPROVAL HAS BEEN PROVIDED BY THE ENGINEER.
24. ALL DISTURBED AREAS IN THE STATED RIGHT OF WAY, BUT NOT IN THE PAVEMENT SECTION MUST BE TOPSOILED (6" MINIMUM), FERTILIZED, MULCHED, AND SEEDED.
25. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE PLACED IN ACCORDANCE WITH THE M.U.T.C.D. MANUAL, MOST CURRENT EDITION.
26. ALL PROPOSED STORM DRAIN DESIGNATED AS "RCCP" IS TO BE REINFORCED CONCRETE CIRCULAR PIPE, MEETING AASHTO M-170 SPECIFICATIONS. SEE FINAL CONSTRUCTION PLAN & PROFILES FOR SPECIFIC PIPE CLASS.
27. ALL LENGTHS OF SANITARY SEWER PIPE ARE MEASURED HORIZONTALLY FROM CENTER LINES OF INLETS, MANHOLES OR FITTINGS. ALL LENGTHS OF STORM DRAIN PIPE ARE MEASURED HORIZONTALLY FROM EDGE OF STRUCTURE TO EDGE OF STRUCTURE. ACTUAL TRUE LENGTHS OF PIPES ARE TO BE DETERMINED IN THE FIELD.
28. WHERE SPECIFIED, HDPE STORM DRAIN PIPE SHALL BE ADS N-12 (SMOOTH INTERIOR) PIPE WITH ADS PRO-LINK WT (BELL/BELL COUPLER) FOR WATER TIGHT CONNECTIONS. REFER TO PLAN AND PROFILES FOR MATERIALS USED.
29. ALL EMBEDMENT MATERIALS USED FOR BEDDING HAUNCHING, AND INITIAL BACKFILL FOR HDPE PIPE SHALL CONFIRM TO AASHTO SECTION 30 AND ASTM D-2321 AS PER MANUFACTURER INSTALLATION REQUIREMENTS. CONTRACTOR SHALL ENSURE THAT PROPER LINE AND GRADE IS ESTABLISHED WITHIN TRENCH BEDDING PRIOR TO PLACEMENT OF PIPE AND THAT PROPER MATERIALS ARE USED AND COMPACTION IS ACHIEVED DURING HAUNCHING AND INITIAL BACKFILL. A GEOTECHNICAL ENGINEER SHALL BE RETAINED TO VERIFY SUITABILITY OF MATERIALS USED AND PROPER COMPACTION. ANY DEVIATION IN LINE AND GRADE OR OBVIOUS JOINT SEPARATION SHALL BE CORRECTED PRIOR TO ESTABLISHMENT OF FINAL SUBGRADE AND PAVEMENT SURFACE. THE CONTRACTOR SHALL TAKE EVERY CARE TO ENSURE CORRECT PIPE INSTALLATION.
30. UNLESS OTHERWISE SPECIFIED ALL ROADWAY INLETS SHALL HAVE A TYPE 1 INLET GRATE AND TYPE S TOP UNIT PER DELDOT STANDARDS, CURRENT REVISION.
31. IT IS THE CONTRACTORS RESPONSIBILITY TO INSURE THAT PAVING IS INSTALLED TO THE ELEVATIONS SHOWN AND THAT NO PONDING OF WATER EXISTS AFTER PAVING IS COMPLETE.

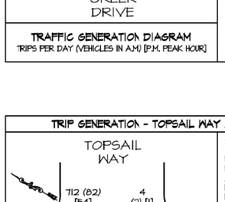
SUSSEX COUNTY CONSTRUCTION NOTES:

1. ROADWAY STAKEOUTS:
   - A. RIGHT-OF-WAY STAKES SHALL BE OFFSET A MINIMUM OF FIVE (5) FEET OUTSIDE THE RIGHT-OF-WAY.
   - B. STATION NUMBERS TO BE INDICATED ON EACH SIDE OF THE STAKE.
   - C. THE CENTERLINE ROADWAY CUT AND CUT-LINE SHALL BE LOCATED ON THE SIDE OF THE STAKE WHICH FACES THE CENTERLINE, ALSO A "CL" DESIGNATION SHALL BE INCLUDED.
   - D. THE SHALE CUT AND CUT-LINE SHALL BE INDICATED ON THE OUTSIDE OF THE STAKE, WHILE ALSO CONTAINING A "SH" DESIGNATION.
2. THE CONTRACTOR SHALL PROVIDE TWO (2) WORKING DAYS NOTICE TO THE COUNTY INSPECTOR PRIOR TO PAVING. AT THIS TIME, THE INSPECTOR MAY REQUIRE THE CONTRACTOR COMPLETE RELATED OR UNRELATED WORK ITEMS BEFORE PAVING MAY BEGIN.
3. SURFACE TREATMENT SHALL NOT BE APPLIED. (SURFACE TREATMENT NOT USED)
   - A. AFTER NOVEMBER 1 OR PRIOR TO APRIL 1; OR
   - B. WHEN THE TEMPERATURE IS BELOW 50° F; OR
   - C. ON ANY WET OR FROZEN SURFACE.
4. HOT MIX SHALL NOT BE APPLIED;
   - A. WHEN THE TEMPERATURE IS BELOW 40° F; OR
   - B. ON ANY WET OR FROZEN SURFACE.
5. FOR ALL WOODED AREAS, A SUFFICIENT AREA BEYOND THE RIGHT-OF-WAY SHALL BE CLEARED AND GRUBBED TO ALLOW PROPER GRADING OF THE ROADWAY SWALE BACKSLOPES.
6. ALL DISTURBED AREAS MUST BE STABILIZED WITH 4 INCHES OF TOPSOIL, SEED, AND MULCH.

DELDOT RECORD PLAN NOTES:

1. ALL ENTRANCES SHALL CONFORM TO THE DELAWARE DEPARTMENT OF TRANSPORTATION'S (DELDOT'S) CURRENT DEVELOPMENT COORDINATION MANUAL AND SHALL BE SUBJECT TO ITS APPROVAL.
2. NO LANDSCAPING SHALL BE ALLOWED WITHIN THE RIGHT-OF-WAY UNLESS THE PLANS ARE COMPLIANT WITH SECTION 3.7 OF THE DEVELOPMENT COORDINATION MANUAL.
3. SHRUBBERY, PLANTINGS, SIGNS AND/OR OTHER VISUAL BARRIERS THAT COULD OBSTRUCT THE SIGHT DISTANCE OF A DRIVER PREPARING TO ENTER THE ROADWAY ARE PROHIBITED WITHIN THE DEFINED DEPARTURE SIGHT TRIANGLE AREA ESTABLISHED ON THIS PLAN. IF THE ESTABLISHED DEPARTURE SIGHT TRIANGLE AREA IS OUTSIDE THE RIGHT-OF-WAY OR PROJECTS ONTO AN ADJACENT PROPERTY OWNER'S LAND, A SIGHT EASEMENT SHOULD BE ESTABLISHED AND RECORDED WITH ALL AFFECTED PROPERTY OWNERS TO MAINTAIN THE REQUIRED SIGHT DISTANCE.
4. UPON COMPLETION OF THE CONSTRUCTION OF THE SIDEWALK OR SHARED-USE PATH ACROSS THIS PROJECT'S FRONTAGE AND PHYSICAL CONNECTION TO ADJACENT EXISTING FACILITIES, THE DEVELOPER, THE PROPERTY OWNERS OR BOTH ASSOCIATED WITH THIS PROJECT, SHALL BE RESPONSIBLE TO REMOVE ANY EXISTING ROAD TIE-IN CONNECTIONS LOCATED ALONG ADJACENT PROPERTIES, AND RESTORE THE AREA TO GRASS. SUCH ACTIONS SHALL BE COMPLETED AT DELDOT'S DISCRETION, AND IN CONFORMANCE WITH DELDOT'S DEVELOPMENT COORDINATION MANUAL.
5. PRIVATE STREETS CONSTRUCTED WITHIN THIS SUBDIVISION SHALL BE MAINTAINED BY THE DEVELOPER, THE PROPERTY OWNERS WITHIN THIS SUBDIVISION OR BOTH (TITLE 17 §131). DELDOT ASSUMES NO RESPONSIBILITIES FOR THE FUTURE MAINTENANCE OF THESE STREETS.
6. THE SIDEWALK AND SHARED-USE PATH SHALL BE THE RESPONSIBILITY OF THE DEVELOPER, THE PROPERTY OWNERS OR BOTH WITHIN THIS SUBDIVISION. THE STATE OF DELAWARE ASSUMES NO RESPONSIBILITY FOR THE FUTURE MAINTENANCE OF THE SIDEWALK AND/OR SHARED-USE PATH.
7. A.L LOTS SHALL HAVE ACCESS FROM THE INTERNAL SUBDIVISION STREET.
8. THE DEVELOPER SHALL BE REQUIRED TO FURNISH AND PLACE RIGHT-OF-WAY MONUMENTS IN ACCORDANCE WITH DELDOT'S DEVELOPMENT COORDINATION MANUAL.
9. THE DEVELOPER SHALL BE REQUIRED TO FURNISH AND PLACE RIGHT-OF-WAY MARKERS TO PROVIDE A PERMANENT REFERENCE FOR RE-ESTABLISHING THE RIGHT-OF-WAY AND PROPERTY CORNERS ON LOCAL AND HIGHER ORDER PRINTABLE ROADWAYS. RIGHT-OF-WAY MARKERS SHALL BE SET AND/OR PLACED ALONG THE FRONTAGE ROAD RIGHT-OF-WAY AT PROPERTY CORNERS AND AT EACH CHANGE IN RIGHT-OF-WAY ALIGNMENT IN ACCORDANCE WITH SECTION 3.2.4.2 OF THE DEVELOPMENT COORDINATION MANUAL.

TRIP GENERATION - SWAN CREEK DRIVE AT MULBERRY KNOLL ROAD (FULL MOVEMENT)

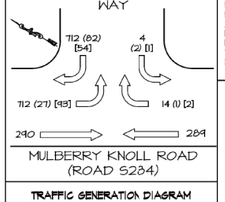


TRAFFIC GENERATION DIAGRAM
TRIPS PER DAY (VEHICLES IN A.M.) [P.M. PEAK HOUR]

ROAD TRAFFIC DATA:
FUNCTIONAL CLASSIFICATION - MAJOR COLLECTOR
POSTED SPEED LIMIT - 25 MPH
AADT = 491 (FROM 2018 DELDOT TRAFFIC SUMMARY)
10 YEAR PROJECTED AADT = 116 X 491 TRIPS = 571 TRIPS
10 YEAR PROJECTED AADT + SITE ADT = 3602 TRIPS
TRAFFIC PATTERN GROUP - 7 (FROM 2018 DELDOT TRAFFIC SUMMARY)
DESIGN HOURLY VOLUME = 3602 X HLSH = 360 VPH

SITE TRIPS GENERATED:
SOURCE: ITE TRIP GENERATION MANUAL 10TH EDITION.
391 SINGLE FAMILY DETACHED HOUSING (210) = 3,023 ADT (OVERALL)
ENTRANCE 1 OF 3 - FULL MOVEMENT
61 D.U. / 391 D.U. * 3,023 ADT = 577 ADT ENTRANCE 1
DESIGN VEHICLES: MB-50
DIRECTIONAL DISTRIBUTION:
47.5% TO AND FROM THE NORTH ADT = 563 TRIPS (281 ENTER / 282 EXIT)
47.5% TO AND FROM THE NORTH AM = 43 TRIPS (11 ENTER / 32 EXIT)
47.5% TO AND FROM THE NORTH PM = 66 TRIPS (36 ENTER / 32 EXIT)
2.5% TO AND FROM THE SOUTH ADT = 14 TRIPS (7 ENTER / 7 E EXIT)
2.5% TO AND FROM THE SOUTH AM = 0 TRIPS (0 ENTER / 0 EXIT)
2.5% TO AND FROM THE SOUTH PM = 2 TRIPS (1 ENTER / 1 EXIT)

TRIP GENERATION - TOPSAIL WAY AT MULBERRY KNOLL ROAD (FULL MOVEMENT)



TRAFFIC GENERATION DIAGRAM
TRIPS PER DAY (VEHICLES IN A.M.) [P.M. PEAK HOUR]

ROAD TRAFFIC DATA:
FUNCTIONAL CLASSIFICATION - MAJOR COLLECTOR
POSTED SPEED LIMIT - 25 MPH ASSUMED (NOT POSTED)
AADT = 491 (FROM 2018 DELDOT TRAFFIC SUMMARY)
10 YEAR PROJECTED AADT = 116 X 491 TRIPS = 571 TRIPS
10 YEAR PROJECTED AADT + SITE ADT = 3602 TRIPS
TRAFFIC PATTERN GROUP - 7 (FROM 2018 DELDOT TRAFFIC SUMMARY)
DESIGN HOURLY VOLUME = 3602 X HLSH = 360 VPH

SITE TRIPS GENERATED:
SOURCE: ITE TRIP GENERATION MANUAL 10TH EDITION.
391 SINGLE FAMILY DETACHED HOUSING (210) = 3,023 ADT (OVERALL)
ENTRANCE 2 OF 3 - FULL MOVEMENT
154 D.U. / 391 D.U. * 3,023 ADT = 1,454 ADT ENTRANCE 2
DESIGN VEHICLES: MB-50
DIRECTIONAL DISTRIBUTION:
47.5% TO AND FROM THE NORTH ADT = 1,424 TRIPS (712 ENTER / 712 EXIT)
47.5% TO AND FROM THE NORTH AM = 109 TRIPS (27 ENTER / 82 EXIT)
47.5% TO AND FROM THE NORTH PM = 147 TRIPS (83 ENTER / 54 EXIT)
2.5% TO AND FROM THE SOUTH ADT = 36 TRIPS (14 ENTER / 14 EXIT)
2.5% TO AND FROM THE SOUTH AM = 3 TRIPS (1 ENTER / 2 EXIT)
2.5% TO AND FROM THE SOUTH PM = 3 TRIPS (2 ENTER / 1 EXIT)

GENERAL NOTES:

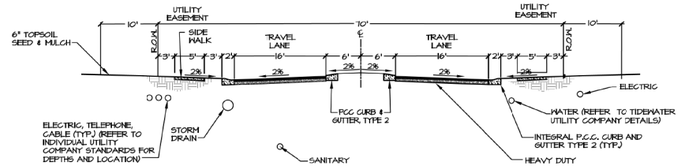
1. SUBDIVISION STREETS ARE TO REMAIN PRIVATE AND ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SUSSEX COUNTY REGULATIONS.
2. MAINTENANCE OF THE STREET WITHIN THIS SUBDIVISION WILL BE THE RESPONSIBILITY OF THE OWNER/DEVELOPER AND OR HOME OWNERS ASSOCIATION. THE STATE AND SUSSEX COUNTY ASSUMES NO RESPONSIBILITY FOR FUTURE MAINTENANCE OF THE STREETS.
3. ACCESS TO ALL LOTS IS TO BE FROM SUBDIVISION STREETS OR DRIVE ACCESS LOOPS.
4. MAINTENANCE OF THE STORM WATER MANAGEMENT AREAS WILL BE THE RESPONSIBILITY OF THE OWNER/DEVELOPER AND OR HOMEOWNER'S ASSOCIATION.
5. THE PROPOSED ENTRANCES/EXITS ARE CONCEPTUAL ONLY AND ARE SUBJECT TO REVIEW AND APPROVAL BY THE DELAWARE DEPARTMENT OF TRANSPORTATION BEFORE A CONSTRUCTION PERMIT IS ISSUED.

PROJECT PHASING

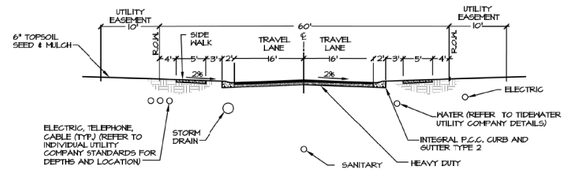
PHASE 1 - 6 YEARS

TOTAL PROJECT BUILDOUT - 6 YEARS
ESTIMATED PROJECT COMPLETION DATE - DECEMBER 2026

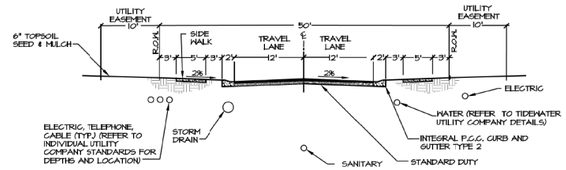
THE PROJECT IS BE APPROVED AS A SINGLE PHASE PROJECT, WITH SIX (6) OPERATIONAL BREAKS FOR PURPOSES OF BONDING, BENEFICIAL OCCUPANCY INSPECTION, RELEASE OF USE AND OCCUPANCY PERMITS.



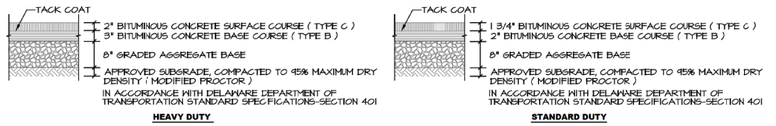
TYPICAL ENTRANCE BOULEVARD - 70' R.O.W.
NOT TO SCALE



TYPICAL ROAD SECTION - 60' R.O.W.
NOT TO SCALE

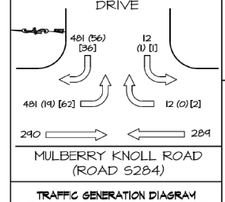


TYPICAL ROAD SECTION - 50' R.O.W.
NOT TO SCALE



PAVING SECTIONS
NOT TO SCALE

TRIP GENERATION - CROSSWINDS DRIVE AT MULBERRY KNOLL ROAD (FULL MOVEMENT)



TRAFFIC GENERATION DIAGRAM
TRIPS PER DAY (VEHICLES IN A.M.) [P.M. PEAK HOUR]

ROAD TRAFFIC DATA:
FUNCTIONAL CLASSIFICATION - MAJOR COLLECTOR
POSTED SPEED LIMIT - 45 MPH ASSUMED (NOT POSTED)
AADT = 491 (FROM 2018 DELDOT TRAFFIC SUMMARY)
10 YEAR PROJECTED AADT = 116 X 491 TRIPS = 571 TRIPS
10 YEAR PROJECTED AADT + SITE ADT = 3602 TRIPS
TRAFFIC PATTERN GROUP - 7 (FROM 2018 DELDOT TRAFFIC SUMMARY)
DESIGN HOURLY VOLUME = 3602 X HLSH = 360 VPH

SITE TRIPS GENERATED:
SOURCE: ITE TRIP GENERATION MANUAL 10TH EDITION.
391 SINGLE FAMILY DETACHED HOUSING (210) = 3,023 ADT (OVERALL)
ENTRANCE 3 OF 3 - FULL MOVEMENT
104 D.U. / 391 D.U. * 3,023 ADT = 986 ADT ENTRANCE 3
DESIGN VEHICLES: MB-50
DIRECTIONAL DISTRIBUTION:
47.5% TO AND FROM THE NORTH ADT = 962 TRIPS (481 ENTER / 481 EXIT)
47.5% TO AND FROM THE NORTH AM = 76 TRIPS (19 ENTER / 56 EXIT)
47.5% TO AND FROM THE NORTH PM = 101 TRIPS (62 ENTER / 36 EXIT)
2.5% TO AND FROM THE SOUTH ADT = 24 TRIPS (12 ENTER / 12 EXIT)
2.5% TO AND FROM THE SOUTH AM = 1 TRIPS (0 ENTER / 1 EXIT)
2.5% TO AND FROM THE SOUTH PM = 3 TRIPS (2 ENTER / 1 EXIT)

SITE DATA

1. PROJECT NAME: SCENIC MANOR
2. TAX PARCEL: 334-18.00-43.00
3. SITE ADDRESS: 20535 MULBERRY KNOLL ROAD LEWES, DE 19958
4. OWNER INFORMATION: THOMAS BEST AND SONS, INC. 32258 JANICE ROAD LEWES, DE 19958
5. DEVELOPER: MKR LAND INVESTMENT, LLC ATTN: MR. JOHN RICHARDSON 260 HOPEWELL ROAD CHURCHVILLE, MD 21028
6. ZONING:
   EXISTING: AR-1 *
   PROP. ZONING: AR-1 *
   *NOTE: SITE IS LOCATED ENTIRELY WITH COASTAL AREA GROWTH ZONE
7. DEVELOPMENT OPTION: AR-1 - CLUSTER DESIGN
8. SITE ACREAGE: 166.83 AC. ±
9. LAND USE:
   EXISTING: AGRICULTURAL
   PROPOSE: RESIDENTIAL - SINGLE FAMILY DETACHED
   MIN. LOT AREA 7,500 SF
10. BULK AREA STANDARDS (AR-1 CLUSTER DEVELOPMENT OPTION)

MIN. FRONT YARD	25'
MIN. SIDE YARD	10'
MIN. REAR YARD	10'
MIN. LOT WIDTH	60'
MIN. LOT AREA	7,500 SF
MAX. BLDG. HT.:	42'
MIN. OPEN SPACE:	30%
MAX. DENSITY:	2.178 D.U./AC.

11. DEVELOPMENT DENSITY COMPUTATIONS:

GROSS SITE AREA:	
BASE SITE AREA:	166.83 AC. ±
WETLANDS:	20.98 AC. ±
GROSS SITE AREA:	146.64 AC. ±

ALLOWABLE DWELLING UNITS:
GROSS SITE AREA * ALLOWABLE DENSITY = ALLOWABLE D.U.
146.64 AC. X 2.178 D.U. / AC. = 319.4 D.U.

PROPOSED DENSITY:
319 D.U. / 146.64 AC. ± = 2.175 D.U./AC.

12. SITE AREA BREAKDOWN:

RESIDENTIAL LOTS =	65.04 AC. ±	
DELDOT R.O.W. =	4.71 AC. ±	
PRIVATE R.O.W. =	16.54 AC. ±	
PUMP STATION * =	0.22 AC. ±	
OPEN SPACE =	80.27 AC. ±	
TOTAL SITE ACREAGE =	166.83 AC. ±	

13. OPEN SPACE AREAS:

REQUIRED [SECTION 115-25B.(2)]:	
30% X 166.83 AC ± =	50.05 AC.±
PROPOSED:	80.27 AC. ±
80.27 AC. ± / 166.83 AC. ± =	48.1 %

12. WATER SERVICE: PUBLIC (TIDEWATER UTILITY COMPANY)
13. SANITARY SEWER: PUBLIC (SUSSEX COUNTY)
14. PROPOSED LOTS: 319 SINGLE FAMILY LOTS
15. PARKING ANALYSIS*:

PARKING REQUIRED:	319 SFD X 2 SP/DU = 638 SP
PARKING PROVIDED:	319 SFD X 2 SP/DU = 638 SP

*NOTE: PARKING ANALYSIS PROVIDED FOR RESIDENTIAL LOT AREAS ONLY; ANALYSIS FOR ACTIVE RECREATION / CLUBHOUSE AREA TO BE INCLUDED AS PART OF SITE PLAN PACKAGE TO BE PROVIDED UNDER SEPARATE COVER.

16. A PRELIMINARY WETLAND EVALUATION WAS PERFORMED BY GEO-TECHNOLOGY ASSOCIATES, INC. (GTA) IN JULY 2019. BASED ON THIS REVIEW, IT IS GTA'S PROFESSIONAL OPINION THAT THERE ARE JURISDICTIONAL "WATERS OF THE U.S.", INCLUDING WETLANDS PRESENT WITHIN THE SUBJECT SITE AS SHOWN BY THIS PLAN.
17. A PORTION OF THIS SITE LIES WITHIN FLOOD ZONE AE (SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD) AND FLOOD ZONE X (AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT, OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM THE 1% ANNUAL CHANCE FLOOD) PER FEMA FLOOD INSURANCE RATE MAP MAP 10005C0334K EFFECTIVE MARCH 16, 2015.
18. NO CHURCHES SCHOOLS, OR COMMERCIAL USE AREAS PROPOSED ON THIS SITE.

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
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FAX: (302) 326-2399
WWW.MRAGTA.COM

COLLEE TOLLIVER — REGISTERED — No. 12489 — DELAWARE — PROFESSIONAL ENGINEER — 05/27/21

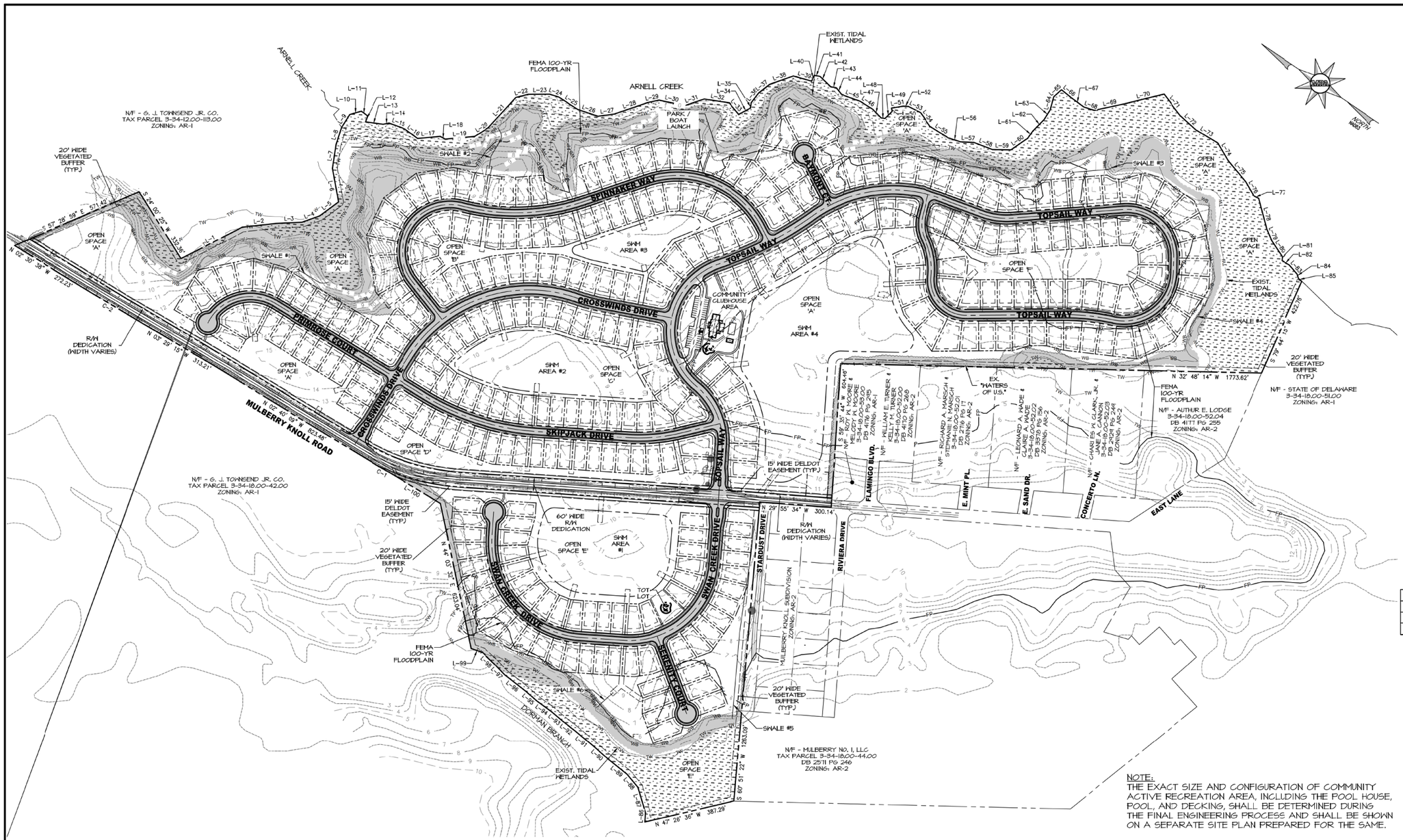
ENGINEER'S SEAL

GENERAL NOTES & DETAILS PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: AS NOTED
DATE: 12/02/19
DRAWN BY: CJF
DESIGN BY: CJF
REVIEW BY:
SHEET: 2 OF 15



PROPERTY LINE TABLE		
LINE	BEARING	DISTANCE
L-1	S 61° 14' 44" E	290.83'
L-2	S 40° 26' 16" E	143.56'
L-3	S 36° 40' 08" E	110.60'
L-4	S 54° 06' 48" E	77.52'
L-5	S 70° 47' 04" E	48.61'
L-6	N 45° 38' 01" E	143.84'
L-7	N 64° 33' 20" E	100.72'
L-8	N 73° 23' 01" E	75.11'
L-9	N 87° 58' 14" E	64.32'
L-10	S 50° 37' 05" E	50.32'
L-11	S 03° 08' 35" W	33.08'
L-12	S 74° 35' 57" W	26.26'
L-13	S 26° 22' 36" E	76.34'
L-14	S 45° 00' 34" E	26.00'
L-15	S 13° 41' 03" E	72.04'
L-16	S 02° 34' 16" W	67.03'
L-17	S 34° 16' 44" E	44.64'
L-18	S 05° 07' 24" E	23.25'
L-19	S 34° 16' 12" E	122.40'
L-20	S 66° 16' 20" E	70.54'
L-21	S 81° 35' 38" E	117.27'
L-22	S 48° 35' 16" E	59.21'
L-23	S 34° 24' 44" E	40.11'
L-24	S 16° 34' 44" E	40.30'
L-25	S 01° 12' 58" E	44.40'
L-26	S 15° 24' 17" E	84.53'
L-27	S 41° 46' 14" E	64.64'
L-28	S 58° 09' 36" E	146.25'
L-29	S 45° 54' 44" E	50.46'
L-30	S 22° 20' 50" E	110.34'
L-31	S 52° 32' 58" E	85.62'
L-32	S 25° 35' 04" E	107.81'
L-33	S 15° 38' 26" W	63.00'
L-34	S 62° 16' 10" E	55.85'
L-35	N 64° 03' 44" E	22.42'
L-36	S 86° 34' 14" E	52.41'
L-37	S 71° 56' 17" E	58.55'
L-38	S 53° 31' 36" E	104.28'
L-39	S 18° 23' 50" E	74.75'
L-40	N 81° 00' 41" E	26.76'
L-41	S 24° 08' 19" E	24.63'
L-42	S 10° 28' 45" W	62.72'
L-43	S 24° 44' 32" E	23.04'
L-44	S 17° 37' 31" W	35.47'
L-45	S 14° 04' 36" E	65.44'
L-46	S 01° 52' 12" E	61.75'
L-47	S 12° 08' 31" W	50.64'
L-48	S 25° 35' 10" E	15.84'
L-49	S 78° 55' 43" E	42.45'
L-50	N 43° 33' 08" E	13.99'

PROPERTY LINE TABLE		
LINE	BEARING	DISTANCE
L-51	S 43° 44' 54" E	49.36'
L-53	S 06° 54' 41" E	57.28'
L-54	S 20° 18' 24" W	70.98'
L-55	S 01° 52' 03" E	90.84'
L-56	S 16° 14' 57" E	55.43'
L-57	S 31° 13' 21" E	56.42'
L-58	S 13° 00' 54" E	82.46'
L-59	S 33° 13' 45" E	77.44'
L-60	S 64° 06' 08" E	84.48'
L-61	S 84° 30' 57" E	37.05'
L-62	S 74° 53' 35" E	64.28'
L-63	N 61° 43' 18" E	47.19'
L-64	N 71° 19' 48" E	56.68'
L-65	S 76° 30' 28" E	43.78'
L-66	S 04° 54' 43" W	56.45'
L-67	S 01° 55' 12" W	61.55'
L-68	S 16° 19' 42" E	46.62'
L-69	S 46° 19' 35" E	142.70'
L-70	S 18° 21' 54" W	112.22'
L-71	S 08° 28' 54" W	90.54'
L-72	S 02° 55' 19" E	106.46'
L-73	S 25° 43' 08" W	86.41'
L-74	S 16° 04' 15" W	114.49'
L-75	S 26° 04' 55" W	61.72'
L-76	S 06° 57' 25" E	25.30'
L-77	S 41° 06' 01" W	134.21'
L-78	S 33° 02' 06" W	54.15'
L-79	S 22° 24' 50" W	74.64'
L-80	S 61° 00' 02" W	16.31'
L-81	S 04° 47' 44" E	31.25'
L-82	S 15° 06' 08" W	50.38'
L-83	S 34° 24' 42" W	18.66'
L-85	S 01° 15' 33" W	18.51'
L-86	N 54° 52' 00" E	40.00'
L-87	N 34° 16' 11" E	110.58'
L-88	N 16° 24' 25" E	71.61'
L-89	N 04° 47' 07" E	47.03'
L-90	N 07° 16' 24" E	45.11'
L-91	N 05° 46' 48" E	43.20'
L-92	N 03° 24' 31" E	67.65'
L-93	N 06° 24' 05" E	58.10'
L-94	N 02° 13' 34" E	76.75'
L-95	N 07° 47' 46" E	62.64'
L-96	N 04° 08' 42" E	112.15'
L-97	N 12° 27' 34" E	54.31'
L-98	N 09° 01' 50" E	77.80'
L-99	N 13° 53' 34" W	51.18'
L-100	N 02° 55' 25" W	252.24'

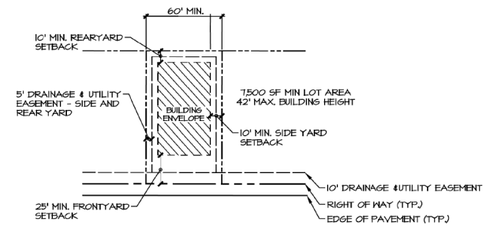
PROPERTY CURVE TABLE						
CURVE	DELTA	RADIUS	LENGTH	TANGENT	CHORD BEARING	CHORD
C-1	005° 08' 41"	477.93'	42.22'	21.12'	N 05° 12' 00" W	42.21'
C-2	000° 58' 36"	23,063.66'	393.17'	196.59'	N 02° 59' 56" W	393.16'

NOTE:
THE EXACT SIZE AND CONFIGURATION OF COMMUNITY ACTIVE RECREATION AREA, INCLUDING THE POOL HOUSE, POOL, AND DECKING, SHALL BE DETERMINED DURING THE FINAL ENGINEERING PROCESS AND SHALL BE SHOWN ON A SEPARATE SITE PLAN PREPARED FOR THE SAME.

200 100 0 100 200 400
SCALE: 1" = 200'

PROPOSED OPEN SPACE SUMMARY			
AREA	SWM FACILITIES	ACTIVE OPEN SPACE	PASSIVE OPEN SPACE*
A	8.63 AC. ±	1.83 AC. ±	50.44 AC. ±
B	1.48 AC. ±	---	2.85 AC. ±
C	3.66 AC. ±	---	4.48 AC. ±
D	---	---	2.20 AC. ±
E	4.10 AC. ±	0.24 AC. ±	15.91 AC. ±
F	---	---	2.32 AC. ±
TOTAL	17.87 AC. ±	2.07 AC. ±	78.20 AC. ±

*NOTE: PASSIVE OPEN SPACE AREA ACREAGE ARE INCLUSIVE OF SWM FACILITY ACREAGE, WHERE APPLICABLE.



TYPICAL LAYOUT SINGLE FAMILY LOT (VARIABLE WIDTHS)

NOT TO SCALE

MORRIS & RITCHIE ASSOCIATES, INC.
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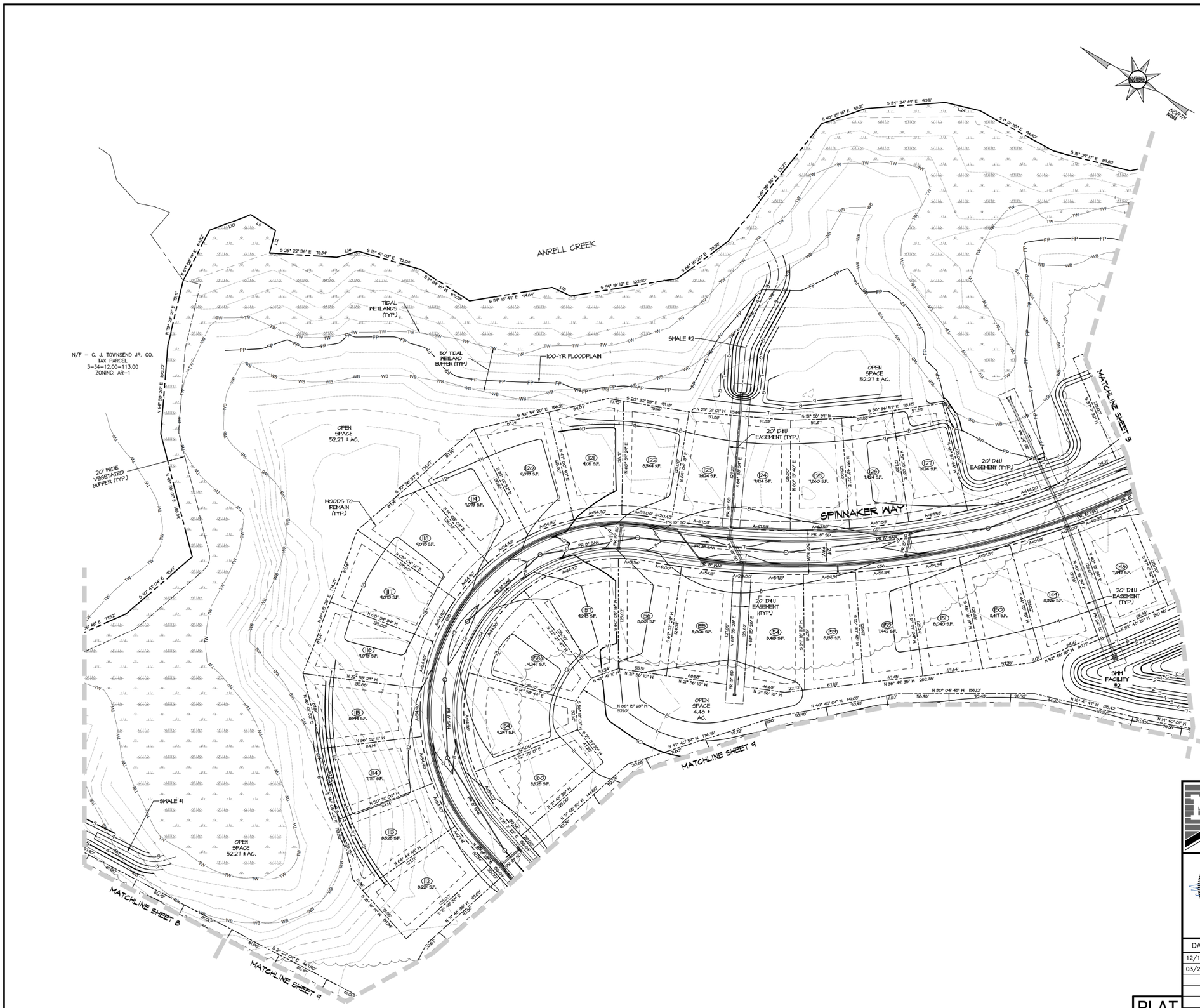
PHILIP LEE TOLLIVER REGISTERED No. 12489 PROFESSIONAL ENGINEER DELAWARE 05/25/21

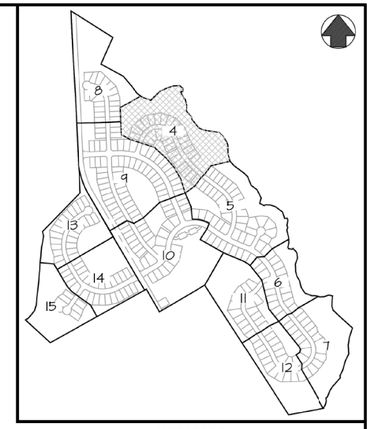
ENGINEER'S SEAL

OVERALL PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS	
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION	JOB NO.: 20572
03/25/21	REVISED LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP	SCALE: 1"= 200'
		DATE: 12/02/'9
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 3 OF 5





KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C54	434.40'	175.00'	142.22	N 89° 18' 04" E	331.15'
C55	558.51'	225.00'	142.22	N 89° 18' 04" E	425.77'
C56	536.32'	925.00'	033.22	S 36° 11' 51" E	528.84'
C57	507.33'	875.00'	033.22	S 36° 11' 51" E	500.25'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L10	50.32	S 50° 37' 05" E
L11	33.08	S 03° 08' 35" W
L14	26.00	S 45° 00' 34" E
L18	23.25	S 05° 07' 24" E
L24	40.30	S 16° 34' 49" E

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE
- PROPOSED RIGHT OF WAY LINE
- PROPOSED STORMWATER MANAGEMENT AREA
- LINE OF SIGHT
- PROPOSED SETBACK LINE
- PROPOSED EASEMENT LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

MORRIS & RITCHIE ASSOCIATES, INC.
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PHILLIP J. LEE TOWNSEND, REGISTERED PROFESSIONAL ENGINEER, No. 12489, STATE OF DELAWARE, 03/25/21
ENGINEER'S SEAL

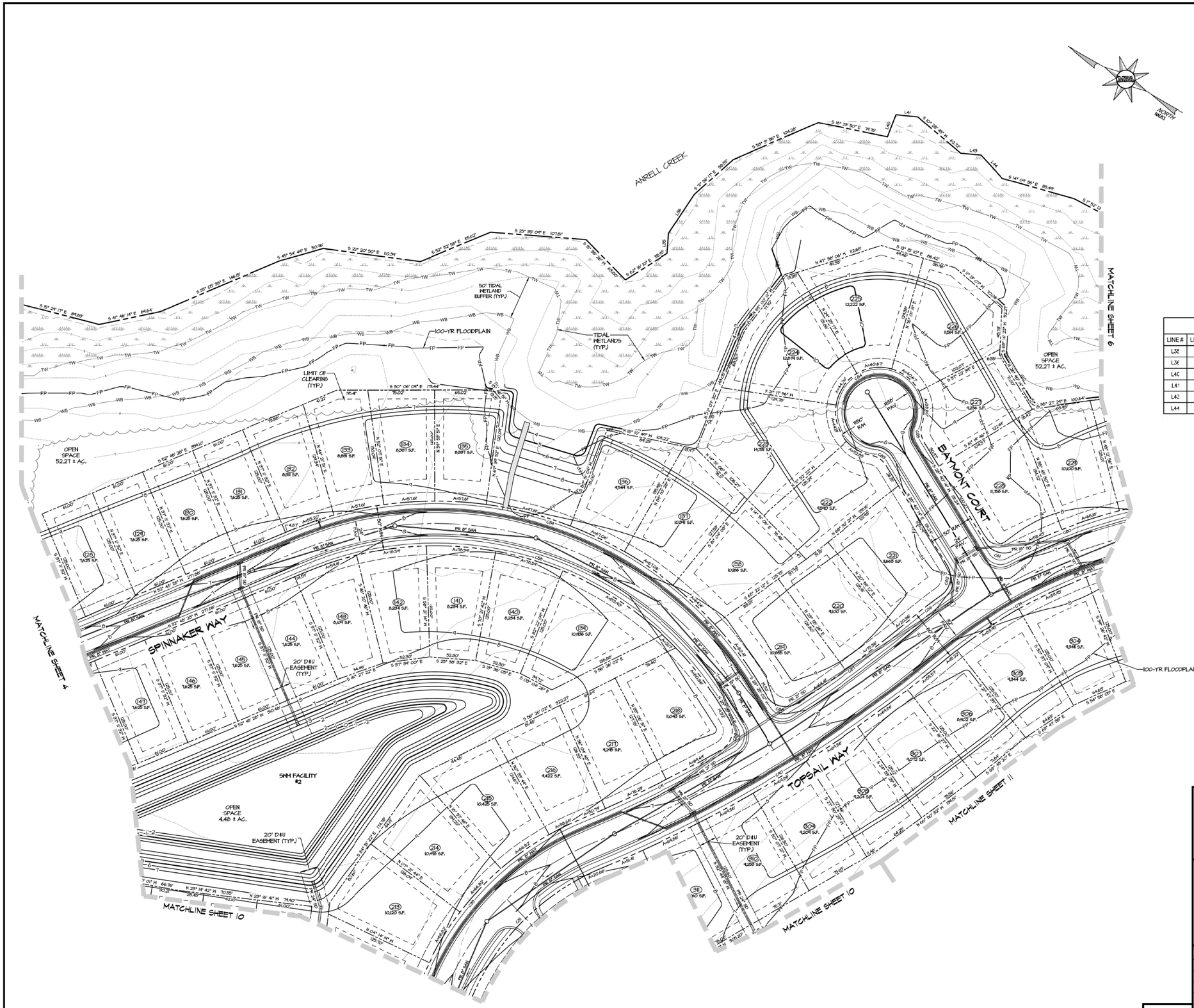
PRELIMINARY PLAT
FOR
SCENIC MANOR

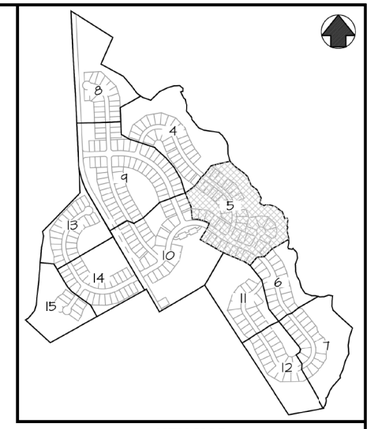
LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: 1"= 50'
DATE: 12/02/'9
DRAWN BY: CJF
DESIGN BY: CJF
REVIEW BY: PLT
SHEET: 4 OF 15

PLAT





KEY MAP
SCALE: 1"=800'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L39	22.42	N 64° 03' 49" E
L39	52.41	S 86° 34' 19" E
L40	26.76	N 81° 00' 41" E
L41	24.63	S 24° 03' 19" E
L42	23.04	S 24° 49' 32" E
L44	35.47	S 17° 37' 31" W

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C31	573.33'	270.00'	121.66	S 66° 26' 53" W	471.52'
C33	297.46'	330.00'	051.65	N 78° 32' 34" W	287.49'
C58	531.62'	375.00'	081.23	S 12° 11' 43" E	488.21'
C59	602.50'	425.00'	081.23	S 12° 11' 43" E	553.30'
C79	429.15'	545.00'	045.12	S 47° 14' 55" E	418.15'
C80	372.07'	605.00'	035.24	S 39° 09' 33" E	366.24'
C81	37.28'	25.00'	085.45	S 14° 03' 13" E	33.92'
C82	37.28'	25.00'	085.45	N 71° 23' 40" E	33.92'
C83	21.03'	25.00'	048.19	N 04° 34' 32" E	20.41'
C84	241.19'	50.00'	276.38	S 61° 19' 46" E	66.67'
C85	21.03'	25.00'	048.19	S 52° 45' 55" W	20.41'
C86	41.45'	605.00'	003.93	S 67° 50' 39" E	41.44'
C88	40.24'	24.78'	093.03	S 17° 34' 27" E	35.96'
C89	40.24'	24.78'	093.03	N 74° 24' 31" E	35.96'
C90	456.28'	1530.00'	017.09	N 61° 15' 49" W	454.59'
C91	176.51'	1470.00'	006.88	N 56° 09' 36" W	176.40'

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE
- PROPOSED RIGHT OF WAY LINE
- PROPOSED STORMWATER MANAGEMENT AREA
- LINE OF SIGHT
- PROPOSED SETBACK LINE
- PROPOSED EASEMENT LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
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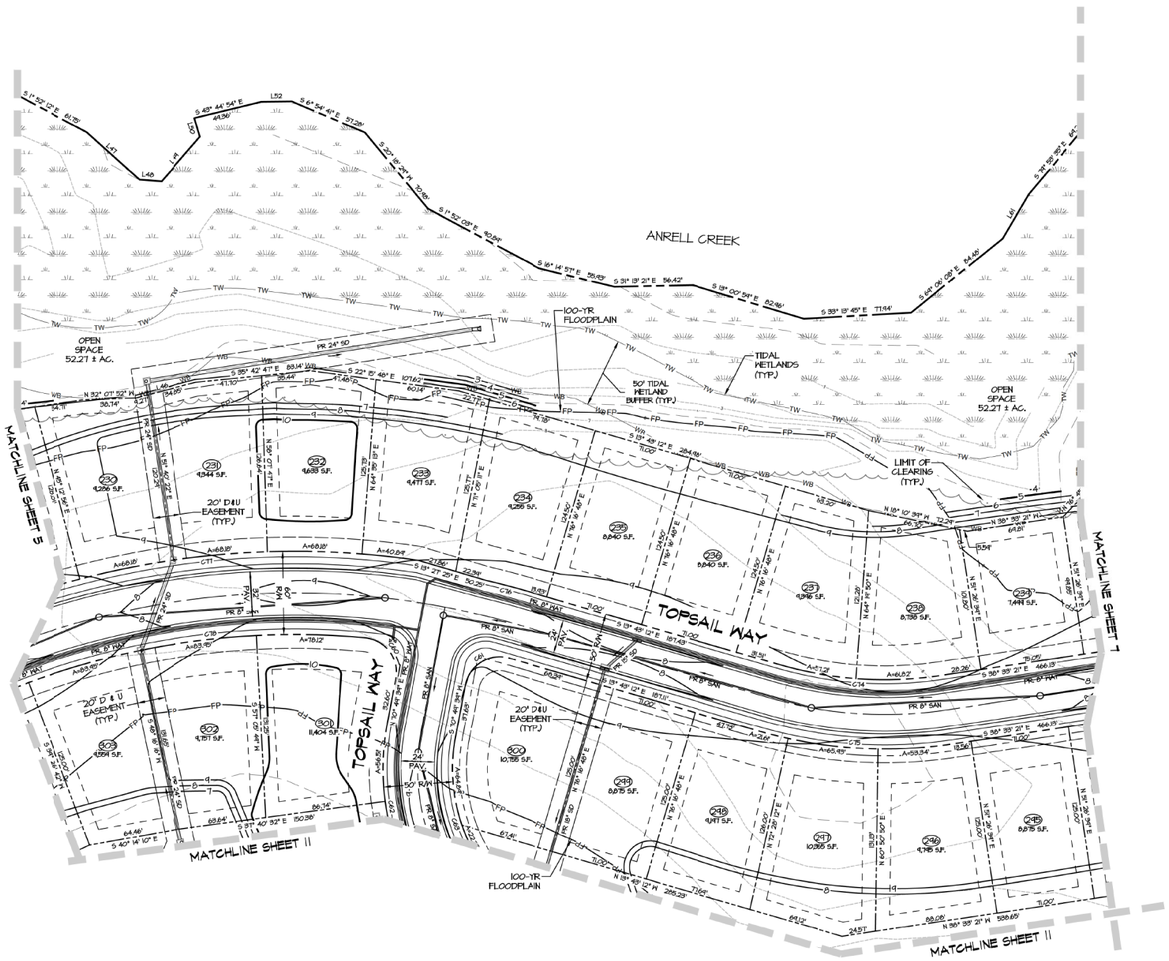
PHILIP LEE TOLLNER — REGISTERED — No. 12489 — PROFESSIONAL ENGINEER — DELAWARE — 03/25/21
ENGINEER'S SEAL

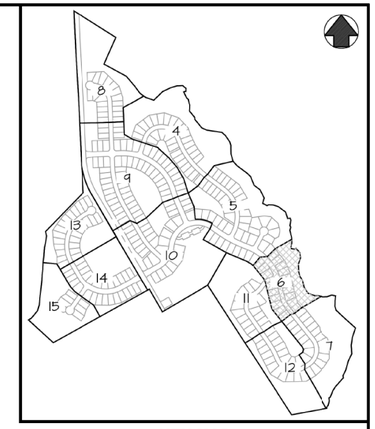
PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS	JOB NO.: 20572
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION	SCALE: 1"= 50'
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP	DATE: 12/02/'9
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 5 OF 15

PLAT





KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C60	41.68'	25.00'	095.52	N 23° 04' 07" E	37.02'
C61	41.65'	25.00'	095.45	N 61° 26' 47" W	37.00'
C62	121.96'	175.00'	039.93	N 50° 51' 42" E	119.51'
C63	87.12'	125.00'	039.93	N 50° 51' 42" E	85.36'
C74	119.04'	270.00'	025.26	S 26° 05' 33" E	118.07'
C75	140.88'	325.00'	024.84	S 26° 08' 16" E	139.78'
C76	32.09'	600.00'	003.06	S 15° 15' 08" E	32.09'
C77	372.07'	605.00'	035.24	S 39° 06' 33" E	366.24'
C78	429.15'	545.00'	045.12	S 47° 14' 55" E	418.15'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L47	50.69	S 12° 03' 31" W
L48	15.84	S 25° 35' 10" E
L50	13.99	N 43° 33' 08" E
L52	21.92	S 30° 50' 24" E
L61	37.05	S 89° 30' 57" E

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
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- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

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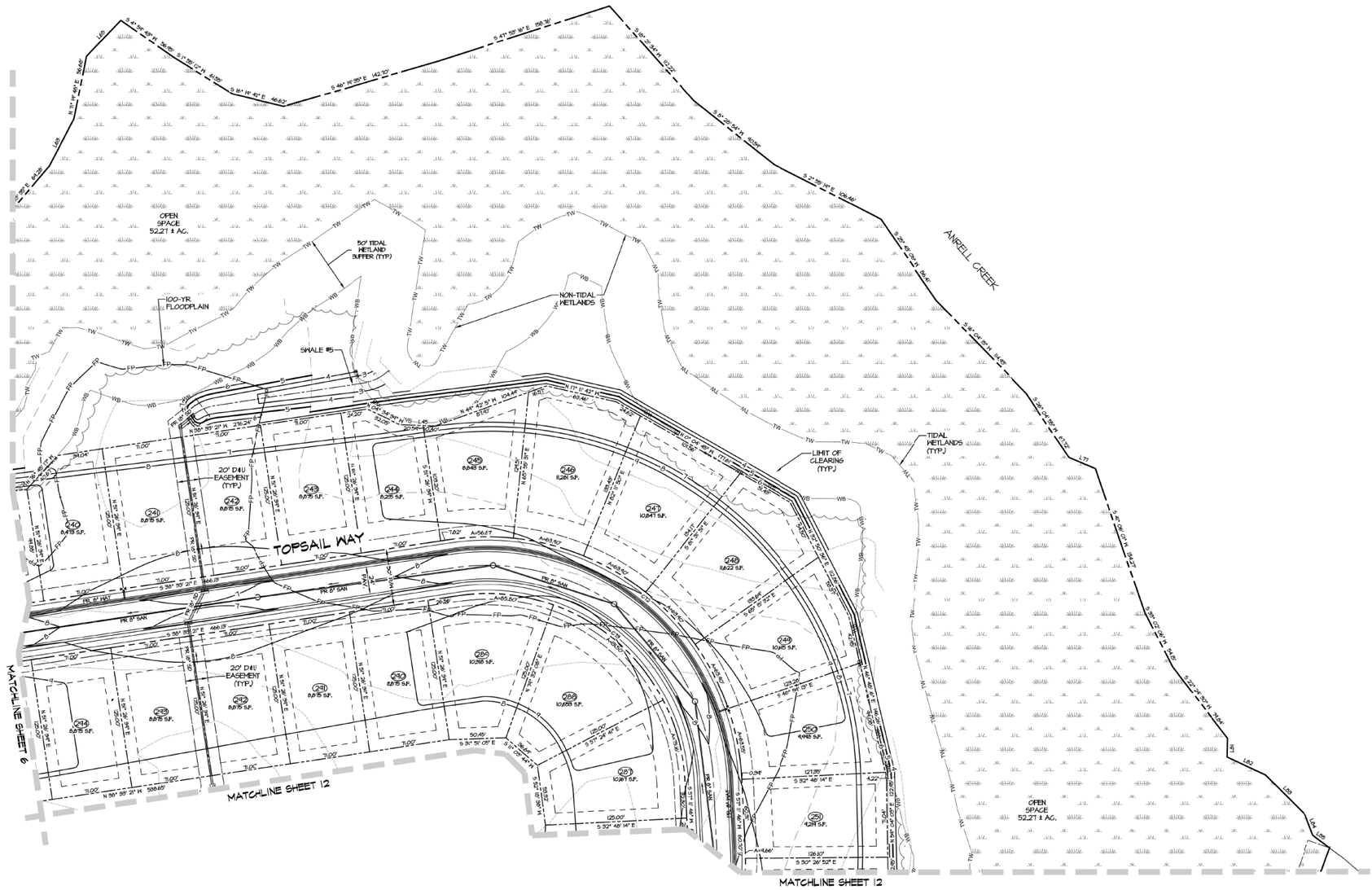
PHILLIP LEE TOLIVER — REGISTERED — No. 17489 — PROFESSIONAL ENGINEER — DELAWARE — 03/25/21
ENGINEER'S SEAL

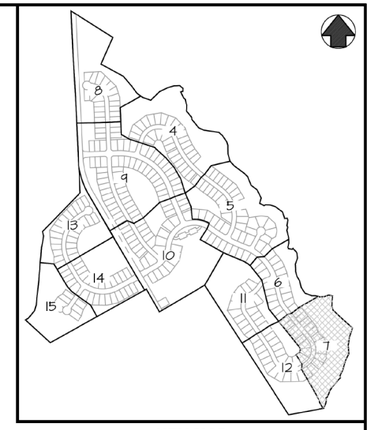
PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS	
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION	JOB NO.: 20572
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP	SCALE: 1"= 50'
		DATE: 12/02/'9
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 6 OF 15

PLAT





KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C72	376.02'	225.00'	095.75	S 09° 19' 13" W	333.76'
C73	292.46'	175.00'	095.75	S 09° 19' 13" W	259.59'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L63	47.19	N 87° 43' 18" E
L65	43.78	S 76° 30' 23" E
L77	25.30	S 06° 57' 25" E
L81	16.37	S 61° 00' 02" W
L82	37.25	S 04° 47' 44" E
L83	50.38	S 15° 06' 08" W
L84	18.66	S 39° 24' 42" W
L85	18.57	S 07° 15' 33" W

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE
- PROPOSED RIGHT OF WAY LINE
- PROPOSED STORMWATER MANAGEMENT AREA
- LINE OF SIGHT
- PROPOSED SETBACK LINE
- PROPOSED EASEMENT LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

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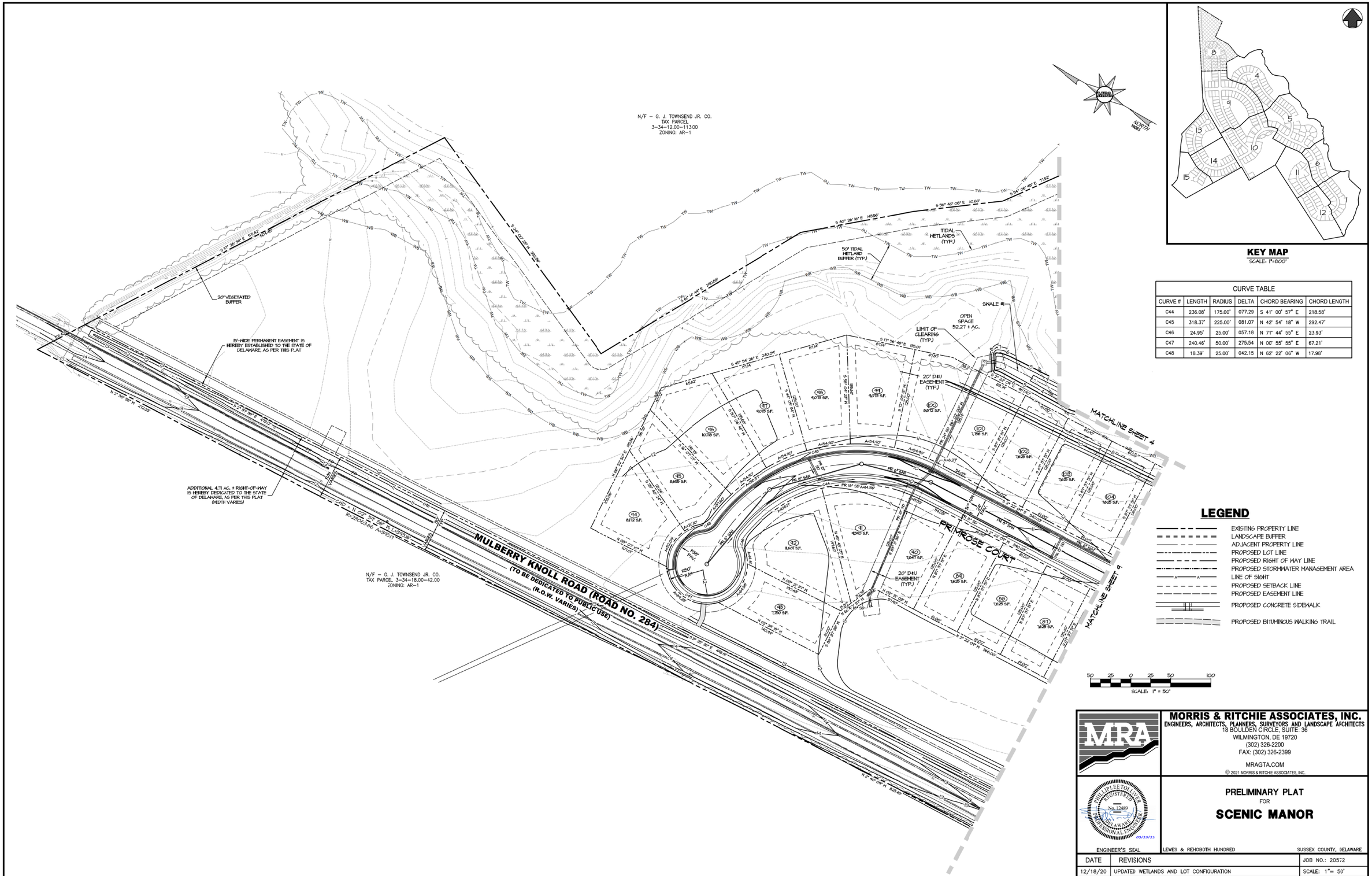
PHILLIP LEE TOLLIVER — REGISTERED — No. 12489 — PROFESSIONAL ENGINEER — DELAWARE — 03/25/21
ENGINEER'S SEAL

PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS	JOB NO.: 20572
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION	SCALE: 1"= 50'
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP	DATE: 12/02/'9
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 7 OF 15

PLAT



KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C44	236.08'	175.00'	077.29	S 41° 00' 57" E	218.58'
C45	318.37'	225.00'	081.07	N 42° 54' 18" W	292.47'
C46	24.95'	25.00'	057.18	N 71° 44' 55" E	23.93'
C47	240.46'	50.00'	275.54	N 00° 55' 55" E	67.21'
C48	18.39'	25.00'	042.15	N 62° 22' 06" W	17.98'

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
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50 25 0 25 50 100
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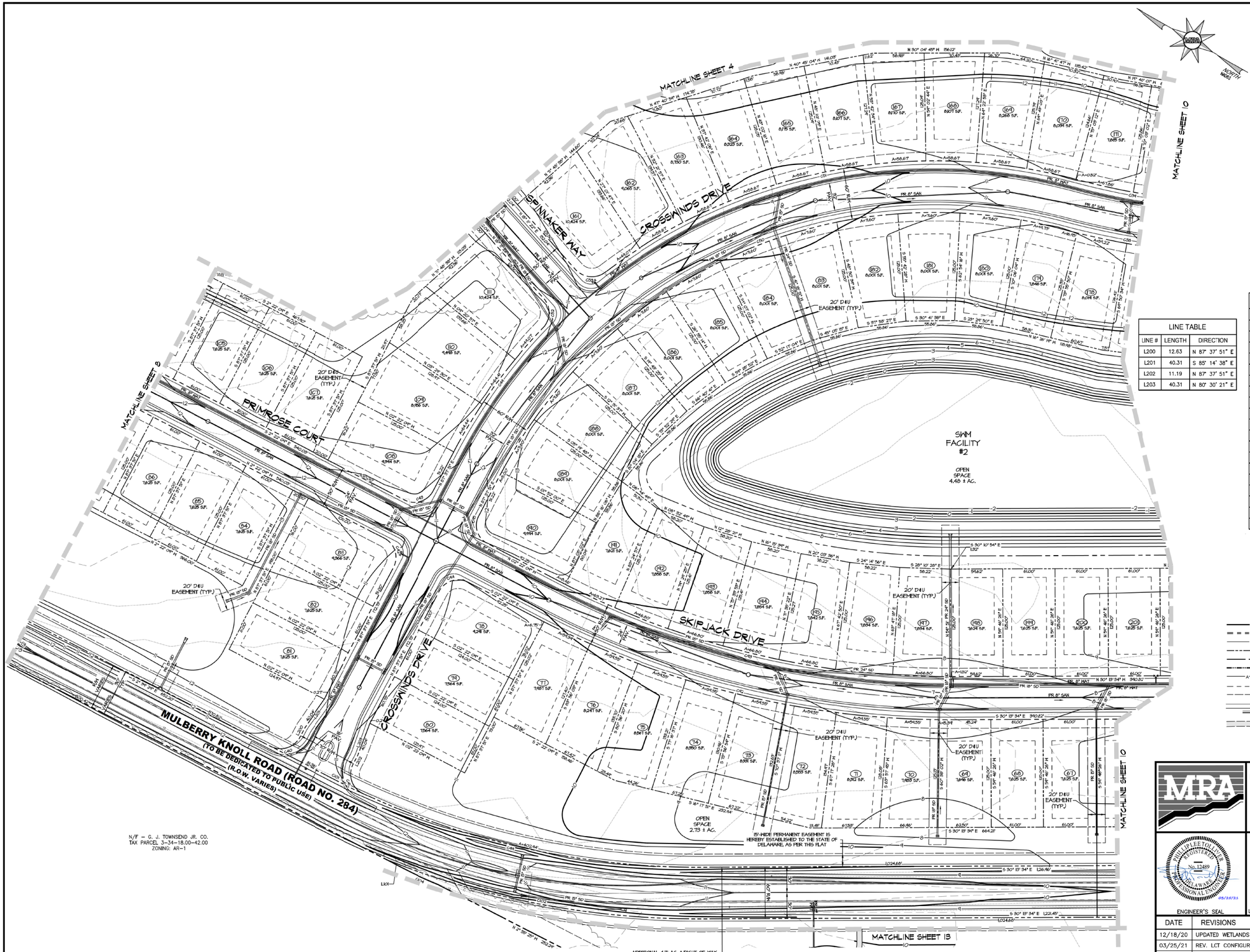
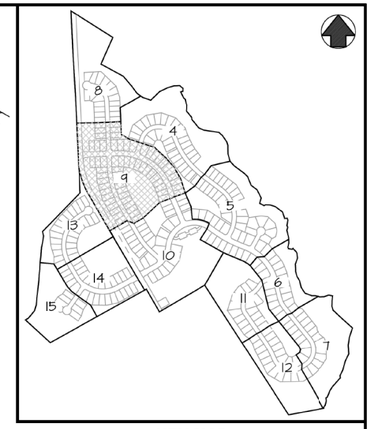
DATE	REVISIONS	JOB NO.: 20572
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION	SCALE: 1"= 50'
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP	DATE: 12/02/'9
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 8 OF 15

PLAT





LINE TABLE		
LINE #	LENGTH	DIRECTION
L200	12.63	N 87° 37' 51" E
L201	40.31	S 85° 14' 38" E
L202	11.19	N 87° 37' 51" E
L203	40.31	N 80° 30' 21" E

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C38	121.37'	830.00'	008.38	S 19° 05' 20" E	121.27'
C39	112.60'	770.00'	008.38	N 19° 05' 20" W	112.50'
C40	39.14'	25.00'	089.71	S 47° 30' 49" E	35.27'
C41	40.48'	25.00'	092.76	N 41° 14' 58" E	36.20'
C42	39.27'	25.00'	090.00	S 42° 37' 51" W	35.36'
C43	39.27'	25.00'	090.00	S 47° 22' 09" E	35.36'
C49	177.91'	630.00'	016.18	S 84° 16' 43" E	177.32'
C50	770.70'	570.00'	077.47	N 53° 38' 03" W	713.32'
C51	577.63'	630.00'	052.53	N 41° 09' 58" W	557.61'
C52	37.29'	25.19'	084.83	N 61° 00' 02" E	33.98'
C53	37.29'	25.19'	084.83	S 24° 37' 17" E	33.98'
C92	498.35'	1025.00'	027.86	S 16° 17' 51" E	493.46'
C93	474.04'	975.00'	027.86	N 16° 17' 51" W	469.39'
C94	39.32'	24.88'	090.54	S 47° 22' 09" E	35.36'
C95	39.90'	23.70'	096.45	N 42° 37' 51" E	35.36'
C99	442.66'	920.00'	027.57	S 16° 26' 32" E	438.40'
C101	39.72'	920.00'	002.47	S 03° 53' 42" E	39.72'
C102	371.81'	980.00'	021.74	S 19° 21' 26" E	369.59'
C104	42.22'	477.93'	005.06	N 05° 12' 00" W	42.21'

LEGEND

- EXISTING PROPERTY LINE
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50 25 0 25 50 100
SCALE: 1" = 50'

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PHILIP E. TOLLIN — REGISTERED — No. 12489 — PROFESSIONAL ENGINEER — STATE OF DELAWARE — 05/25/21
ENGINEER'S SEAL

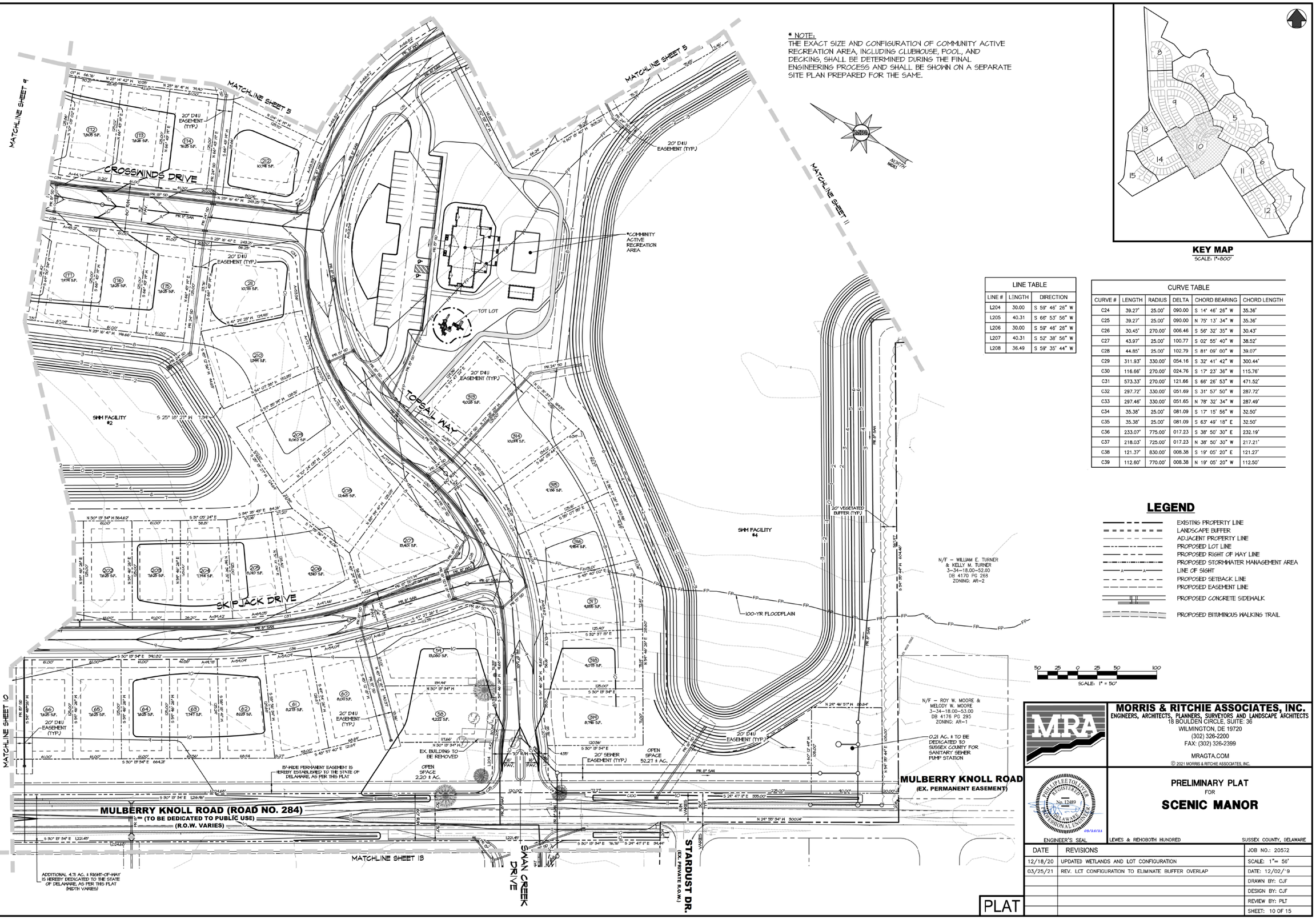
PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: 1"= 50'
DATE: 12/02/'9
DRAWN BY: CJF
DESIGN BY: CJF
REVIEW BY: PLT
SHEET: 9 OF 15

PLAT



* NOTE:
THE EXACT SIZE AND CONFIGURATION OF COMMUNITY ACTIVE RECREATION AREA, INCLUDING CLUBHOUSE, POOL, AND DECKING, SHALL BE DETERMINED DURING THE FINAL ENGINEERING PROCESS AND SHALL BE SHOWN ON A SEPARATE SITE PLAN PREPARED FOR THE SAME.

KEY MAP
SCALE: 1"=800'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L204	30.00	S 59° 46' 26" W
L205	40.31	S 66° 53' 56" W
L206	30.00	S 59° 46' 26" W
L207	40.31	S 52° 38' 56" W
L208	36.49	S 59° 35' 44" W

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C24	39.27'	25.00'	090.00	S 14° 46' 26" W	35.36'
C25	39.27'	25.00'	090.00	N 75° 13' 34" W	35.36'
C26	30.45'	270.00'	006.46	S 56° 32' 35" W	30.43'
C27	43.97'	25.00'	100.77	S 02° 55' 40" W	38.52'
C28	44.85'	25.00'	102.79	S 81° 09' 00" W	39.07'
C29	311.93'	330.00'	054.16	S 32° 41' 42" W	300.44'
C30	116.66'	270.00'	024.76	S 17° 23' 36" W	115.76'
C31	573.33'	270.00'	121.66	S 66° 26' 53" W	471.52'
C32	297.72'	330.00'	051.69	S 31° 57' 50" W	287.72'
C33	297.46'	330.00'	051.65	N 78° 32' 34" W	287.49'
C34	35.38'	25.00'	081.09	S 17° 15' 56" W	32.50'
C35	35.38'	25.00'	081.09	S 63° 49' 18" E	32.50'
C36	233.07'	775.00'	017.23	S 38° 50' 30" E	232.19'
C37	218.03'	725.00'	017.23	N 38° 50' 30" W	217.21'
C38	121.37'	830.00'	008.38	S 19° 05' 20" E	121.27'
C39	112.60'	770.00'	008.38	N 19° 05' 20" W	112.50'

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
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03/25/21
ENGINEER'S SEAL

PRELIMINARY PLAT
FOR
SCENIC MANOR

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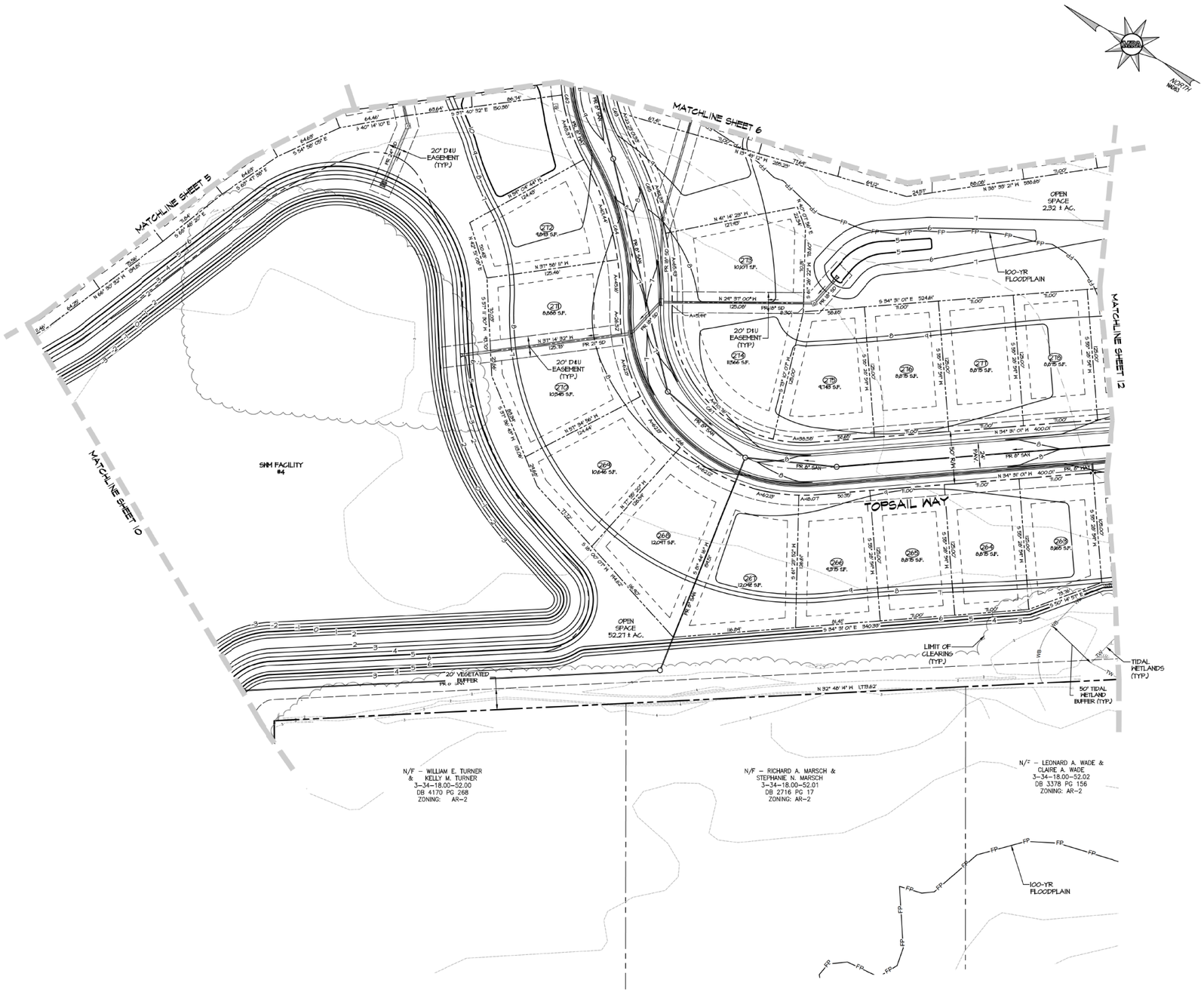
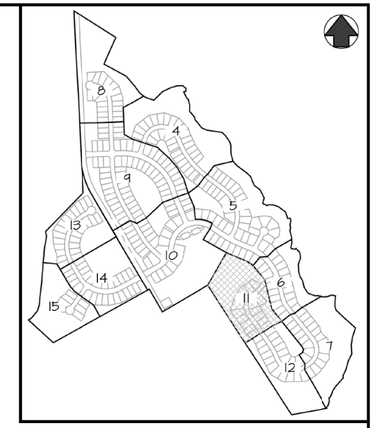
DATE	REVISIONS
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP

JOB NO.: 20572
SCALE: 1"= 50'
DATE: 12/02/'9
DRAWN BY: CJF
DESIGN BY: CJF
REVIEW BY: PLT
SHEET: 10 OF 15

PLAT





KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C62	121.96'	175.00'	039.93	N 50° 51' 42" E	119.51'
C63	87.12'	125.00'	039.93	N 50° 51' 42" E	85.36'
C64	146.60'	275.00'	030.54	N 46° 10' 04" E	144.87'
C65	173.25'	325.00'	030.54	N 46° 10' 04" E	171.21'
C66	293.08'	175.00'	095.96	N 13° 27' 40" E	260.01'
C67	209.34'	125.00'	095.96	N 13° 27' 40" E	185.72'

LEGEND

- EXISTING PROPERTY LINE
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50 25 0 25 50 100
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PAUL J. FLEETON, JR. REGISTERED PROFESSIONAL ENGINEER No. 12489 STATE OF DELAWARE 05/28/21
ENGINEER'S SEAL

PRELIMINARY PLAT
FOR
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LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS	JOB NO.: 20572
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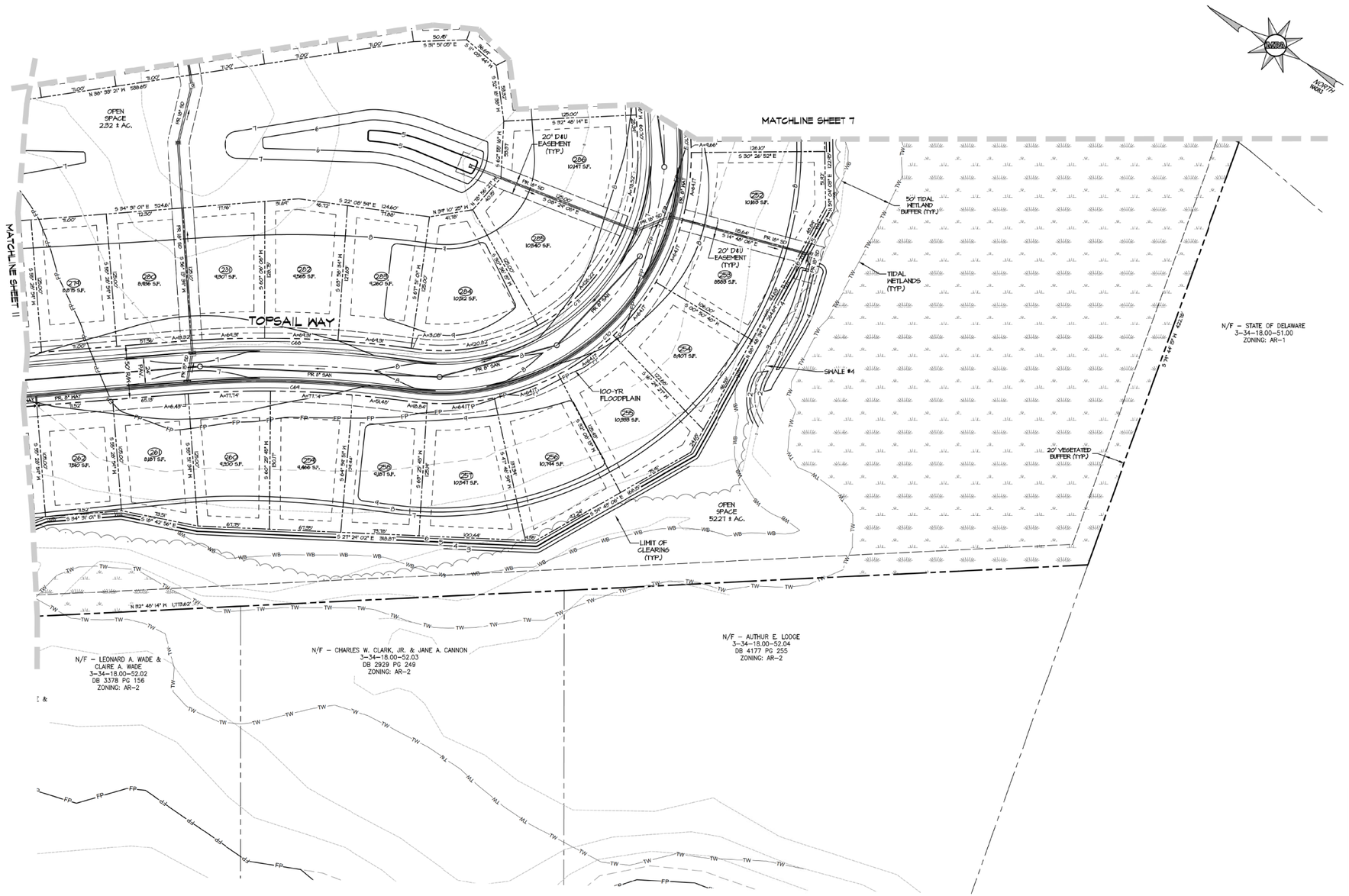
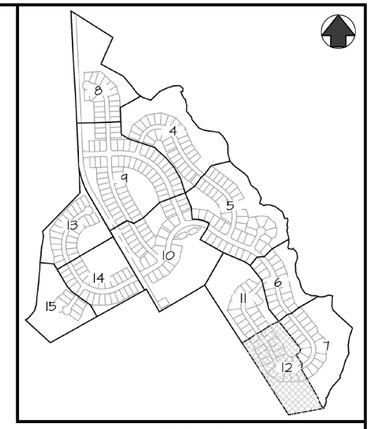
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 11 OF 15

PLAT





KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C68	224.33'	1025.00'	012.54	N 28° 14' 50" W	223.88'
C69	213.36'	975.00'	012.54	N 28° 14' 50" W	212.96'
C70	413.54'	235.00'	100.83	N 72° 23' 26" W	362.21'
C71	325.55'	185.00'	100.83	N 72° 23' 26" W	285.14'

LEGEND

- EXISTING PROPERTY LINE
- LANDSCAPE BUFFER
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE
- PROPOSED RIGHT OF WAY LINE
- PROPOSED STORMWATER MANAGEMENT AREA
- LINE OF SIGHT
- PROPOSED SETBACK LINE
- PROPOSED EASEMENT LINE
- PROPOSED CONCRETE SIDEWALK
- PROPOSED BITUMINOUS WALKING TRAIL

50 25 0 25 50 100
SCALE: 1" = 50'

MORRIS & RITCHIE ASSOCIATES, INC.
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PHILIP L. FLEETWOOD III — REGISTERED — No. 12489 — PROFESSIONAL ENGINEER — STATE OF DELAWARE — 03/25/21
ENGINEER'S SEAL

PRELIMINARY PLAT
FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS	JOB NO.: 20572
12/18/20	UPDATED WETLANDS AND LOT CONFIGURATION	SCALE: 1"= 50'
03/25/21	REV. LOT CONFIGURATION TO ELIMINATE BUFFER OVERLAP	DATE: 12/02/'9
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 12 OF 15

PLAT

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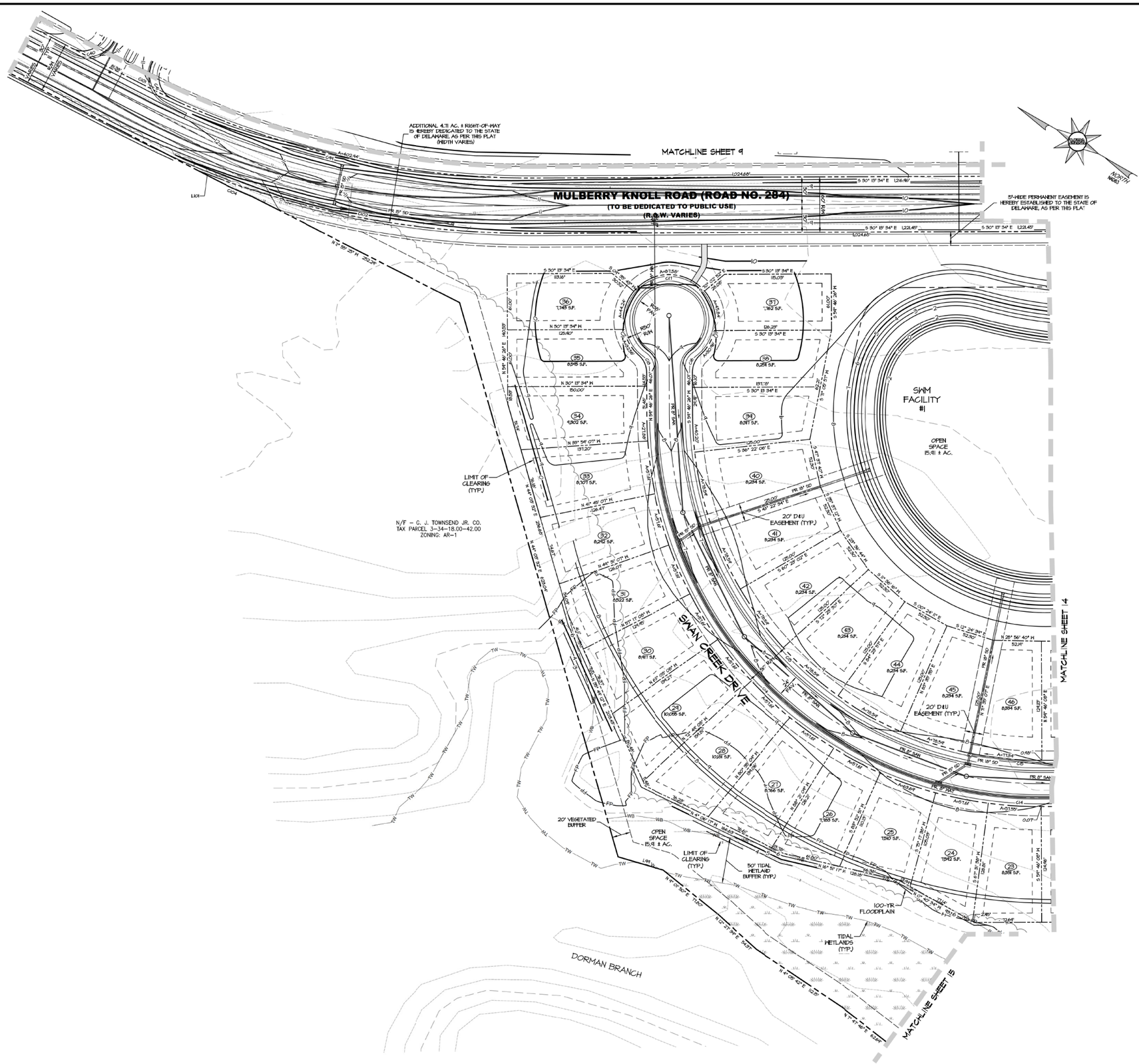

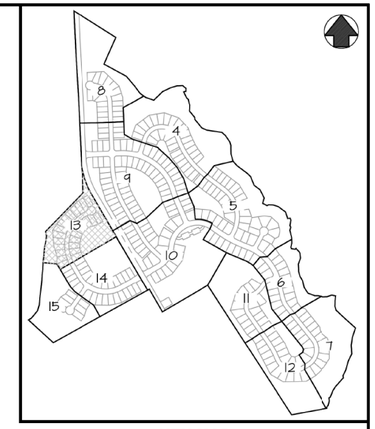

KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C14	667.62'	425.00'	090.00	N 14° 46' 17" E	601.07'
C15	589.08'	375.00'	090.00	N 14° 46' 17" E	530.35'
C16	21.03'	25.00'	048.19	S 83° 52' 07" W	20.41'
C17	241.19'	50.00'	276.38	S 30° 13' 34" E	66.67'
C18	21.03'	25.00'	048.19	N 35° 40' 44" E	20.41'
C40	39.14'	25.00'	089.71	S 47° 30' 49" E	35.27'
C41	40.48'	25.00'	092.76	N 41° 14' 58" E	36.20'
C99	442.66'	920.00'	027.57	S 16° 26' 32" E	438.40'
C101	39.72'	920.00'	002.47	S 03° 53' 42" E	39.72'
C102	371.81'	980.00'	021.74	S 19° 21' 26" E	369.59'
C104	42.22'	477.93'	005.06	N 05° 12' 00" W	42.21'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L99	51.18	N 13° 53' 34" W
L101	823.48	N 02° 40' 09" W

LEGEND

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SCALE: 1" = 50'

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ENGINEER'S SEAL

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FOR
SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

DATE	REVISIONS	JOB NO.: 20572
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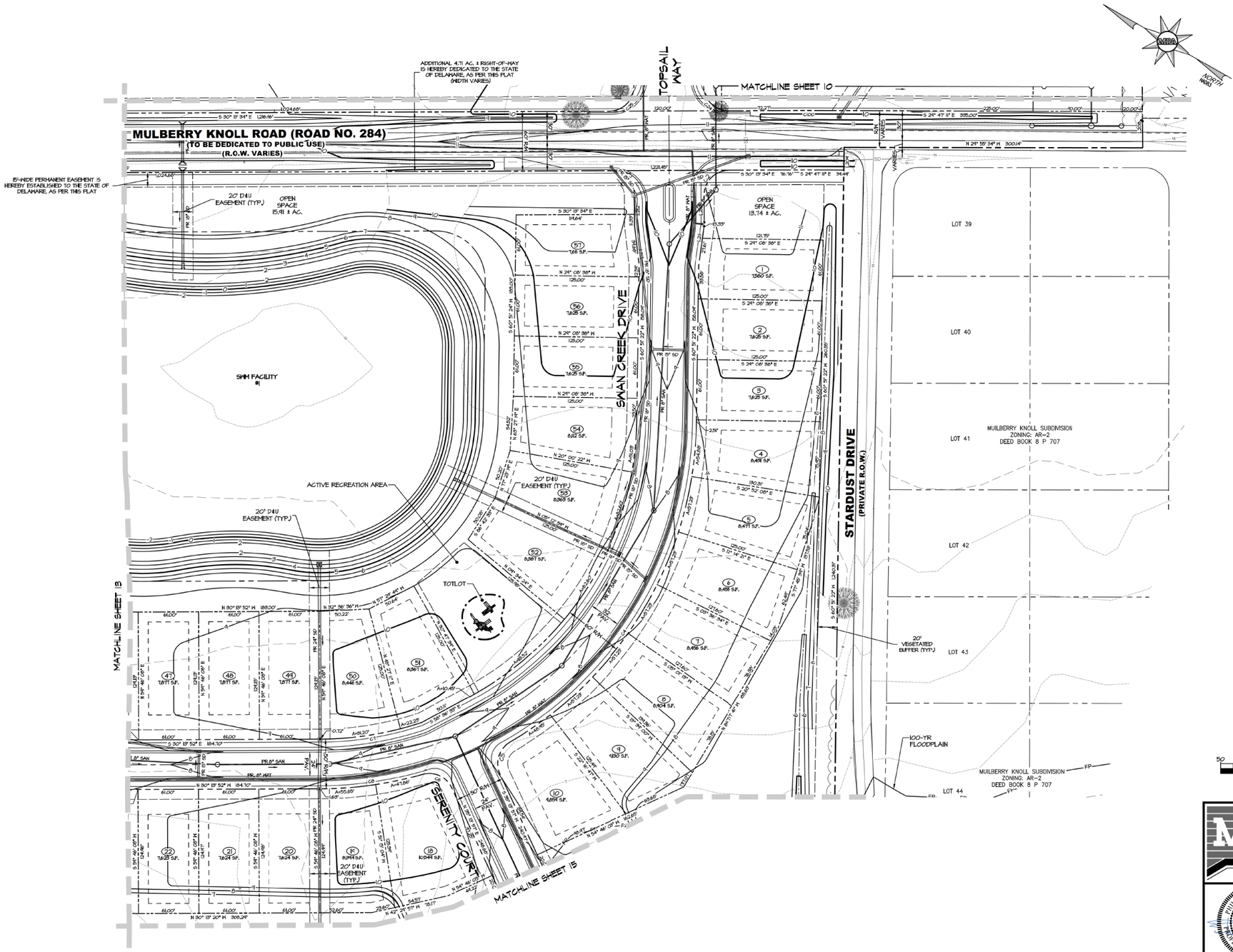
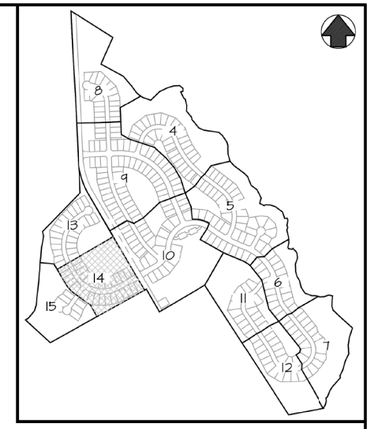
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 13 OF 15

PLAT





CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C1	39.27'	25.00'	090.00	N 14° 46' 26" E	35.36'
C2	39.17'	25.24'	088.90	N 75° 13' 34" W	35.36'
C4	390.00'	380.00'	058.80	N 89° 44' 31" W	373.11'
C5	36.84'	25.00'	084.43	S 77° 26' 46" W	33.59'
C6	35.50'	24.89'	081.72	N 05° 24' 19" W	32.56'
C7	103.44'	325.00'	018.24	N 39° 20' 55" W	103.00'
C8	103.51'	364.81'	016.26	N 38° 08' 14" W	103.16'
C14	667.62'	425.00'	090.00	N 14° 46' 17" E	601.07'
C15	589.08'	375.00'	090.00	N 14° 46' 17" E	530.35'
C24	39.27'	25.00'	090.00	S 14° 46' 26" W	35.36'
C25	39.27'	25.00'	090.00	N 75° 13' 34" W	35.36'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L208	36.49	S 59° 35' 44" W
L209	1263.09	S 60° 51' 22" W
L210	30.45	S 59° 46' 26" W
L211	40.94	S 67° 36' 36" W
L212	30.45	N 59° 46' 26" E
L213	39.68	S 53° 21' 57" W

LEGEND

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SCALE: 1" = 50'

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ENGINEER'S SEAL

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SCENIC MANOR

LEWES & REHOBOTH HUNDRED — SUSSEX COUNTY, DELAWARE

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		DATE: 12/02/19
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 14 OF 15

PLAT

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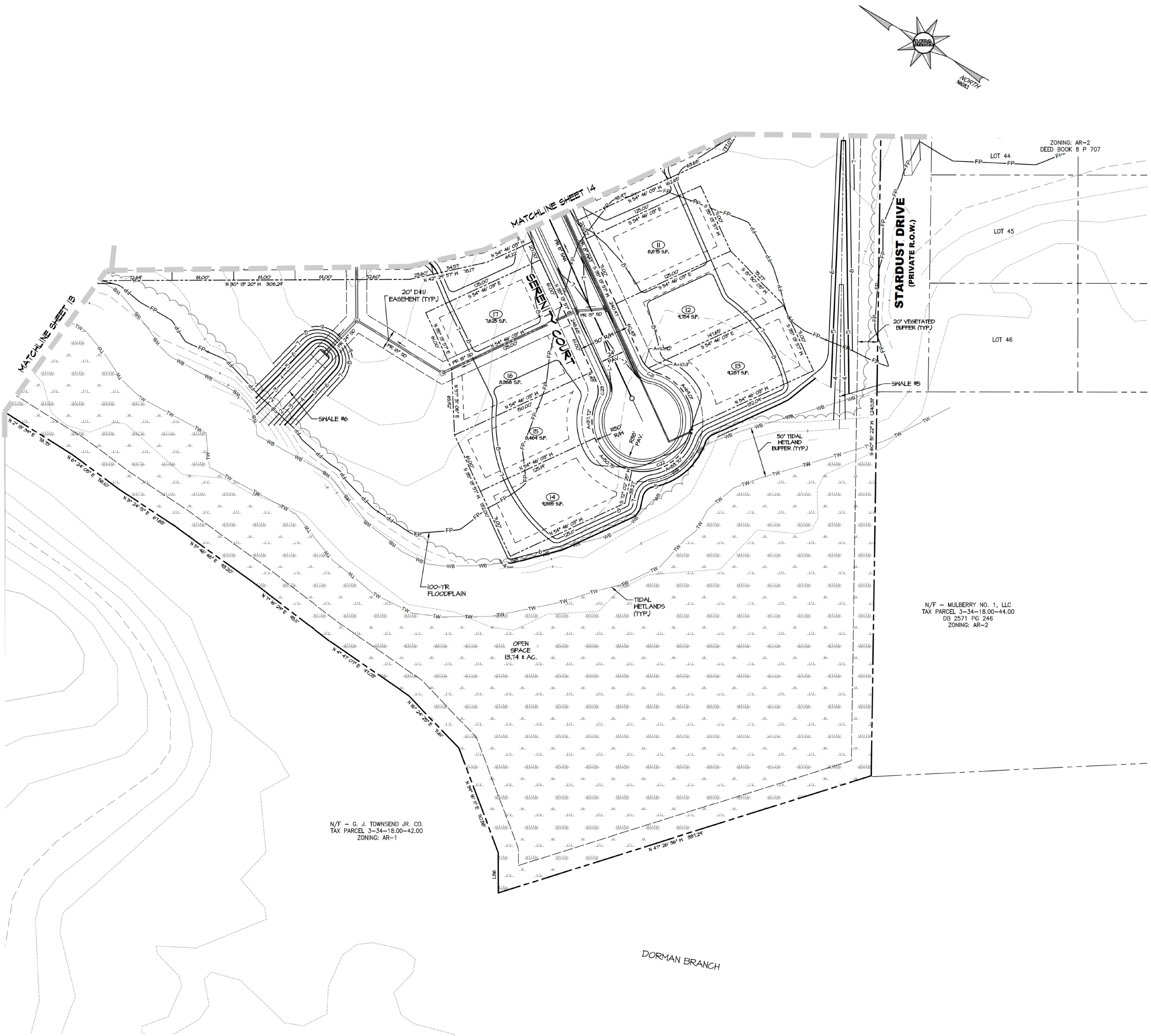

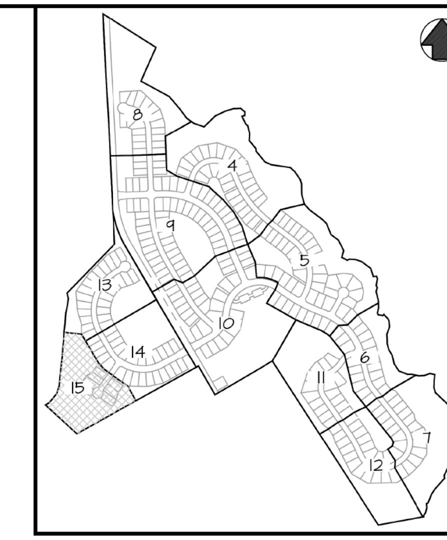

KEY MAP
SCALE: 1"=800'

CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH
C21	21.03'	25.00'	048.19	S 11° 08' 16" W	20.41'
C22	241.19'	50.00'	276.38	N 54° 46' 03" W	66.67'
C23	21.03'	25.00'	048.19	N 59° 19' 39" E	20.41'

LINE TABLE		
LINE #	LENGTH	DIRECTION
L86	40.00	N 59° 52' 00" E

LEGEND

- EXISTING PROPERTY LINE
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50 25 0 25 50 100
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PHILLIP LEE TOLLIVER REGISTERED No. 12489 DELAWARE PROFESSIONAL ENGINEER 03/25/21
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		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 15 OF 15

PLAT

Appendix 4 – PLUS Review Response Letter

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS,
AND LANDSCAPE ARCHITECTS

Date: March 23, 2021

Office of State Planning Coordination
122 Martin Luther King Jr. Blvd. South
Dover, DE 19901

Attention: Ms. Constance C. Holland, Director

Subject: Scenic Manor
(Formerly Estates at Mulberry Knoll)
PLUS Review 2019-08-06

Dear Ms. Holland:

We are in receipt of your comment letter dated September 26, 2019 with regard to Concept Plan associated with the proposed Scenic Manor (formerly known as Estates at Mulberry Knoll) residential subdivision proposed in Sussex County and respond as follows:

Strategies for State Policies and Spending

Comment 1: This project is located in Investment Levels 3, 4, and Out of Play according to the Strategies for State Policies and Spending. Investment Level 3 reflects areas where growth is anticipated by local, county, and state plans in the longer term future, or areas that may have environmental or other constraints to development. State investments may support future growth in these areas, but may have priorities for the near future. Level 3 area means there may be environmental concerns on or near the parcel and we would encourage you to design the site with respect for the environmental features which are present.

Investment Level 4 indicates where State investments will support agricultural preservation, natural resource protection, and the continuation of the rural nature of these areas. New development activities and suburban development are not supported in Investment Level 4 areas. These areas are comprised of prime agricultural lands and environmentally sensitive wetlands and wildlife habitats, which should be, and in many cases have been preserved.

Out of Play reflects lands that, at the time the State Strategies were developed, were not available for private development due to public ownership and / or preservation.

Because the development is inconsistent with the Strategies for State Policies and Spending, the State does not support development in Level 4 areas. We respectfully request that the proposed development in the Level 4 area be removed and the areas that are in Level 3 be designed with the maximum protection for the environmentally sensitive feature on the site.

Response: *Comment acknowledged. The project is located within the Sussex County Coastal Area growth zone and has access to public water and sewer infrastructure. Site design, including preservation and protection of existing natural resources, will be performed in*

accordance with requirements of the Sussex County Code in effect at the time of the Preliminary Plan application.

Code Requirements/Agency Permitting Requirements

Department of Transportation - Contact Bill Brockenbrough 760-2109

Comment 2: The site access on Mulberry Knoll Road (Sussex Road 284) must be designed in accordance with DelDOT's Development Coordination Manual, which is available at https://www.deldot.gov/Business/subdivisions/index.shtml?dc=changes

Response: *Comment acknowledged; the site access will be designed in accordance with the Development Coordination Manual.*

Comment 3: Pursuant to Section P.3 of the Manual, a Pre-Submittal Meeting is required before plans are submitted for review. The form needed to request the meeting and guidance on what will be covered there and how to prepare for it is located at https://deldot.gov/Business/subdivisions/pdfs/Meeting_Request_Form.pdf?08022017

Response: *Comment acknowledged; a Pre-Submittal Meeting with the DelDOT Subdivision Section will be scheduled prior to submittal of plans for review.*

Comment 4: Section P.5 of the Manual addresses fees that are assessed for the review of development proposals. DelDOT anticipates collecting the Initial Stage Fee when the record plan is submitted for review and the Construction Stage Fee when construction plans are submitted for review.

Response: *Comment acknowledged; review fees are anticipated to be provided in accordance with current DelDOT policy.*

Comment 5: Per Section 2.2.2.1of the Manual, Traffic Impact Studies (TIS) are warranted for developments generating more than 500 vehicle trip ends per day or 50 vehicle trip ends per hour in any hour of the day. From the PLUS application, the total daily trips are estimated at 3,032 vehicle trip ends per day and DelDOT confirms this number. A TIS scoping meeting was held on August 15, 2019.

Response: *Comment addressed; the final TIS report was prepared by the Traffic Group and submitted for DelDOT review on April 1, 2020. DelDOT issued letter of approval on February 11, 2021.*

Comment 6: The purpose of a TIS is to identify offsite improvements that the developer should build or contribute toward. Even without the benefit of the TIS, DelDOT anticipates requiring the developer to improve Mulberry Knoll Road to meet Local Road standards, including two eleven-foot travel lanes and two five-foot shoulders, within the limits of their frontage. This requirement may include a bituminous concrete overlay to the existing travel lanes, at DelDOT's discretion. It may also include a realignment to ease the curve in Mulberry Knoll Road between the Road A/D and Road G intersections. If DelDOT requires an overlay, they will analyze the existing travel lanes' pavement section specify the overlay thickness.

Response: *Comment acknowledged; as discussed with DelDOT during the pre-submittal meeting for the project, Mulberry Knoll Road will be improved for the portion of the site frontage between the two entrance locations to typical DelDOT standards for Local Roads. We will coordinate with the Development Coordination Section and DelDOT Material*

Section to determine paving section to be utilized for Mulberry Knoll Road improvements. The developer will make contributions through the TID funding for additional improvements to Mulberry Knoll Road and other off-site locations.

Comment 7: As necessary, in accordance with Section 3.2.5 and Figure 3.2.5-aof the Manual, DelDOT will require dedication of right-of-way along the site's frontage on Mulberry Knoll Road. By this regulation, this dedication is to provide a minimum of 30 feet of right-of-way from the physical centerline. The following right-of-way dedication note is required, "An X-foot wide right-of-way is hereby dedicated to the State of Delaware, as per this plat."

Response: *Comment addressed; as shown on the Preliminary Plan, Mulberry Knoll Road access through the subject parcel is currently within an easement area. It is the intent of the Scenic Manor plan to provide the full right-of-way dedication for Mulberry Knoll Road to current DelDOT standards for the entire frontage on the subject parcel. Dedication of this right-of-way will be noted no final Record Plans utilizing DelDOT standard language requirements.*

Comment 8: In accordance with Section 3.2.5.1.2 of the Manual, DelDOT will require the establishment of a 15-foot wide permanent easement across the property frontage on Mulberry Knoll Road. The location of the easement shall be outside the limits of the ultimate right-of-way. The easement area can be used as part of the open space calculation for the site. The following note is required, "A 15-foot wide permanent easement is hereby established for the State of Delaware, as per this plat."

Response: *Comment addressed; the requested easement area has been shown on the plan. The Record Plan will include the requested easement note in accordance with DelDOT requirements.*

Comment 9: Referring to Section 3.4.2.1of the Manual, the following items, among other things, are required on the Record Plan:

- A Traffic Generation Diagram. See Figure 3.4.2-a for the required format and content.
- Depiction of all existing entrances within 600 feet of the entrances on Mulberry Knoll Road.
- Notes identifying the type of off-site improvements, agreements (signal, letter) contributions and when the off-site improvements are warranted.

Response: *Comment acknowledged; Record Plans will be prepared in and submitted for DelDOT review in accordance with current DelDOT requirements.*

Comment 10: Section 3.5 of the Manual provides DelDOT's requirements with regard to connectivity. The requirements in Sections 3.5.1 through 3.5.3 shall be followed for all development projects having access to state roads or proposing DelDOT maintained public streets for subdivisions. DelDOT recommends that l5-foot wide permanent easement for a pedestrian path be provided from the cul-de-sac on Road F to the north property line, along the east edge of the storm water management basin.

Response: *Comment addressed; with the prior development of the lands to the southeast of the subject site, and the wetlands areas occupying a significant portion of the remaining site perimeter, the opportunities for vehicular interconnections are severely limited. As shown on the preliminary plan, pedestrian interconnections from the internal subdivision cul-de-sacs have been extended to the shared use path area to be provided along*

Mulberry Knoll Road. Pedestrian access easement will be provided for these areas on the Record Plans.

Comment 11: Section 3.5.4.2 of the Manual addresses requirements for shared-use paths and sidewalks. For projects in Level 1 and 2 Investment Areas, installation of paths or sidewalks along the frontage on State-maintained roads is required. DelDOT anticipates requiring the developer to build Shared Use Paths along their frontage on both sides of Mulberry Knoll Road.

Response: *Comment addressed; the easement area for a Shared Use Path has been shown on the plan as noted above. The requirement to provide the Shared Use Path will be discussed with the Subdivision Engineer to determine whether construction along the limited frontage area, or payment of the fee in lieu would be a better alternative at this location.*

Comment 12: Section 3.5.4.4 of the Manual addresses access-ways, essentially Shared Use Paths connecting subdivision streets either to each other or to the road on which the property DelDOT anticipates requiring the developer to build three access-ways, from the cul-de-sacs on Roads A, B and F to the Shared Use Paths along Mulberry Knoll Road.

Response: *Comment addressed; as noted above, pedestrian linkages from the internal subdivision streets to the shared use paths along Mulberry Knoll Road have been shown on the Preliminary Plan.*

Comment 13: Referring to Section 3.5.5 of the Manual, existing and proposed transit stops and associated facilities as required by the Delaware Transit Corporation (DTC) or DelDOT shall be shown on the Record Plan.

Response: *Comment acknowledged; the project site is not located along any current DART routes. Therefore, no transit stops or associated facilities are anticipated to be required for this project. We will confirm any changes to this approach with DTC and revise Record Plan accordingly.*

Comment 14: In accordance with Section 3.8 of the Manual, storm water facilities, excluding filter strips and bio swales, shall be located a minimum of 20 feet from the ultimate State right-of-way along Mulberry Knoll Road.

Response: *Comment addressed; all SWM areas are shown a minimum of 20' beyond the area of DelDOT Right-of-Way dedication.*

Comment 15: In accordance with Section 5.2.9 of the Manual, the Auxiliary Lane Worksheet should be used to determine whether auxiliary lanes are warranted at the site entrances and how long those lanes should be. The worksheet can be found at https://deldot.gov/Business/subdivisions/index.shtml.

Response: *Comment acknowledged; site entrance will be designed in accordance with current DelDOT requirements. Supporting design calculations will be provided as part of the plan review package. Design deviation requests will be submitted for DelDOT consideration in accordance with current DelDOT policy.*

Comment 16: In accordance with Section 5.14 of the Manual, all existing utilities must be shown on the plan and a utility relocation plan will be required for any utilities that need to be relocated.

Response: *Comment acknowledged; plans will be developed and submitted for DelDOT review in accordance with current DelDOT requirements.*

State Historic Preservation Office - Contact Carlton Hall 736-7400

Comment 17: The Delaware SHPO does not recommend development in a Level 4 area.

Response: *Comment acknowledged. The project is located within the Sussex County Coastal Area growth zone and has access to public water and sewer infrastructure. Site design, including preservation and protection of existing natural resources, will be performed in accordance with requirements of the Sussex County Code in effect at the time of the Preliminary Plan application.*

Comment 18: There are three known archaeological sites on the parcel. One on the western (507909), northeastern (500593) and one on the southern part of the parcel (S007S5). There is also a historic farm known as the Captain Robinson Tenant Farm (501001) near the middle of the parcel.

Response: *Comment acknowledged. A Phase I Archaeological Survey was performed in February 2020 to determine extent of existing historical resources on site.*

Comment 19: The Arnell Creek has a string of prehistoric and historic sites along it. The area was being settled by the Dutch and Maryland settlers in the 17th century. There are collections from all those sites, and an Archeolog article, which documents that 500593 was an early historic site, certainly 18th century and possibly earlier, with evidence of prehistoric occupation as well. The article notes that Wm. Futcher originally patented this area in 1681. The Beers Atlas Map shows Futcher properties mapped closer to the creek which was usual for mid-19th century properties. One of the properties is the same location as archaeological site 500593 located on the northeastern part of the parcel.

Response: *Comment acknowledged. A Phase I Archaeological Survey was performed in February 2020 to determine extent of existing historical resources on site.*

Comment 20: There is high potential for additional archaeological sites and a family cemetery to be present in the area. Therefore, the State Historic Preservation Office is recommending an archaeological survey of the project area. Abandoned or unmarked family cemeteries are very common in the State of Delaware. They are usually in rural or open space areas, within or near the boundary of a historic farm site. If you have any questions, inquires or concerns, feel free to contact us for assistance at302-736-1400.

If any project or development proceeds, the developer should be aware of the Unmarked Human Burials and Human Skeletal Remains Law (Del. C. Title 7, Ch.54). Prior to any demolition or ground-disturbing activities, the developer should hire an archaeological consultant to examine the parcel for archaeological resources, including unmarked human burials or human skeletal remains, to avoid those sites or areas.

Response: *Comment acknowledged. A Phase I Archaeological Survey was performed in February 2020. No evidence of burial sites were found during this process.*

Comment 21: If there is federal involvement, in the form of licenses, permits, or funds, the federal agency, often through its client, is responsible for complying with Section 106 of the National Historic Preservation Act (36 CFR 800) and must consider their project's effects on any known or potential cultural or historic resources. For further information on the

Section 106 process please review the Advisory Council on Historic Preservation's website at: www.achp.gov

Response: *Comment acknowledged.*

Delaware State Fire Marshall's Office - Contact Duane Fox 259-7037

Comment 22: At the time of formal submittal, the applicant shall provide; completed application, fee, and three sets of plans depicting the following in accordance with the Delaware State Fire Prevention Regulation:

Fire Protection Water Requirements:

- Where a water distribution system is proposed for single-family dwellings it shall be capable of delivering at least 500 gpm for 1-hour duration, at 20-psi residual pressure. Fire hydrants with 1000 feet spacing on centers are required.
- The infrastructure for fire protection water shall be provided, including the size of water mains.

Accessibility:

- All premises, which the fire department may be called upon to protect in case of fire, and which are not readily accessible from public roads, shall be provided with suitable gates and access roads so that all buildings on the premises are accessible to fire apparatus. If a "center island" is placed at an entrance into other streets in the subdivision, it shall be arranged in such a manner that it will not adversely affect quick and unimpeded travel of fire apparatus, .Additionally, where trees are to be situated adjacent to travel roads in the subdivision, some forethought should be exercised regarding how future growth of the trees may affect fire department travel throughout the subdivision.
- Fire department access shall be provided in such a manner so that fire apparatus will be able to locate within 100 ft. of the front door.
- Any dead end road more than 300 feet in length shall be provided with a turn-around or cul-de-sac arranged such that fire apparatus will be able to turn around by making not more than one backing maneuver. The minimum paved radius of the cul-de-sac shall be 38 feet. The dimensions of the cul-de-sac or turn-around shall be shown on the final plans. Also, please be advised that parking is prohibited in the cul-de-sac or turn around.
- The use of speed bumps or other methods of traffic speed reduction must be in accordance with Department of Transportation requirements.
- The local Fire Chief, prior to any submission to our Agency, shall approve in writing the use of gates that limit fire department access into and out of the development or property

Gas Piping and System Information:

- Provide type of fuel proposed, and show locations of bulk containers on plan.

Required Notes:

- Provide a note on the final plans submitted for review to read " All fire lanes, fire hydrants, and fire department connections shall be marked in accordance with the Delaware State Fire Prevention Regulations"
- Name of Water Supplier
- Proposed Use
- National Fire Protection Association O{FPA) Construction Type

- Maximum Height of Buildings (including number of stories)
- Provide Road Names, even for County Roads

Response: *Comment acknowledged; plans will be prepared and submitted to the SFMO in accordance with the current Delaware Fire Regulations.*

Recommendations/Additional Information

This section includes a list of site specific suggestions that are intended to enhance the project. These suggestions have been generated by the State Agencies based on their expertise and subject area knowledge. These suggestions do not represent State code requirements. They are offered here in order to provide proactive ideas to help the applicant enhance the site design, and it is hoped (but in no way required) that the applicant will open a dialogue with the relevant agencies to discuss how the suggestions can benefit the project.

Department of Transportation - Bill Brockenbrough 760-2109

Recommendation 1: The applicant should expect a requirement that any substation and/or wastewater facilities will be required to have access from an internal driveway with no direct access to Mulberry Knoll Road.

Response: *Comment acknowledged; no substations ow wastewater facilities are anticipated to be constructed by the Developer as part of the proposed Scenic Manor project.*

Recommendation 2: The applicant should expect a requirement that all PLUS and Technical Advisory Committee (TAC) comments be addressed prior to submitting plans for review.

Response: *Comment acknowledged; plans will be submitted to DelDOT with revisions to address TAC and PLUS comments as noted above.*

Recommendation 3: Please be advised that the Standard General Notes have been updated and posted to the DelDOT website. Please begin using the new versions and look for the revision dates of March 21, 2019 and March 25, 2019. The notes can be found at https://www.deldot.gov/Business/subdivisions/.

Response: *Comment acknowledged; plans to be submitted to DelDOT will referenced latest General Notes for Record Plans, Entrance Plans, and Maintenance of Traffic Plans.*

Department of Natural Resources and Environmental Control - Contact Michael Tholstrup 735-3352

Rare, Threatened, and Endangered species

Scientific Name	Common Name	Taxon	State Rank	State Status	SGCN Tier
Ambystoma tigrinum	Eastern Tiger Salamander	Amphibian	S1	E	Tier 1

A review of our database indicates that the following state rare, and Species of Greatest Conservation (SGCN) may occur at or adjacent to the project site.

The Tiger Salamander (Ambystoma tigrinum tigrinum) occurs in moist, often sandy, deciduous, coniferous or mixed woodlands with adequate wetlands for breeding, such as coastal plain ponds. This species spends most of its life cycle underground and is rarely encountered except during breeding periods and when recently transformed sub-adults leave their larval pools. Eggs are laid during the winter in masses underwater. Larvae hatch in about four weeks and then transform into sub-adults. Availability of fishless breeding pools and adequate upland forested buffers around those pools is critical for this species.

SGCN are identified in the Delaware Wildlife Action Plan (DEWAP) which is a comprehensive strategy for conserving the full array of native wildlife and habitats common and uncommon- as vital components of the state's natural resources. This document can be viewed via the Division of Fish and Wildlife's website at http://www.dnrec.delaware.gov/fw/dwap/Pages/default.aspx.

Leaving the forest intact would be the most beneficial to state rare species that may utilize the habitats in and around the project area. In lieu of that option, DNREC offers the following recommendations that, if implemented, will reduce negative impacts to wildlife and their habitats:

Recommendation 4: Tree clearing should be restricted to the areas that are absolutely necessary for the footprint of homes and infrastructure.

Response: *Comment acknowledged; tree clearing is anticipated to be limited to those areas necessary for construction of road, residential lots, and infrastructure directly associated with the proposed residential subdivision. This may include those areas required to accommodate grading to elevate the residential lots and essential access above the FEMA floodplain elevation.*

Recommendation 5: Due to the difficulty that small animals (i.e. salamanders) have climbing vertical curbs, DNREC recommends designing the development to exclude curbs. Our state herpetologist is concerned that if the state endangered tiger salamanders are using the seasonal ponds located on the project site, they will not be able to cross curbed roads during the breeding season.

Response: *Comment acknowledged; all streets will be designed in accordance with State and County design standards. It is anticipated that internal subdivision streets will include rolled curbs to eliminate a vertical barrier to any wildlife that may be crossing proposed road areas.*

Recommendation 6: To avoid attracting reptiles and other amphibians to the proposed stormwater management ponds in the center of the development, DNREC recommends installing stormwater ponds adjacent to the forests on site, far from the above mentioned ponds as possible.

Response: *Comment acknowledged; stormwater BMPs have been dispersed throughout the community in accordance with recommendations from DNREC Sediment and Stormwater Management Program. Several of the facilities located in the interior portion of the site will be located in portions where wetlands already exist.*

Recommendation 7: Reptile and amphibian species need predator-free ponds in order to survive and reproduce successfully. Therefore, DNREC recommends allowing the stormwater

management ponds to dry up seasonally so that fish (predators) are not capable of inhabiting these systems.

Response: *Comment acknowledged; stormwater BMPs will be designed in accordance with the Regulatory Guidance Documents from DNREC Sediment and Stormwater Management Program.*

Recommendation 8: Any culverts installed should be open bottom box culverts to allow for natural substrate to remain and for in-water passage of aquatic life. Additionally, culverts should be left as wide as possible to ensure that salamanders can travel through them.

Response: *Comment acknowledged; no existing drainage ways or streams cross through the project site area. Stormwater drainage, including on-site conveyance and stormwater management outfalls will be designed in accordance with State and County Code requirements.*

Rare and Unique Natural Communities

According to DNREC's Division of Fish and Wildlife database, the forested wetlands on the project parcel support potential old-growth forest, in that it has not been cleared since at least 1937 (the year of the oldest aerial image DNREC has on file).

The potential old growth forest on this site has been identified as core wildlife habitat by the Delaware Ecological Network (DEN), which is habitat that is defined as containing relatively intact natural ecosystems, and is of high-quality for native plants and animals. The DEN is a statewide conservation network developed using GIS and field collected datasets that help to identify and prioritize ecologically important areas for natural resource protection, including areas of especially high quality that support rare species.

Response: *Comment acknowledged; as noted above, tree clearing is anticipated to be limited to those areas necessary for construction of road, residential lots, and infrastructure directly associated with the proposed residential subdivision. This may include those areas required to accommodate grading to elevate the residential lots and essential access above the FEMA floodplain elevation.*

Fisheries

DNREC fisheries staff has determined that Love Creek supports a large number of juvenile migratory fish. Several species of particular commercial and recreational importance utilize the creek and could be impacted by this project. It is possible that striped bass (Morone saxitilis) spawn in upper Love Creek due to the number of young-of-the-year (YOY) caught during sampling efforts. A primary species of concern for this project is summer flounder (Paralichthys dentatus), which also utilizes the creek as a spawning and nursery habitat.

Recommendation 9: If dredging is to occur for this project, DNREC recommends that dredging occur from September through December to allow these species time to mature and migrate out of the stream system prior to disturbance. This window should minimize the number of YOY flounder impacted by the dredging operation.

Response: *Comment acknowledged; no dredging is anticipated to be proposed by this project. Should this be required, the developer will coordinate with DNREC agencies to determine all requirements for such operations.*

Park/Boat Launch Area

Recommendation 10: DNREC requests additional details regarding the park/boat launch area. This area is a tidal wetland, and falls under the jurisdiction of waters of the U.S. under the Clean Water Act. If a proper boat ramp is to be built here, a U.S. Army Corp of Engineers and DE Wetlands and Subaqueous Lands permit will be required to dredge for the boat ramp, and a time of year restriction (TOYR) will be recommended to address fisheries concerns.

Response: *Comment acknowledged; the community area is anticipated to be utilized as a kayak launch area and will only include those facilities necessary to accommodate such activities. We will coordinate with ACOE and the DNREC Wetlands and Subaqueous Lands Section to determine what, if any, requirements will be required to permit the proposed activity.*

Nesting/Breeding Bird

Based on aerial images this site appears to have wetland habitat which could support sensitive marsh bird species including SGCN species such as Saltmarsh Sparrow and Black Rail. However, since SCRP does not have any records from this exact location, DNREC would like to request a site visit to survey for potential breeding marsh birds. Please see the "Site Visit Request" section below for additional details.

To reduce impacts to ground-nesting marsh birds, it would be optimal if work activities are completed prior to April 1st. In the event that project activities extend past April 1st the following contingency plan could minimize direct impacts:

A qualified biologist should be on-site to determine if and when marsh birds have begun establishing territories and / or nesting.

Note: If nesting activities of a Species of Conservation Concern (S 1 and 52) have begun and a nest is within the area of disturbance or so close that abandonment is likely, work activities may have to cease until young are fledged or nesting attempt fails.

Response: *Comment acknowledged; the developer has determined to decline the request for site visit at this time. The development site is currently utilized for agricultural purposes, and will continue to operate as such until such time that on-site construction is initiated. The developer / contractor will comply with all State regulatory requirements related to Nesting/Breeding Birds*

Recommendation 11: If it is determined that nesting activity has not taken place yet:

1) To minimize impacts to shrub/scrub-nesting birds, selective clearing of woody vegetation that could be used for nesting and is within the footprint of immediate disturbance is recommended. This may discourage birds from constructing nests in habitat that will be impacted by the project anyway.

2) To minimize impacts to ground-nesting birds, place construction matting within the area of immediate disturbance. This would prohibit nesting in the project

area and therefore, reduce the chance of destroying established nests, eggs, and/or chicks.

If nesting activity has taken place and/or nests are found in or within 50ft of the project area, work activities should cease and the Division of Fish and Wildlife should be contacted for further recommendations. Henrietta Bellman can be reached at (302) 735-8677

Response: *Comment acknowledged; the developer / contractor will comply with all State regulatory requirements related to Nesting/Breeding Birds*

Marsh Buffer

According to the site plan, the applicant proposes a +/- 25' buffer from the Limit of Disturbance (LOD) to the tidal wetland demarcation line. To protect the function and integrity of wetlands, a minimum 100- foot buffer should be left intact around the perimeter of the forested wetlands. This recommendation is based on peer-reviewed scientific literature that shows an adequately sized buffer that effectively protects wetlands and streams - in most circumstances - is about 100' in width. Upland buffers also serve as habitat for many terrestrial species that are dependent on aquatic and wetland habitats for a portion of their annual life cycle. Lot lines, roadways, and infrastructure should not be placed within this buffer zone. Buffers are an integral component of aquatic and wetland habitats, reducing the amount of sediments, pollutants, and other non-point source material that may affect the function and integrity of habitat and the condition and survivability of aquatic organisms.

Recommendation 12: Given the benefit of trees in erosion control and flood abatement, tree removal for construction activities and stormwater management should be minimized. The site plan should be designed in a way that allows for preservation of as much of this wooded area as feasible.

Response: *Comment acknowledged; a 50' buffer is provided to all tidal wetlands as shown on the Preliminary Plan for the Scenic Manor site in accordance with Sussex County Code requirements. As noted above, ; tree clearing is anticipated to be limited to those areas necessary for construction of road, residential lots, and infrastructure directly associated with the proposed residential subdivision. This may include those areas required to accommodate grading to elevate the residential lots and essential access above the FEMA floodplain elevation.*

Recommendation 13: Restrict forest clearing and soil disturbance to the footprint of homes and infrastructure.

Response: *Comment acknowledged, tree clearing is anticipated to be limited to those areas necessary for construction of road, residential lots, and infrastructure directly associated with the proposed residential subdivision. This may include those areas required to accommodate grading to elevate the residential lots and essential access above the FEMA floodplain elevation.*

Recommendation 14: Re-seed and stabilize disturbed areas as soon as practicable. Landscape with native species.

Response: *Comment acknowledged; seeding / stabilization of disturbed areas will be performed within 14 days in accordance with Sussex Conservation District &*

DNREC standards. Landscape plans will be developed for the site by a licensed Landscape Architect in accordance with County Code requirements; consideration will be given to utilization of native species for open space, buffer, on-lot landscaping, and stormwater plantings as appropriate.

Recommendation 15: To reduce impacts to nesting birds and other wildlife species that utilize forests for breeding, forest clearing should not occur from April 1st to July 31st.

Response: *Comment acknowledged; all site clearing will be performed in accordance with Sussex County and DNREC Code requirements.*

Recommendation 16: Love Creek Natural Area is directly adjacent to the project parcel. Efforts should be made to avoid diverting surface water from roadways and stormwater facilities into this area. Water and habitat quality could be detrimentally affected by run-off which may contain oil and other pollutants, such as fertilizers and other chemicals applied by homeowners.

Response: *Comment acknowledged; it is assumed that the Love Creek Natural Area is located at the southerly end of Mulberry Knoll Road. Runoff from this portion of the Scenic Manor site will be conveyed to on-site SWM facilities to the maximum extent practicable. Discharge from the facilities will be directed to Arnell Creek to minimize the impact to the Love Creek Natural area.*

Recommendation 17: Maintain inputs to natural wetlands at pre-construction levels. Avoid causing increases or decreases in water levels.

Response: *Comment acknowledged; the on-site grading will attempt to maintain the drainage patterns of the undeveloped site. Discharge from the site will utilize techniques to provide for non-erosive discharge from all SWM facilities. Consideration of runoff volumes with regard to input to interior wetlands areas will be given throughout the grading and SWM design for the developed site condition.*

Recommendation 18: Low spillage lightbulbs (those that reflect light directly downward onto the illuminated area) should be used on roads and homes within 750-feet of the forested wetlands on site. Fluorescent and mercury vapor lighting should not be used.

Response: *Comment acknowledged; cutoff style light fixtures will be utilized throughout the community for the road lighting purposes. It is anticipated that these fixtures will utilize LED technology. Recommendations for any exterior lighting on the proposed residential structures will be shared with potential builders for their consideration.*

Recommendation 19: To deter waterfowl from taking up residence in the stormwater ponds, DNREC recommends planting the surrounding open space with a mix of native wildflower plantings (to be planted in accordance with the Sediment and Stormwater Plan approval agency requirements). In addition to deterring nuisance waterfowl, the native wildflower mix will also serve to attract bees, butterflies, and other pollinators, and reduce run-off, which can contain oil and other pollutants from the parking areas. Our program botanist, Bill McAvoy would gladly assist in drafting a list of plants suitable for this site. Bill can be contacted at (302) 735-8668 or William.McAvoy@delaware.gov.

Response: *Comment acknowledged; buffer areas around the SWM facilities will be planted with materials to discourage waterfowl per SCD recommendations. Plant material selection will be made by licensed Landscape Architect in accordance DNREC Stormwater Section guidelines as well as Sussex County and SCD requirements.*

Recommendation 20: Small animals, such as salamanders, have difficulty climbing vertical curbs. DNREC recommends designing the development to exclude curbs to prevent mortality from vehicle traffic. If road curbing must be installed, DNREC recommends curbing styles such as Cape Cod curbing, which allows small animals to climb out of the roadbed.

Response: *Comment acknowledged; all streets will be designed in accordance with State and County design standards. It is anticipated that internal subdivision streets will include rolled curbs to eliminate a vertical barrier to any wildlife that may be crossing proposed road areas.*

Recommendation 21: Avoid installing sewers with grates, which can create a hazard for amphibians and reptiles. Consider working with the Sussex Conservation District to implement safer alternatives.

Response: *Comment acknowledged; all streets will be designed in accordance with State and County design standards. As such, inlet and grate styles will utilize typical DelDOT details.*

Site Visit Request

In order to provide informed, up-to-date comments, DNREC's Division of Fish and Wildlife scientists request the opportunity to conduct a survey to evaluate habitat and the site's potential to support additional species of concern. In particular, DNREC would appreciate being able to conduct the survey during the breeding season for Eastern Tiger Salamander (January through February) and the breeding/territory-establishment season for marsh birds (April through June). The surveys will be conducted at no expense to the property owner. In the event that authorizations will be needed from DNREC's Coastal Management Program and / or Wetlands and Subaqueous Lands Section, they may request complete and up-to-date information from the Species Conservation and Research Program as part of their review. Therefore, granting access to the site may increase the efficiency of the State authorization process. Applicants/ property owners are welcome to join DNREC staff during the site visit, as it could also be a good opportunity to discuss options for minimizing impacts. Please contact Brian Galvez at (302) 223-2446 or Brian.Galvez@delaware.gov to schedule a site visit.

Response: *Comment acknowledged; the developer has determined to decline the request for site visit at this time. We understand this requirement may be required in the event that certain regulatory permits are required.*

Water Quality

DNREC mapping has identified hydric soils (e.g., Hurlock, Fallsington, & Broadkill) and non-tidal and tidally-influenced wetlands (e.g., Palustrine & Estuarine) within the project parcel. DNREC strongly discourages building on hydric soils because they are functionally important source of water storage (functions as a "natural sponge");the loss of water storage through excavation,

filling, or grading of intact native hydric soils increases the probability for more frequent and destructive flooding. Moreover, destruction of hydric soils increases the amount pollutant runoff which contributes to lower observed water quality in regional waterbodies and wetlands.

The applicant should contact the DNREC Subaqueous Lands section for regulatory information about tidal wetlands, at (302) 739-9943. The 25-foot buffer proposed by the applicant is insufficiently protective of water quality.

It is not considered an environmentally-acceptable practice to fill or remove wetlands or wetland vegetation or hydric soils to site or accommodate a SWM structure.

Recommendation 22: The applicant should contact a licensed (Delaware Class D) soil scientist to make a site specific assessment (i.e., soil survey mapping) and conduct a US Army Corps of Engineers approved wetlands delineation. A list of licensed Class D soil scientists can be obtained at the following web link: http://www.dnrec.delaware.gov/wr/Information/GWDlnfo/Pages/GroundWaterDischargesLicensesand Licensees.aspx

Response: *Comment acknowledged; a Preliminary Wetlands Evaluation was conducted on-site by Geo-Technology Associates, Inc. (GTA) in July 2019. A Final Wetlands Delineation and ACOE Jurisdictional Determination will be obtained prior to Record Plan approval.*

Recommendation 23: Generally, a 100-foot vegetated buffer is sufficiently protective of water quality.

Response: *Comment acknowledged; a minimum 50' buffer is to be provided adjacent to all tidal wetlands as shown on the Preliminary Plan for the Scenic Manor site in accordance with Sussex County Code requirements.*

Recommendation 24: The applicant should consider employing green-technology storm water management and a rain gardens (in lieu of open-water management structures) as best management practices to mitigate or reduce nutrient and bacterial pollutant runoff. If open-water stormwater management is selected for use, they should be employed for their intended function - that is, the management of stormwater - not for the creation of additional pond acreage to enhance property/aesthetic values. It should also be noted that open-water stormwater ponds attract nuisance geese (i.e., waste leads to increases in nutrient and bacterial pollutants) and nuisance algae (i.e., potentially source for a poisonous neurotoxin and low oxygen concentrations in water) that contribute to the degradation of water quality of waters in the greater Inland Bays watershed.

Response: *Comment acknowledged; consideration to green technology / infiltration based SWM practices will be performed during the SWM strategy development. Due to high groundwater table conditions anticipated for the site, the applicability of these practices was anticipated to be severely limited. As noted above, buffer areas around the SWM facilities will be planted with materials to discourage waterfowl per SCD recommendations. Plant material selection will be made by licensed Landscape Architect in accordance DNREC Stormwater Section guidelines as well as Sussex County and SCD requirements.*

State Natural Areas

The southeast and southwest portions of the property are within the Love Creek Natural Area. The Love Creek Natural Area also borders the western portion of the property. State Natural Areas are composed of areas of land and/or water, whether in public or private ownership, which have retained or reestablished its natural character (although it need not be undisturbed), has unusual flora or fauna, or has biotic, geological, scenic or archaeological features of scientific or educational value.

Recommendation 25: Avoid impacts to forested areas within the natural area as well as avoid/minimize impacts to wetlands and forested riparian habitat adjacent to the natural area.

Response: *Comment acknowledged; no disturbance is proposed to the forest wetland areas on site. As noted above, tree clearing is anticipated to be limited to those areas necessary for construction of road, residential lots, and infrastructure directly associated with the proposed residential subdivision. This may include those areas required to accommodate grading to elevate the residential lots and essential access above the FEMA floodplain elevation. More than 66% of the existing wooded areas are anticipated to be retained on the project site.*

Sustainable Development Recommendations

Recommendation 26: The applicant should consider the use of recycled, energy efficient materials, and renewable energy infrastructure.

Response: *Comment acknowledged; opportunities to incorporate sustainable materials will be discussed with developer, approval agencies, and contractor throughout the plan development process.*

Recommendation 27: The Division of Climate, Coastal, & Energy offers incentives for clean transportation (EV Charging) and energy efficiency. These programs address climate change goals of reducing greenhouse gas emissions and improving overall air quality (www.de.gov/greenenergy, http://www.de.gov/cleantransportation, www.de.gov/eeif.

Response: *Comment acknowledged; incentive programs will be shared with developer and builders for their consideration in incorporating these facilities into the residential and community amenities.*

Delaware State Fire Marshall's - Contact Duane Fox259-7037

Recommendation 28: Although not a requirement of the State Fire Prevention Regulations, the Office of the State Fire Marshal encourages home builders to consider the benefits of home sprinkler protection in dwellings. The Office of the State Fire Marshal also reminds home builders that they are obligated to comply with requirements of Subchapter III of Chapter 36 of Title 6 of the Delaware Code which can be found at the following website: http://delcode.delaware.gov/title6/c036/sc03/index.shtml

Response: *Comment acknowledged; recommendation will be shared with home builder for their consideration.*

Recommendation 29: Preliminary meetings with fire protection specialists are encouraged prior to formal submittal. Please call for appointment. Applications and brochures can be

downloaded from our website: www.statefiremarshal.delaware.gov, technical services link, plan review, applications or brochures.

Sussex County Housing - Contact Brandy Naurman

In addition to the comments above our office has received a letter from Brandy Nauman, Sussex County Housing Coordinator & Fair Housing Compliance Officer. A copy of that letter is enclosed wit this letter.

Response: Comment acknowledged; information will be shared with developer and home builder for their consideration.

A Preliminary Plan application has been submitted to Sussex County Department of Planning and Zoning review and approval. If you should require additional information regarding this PLUS application, please contact me to discuss at 302-326-2200.

Very Truly Yours,
MORRIS & RITCHIE ASSOCIATES, INC.

Christopher J. Flathers, P.E.
Senior Project Manager

cc: J. Whitehouse, Sussex County
J. Richardson, MKR Land, LLC
J. Fuqua, Esq.
P. Tolliver, MRA
File

Appendix 5 – Soils Report

“Report of Subsurface Exploration”

Geo-Technology Associates, Inc., February 21, 2020

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND
ENVIRONMENTAL CONSULTANTS

A Practicing Geoprofessional Business Association Member Firm

February 21, 2020

MKR Land Development, LLC
260 Hopewell Road
Churchville, Maryland 21028

Attn: Mr. John Richardson

Re: Report of Subsurface Exploration
Scenic Manor
Sussex County, Delaware

Dear Mr. Richardson:

In accordance with our agreement dated December 11, 2019, Geo-Technology Associates (GTA) has completed subsurface exploration for the Scenic Manor project located in Sussex County, Delaware. The exploration consisted of performing 13 borings within the proposed development area, visually classifying the soils, and performing limited laboratory testing. Transmitted herein is a report of our findings and conclusions about our preliminary recommendations with respect to general development implications. A report regarding stormwater management was submitted separately.

Unless MKR Land Development, LLC specifies otherwise, the samples collected as a part of the subsurface exploration will be disposed of after a period of 60 days from the date of this report. Thank you for the opportunity to be of assistance. If you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,
GEO-TECHNOLOGY ASSOCIATES, INC.

Travis Caraway, E.I.T.
Project Geotechnical Professional

GREGORY R. SAUTER
REGISTERED
NO. 13047
DELAWARE
PROFESSIONAL ENGINEER

Gregory R. Sauter, P.E.
Vice President

TPC/GRS/llh 31191815

21133 Sterling Avenue, Suite 7, Georgetown, DE 19947 (302) 855-9761 Fax: (302) 856-3388

REPORT OF SUBSURFACE EXPLORATION

Scenic Manor

Lewes
Sussex County, Delaware

February 21, 2020

Prepared For:

MKR Land Development, LLC
260 Hopewell Road
Churchville, Maryland 21028

Attn: Mr. John Richardson

Prepared By:

GEO-TECHNOLOGY ASSOCIATES, INC.
Geotechnical and Environmental Consultants
21133 Sterling Avenue, Suite 7
Georgetown, Delaware 19947
302-855-9761 / Fax 302-856-3388

GTA Job No: 31191815

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SCENIC MANOR
SUSSEX COUNTY, DELAWARE
FEBRUARY 2020

INTRODUCTION

Geo-Technology Associates, Inc. (GTA) was retained by MKR Land Development, LLC to perform a geotechnical exploration of the Scenic Manor project. The scope of this study included field exploration, limited laboratory testing and analysis pertaining to general development implications. The field exploration consisted of 13 Standard Penetration Test (SPT) borings located throughout the property. Conclusions and recommendations regarding site development were derived from analysis of field data and plans titled *Scenic Manor* prepared by Morris and Ritchie Associates (MRA), dated December 2, 2019. A stormwater management subsurface exploration report has been submitted separately.

SITE CONDITIONS

Referring to the Site Location Plan and Exploration Location Plan included as Figure Nos. 1 and 2 in Appendix A, the project site consists of an irregular shaped parcel located in Lewes, Delaware. The subject property is an open field with partial woods situated on the northeast and northwest side of Mulberry Knoll Road in Sussex County, Delaware. The site gently slopes downward in an easterly direction on the east side of Mulberry Knoll Road and in a westerly direction on the west side of Mulberry Knoll Road, with the ground surface ranging from approximate Elevation 5 to 12 Mean Sea Level (MSL), at the boring locations.

PROPOSED CONSTRUCTION

The proposed construction will consist of 319 single family lots, roadways, stormwater management (SWM) facilities, a pump station and a community clubhouse/recreation area. The houses will be wood framed with slab-on-grade or conditioned crawlspace construction. The buildings will be served by public water and sewer. GTA assumes the grading scheme will generally entail several feet of cuts to fills in proposed building and roadway areas with upwards to 5 to 10 feet of cut in the pond areas.

SITE GEOLOGY

According to the Geologic Map of the Fairmount and Rehoboth Beach Quadrangle, Delaware Geologic Map Series No. 19 (2011) published by the Delaware Geological Survey, the site is within the Coastal Plain Physiographic Province. Coastal Plain sediments below the surficial deposits exposed in the site area were generally deposited in commonly estuarine environments of Quaternary geologic age. The Pleistocene deposits are designated as the Scotts Corners Formation and typically consist of "… well-sorted coarse to fine sand with scattered thin clay laminae." Please review the referenced map for further details regarding this geologic unit.

SUBSURFACE EXPLORATION

To characterize subsurface conditions, 13 Standard Penetration Test (SPT) borings, designated as PS-1, C-1 and Borings R-1 through R-11, were performed at the approximate locations shown on the Exploration Location Plan, presented as Figure 2 in Appendix A. Boring locations were selected by GTA. The borings were staked with elevations determined by MRA. The exploration locations indicated on the plan should be considered approximate.

The SPT borings were advanced to depths of approximately 15 feet below existing grades for the roadway and clubhouse borings and to 40 feet for the pump station boring, using an ATV-mounted CME-55 drill rig. Standard Penetration Testing was performed in the boreholes, with soil samples obtained at approximately 2-foot intervals in the upper 10 feet and then at 5-foot intervals thereafter. Standard Penetration Testing involves driving a 2-inch O.D., 1 ⅜ -inch I.D. split-spoon sampler with a 140-pound hammer free-falling 30 inches. The SPT N-value, given as blows per foot (bpf), is defined as the total number of blows required to drive the sampler from 6 to 18 inches below the initial sampling depth. The boring holes were backfilled after longer term readings were performed.

Samples obtained from the borings were delivered to GTA's office for visual classification by GTA personnel. Selected samples recovered from the field exploration were submitted for limited laboratory analysis. The soil layers were classified in accordance with the Unified Soil Classification

System (USCS). Classifications provided on the logs are visual descriptions, supplemented by available laboratory data. The exploration logs are presented in Appendix B. The logs represent our interpretation of the field data based on observation and selected soil classification tests. The interfaces indicated on the logs may be gradual.

SUBSURFACE CONDITIONS

The explorations generally confirm the description of subsurface conditions provided in the *SITE GEOLOGY* section of this report. Below a 2 to 12-inch thick surface topsoil layer, the explorations generally encountered native subsoils visually classified as predominately consisting of Poorly-graded SANDs with Silt (USCS: SP-SM), Poorly-graded SANDs (SP), Silty SANDs (SM), Clayey SAND (SC), Lean CLAY (CL) and SILT (ML). The relative densities of the granular soils were very loose to medium dense based on SPT N-values of 2 to 27 blows per foot (bpf). The relative consistencies of the fine-grained soils were medium stiff to very stiff based on SPT N-values of 5 to 16 bpf.

Water was encountered during the exploration program at depths of approximately 3½ to 13½ feet below the ground surface. Longer term water levels recorded one to six days after completion ranged between 2 and 11 feet below the existing ground surface. The longer-term water levels at the borings ranged between approximate Elevation 0 and 6 MSL.

The groundwater levels can be expected to fluctuate with seasonal changes, precipitation, and other factors such as development activity. Additionally, perched water conditions develop in granular soils overlying fine-grained soils during the "wet season" as well as during periods of precipitation. Please refer to the roadway, clubhouse and pump station exploration logs provided in Appendix B for further information. Please refer to our stormwater management report dated February 19, 2020 for the SWM exploration logs.

LABORATORY TESTING

Selected samples were obtained from the borings and were tested for grain-size analyses, Atterberg Limits, and natural moisture content. The grain-size analysis and Atterberg Limits testing were performed to determine the Unified Soil Classification System (USCS) designations for the soil. USCS classifications provide information regarding soil behavior beneath pavement, foundation systems, and infiltration areas. The results of testing are as follows:

SUMMARY OF INDEX TESTING

EXPLORATION NO.	DEPTH (ft)	USCS CLASSIFICATION	LL %	PI %	NMC%
R-9	1 – 4	Clayey SAND with Silt (SC-SM)	23	5	17.8
SWM-17	1 – 4	Poorly-graded SAND (SP)	NP	NP	7.5
SWM-33	1 – 4	Silty SAND (SM)	NP	NP	15.4
SWM-59	1 – 4	Silty SAND (SM)	NP	NP	15.7
SWM-71	1 – 4	Poorly-graded SAND with Silt (SP-SM)	NP	NP	8.5

Note: LL=Liquid Limit PI=Plastic Index NP=Non-Plastic NMC=Natural Moisture Contents

Five bulk, near-surface samples were also tested for moisture-density relationships in accordance with the Modified Proctor (ASTM D-1557) method for use in evaluating the suitability of these soils for reuse as fill. Three of the samples were also subjected to California Bearing Ratio (CBR) testing for use in evaluation of pavement subgrade supporting quality. Two of the samples were also amended with 6 percent (by dry weight) Type I/II Portland cement. Results of these tests are summarized in the following tables.

SUMMARY OF COMPACTION and CBR DATA
(ASTM D 1557, the Modified Proctor; ASTM D 1883, CBR)

EXPLORATION NO.	DEPTH (FT)	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE (%)	NATURAL MOISTURE (%)	APPROXIMATE CBR AT 95% COMPACTION (%)
R-9	1 – 4	122.0	10.2	17.8	16
SWM-17	1 – 4	116.3	10.1	7.5	10
SWM-33	1 – 4	122.6	10.1	15.4	8
SWM-59	1 – 4	122.5	10.6	15.7	NT*
SWM-71	1 – 4	122.0	9.5	8.5	NT

*NT- Not Tested.

SUMMARY OF COMPACTION of SOIL CEMENT MIXTURES
(ASTM D 558, the Standard Proctor)

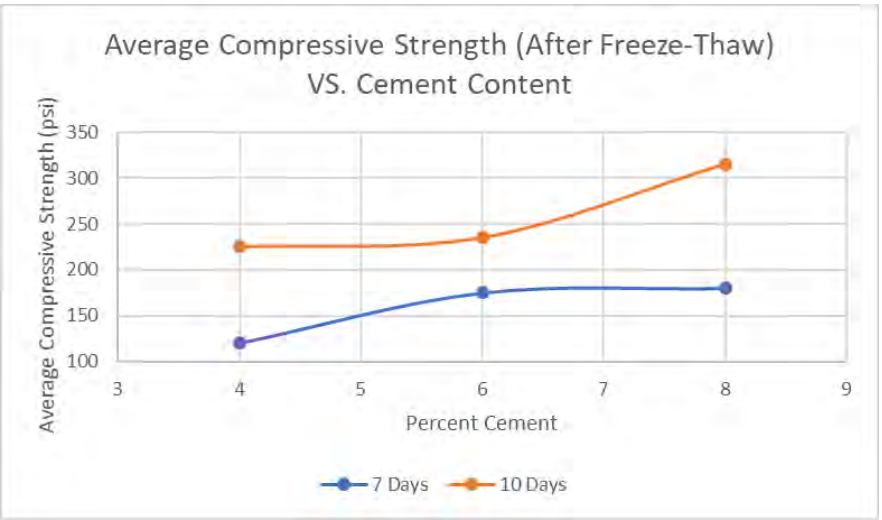
EXPLORATION NO.	DEPTH (FT)	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE (%)	PERCENT CEMENT* (%)
R-9	1 – 4	119.1	8.6	6
SWM-33	1 – 4	117.5	11.7	6

*Percent by Dry Weight

Upon completion of soil-cement moisture-density testing, unconfined compressive strength testing was performed on composite pil samples after mixing Type I/II Portland cement. For the unconfined compressive strength testing, the composite samples were hydrated to about two percent above the optimum moisture content. Three sub-samples were then split from each composite sample, and mixed with 4, 6, and 8 percent (by dry weight) Type I/II Portland cement. For each cement percentage, two, 4-inch diameter, cylindrical specimens were formed using the Standard Proctor effort and allowed to moist cure at room temperature for 7 days. One set of specimens was subjected to compressive strength test at an age of 7 days with the balance of specimens, then subjected to two freeze thaw cycles before compressive strength testing at an age of 10 to 12 days. The results of the testing are summarized below.

SUMMARY OF COMPRESSIVE STRENGTH TESTING

Composite Test Specimen	Portland Cement %	7 Day Compressive Strength Without Freeze-Thaw (psi)	10 to 12 Day Compressive Strength After Two Cycles of Freeze-Thaw (psi)
SWM-33	4%	100	190
	6%	160	260
	8%	170	310
R-9	4%	140	260
	6%	190	210
	8%	190	320



Please refer to the laboratory test results included within Appendix C for additional information.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the results of this study, it is our opinion that development of the property is feasible, given that the geotechnical recommendations are followed and that the standard level of care is maintained during construction. GTA's preliminary recommendations are provided in the following paragraphs.

Earthwork

Prior to the placement of compacted fill, areas below proposed foundation, slab, and pavement should be stripped and grubbed to remove topsoil and otherwise unsuitable materials to expose native granular soils. The building pads should be oversized at least 5 feet outside the building footprints. The actual stripping thickness will be dependent on localized topsoil development, previous plow depth, precipitation, soil moisture, construction traffic disturbance, and contractor care.

Precipitation will result in standing water at low areas and in localized undercut areas. If the water is allowed to pond, the exposed subgrade materials may deteriorate and additional over-

excavation or subgrade improvement may be required at the affected areas. Positive drainage should be provided to protect exposed subgrades. During wet season construction, GTA anticipates that the existing surficial soils may soften and significant rutting may occur. The affected material will likely require removal prior to placement of fill. GTA recommends a summer season earthwork operation to minimize the economic impact of wet near surface soils.

Most near surface on-site soils beneath the topsoil are considered suitable for re-use as structural fill material. Excavated site materials conforming to SP, SP-SM or SM classifications will be suitable for re-use in structural areas of mass earthwork construction. The moisture content of the bulk sample materials tested ranged from approximately 2 percent below to five percent above the optimum moisture, and at the tested moisture, on-site soils similar to the samples tested may require limited, if any, moisture adjustment to drying by aeration after spreading over a large area and prior to compaction in fill construction.

Off-site borrow should meet Unified Soil Classification System (USCS) designation SM, SP, SW, GP, GM, or GW for general structural fill and be approved by GTA. All fills should be constructed in maximum 8-inch thick loose lifts and be compacted to the following specifications:

COMPACTION SPECIFICATIONS

Structure / Fill Location	Compaction / Moisture Specification
Below foundations, retaining walls, floor slabs, fills below top one foot of pavement subgrade and within wall backfill or slopes steeper than 5H:1V	95% of ASTM D-698 Moisture: ± 3% of optimum
Fills within top one foot of pavement subgrade	95% of ASTM D-1557 Moisture: ± 3% of optimum

A soils-technician should observe fill construction on a full-time basis under the supervision of a geotechnical engineer in accordance with the 2012 International Building Code (IBC). Compactive effort should be verified by in-place density testing.

Subsurface Utilities

Based upon the results of the exploration, GTA anticipates that standard excavating techniques should be suitable for utility installation to depths of 10 feet. Firm natural soil and controlled compacted fill are considered suitable for support of the proposed pipe systems. Due to the potential for collapse of unsupported excavation in granular soils, the utility contractor should be prepared to provide adequate earth support systems during utility construction. Dewatering through the use of "sump and pump" for trenches extending 1 to 2 feet below groundwater, in conjunction with well point techniques in deeper utility areas, will be required for utility installation. At the current groundwater levels, most utility installations extended below 5 feet will likely encounter groundwater.

Pump Station

The proposed pump station at Boring PS-1 may be supported on a mat slab type foundation. The foundation may be proportioned for a maximum net allowable soil bearing pressure of 2,000 pounds per square foot (psf). Foundations should be supported on the USCS SP-SM granular soils. Disturbed, very loose layers should be excavated to a stable stratum. Proposed subgrade should be reestablished with AASHTO No. 57 crushed stone or in accordance with GTA's recommendations in the field at the time of construction. Use of a mud mat or crushed stone layer may be required to stabilize and protect the foundation subgrade.

Referring to log PS-1, the on-site soils beneath the topsoil that conform to USCS SM, SP-SM, or SP classifications will be suitable for reuse as structural backfill, however, materials excavated near or below groundwater are anticipated to require substantial drying prior to reuse as structural backfill. Materials conforming to CL, ML or SC are not recommended for reuse as structural backfill of the pump station.

Based on the proposed depth of the excavation required for the pump station, groundwater will impact the construction of the proposed pump station. Well points will be required to dewater the excavation during construction. The foundation/floor slab of the proposed pump station will likely be subjected to permanent uplift pressures. GTA recommends that the pump station bottom

slab be designed to resist these uplift forces and should be watertight. Use of a relatively thick mat slab may be required to balance the uplift forces. The structure will also be subjected to hydrostatic and unbalanced earth pressures and must be designed to resist such lateral pressures. GTA recommends that the following soil design parameters be used for the pump station construction:

Friction Angle	φ = 30 degrees
Active Pressure Coefficient*	K_a = 0.3
At Rest Pressure Coefficient*	K_o = 0.5
Passive Pressure Coefficient*	K_p = 3.0
Moist Unit Weight of Soil	125 pcf
Saturated Unit Weight of Soil	130 pcf
Submerged Unit Weight of Soil	68 pcf
Design Groundwater Elevation	9 MSL at PS-1

**Level backfill condition*

Surface and Subsurface Drainage

Final building pad and pavement grades should be carefully established to provide adequate surface drainage away from the foundations. Groundwater levels referenced in the *SUBSURFACE CONDITIONS* section of the report are, in our opinion, below normal seasonal high groundwater levels. Furthermore, soil layers containing appreciable amounts of silt or clay tend to perch groundwater at higher levels during wetter periods.

Foundations

It is GTA's opinion that the community center and residential building construction may be supported on native soils or structural fill using shallow spread footings preliminarily designed for a maximum net allowable bearing pressure on the order of 2,000 pounds per square foot (psf). Minimum widths for wall footings of 16 inches and column footings of 24 inches are recommended. Exterior footings should be founded a minimum of 24 inches below the final exterior grades to provide protection from frost action.

Standard footing details should prove acceptable for construction. However, if very loose or soft soils are encountered at footing subgrade, these materials will require remediation. Remediation

may include undercut and replacement of subgrade material. Remediation should be performed during foundation construction as directed by the project geotechnical engineer.

Floor Slabs

Ground floor slabs should be designed as concrete slab-on-grade. GTA recommends that the concrete floor slabs supported on grade be founded on a four-inch thick open-graded washed gravel or stone layer covered with a polyethylene vapor retarder to interrupt the rise of moisture through the slab. Natural and compacted fill subgrades for support of the floor slabs should be tested to verify stability and compaction in accordance with GTA's earthwork recommendations prior to placement of concrete. Control joints should be provided to control shrinkage cracking of the concrete floor system. Isolation joints should be present at the location of walls, columns, and footings to allow for differential movement.

Pavements

Pavement sections should be designed based on anticipated subgrade conditions and traffic intensity. Laboratory testing of selected site soils conforming to USCS classification SC-SM, SM or SP and AASHTO classification A-2-4 or A-3 indicated a CBR value ranging from approximately 8 to 16 percent, and averaging 11 percent for the samples tested. The CBR values are based upon a relative compaction of 95 percent of maximum dry density (Modified Proctor, ASTM D-1557). Based upon the CBR value and the field conditions encountered at the borings, the site soils tested are considered to be generally medium to good for supporting standard pavement sections.

Based on GTA's experience with similar developments, construction traffic is likely to be more significant for the design of the pavements. The pavement section thickness should be designed to reflect construction traffic and the subgrade supporting quality of the site soils. It is likely that the majority of the on-site soils conforming to USCS Classifications SP, SP-SM or SM, and AASHTO A-1, A-2, or A-3 will be suitable for the support of standard pavement thickness sections. However, subgrade materials should be carefully evaluated prior to graded aggregate base placement and

paving. Therefore, GTA recommends that the upper 12 inches of pavement subgrade be constructed of fill with the following characteristics:

PAVEMENT SUBGRADE SPECIFICATIONS

Liquid Limit	35 or less
Plasticity Index	Non-Plastic
Maximum Dry Density	105 pcf or greater
California Bearing Ratio	8 or greater

Prior to construction of pavement sections, the pavement subgrade should be proof-rolled with a loaded tandem-axle dump truck under the observation of GTA to verify stability. Unstable or unsuitable soils should be over-excavated to a stable bearing layer. The subgrade may be re-established with approved, controlled, compacted stabilized fill. A contingency for undercutting and replacement of unsuitable materials should be provided.

For pavement construction, it is recommended that two different pavement sections be utilized to reduce the potential for pavement failures during construction. The heavy-duty pavement section can be constructed for the main roadways. The standard-duty pavement section can be constructed in the Cul-de-Sac (truncated/spur) roadways. It is recommended that construction traffic be limited to the heavy-duty pavement sections. The recommended preliminary pavement sections are as follows:

FLEXIBLE PAVEMENT

Pavement Components	Standard-Duty	Heavy-Duty
Bituminous Concrete Surface Course (Type C; 9.5 mm Superpave)	1 ¼ inches	1 ¼ inches
Bituminous Concrete Intermediate Course (Type C)*	--	1 ¾ inches
Bituminous Concrete Base Course (Type B; 12.5 or 19 mm Superpave)	3 inches	3 inches
Graded Aggregate Base Course (Type B Crusher Run)	6 inches	8 inches
Approved Subgrade	12 inches	12 inches

*Intermediate Course placed immediately following Base Course.

RIGID PAVEMENT

Pavement Components	Standard-Duty	Heavy-Duty
Portland Cement Concrete*	5 inches	6 inches
Graded Aggregate Base Course (Type B Crusher Run)	4 inches	4 inches
Approved Subgrade	12 inches	12 inches

*f'c= 4,000 psi concrete provided with 7% air-entrainment; control joints, isolation joints, load transfer devices, and reinforcement as required.

When pavement areas are established to approximate pavement subgrade, the pavement subgrade material should be observed by GTA to allow for additional recommendations based upon subgrade conditions observed at the time of construction. All pavement materials and construction should conform to the State of Delaware, Department of Transportation (DelDOT), STANDARD SPECIFICATIONS, and Sussex County Private Road Standard Details, latest editions, as applicable.

Alternatively, to further reduce the potential of pavement failures, particularly during construction, GTA recommends that the pavement soil subgrade be amended with cement to improve the subgrade supporting qualities of the native soils, to facilitate pavement construction and to maximize the use of available on-site soils for reuse in structural fill areas. The cement treated subgrade should be constructed and cured in general accordance with the Portland Cement Association (PCA) specifications. The cement amended subgrade should be compacted to 95 percent of the Standard Proctor (ASTM D-698) maximum dry density.

GTA should be present during a proofroll of the subgrade soils in these areas prior to subgrade cement amendment and paving. Any unsuitable or unstable soils present at the time should be undercut and replaced with suitable materials amended with cement as outlined in the following paragraphs. GTA recommends a minimum spread rate of 35 pounds of cement per square yard (approximately 3 to 4 percent by dry weight), mixed to a depth of 12 inches. The following preliminary pavement section with a cement treated subgrade is recommended for use at this project:

FLEXIBLE PAVEMENT - With Soil Cement Subgrade

Pavement Components	Standard-Duty	Heavy-Duty
Bituminous Concrete Surface Course (Type C; 9.5 mm Superpave)	1 ¼ inches	1 ¼ inches
Bituminous Concrete Intermediate Course (Type C)*	--	1 ¼ inches
Bituminous Concrete Base Course (Type B; 12.5 or 19 mm Superpave)	3 inches	3 inches
Graded Aggregate Base Course (Type B Crusher Run)	4 inches	4 inches
Cement Treated Subgrade**	12 inches	12 inches

*Intermediate Course placed immediately following Base Course.
**GTA recommends a spread rate of 35 pounds of cement per square yard (approximately 3 to 4 percent by weight), mixed to a depth of 12 inches. Higher cement content may be required depending upon field conditions and additional testing.

Considering a pavement section with a cement treated subbase (e.g., no crusher run), GTA recommends a minimum spread rate of 70 pounds of cement per square yard (approximately 7 percent by dry weight), mixed to a depth of 12 inches. The following preliminary pavement sections with a cement treated subbase are recommended for use at this project:

FLEXIBLE PAVEMENT With Cement Treated Subbase

Pavement Components	Standard-Duty	Heavy-Duty
Bituminous Concrete Surface Course (Type C; 9.5 mm Superpave)	1 ¼ inches	1 ¼ inches
Bituminous Concrete Intermediate Course (Type C)*	--	1 ¼ inches
Bituminous Concrete Base Course (Type B; 12.5 or 19 mm Superpave)	3 inches	3 inches
Cement Treated Subbase**	12 inches	12 inches

*Intermediate Course placed immediately following Base Course.
**GTA recommends a spread rate of 70 pounds of cement per square yard (approximately 7 percent by weight), mixed to a depth of 12 inches. Higher cement content may be required depending upon field conditions and additional testing.

RIGID PAVEMENT With Cement Treated Subbase

Pavement Components	Standard-Duty	Heavy-Duty
Portland Cement Concrete*	4 inches	6 inches
Cement Treated Subbase**	12 inches	12 inches

*f'c= 4,000 psi concrete provided with 7% air-entrainment; control joints, isolation joints, load transfer devices, and reinforcement as required.
**GTA recommends a spread rate of 70 pounds of cement per square yard (approximately 7 percent by weight), mixed to a depth of 12 inches. Higher cement content may be required depending upon field conditions and additional testing.

The actual of amount of cement required will need to be determined based upon laboratory testing and the results of initial field treatment. Some of the more plastic clayey soils may require additional treatment with cement or lime. GTA will evaluate these soils after the cement has been applied, mixed, and recompacted. The construction of the modified soil subgrade should generally follow PCA specifications, with some slight modifications particularly with respect to curing times. GTA will likely recommend allowing paving prior to seven days, depending upon observed stability after 24 to 48 hours. Conformance testing will need to be performed by GTA during construction to verify that the modified soils and the pavement construction meet the project specifications.

In general, the soil cement operations should be performed in general accordance with the project specifications. Also, it is recommended that the soil cement work observe GTA's *Supplemental Cement Stabilization Considerations* that are attached. These considerations are not a specification. The following issues should be addressed during soil cement construction:

- We recommend that the soil cement extend a minimum of six inches outside of the proposed edge of pavement in order to provide edge support for the pavement.
- The performance of the final soil cement layer is contingent on the stability of the underlying subgrade soils. A soil cement layer is not designed to be supported by unstable subgrade soils. Therefore, areas of instability caused by natural soils or poor drainage will need to be remediated to support the soil cement. All unstable soils below the proposed

depth of treatment will need to be undercut and replaced or chemically treated to a greater depth.

- Utilities may be located in the area of treatment. The utilities should be identified and located by the contractor, and the reclamation operations adjusted accordingly.
- Shrinkage cracking of material treated with cement may occur. This will create a conduit for water infiltration into the soil cement base. This design has been prepared to reduce, but not eliminate, the potential for shrinkage cracking. Industry standards on limiting water in the mixture (within 2% of the optimum moisture content), preventing rapid moisture loss during curing, and achieving adequate compaction should be followed.

General Drainage Considerations

The presence of water within the subbase and soil subgrade can cause premature degradation of the pavement due to weakening of the subgrade from freeze/thaw, wetting/drying, and subsurface erosion. Where surface and subsurface drainage problems are anticipated, adequate drainage measures should be incorporated. Drainage measures may include installation of base under-drains along the roadway edge, cross-drains in sump areas (and wherever else necessary), and the creation of swales. The drains and swales should be graded to flow by gravity to a suitable outlet point. The location, depth, and type of drains/swales will depend on the specific conditions and their location with respect to the pavement and should be completed prior to the paving operations. However, the need for these drainage measures may not be identified until during construction. In some cases, such as construction occurring during dry periods, areas requiring drainage measures may not be identified until after the pavement has been completed.

ADDITIONAL SERVICES

We recommended that GTA be retained to provide consultation, observation and testing services for the following items.

- Provide additional exploration, including borings and infiltration testing, as appropriate as development features are further defined.
- Review preliminary structural loads when estimated.

- Provide observation and testing services during fill placement to evaluate if the work is being performed in accordance with the project specifications and intent of this report.
- Observe the proof-rolling of pad and pavement subgrades prior to placing fill or base course to evaluate stability.
- Review foundation construction for compliance with the project drawings and the intent of this geotechnical report.
- Provide "special inspection" services during building construction for compliance with building code requirements.

LIMITATIONS

This report, including all supporting boring logs, field data, field notes, laboratory test data, calculations, estimates and other documents prepared by GTA in connection with this project have been prepared for the exclusive use of MKR Land Development, LLC pursuant to agreements between GTA and MKR Land Development, LLC dated December 11, 2019 and agreement to perform supplemental exploration, and in accordance with generally accepted engineering practice. All terms and conditions set forth in the Agreement and the General Provisions appended thereto are incorporated herein by reference. No warranty, express or implied, is made herein. Use and reproduction of this report by any other person without the expressed written permission of GTA and MKR Land Development, LLC is unauthorized and such use is at the sole risk of the user.

The analysis and preliminary recommendations contained in this report are based on the data obtained from limited observation and testing of the encountered materials. Test borings indicate soil conditions only at specific locations and times and only at the depths penetrated. They do not necessarily reflect strata or variations that may exist between test boring locations. Consequently, the analysis and recommendations must be considered preliminary until the subsurface conditions can be verified by direct observation at the time of construction. If variations of subsurface conditions from those described in this report are noted during construction, recommendations in this report may need to be re-evaluated.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report are verified in writing. Geo-Technology Associates, Inc. is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the expressed written authorization of Geo-Technology Associates, Inc.

The scope of our services for this geotechnical exploration did not include any environmental assessment or investigation for the presence or absence of wetlands, or hazardous or toxic materials in the soil, surface water, groundwater or air, on or below or around this site. Any statements in this report or on the logs regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our Client. This report and the attached logs are instruments of service. The subject matter of this report is limited to the facts and matters stated herein. Absence of a reference to any other conditions or subject matter shall not be construed by the reader to imply approval by the writer.

31191815 **GEO-TECHNOLOGY ASSOCIATES, INC.**

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation

everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed

and imes

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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SUPPLEMENTAL CEMENT STABILIZATION CONSIDERATIONS

The following paragraphs provide further direction concerning typical issues that affect the construction and performance of cement stabilized materials. These recommendations should not be considered to be a specification.

Unstable Soils Below Stabilized Layer - Unstable soil below the stabilized layer may cause the layer to experience excessive deflection and distress when exposed to loading. A cement-stabilized layer is not intended to bridge soft/loose/wet soil and uncompacted fill materials, when exposed to traffic and/or concentrated dead loads. Therefore, GTA recommends that during pulverization or prior to placement of cement, the underlying subgrade be evaluated by proof-rolling, hand probing, or other suitable means. This evaluation will allow unstable subgrades to be proactively identified so the appropriate measures for stabilization may be incorporated. These measures may include mixing to greater depths and increasing the cement application rate accordingly. Also, an upper lift of material can be removed to allow for mixing at a greater depth followed by replacement and mixing of the upper lift. Alternatively, the unstable soil can be removed and replaced with structural fill.

Widening Considerations - Unless the roadway is bordered by curbing or other immovable structures, the lateral extent of stabilization should typically extend a minimum of one foot beyond the limits of the proposed asphalt pavement, to provide lateral subgrade support and to reduce the potential for edge failure of the pavement surface. Stabilization that extends beyond the existing edge of aggregate or asphalt pavement may possibly encounter unsuitable material outside the roadway. Where widening is less than one foot beyond the existing edge of pavement, at a minimum we recommend removal of topsoil before proceeding with conventional reclaiming. For areas where the widening extends more than one foot beyond the existing edge of pavement, we recommend removal of topsoil and unstable surface soil and replacing with dense graded aggregate in a similar proportion to that in the existing pavement. The purpose of the additional aggregate is to generate similar strengths to the material in the center of the roadway.

Drainage Measures - The presence of water within the stabilized layer and soil subgrade will cause premature degradation of the stabilized surface due to freeze/thaw, wetting/drying, and subsurface erosion. Where surface and subsurface drainage problems are anticipated or encountered, drainage measures should be incorporated. Drainage measures may include installation of base drains along the roadway edge, cross-drains (in sump areas and wherever else necessary), blanket drains in areas of widespread seepage/springs, and the creation of swales. The drains and swales should be graded to flow by gravity to a suitable outlet point. The location, depth, and type of drains/swales will depend on the specific conditions and their location with respect to the stabilized surface, and should be completed prior to beginning stabilization operations. The need for these drainage measures may not be able to be identified before construction. In some cases, such as construction occurring during dry periods, areas requiring drainage measures may not be identified until after the stabilization and proposed surface is completed. The owner should be consulted prior to constructing drainage measures, to ensure that the measures are compliant with environmental regulations.

Moisture Content - The moisture content of the stabilized material affects the performance of the stabilization. Material that is too dry will not have enough moisture to hydrate the cement and will not reach the desired level of compaction and strength. Materials that are too wet will be difficult to grade and compact and can result in an elevated risk of shrinkage cracking. Therefore, the moisture

content of the material should be monitored during mixing. The moisture content of the pulverized material should be within 2 percentage points of the optimum moisture content during mixing, unless indicated otherwise in the project specifications or the mix design.

Compaction and Curing Considerations - Materials stabilized with Type I/II cement should be graded, compacted, final rolled, and fine graded before the material "sets," which is usually within approximately 4 hours of mixing, unless the project specifications or mix design indicate otherwise. The time depends on the soil type, cement application rate, and weather conditions. Materials should be compacted in accordance with project specifications. Moist curing of the stabilized surface will help in the hydration process and increases the strength of the stabilized layer. Moist curing can consist of an approved surface sealant or periodic water spraying to keep the surface moist.

Vehicular Traffic Considerations - Light vehicular traffic can typically be allowed on the stabilized layer immediately after final compaction, provided that the layer is stable and does not rut/shove under the vehicle loads. However, premature disturbance of the stabilized layer by heavily loaded traffic can compromise the integrity of the stabilized layer. Therefore, heavy traffic should not be permitted on the layer until it is stable (does not rut or shove) under the traffic, which may require two to five days, depending on the temperatures, precipitation, and other factors. A proof-roll with a loaded dump truck can be performed to assess the stability prior to allowing heavy traffic on the layer. We recommend that the stabilized material be surfaced as soon as the layer is stable. Placing the surface layer will help with curing and protection of the stabilized layer. During the curing and surfacing periods, ensure that vehicles are not riding over the edge of the stabilized layer.

Shrinkage Cracking Potential – Due to the volume reduction of the soil and cement during curing and drying, shrinkage cracking of cement stabilized material may occur. These cracks can reflect through the bituminous pavement surface, creating a conduit for water infiltration into and below the stabilized base. Therefore, the owner should be aware of the potential maintenance requirements for sealing cracks in the pavement surface. Measures that should be taken during construction to reduce, but not eliminate, the potential for shrinkage cracking are limiting water in the mixture (within 2% of the optimum moisture content); preventing rapid moisture loss by providing moisture during curing or promptly placing an approved moisture barrier; and achieving adequate compaction. Additional measures can be taken after construction, such as providing a stress relief layer below the base paving, delaying paving to allow cracks to form, microcracking, or cutting control joints. GTA can provide additional information on each of these measures.

Thin Overlay Surface Preparation - With thin bituminous pavement overlays, special attention will be necessary during construction to provide a final stabilized surface with minimal irregularities. The final surface can be variable and rough, especially if there are larger sized aggregate, cobbles, or rock in the mixture. This may result in a pavement surface having areas that will be less than the required overlay thickness. If fine grading of the stabilized layer results in a variable surface, a thin layer of crushed aggregate or scratch asphalt can be used to provide a uniform paving surface.

Shallow Rock Considerations – Shallow rock will influence the stabilization operations. Where softer in-situ rock can be pulverized, or in the case where a significant quantity of large diameter rock particles are within the subgrades, the resulting pulverized layer may not become adequately stabilized due to the absence of fines to fill in the voids in the rock. This may be mitigated by the

addition of low plasticity soil, fine aggregate, or HMA millings on top of the rock layer prior to pulverization and/or chemical mixing. Where more competent rock is encountered, GTA should be consulted to evaluate the competence of the material for direct support of pavement. Highly weathered to competent rock that cannot be pulverized is typically suitable for direct support, and the FDR stabilization operations may be able to be omitted in these areas.

Bridge/Culvert Approach and Pavement Tie-in Considerations - Approaches to bridges and culverts as well as tie-in to existing pavements will require additional grading measures to allow an adequate transition to the structures. This will likely require regrading prior to, or after pulverization to provide a transition that allows the proposed bituminous pavement overlay and stabilized layer to tie into the existing structure grades, without sacrificing thickness of the pavement layers. Coordination with the project civil engineer may be required to ensure proper final grades and drainage considerations, as well as to provide temporary grading or wedging for traffic access.

Low Temperature Considerations - Soil temperatures near or below freezing, and the presence of snow, ice, and frozen material should be expected to negatively influence construction and the performance of the stabilized layer. These conditions may interfere with subgrade pulverization, moisture conditioning, cement mixing, compaction, and curing. Cement hydration and strength development will be slowed by low temperatures, and may stop if the material temperature drops below 40 degrees, or becomes frozen.

Soil specimens cured at 40 degrees typically exhibit reduced strength levels of 25% or more when compared to specimens cured under standard temperature conditions. Therefore, strength development for cement stabilization performed during low temperature conditions should not be expected to meet laboratory mix design requirements. As the temperature decreases below 40 degrees, the risk of strength reduction also incrementally increases, which will compromise the performance of the stabilized layer. When the soil temperatures drop below 32 degrees, there is a risk of frozen pore water during mixing and subsequent freezing of the completed layer, which will result in a significant decrease in initial and long-term strength development. Therefore, we do not recommend performing soil stabilization when soil temperatures are below freezing or long-term freezing is expected in the first 7 days after construction.

The following measures should be considered to counteract the effects of low temperature (above freezing) conditions during stabilization operations: (1) increasing cement application rate; (2) use of Type III Portland cement to increase the initial rate of strength gain; (3) placement of graded aggregate or soil fill to insulate the surface of treated layer from low temperatures; and (4) overexcavation to remove frozen soil prior to stabilization.

Cement Damage – Cement dust can cause damage to vehicles that travel through the dry cement or the uncured, stabilized material. The contractor is responsible for providing means, methods, and sequences, so that public traffic is not exposed to cement dust or cement spatter. This may include, but is not limited to, sequencing traffic and controlling spreading operations to provide a travel lane free of cement, providing temporary windrows to control lateral cement spreading, maintaining road closures and detours during cement spreading and mixing, providing a pilot vehicle to direct traffic through the work area, controlling cement spreading and mixing at driveways and intersections, and notifying and coordinating with adjacent property owners for driveway access.

SUPPLEMENTAL CEMENT STABILIZATION CONSIDERATIONS

Airborne cement dust can spread onto adjacent properties causing damage. The contractor is responsible for providing means, methods, and sequences such that airborne cement does not damage adjacent properties. This may include, but is not limited to, limiting transfer pressure of cement from tankers to spreaders, providing equipment with dust control measures (skirts, filters, etc.), maintaining and replacing all worn equipment (spreader skirts and spreader filters), performing cement transfer operations away from sensitive and/or populated areas, suspending cement spreading during windy conditions, constructing windrows to prevent cement from laterally spreading, and limiting the speed of vehicles and equipment when travelling through cement. The contractor should be responsible for the means, methods, and sequences that will be used to eliminate exposure of vehicles and adjacent properties to cement.

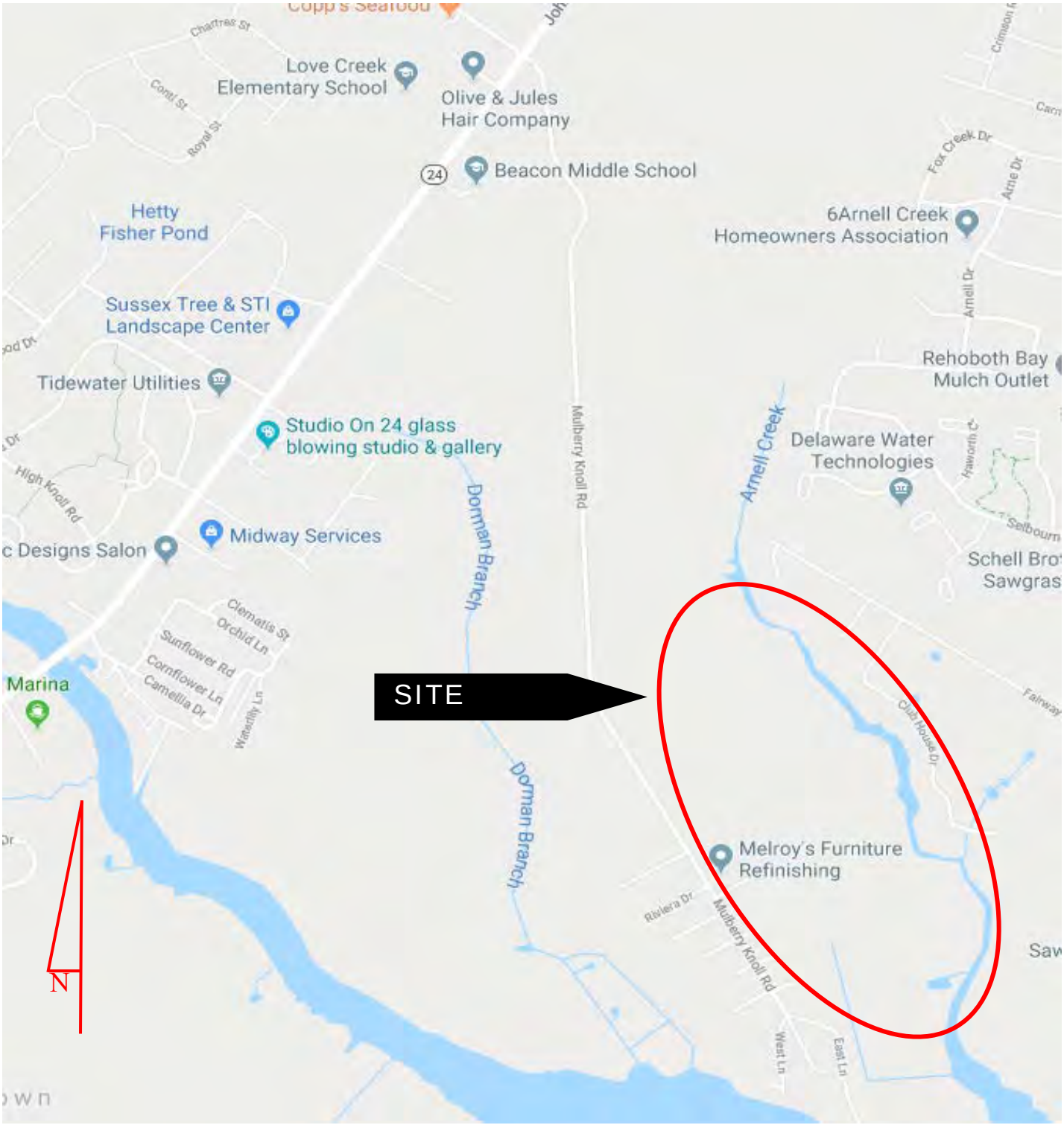
We recommend that the contractor provide a work plan that details the means, methods, and sequences, including traffic control that will be implemented to ensure that cement does not damage vehicles or adjacent properties.

Observation and Testing Considerations - It is recommended that GTA observe the stabilization operations, as modifications in the depth of mixing, compaction, moisture content of the materials, and percent chemical additive may be necessary, based on variation in field conditions. Moisture content testing of the reclaimed materials is considered necessary to verify that an adequate amount of water has been added during mixing. Moisture density relationship testing will need to be performed on the pulverized and chemically stabilized soils to establish the maximum dry density needed for compaction control. Compacted samples of chemically stabilized material can be fabricated for subsequent unconfined compressive strength testing in the laboratory. Field density testing should be performed during rolling to verify that the reclaimed material has been compacted in accordance with the applicable specifications. A proofroll should be performed to evaluate the stability of the stabilized layer prior to the placement of traffic and pavement surface.

Future Crack/Joint Sealing - Surface water infiltration into the underlying subgrade is one of the primary causes of premature pavement failures. Upon completion of the surface paving operations, GTA recommends sealing along all pavement curbs, catch basins, paving joints, and concrete slabs/aprons to reduce the potential for water infiltration into the underlying treated subgrade. Thermal cracks can also develop in the bituminous pavement or surface seal, particularly along cold joints. Therefore, regular maintenance should be performed on the pavement, including sealing cracks as soon as possible after cracking develops and as often as necessary to block the passage of water to the subgrade.

APPENDIX A

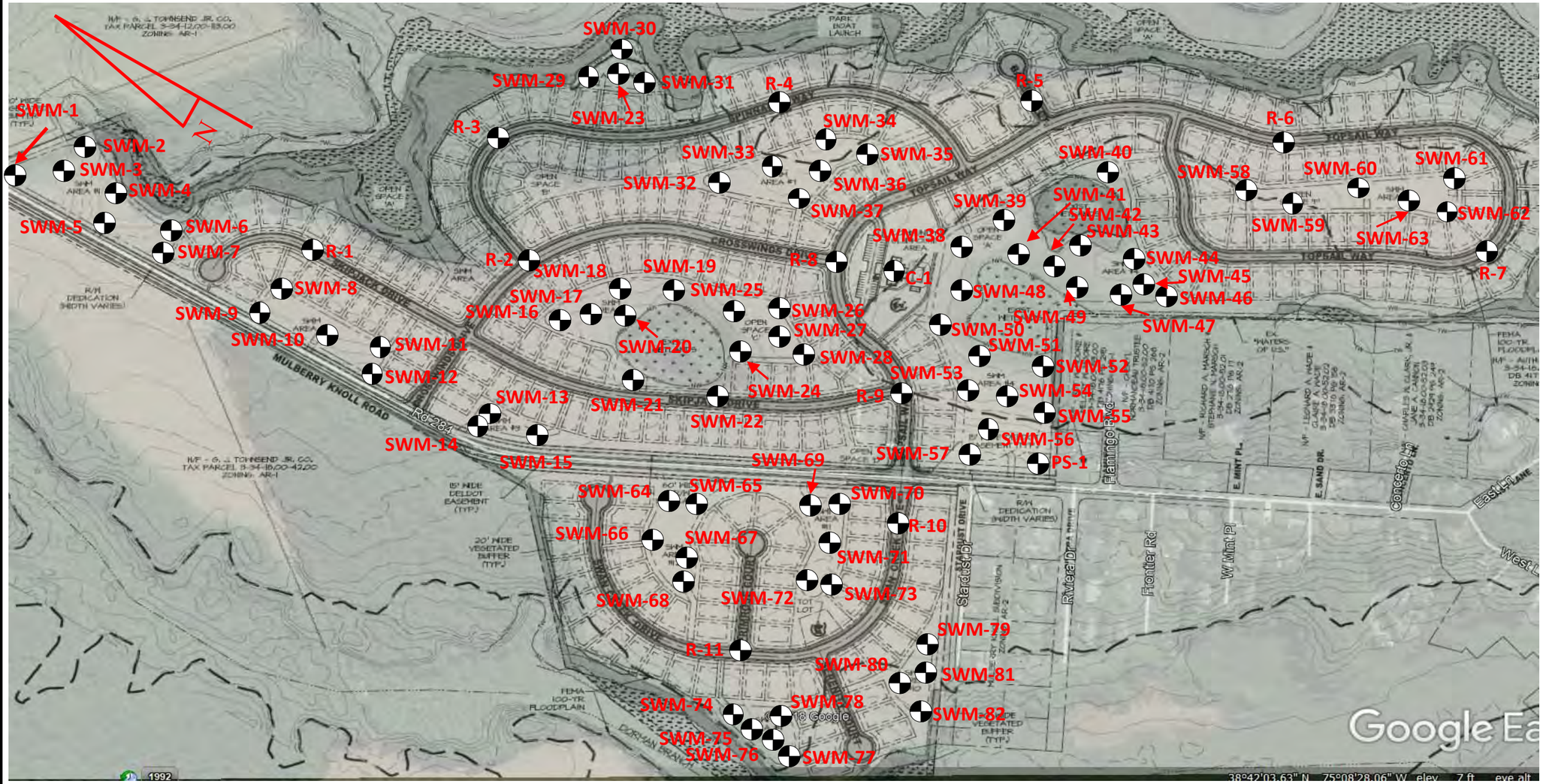
FIGURES



Site Location Plan taken from Google Maps

	GEO-TECHNOLOGY ASSOCIATES, INC. *GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS* 21133 Sterling Avenue, Suite 7 Georgetown, Delaware 19947 (302) 855-9761 Fax (302) 856-3388	**Site Location Plan** **Scenic Manor** **Sussex County, Delaware**

SCALE	DATE	DRAWN BY	DESIGN BY	REVIEW BY	JOB NO.
NTS	December 2019	GTA	Google Maps	GRS	31191815



Exploration Location Plan taken from Google Earth and a plan titled *Scenic Manor* prepared by Morris & Ritchie Associates, Inc. and dated December 2, 2019.

- Boring Location

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
21133 Sterling Avenue, Suite 7
Georgetown, Delaware 19947
(302) 855-9761 Fax (302) 856-3388

Exploration Location Plan
Scenic Manor
Sussex County, Delaware

SCALE 11X17	DATE	DRAWN BY	DESIGN BY	REVIEW BY	JOB NO.	Figure
1" ~ 375'	December 2019	GTA	MRA	GRS	31191815	2

APPENDIX B
EXPLORATION DATA

NOTES FOR EXPLORATION LOGS

KEY TO USCS TERMINOLOGY AND GRAPHIC SYMBOLS

MAJOR DIVISIONS (BASED UPON ASTM D 2488)				SYMBOLS GRAPHIC	SYMBOLS LETTER
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			GW
					GP
		GRAVELS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			GM
					GC
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LESS THAN 15% PASSING THE NO. 200 SIEVE)			SW
					SP
		SANDS WITH FINES (MORE THAN 15% PASSING THE NO. 200 SIEVE)			SM
					SC
FINE-GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT OR CLAY (<15% RETAINED ON THE NO. 200 SIEVE) SILT OR CLAY WITH SAND OR GRAVEL (15% TO 30% RETAINED ON THE NO. 200 SIEVE) SANDY OR GRAVELLY SILT OR CLAY (>30% RETAINED ON THE NO. 200 SIEVE)	SILTS AND LEAN CLAYS LIQUID LIMIT LESS THAN 50			ML
					CL
					OL
		ELASTIC SILTS AND FAT CLAYS LIQUID LIMIT GREATER THAN 50			MH
					CH
					OH
HIGHLY ORGANIC SOILS					PT

NOTE: DUAL SYMBOLS ARE USED TO INDICATE COARSE-GRAINED SOILS WHICH CONTAIN AN ESTIMATED 5 TO 15% FINES BASED ON VISUAL CLASSIFICATION OR BETWEEN 5 AND 12% FINES BASED ON LABORATORY TESTING; AND FINE-GRAINED SOILS WHEN THE PLOT OF LIQUID LIMIT & PLASTICITY INDEX VALUES FALLS IN THE PLASTICITY CHART'S CROSS-HATCHED AREA. FINE-GRAINED SOILS ARE CLASSIFIED AS ORGANIC (OL OR OH) WHEN ENOUGH ORGANIC PARTICLES ARE PRESENT TO INFLUENCE ITS PROPERTIES. LABORATORY TEST RESULTS ARE USED TO SUPPLEMENT SOIL CLASSIFICATION BY THE VISUAL-MANUAL PROCEDURES OF ASTM D 2488.

ADDITIONAL TERMINOLOGY AND GRAPHIC SYMBOLS

	DESCRIPTION		GRAPHIC SYMBOLS
ADDITIONAL DESIGNATIONS	TOPSOIL		
	MAN MADE FILL		
	GLACIAL TILL		
	COBBLES AND BOULDERS		
RESIDUAL SOIL DESIGNATIONS	DESCRIPTION	"N" VALUE	
	HIGHLY WEATHERED ROCK	50 TO 50/1"	
	PARTIALLY WEATHERED ROCK	MORE THAN 50 BLOWS FOR 1" OF PENETRATION OR LESS, AUGER PENETRABLE	

COARSE-GRAINED SOILS
(GRAVEL AND SAND)

DESIGNATION	BLOWS PER FOOT (BPF) "N"
VERY LOOSE	0 - 4
LOOSE	5 - 10
MEDIUM DENSE	11 - 30
DENSE	31 - 50
VERY DENSE	>50

NOTE: "N" VALUE DETERMINED AS PER ASTM D 1586

FINE-GRAINED SOILS
(SILT AND CLAY)

CONSISTENCY	BPF "N"
VERY SOFT	<2
SOFT	2 - 4
MEDIUM STIFF	5 - 8
STIFF	9 - 15
VERY STIFF	16 - 30
HARD	>30

NOTE: ADDITIONAL DESIGNATIONS TO ADVANCE SAMPLER INDICATED IN BLOW COUNT COLUMN:
WOH = WEIGHT OF HAMMER
WOR = WEIGHT OF ROD(S)

SAMPLE TYPE

DESIGNATION	SYMBOL
SOIL SAMPLE	S-
SHELBY TUBE	U-
ROCK CORE	R-

WATER DESIGNATION

DESCRIPTION	SYMBOL
ENCOUNTERED DURING DRILLING	▽
UPON COMPLETION OF DRILLING	▼
24 HOURS AFTER COMPLETION	▼

NOTE: WATER OBSERVATIONS WERE MADE AT THE TIME INDICATED. POROSITY OF SOIL STRATA, WEATHER CONDITIONS, SITE TOPOGRAPHY, ETC. MAY CAUSE WATER LEVEL CHANGES.

LOG OF BORING NO. C-1

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	5.9		3.9
DATE:	1/13/2020		1/14/2020
CAVED (ft):	-		-

DATE STARTED: **1/13/2020**
DATE COMPLETED: **1/13/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **5.9**
GROUND SURFACE ELEVATION: **6.3**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **JOS**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	16	2-4-4-6	8	6.3	0	TS		Topsoil: 7 inches	
					5.6		SM		Brown, moist, loose, Silty SAND	
2	2.0	16	4-5-7-7	12	4.3		SP-SM		Brown, moist, medium dense, Poorly-graded SAND with Silt	
3	4.0	18	3-5-6-7	11	2.3		CL		Gray, moist to wet, stiff, Lean CLAY	▽
4	6.0	14	4-4-6-7	10		7				▽
5	8.0	18	3-4-5-7	9	-1.7		SC		Gray, wet, loose to medium dense, Clayey SAND	
6	13.5	18	5-6-7	13		14				
					-8.7				Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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Georgetown, DE 19947

LOG OF BORING NO. C-1

LOG OF BORING NO. PS-1

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	4.0		2.7
DATE:	1/27/2020		1/29/2020
CAVED (ft):	-		-

DATE STARTED: **1/27/2020**
DATE COMPLETED: **1/27/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **4.0**
GROUND SURFACE ELEVATION: **10.8**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **WLG**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					10.8	0	TS		Topsoil: 8 inches	
1	0.0	16	4-11-5-5	16	10.1		SC		Brown, moist, medium dense, Clayey SAND	
2	2.0	18	7-11-15-11	26						▽
3	4.0	14	12-14-13-12	27	6.8		SM		Brown, wet, medium dense, Silty SAND	▽
4	6.0	18	5-5-6-7	11	4.8	7	CL		Gray, wet, medium stiff to stiff, Lean CLAY	
5	8.0	16	3-2-6-8	8						
					-1.2		SM		Brown-gray, wet, very loose to loose, Silty SAND	
6	13.5	16	4-5-5	10		14				
7	18.5	18	3-2-2	4						
					-11.2	21	SP-SM		Gray, wet, loose to medium dense, Poorly-graded SAND with Silt	
8	23.5	10	3-5-5	10						
9	28.5	10	4-6-8	14		28				
					-21.2		SM		Gray, wet, loose, Silty SAND	
10	33.5	14	5-2-3	5		35				
					-26.2		SP-SM		Gray, wet, loose, Poorly-graded SAND with Silt	
11	38.5	16	5-5-5	10						
					-29.2	42			Bottom of hole 40 ft.	

NOTES:

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LOG OF BORING NO. PS-1

LOG OF BORING NO. R-1

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	6.0		8.2
DATE:	1/2/20		1/6/20
CAVED (ft):	-		-

DATE STARTED: **1/2/20**
DATE COMPLETED: **1/2/20**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **6.0**
GROUND SURFACE ELEVATION: **11.6**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **WLG**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					11.6	0				
1	0.0	18	1-2-3-5	5	11.4		TS		Topsoil: 2 inches	
					9.6		ML		Brown, moist, medium stiff, SILT	
2	2.0	14	6-5-4-5	9			SM		Brown, moist to wet, loose, Silty SAND	
3	4.0	16	5-4-5-4	9						
4	6.0	16	4-3-4-5	7		7				
					3.6					
5	8.0	14	6-5-5-3	10			SP-SM		Tan, wet, loose, Poorly-graded SAND with Silt and Gravel	
					-0.4					
							CL		Gray, wet, medium stiff, Lean CLAY	
6	13.0	18	2-2-3-3	5		14				
					-3.4				Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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Georgetown, DE 19947

LOG OF BORING NO. R-1

LOG OF BORING NO. R-2

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	8.0		9.7
DATE:	12/30/19		12/31/19
CAVED (ft):	-		-

DATE STARTED: **12/30/19**
DATE COMPLETED: **12/30/19**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **8.0**
GROUND SURFACE ELEVATION: **12.1**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **JOS**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	18	1-4-3-3	7	12.1	0	TS		Topsoil: 2 inches	
					11.9		ML		Brown, moist, medium stiff, SILT	
2	2.0	13	4-5-5-7	10	10.1		SC		Brown, moist, loose, Clayey SAND	
3	4.0	16	5-7-5-7	12	8.1		SM		Brown, moist to wet, loose to medium dense, Silty SAND	
4	6.0	14	7-7-7-8	14		7				▽
5	8.0	16	3-5-2-2	7						▽
					0.1		SP-SM		Brown, wet, medium dense, Poorly-graded SAND with Silt	
6	13.5	11	9-10-3	13		14				
					-2.9				Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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Georgetown, DE 19947

LOG OF BORING NO. R-2

LOG OF BORING NO. R-3

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	5.2		7.5
DATE:	1/24/2020		1/27/2020
CAVED (ft):	-		-

DATE STARTED: **1/24/2020**
DATE COMPLETED: **1/24/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **5.2**
GROUND SURFACE ELEVATION: **10.2**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **WLG**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	16	3-2-2-3	4	10.2	0	TS		Topsoil: 8 inches	
					9.5		SM		Brown, moist to wet, very loose to medium dense, Silty SAND	
2	2.0	14	3-3-3-5	6						
3	4.0	10	4-4-7-6	11						▽
4	6.0	10	5-6-8-11	14		7				▽
5	8.0	18	2-2-4-4	6	2.2		CL		Gray, wet, medium stiff, Lean CLAY	
					-1.8		SC		Gray, wet, loose, Clayey SAND	
6	13.5	4	2-3-3	6	-4.8	14			Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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Georgetown, DE 19947

LOG OF BORING NO. R-3

LOG OF BORING NO. R-4

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	9.8		6.6
DATE:	1/8/2020		1/9/2020
CAVED (ft):	-		-

DATE STARTED: **1/8/2020**
DATE COMPLETED: **1/8/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **9.8**
GROUND SURFACE ELEVATION: **7.8**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **JOS**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					7.8	0				
1	0.0	12	2-2-2-5	4	7.2		TS		Topsoil: 6 inches	
							SM		Brown-gray, moist, very loose to loose, Silty SAND	
2	2.0	13	5-5-5-6	10						
3	4.0	14	4-4-5-4	9						
4	6.0	16	4-4-5-4	9	1.8	7	CL		Gray, moist to wet, stiff, Lean CLAY	▽
5	8.0	18	3-5-8-7	13						▽
					-4.2		SP-SM		Gray, wet, loose, Poorly-graded SAND with Silt	
6	13.5	18	7-4-5	9		14				
					-7.2				Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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Georgetown, DE 19947

LOG OF BORING NO. R-4

LOG OF BORING NO. R-5

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	7.6		3.3
DATE:	1/8/2020		1/10/2020
CAVED (ft):	-		-

DATE STARTED: **1/10/2020**
DATE COMPLETED: **1/10/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **7.6**
GROUND SURFACE ELEVATION: **5.0**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **KMM**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	18	3-2-2-2	4	5.0 4.0	0	TS		Topsoil: 12 inches	
							SM		Brown, moist, very loose, Silty SAND	
2	2.0	18	1-4-5-5	9	3.0		SC		Orange-gray, moist to wet, loose to medium dense, Clayey SAND	▽
3	4.0	14	2-3-3-4	6						
4	6.0	16	3-5-10-10	15		7				▽
5	8.0	18	6-6-6-7	12	-3.0		SP-SM		Gray, wet, loose to medium dense, Poorly-graded SAND with Silt	
6	13.5	18	5-4-4	8		14				
					-10.0				Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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LOG OF BORING NO. R-5

LOG OF BORING NO. R-6

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	10.0		8.2
DATE:	1/10/2020		1/13/2020
CAVED (ft):	-		-

DATE STARTED: **1/10/2020**
DATE COMPLETED: **1/10/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **10.0**
GROUND SURFACE ELEVATION: **10.3**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **JOS**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	14	2-2-3-3	5	10.3 9.5	0	TS		Topsoil: 8 inches	
2	2.0	10	2-1-2-1	3			SM		Brown-tan, moist, very loose to medium dense, Silty SAND	
3	4.0	18	2-4-6-5	10						
4	6.0	14	7-7-8-9	15		7				
5	8.0	16	6-3-3-2	6	2.3		SC		Gray-orange, moist to wet, loose, Clayey SAND	▽ ▽
					-1.7		CL		Gray-orange, wet, stiff, Lean CLAY	
7	13.5	14	4-6-9	15	-4.7	14			Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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LOG OF BORING NO. R-6

LOG OF BORING NO. R-7

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	8.9		6.2
DATE:	1/10/2020		1/13/2020
CAVED (ft):	-		-

DATE STARTED: **1/10/2020**
DATE COMPLETED: **1/10/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **8.9**
GROUND SURFACE ELEVATION: **6.4**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **JOS**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					6.4	0				
1	0.0	14	2-3-3-3	6	5.6		TS		Topsoil: 8 inches	
							SM		Brown, moist, loose, Silty SAND	
2	2.0	14	3-4-4-3	8						
					2.4					
3	4.0	11	4-4-4-4	8			SP-SM		Gray-orange, moist, loose, Poorly-graded SAND with Silt	
					0.4					
4	6.0	14	3-4-7-8	11		7	SC		Gray, moist, medium dense, Clayey SAND	▽
					-1.6					
5	8.0	18	3-5-7-8	12			CL		Gray, moist to wet, stiff, Lean CLAY	▽
					-5.6					
							SP-SM		Gray-orange, wet, medium dense, Poorly graded SAND with Silt	
7	13.5	18	3-7-4	11		14				
					-8.6				Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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LOG OF BORING NO. R-7

LOG OF BORING NO. R-8

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	13.7		6.9
DATE:	1/8/2020		1/9/2020
CAVED (ft):	-		-

DATE STARTED: **1/8/2020**
DATE COMPLETED: **1/8/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **13.7**
GROUND SURFACE ELEVATION: **9.3**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **JOS**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					9.3	0				
1	0.0	16	3-3-2-3	5	8.7		TS		Topsoil: 6 inches	
					7.3		SM		Brown, moist, loose, Silty SAND	
2	2.0	12	3-5-8-8	13			SC		Orange-tan, moist, medium dense, Clayey SAND	
3	4.0	16	7-12-15-12	27						
					3.3					
4	6.0	13	7-11-8-9	19		7	SM		Gray, moist, medium dense, Silty SAND	▽
					1.3					
5	8.0	18	4-3-5-6	8			CL		Gray, moist to wet, medium stiff, Lean CLAY	
										▽
6	13.5	16	3-3-4	7		14				
					-5.7				Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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LOG OF BORING NO. R-8

LOG OF BORING NO. R-9

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	3.6		3.3
DATE:	1/15/2020		1/16/2020
CAVED (ft):	-		-

DATE STARTED: **1/15/2020**
DATE COMPLETED: **1/15/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **3.6**
GROUND SURFACE ELEVATION: **5.5**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **WLG**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	8	2-2-1-1	3	5.5	0	TS		Topsoil: 12 inches	
					4.5		SM		Tan, moist to wet, very loose, Silty SAND	
2	2.0	8	1-1-2-3	3						▽
					1.5		SC		Gray-orange, wet, loose, Clayey SAND	
3	4.0	12	2-4-4-7	8	-0.5					
4	6.0	18	3-5-7-8	12		7	CL		Gray, wet, stiff, Lean CLAY	
5	8.0	18	3-4-5-7	9	-2.5		SM		Gray-orange, wet, loose, Silty SAND	
					-6.5		SC		Tan, wet, loose, Clayey SAND	
6	13.5	14	3-2-3	5		14				
					-9.5				Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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Georgetown, DE 19947

LOG OF BORING NO. R-9

LOG OF BORING NO. R-10

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	13.5		10.7
DATE:	1/16/2020		1/22/2020
CAVED (ft):	-		-

DATE STARTED: **1/16/2020**
DATE COMPLETED: **1/16/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **D. Addison**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **13.5**
GROUND SURFACE ELEVATION: **11.8**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **JOS**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					11.8	0				
1	0.0	18	2-3-4-4	7	10.8		TS		Topsoil 12 inches	
							SM		Brown, moist, loose, Silty SAND	
2	2.0	12	6-7-9-8	16	9.8		CL		Orange-brown, moist, very stiff, Lean CLAY	
3	4.0	16	6-6-3-3	9	7.8		SP-SM		Tan-orange, moist, loose, Poorly-graded SAND with Silt	
4	6.0	14	4-5-4-4	9	5.8	7	SM		Gray-orange, moist, loose, Silty SAND	
5	8.0	16	5-4-6-4	10	3.8		CL		Gray-orange, moist, stiff, Lean CLAY	▽
					-0.2		SC		Gray-orange, moist to wet, medium dense, Clayey SAND	▽
7	13.5	12	5-7-6	13	-3.2	14			Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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Georgetown, DE 19947

LOG OF BORING NO. R-10

LOG OF BORING NO. R-11

PROJECT: **Scenic Manor**
PROJECT NO.: **31191815**
PROJECT LOCATION: **Sussex County, Delaware**

WATER LEVEL (ft):	6.4		4.3
DATE:	1/22/2020		1/24/2020
CAVED (ft):	-		-

DATE STARTED: **1/22/2020**
DATE COMPLETED: **1/22/2020**
DRILLING CONTRACTOR: **Manos Drilling Associates**
DRILLER: **K. Manos**
DRILLING METHOD: **Hollow Stem Auger**
SAMPLING METHOD: **Splitspoon**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **6.4**
GROUND SURFACE ELEVATION: **10.1**
DATUM: **Survey**
EQUIPMENT: **CME 55**
LOGGED BY: **WLG**
CHECKED BY: **GRS**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
1	0.0	10	2-3-3-2	6	10.1 9.6	0	TS SM		Topsoil: 6 inches Brown, moist, loose, Silty SAND	
2	2.0	14	3-3-3-3	6						
3	4.0	16	4-5-4-5	9	6.1		SP-SM		Tan-orange, moist to wet, loose, Poorly-graded SAND with Silt	▽ Mottling present at 6 ft.
4	6.0	16	3-4-4-5	8		7				
5	8.0	16	3-3-4-2	7						
6	13.5	18	3-4-6	10	-4.9	14			Bottom of hole 15 ft.	
						21				
						28				
						35				
						42				

NOTES:

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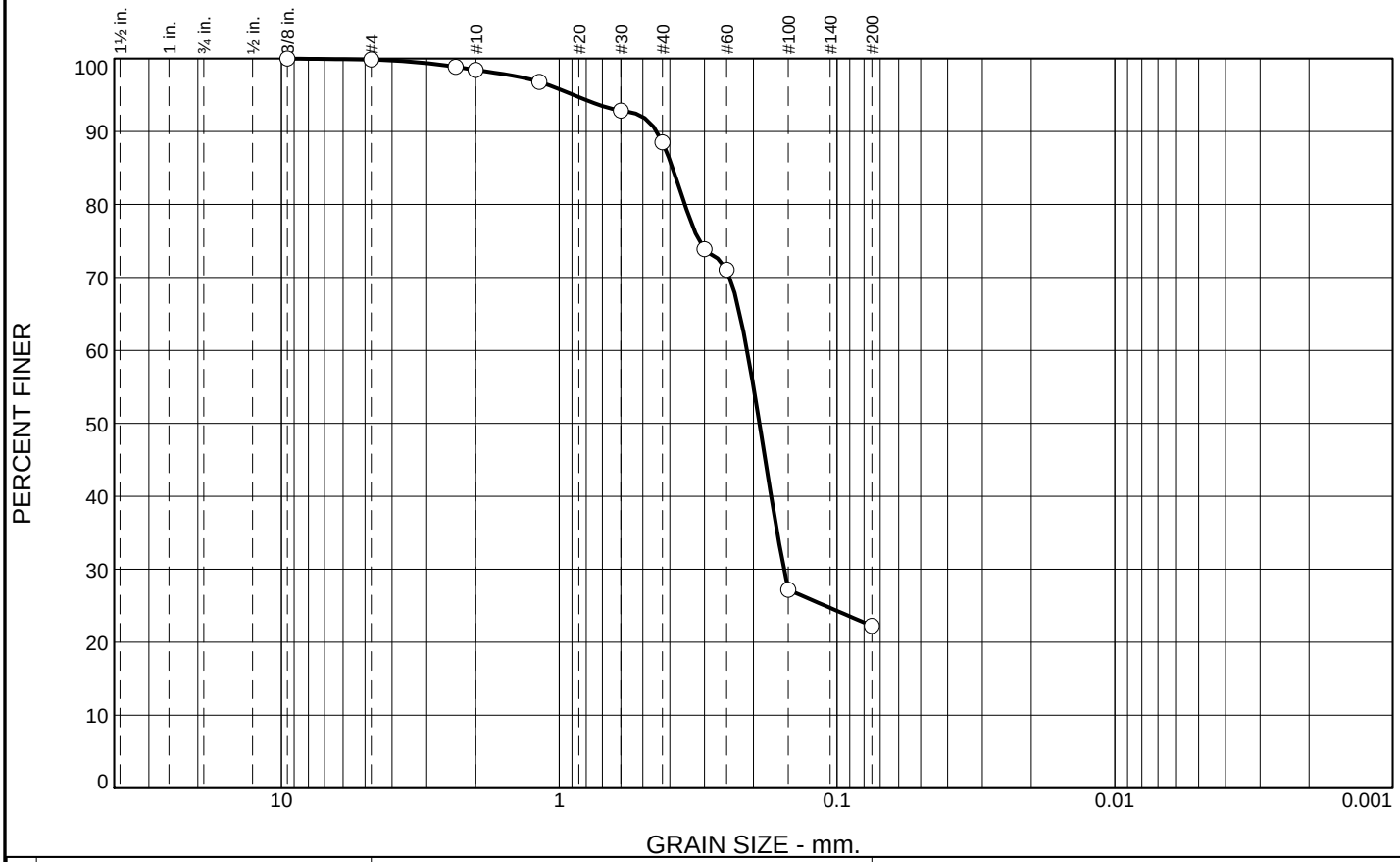
LOG OF BORING NO. R-11

APPENDIX C
LABORATORY DATA

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	0.1	1.5	9.9	66.3	22.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in	100.0		
# 4	99.9		
# 8	98.9		
# 10	98.4		
# 16	96.8		
# 30	92.9		
# 40	88.5		
# 50	73.9		
# 60	71.1		
# 100	27.2		
#200	22.2		

* (no specification provided)

Soil Description

Gray-tan, Clayey SAND with Silt

Atterberg Limits

PL= NP LL= 23 PI= 5 NM= 15.2

Coefficients

D_{90}= 0.4459 D_{85}= 0.3909 D_{60}= 0.2110
D_{50}= 0.1904 D_{30}= 0.1554 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC-SM AASHTO= A-2-4(0)

Remarks

Location: R-9
Sample Number: S-20191224-01 **Depth:** 1.0' - 4.0' **Date:** 12/24/19

GEO-TECHNOLOGY ASSOCIATES, INC.
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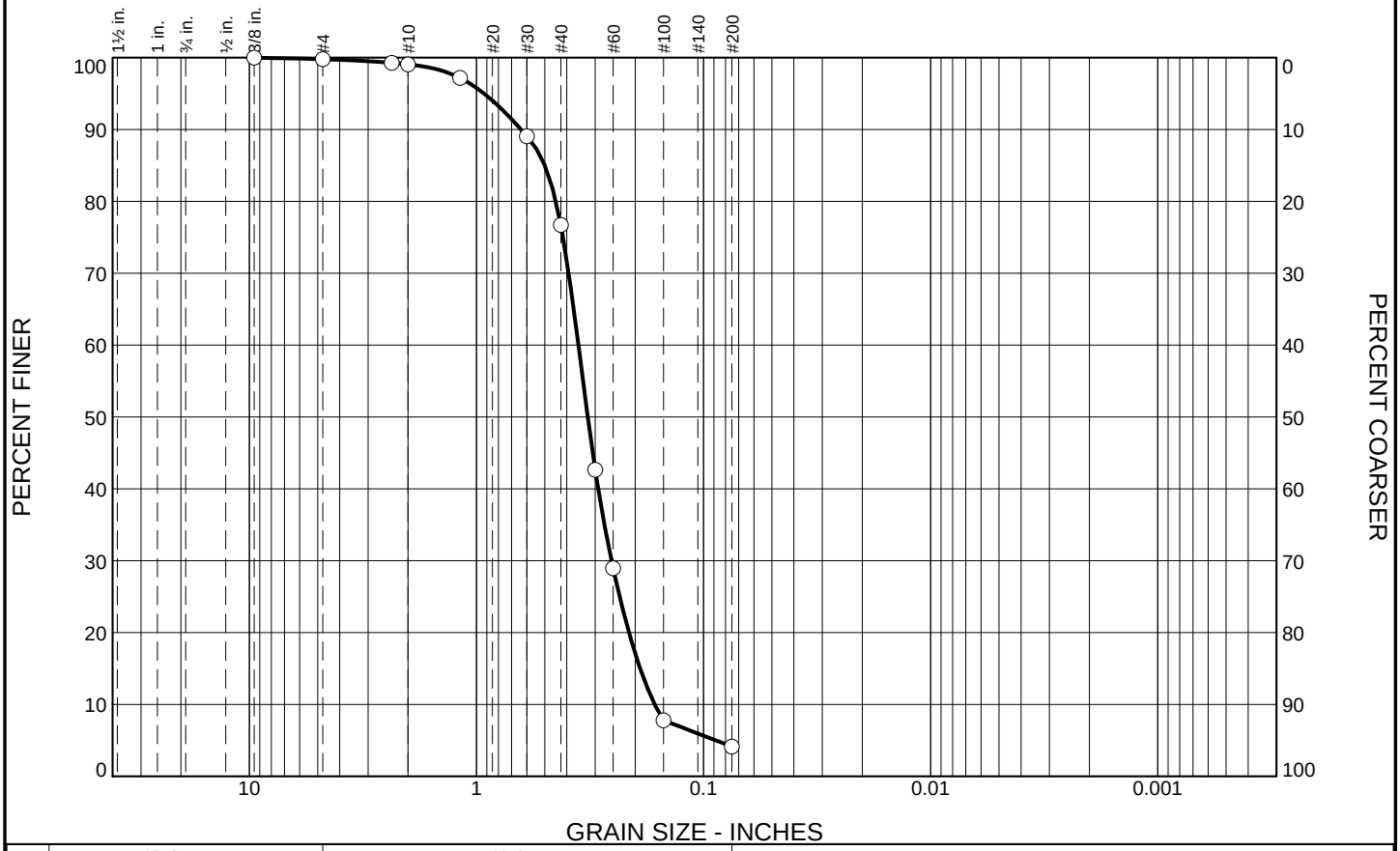
Georgetown, DE 19947

Client: MKR Land Development, LLC
Project: Scenic Manor

Project No: 31191815 **Figure**

Tested By: JNJ **Checked By:** GRS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	0.2	0.7	22.4	72.6	4.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in	100.0		
# 4	99.8		
# 8	99.3		
# 10	99.1		
# 16	97.2		
# 30	89.1		
# 40	76.7		
# 50	42.7		
# 60	28.9		
# 100	7.8		
#200	4.1		

* (no specification provided)

Soil Description

Tan, Poorly-graded SAND

Atterberg Limits

PL= NP LL= NP PI= NP NM= 7.5

Coefficients

D_{90}= 0.6362 D_{85}= 0.4995 D_{60}= 0.3555
D_{50}= 0.3234 D_{30}= 0.2542 D_{15}= 0.1902
D_{10}= 0.1640 C_u= 2.17 C_c= 1.11

Classification

USCS= SP AASHTO= A-3

Remarks

Location: SWM-17
Sample Number: S-20191224-02 **Depth:** 1.0' - 4.0' **Date:** 12/24/19

GEO-TECHNOLOGY ASSOCIATES, INC.
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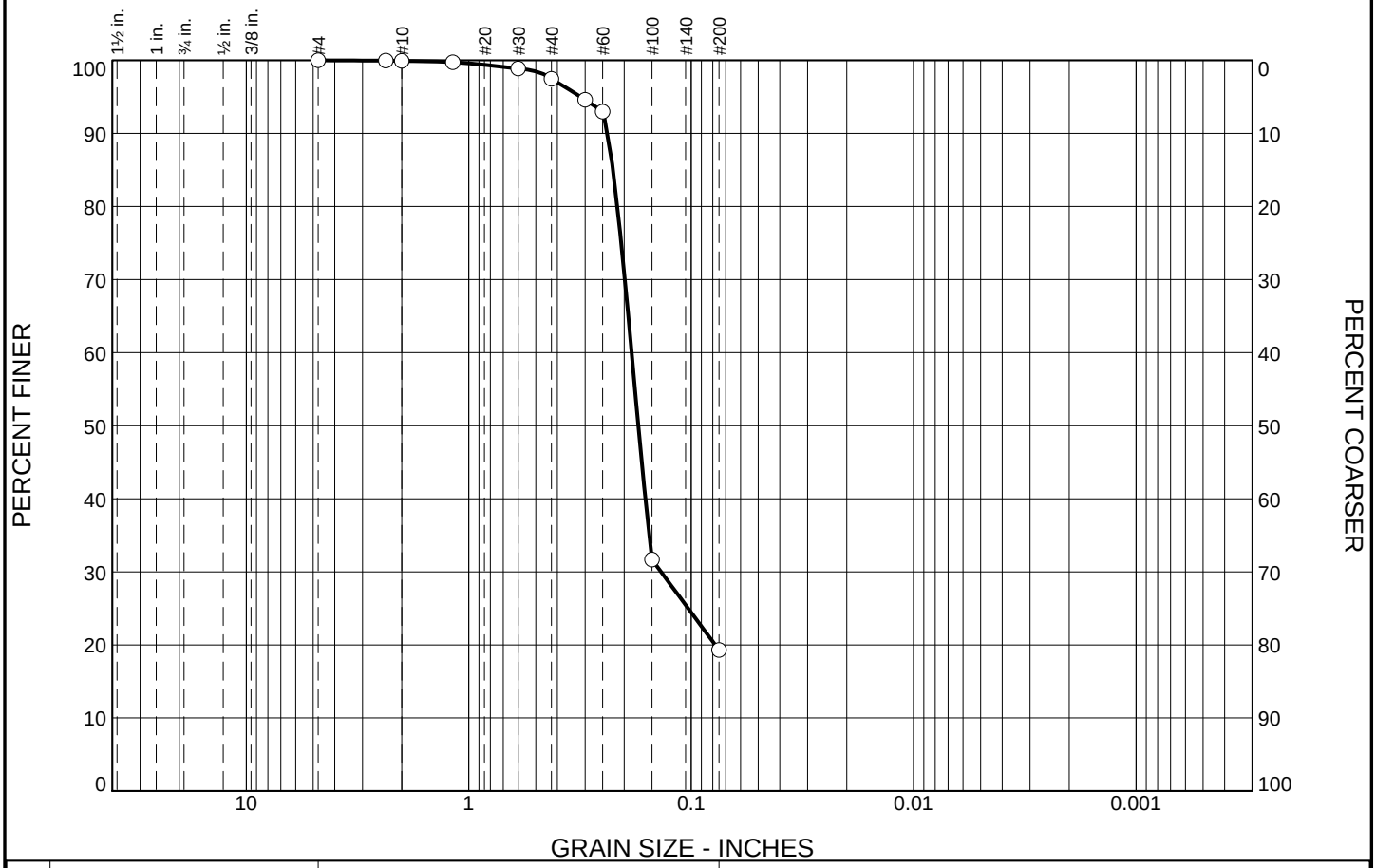
Client: MKR Land Development, LLC
Project: Scenic Manor
Project No: 31191815 **Figure**

Tested By: RC **Checked By:** GRS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	0.0	0.1	2.4	78.2	19.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
# 4	100.0		
# 8	100.0		
# 10	99.9		
# 16	99.7		
# 30	98.9		
# 40	97.5		
# 50	94.6		
# 60	93.0		
# 100	31.7		
#200	19.3		

* (no specification provided)

Soil Description

Brown, Silty SAND

Atterberg Limits

PL= NP LL= NP PI= NP NM= 15.4

Coefficients

D_{90}= 0.2378 D_{85}= 0.2246 D_{60}= 0.1852
D_{50}= 0.1729 D_{30}= 0.1366 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Location: SWM-33
Sample Number: S-20191224-03 **Depth:** 1.0' - 4.0' **Date:**

GEO-TECHNOLOGY ASSOCIATES, INC.
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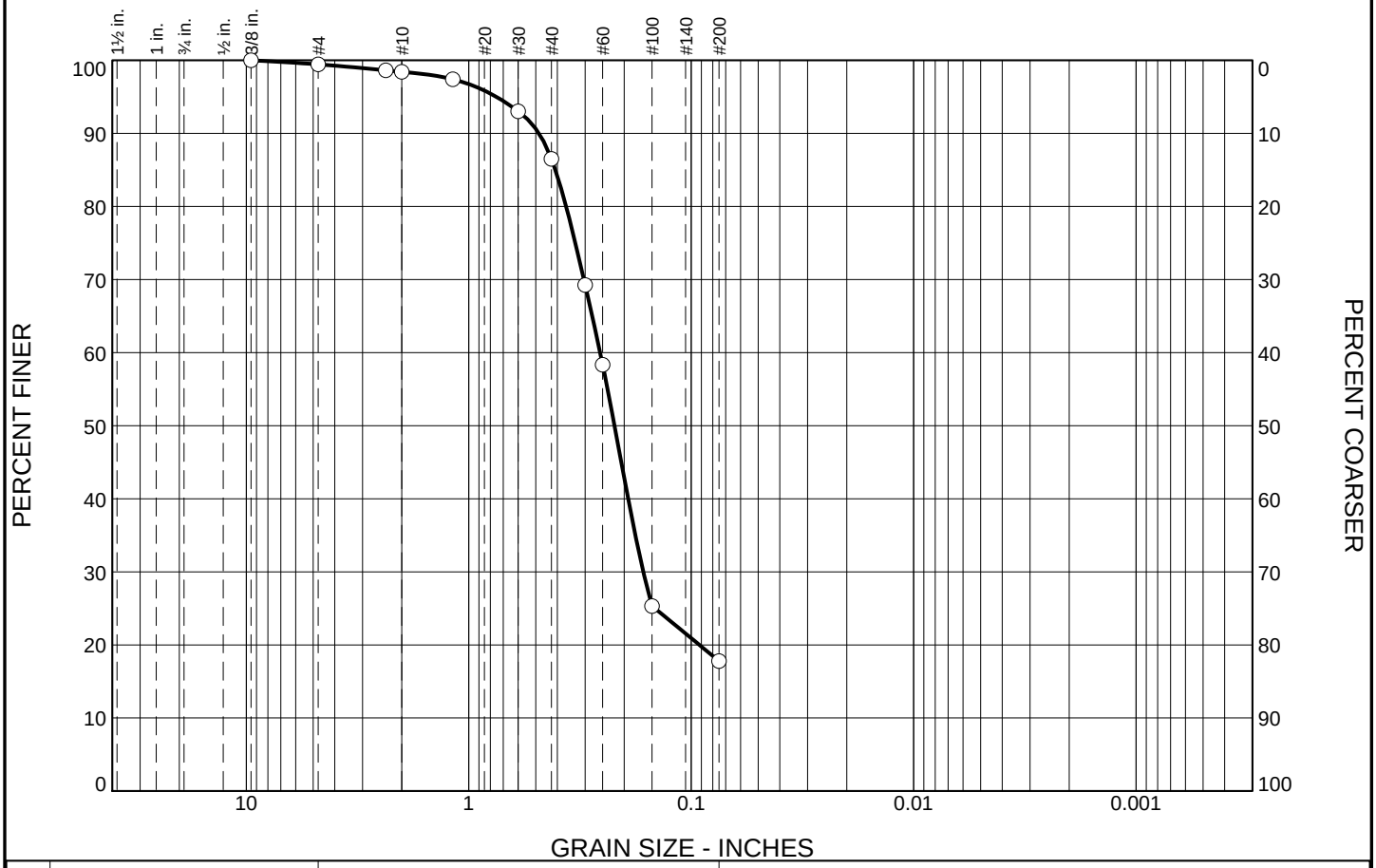
Georgetown, DE 19947

Client: MKR Land Development, LLC
Project: Scenic Manor

Project No: 31191815 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	0.6	1.0	11.9	68.7	17.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in	100.0		
# 4	99.4		
# 8	98.6		
# 10	98.4		
# 16	97.4		
# 30	93.0		
# 40	86.5		
# 50	69.3		
# 60	58.3		
# 100	25.3		
#200	17.8		

* (no specification provided)

Soil Description

Brown, Silty SAND

Atterberg Limits

PL= NP LL= NP PI= NP NM= 15.7

Coefficients

D_{90}= 0.4835 D_{85}= 0.4079 D_{60}= 0.2566
D_{50}= 0.2212 D_{30}= 0.1642 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Location: SWM-59
Sample Number: S-20191224-04 **Depth:** 1.0' - 4.0' **Date:**

GEO-TECHNOLOGY ASSOCIATES, INC.
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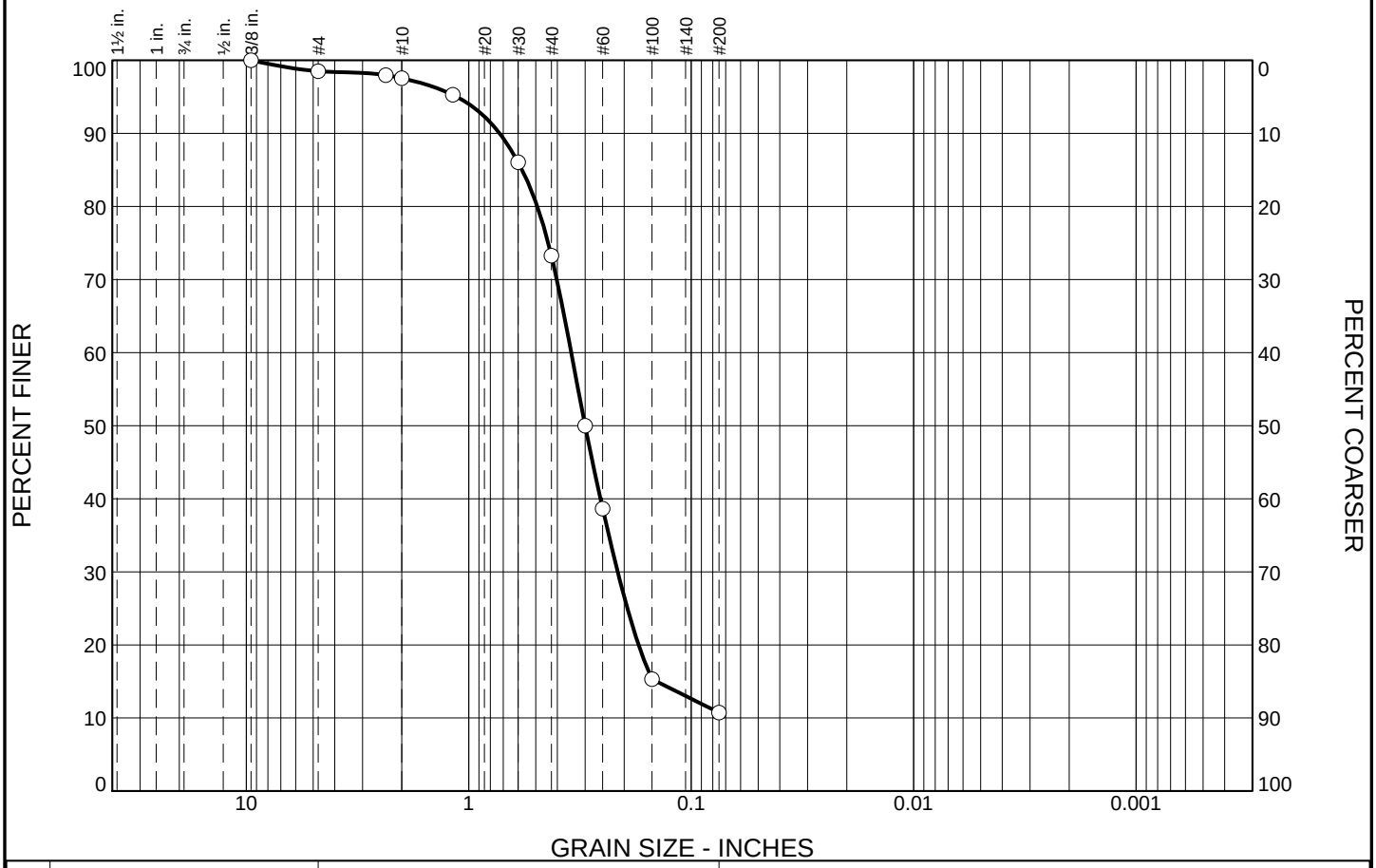
Georgetown, DE 19947

Client: MKR Land Development, LLC
Project: Scenic Manor

Project No: 31191815 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	1.5	1.0	24.2	62.6	10.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 in	100.0		
# 4	98.5		
# 8	98.0		
# 10	97.5		
# 16	95.3		
# 30	86.1		
# 40	73.3		
# 50	50.0		
# 60	38.6		
# 100	15.3		
#200	10.7		

* (no specification provided)

Soil Description

Brown, Poorly-graded SAND with Silt

Atterberg Limits

PL= NP LL= NP PI= NP NM= 8.5

Coefficients

D_{90}= 0.7261 D_{85}= 0.5756 D_{60}= 0.3463
D_{50}= 0.3001 D_{30}= 0.2140 D_{15}= 0.1432
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-2-4(0)

Remarks

Location: SWM-71
Sample Number: S-20191224-05 **Depth:** 1.0' - 4.0' **Date:**

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21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

Client: MKR Land Development, LLC
Project: Scenic Manor

Project No: 31191815 **Figure**

MOISTURE-DENSITY RELATIONSHIP TEST REPORT
ASTM D 558-11 Standard Test Methods for Moisture-Density Relations of Soil -Cement Mixtures

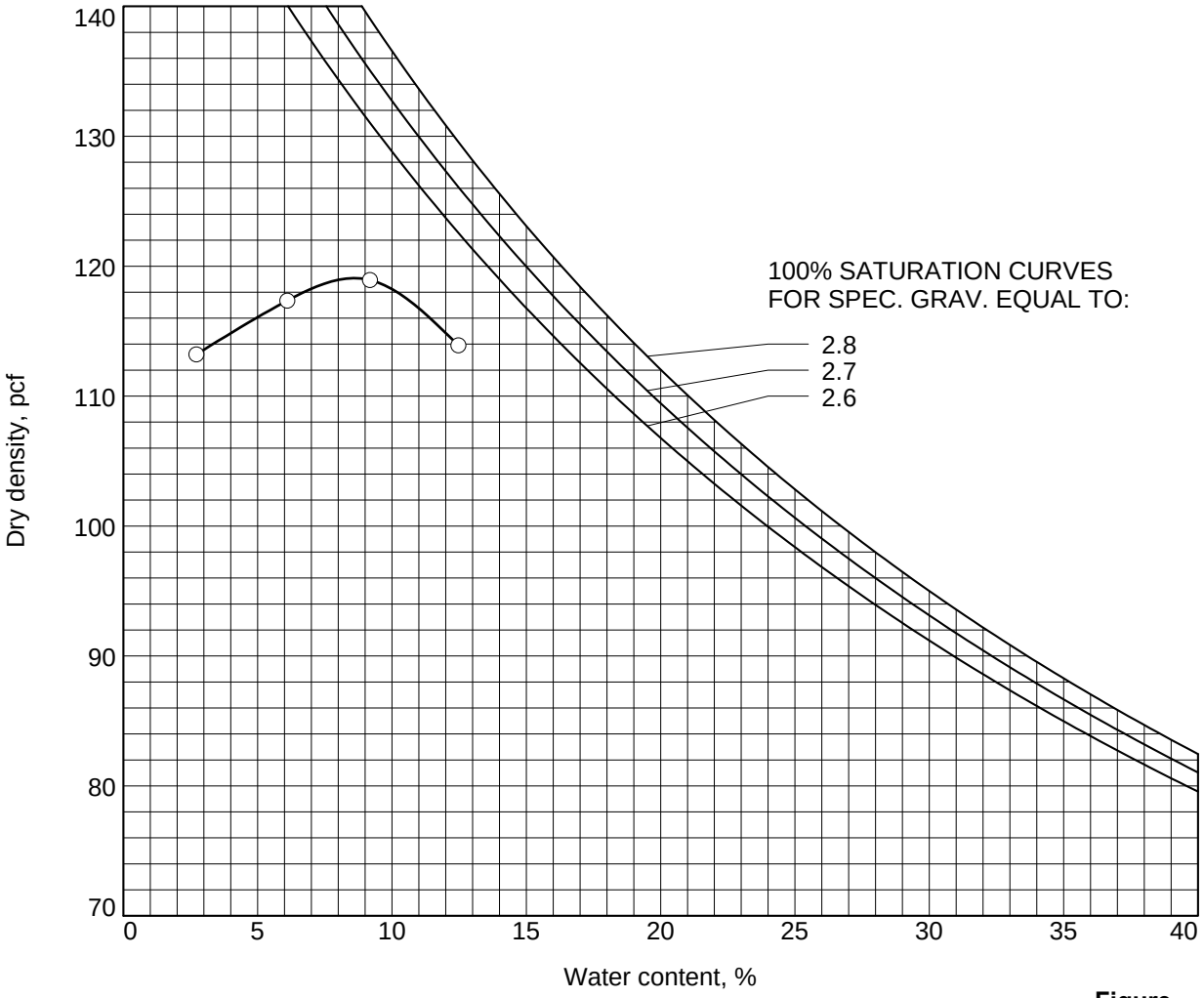
Project No.: 31191815 **Date:** 01/10/2020
Project: Scenic Manor
Client: MKR Land Development, LLC
Location: R-9
Sample Number: S-20200110-02 **Depth:** 1.0' - 4.0'
Remarks:

MATERIAL DESCRIPTION

Description: Gray-tan, Clayey SAND with Silt with 6% cement

Classifications - **USCS:** **AASHTO:**
Nat. Moist. = **Sp.G. =**
Liquid Limit = **Plasticity Index =**
% < No.200 =

TEST RESULTS
Maximum dry density = 119.1 pcf
Optimum moisture = 8.6 %



Figure

Geo-Technology Associates, Inc.

Tested By: JNJ **Checked By:** GRS

MOISTURE-DENSITY RELATIONSHIP TEST REPORT
ASTM D 698-12 Method A Standard

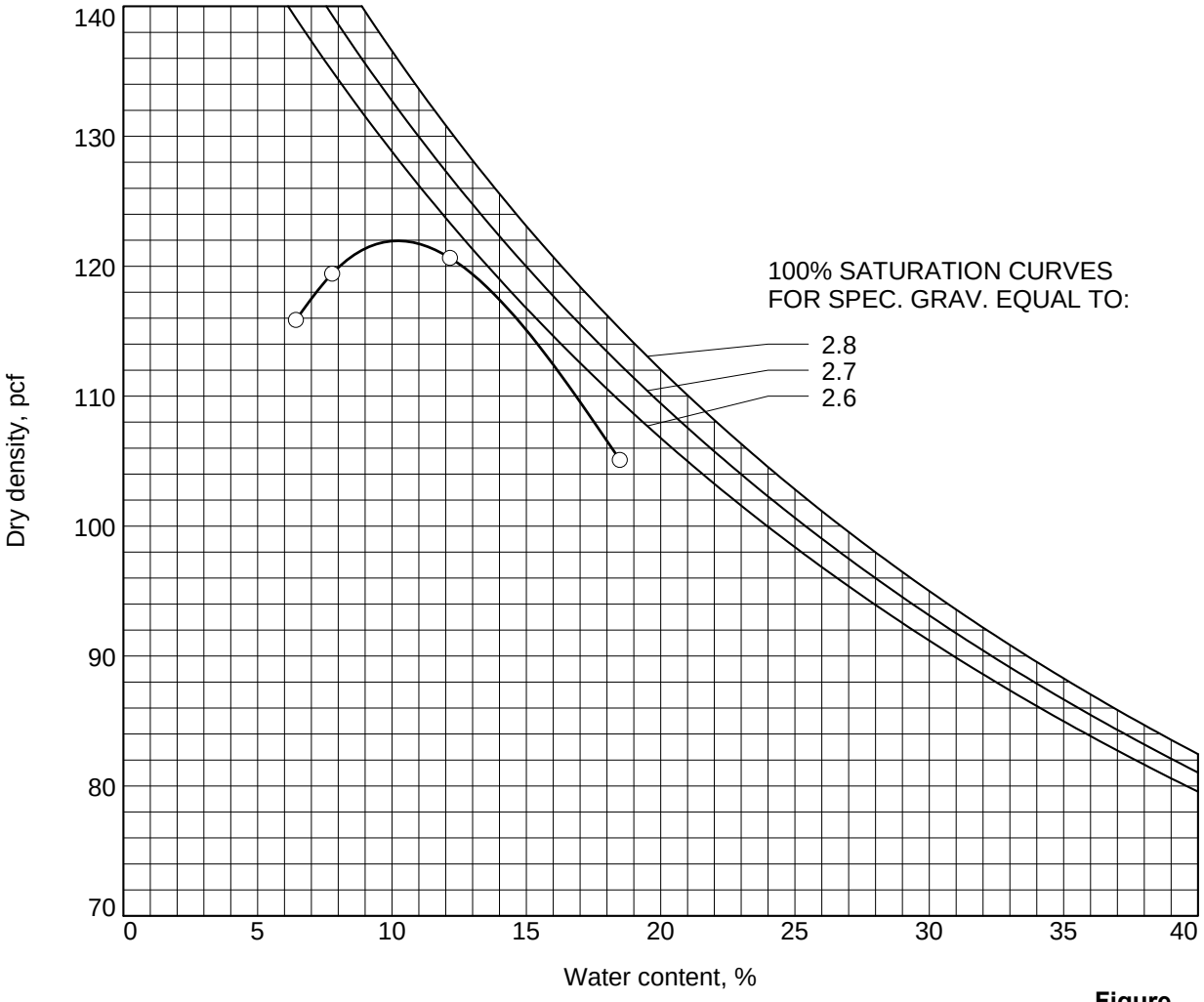
Project No.: 31191815 **Date:** 12/24/19
Project: Scenic Manor
Client: MKR Land Development, LLC
Location: R-9
Sample Number: S-20191224-01 **Depth:** 1.0' - 4.0'
Remarks:

MATERIAL DESCRIPTION

Description: Gray-tan, Clayey SAND with Silt

Classifications - **USCS:** SC-SM **AASHTO:** A-2-4(0)
Nat. Moist. = 17.8 % **Sp.G. =**
Liquid Limit = 23 **Plasticity Index =** 5
% < No.200 = 22.7 %

TEST RESULTS
Maximum dry density = 122.0 pcf
Optimum moisture = 10.2 %



Figure

Geo-Technology Associates, Inc.

Tested By: SLCW **Checked By:** GRS

MOISTURE-DENSITY RELATIONSHIP TEST REPORT
ASTM D 1557-12 Method A Modified

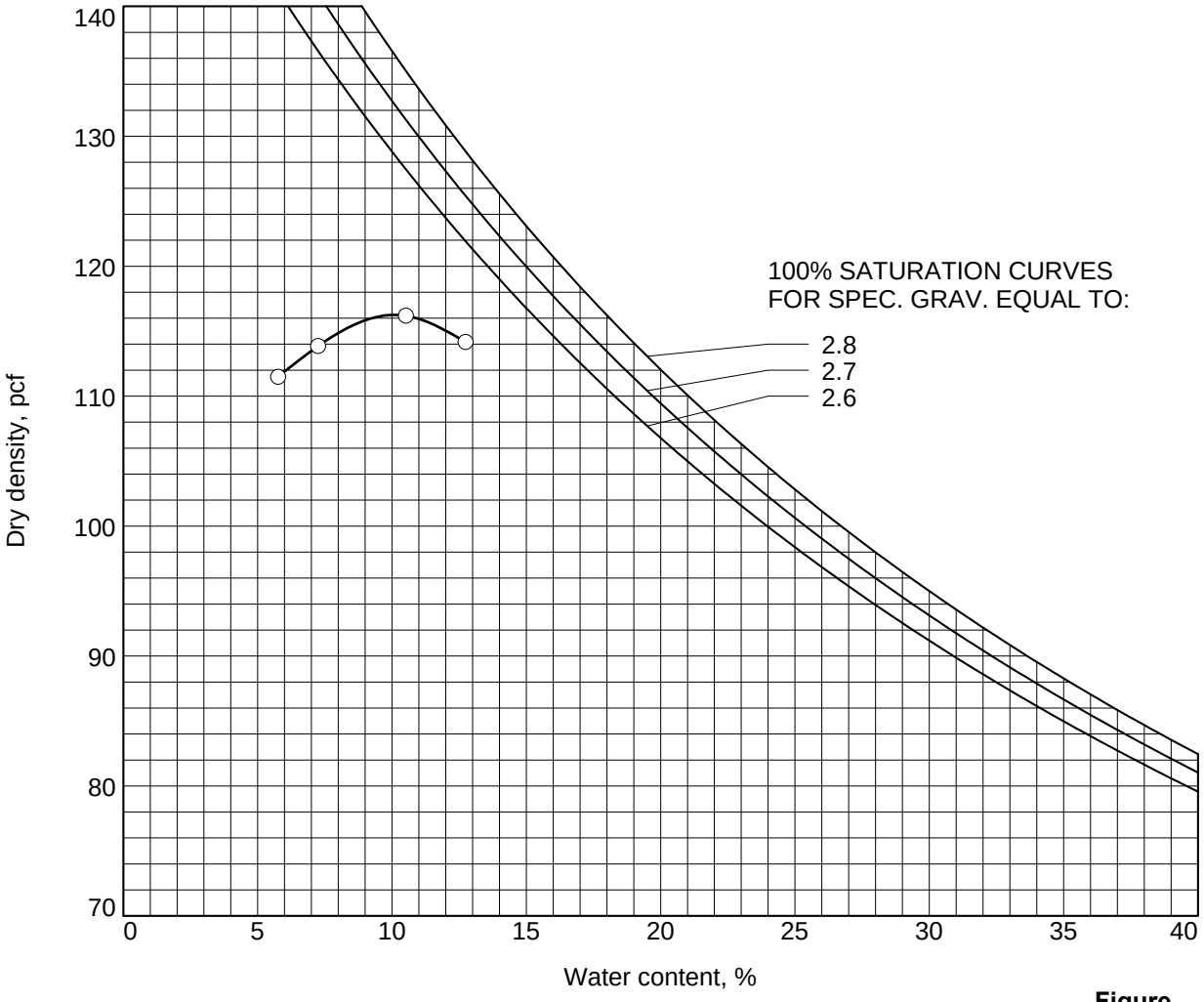
Project No.: 31191815 **Date:** 12/24/19
Project: Scenic Manor
Client: MKR Land Development, LLC
Location: SWM-17
Sample Number: S-20191224-02 **Depth:** 1.0' - 4.0'
Remarks:

MATERIAL DESCRIPTION

Description: Tan, Poorly-graded SAND

Classifications - **USCS:** SP **AASHTO:** A-3
Nat. Moist. = 7.5 % **Sp.G. =**
Liquid Limit = NP **Plasticity Index =** NP
% < No.200 = 4.1 %

TEST RESULTS
Maximum dry density = 116.3 pcf
Optimum moisture = 10.1 %



Figure

Geo-Technology Associates, Inc.

Tested By: JNJ **Checked By:** GRS

MOISTURE-DENSITY RELATIONSHIP TEST REPORT
ASTM D 558-11 Standard Test Methods for Moisture-Density Relations of Soil -Cement Mixtures

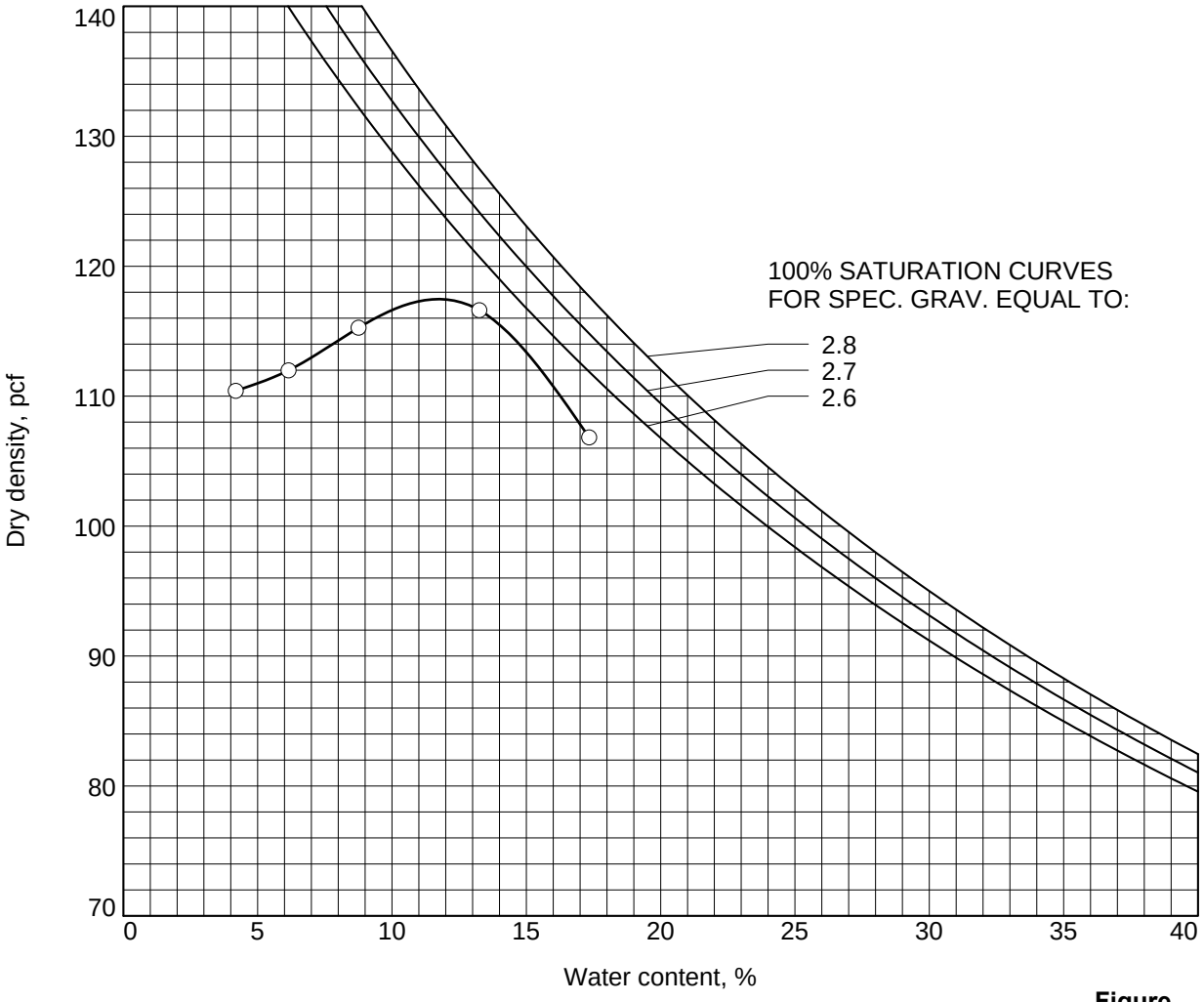
Project No.: 31191815 **Date:** 01/10/2020
Project: Scenic Manor
Client: MKR Land Development, LLC
Location: SWM-33
Sample Number: S-20200110-02 **Depth:** 1.0' - 4.0'
Remarks:

MATERIAL DESCRIPTION

Description: Brown, Silty SAND with 6% cement

Classifications - **USCS:** **AASHTO:**
Nat. Moist. = **Sp.G. =**
Liquid Limit = **Plasticity Index =**
% < No.200 =

TEST RESULTS
Maximum dry density = 117.5 pcf
Optimum moisture = 11.7 %



Figure

Geo-Technology Associates, Inc.

Tested By: JNJ **Checked By:** GRS

MOISTURE-DENSITY RELATIONSHIP TEST REPORT
ASTM D 1557-12 Method A Modified

Project No.: 31191815 **Date:** 12/24/19

Project: Scenic Manor

Client: MKR Land Development, LLC

Location: SWM-33

Sample Number: S-20191224-03 **Depth:** 1.0' - 4.0'

Remarks:

MATERIAL DESCRIPTION

Description: Brown, Silty SAND

Classifications - **USCS:** SM **AASHTO:** A-2-4(0)

Nat. Moist. = 15.4 %

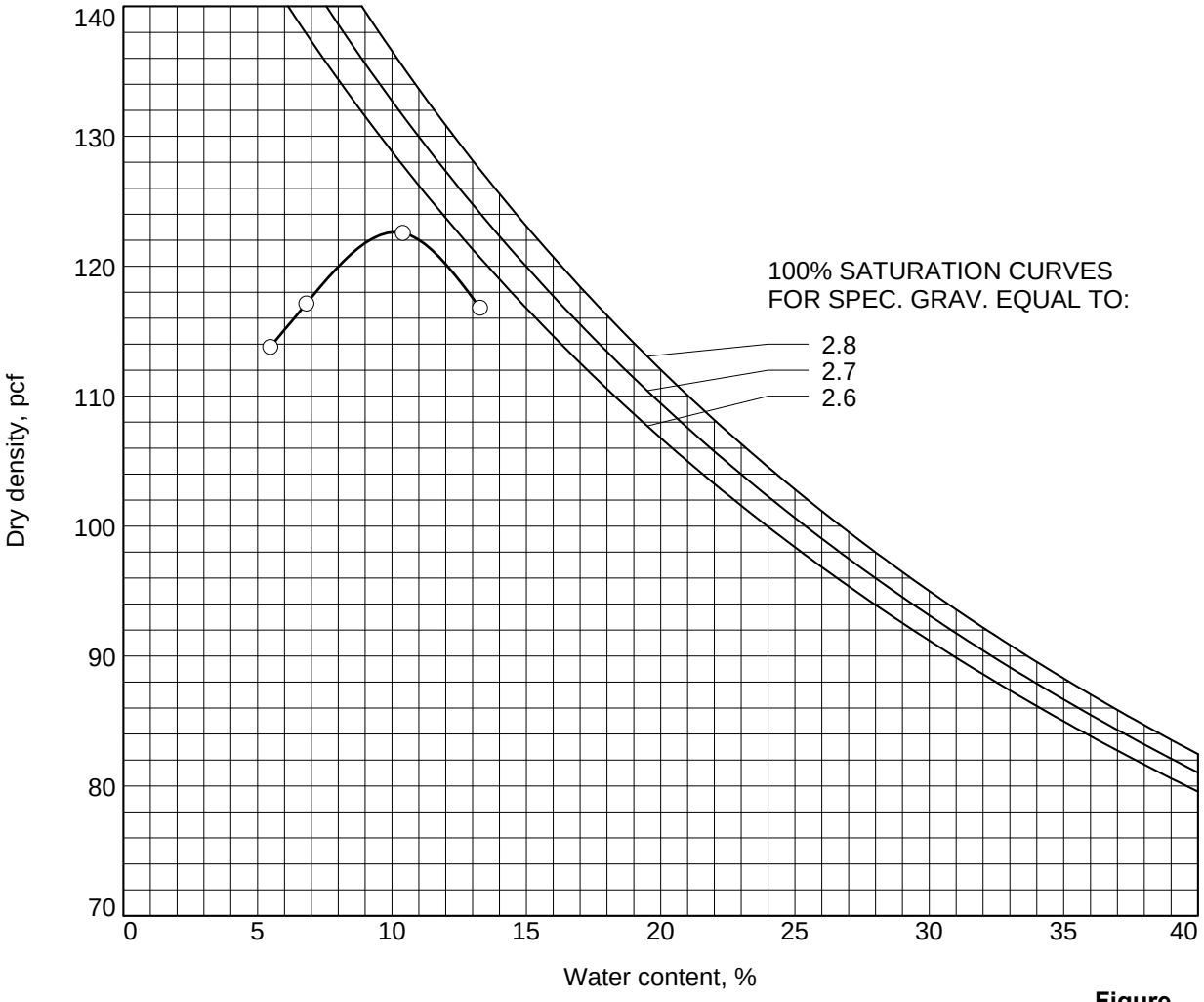
Liquid Limit = NP

Sp.G. =

Plasticity Index = NP

% < No.200 = 19.3 %

TEST RESULTS
Maximum dry density = 122.6 pcf
Optimum moisture = 10.1 %



Figure

Geo-Technology Associates, Inc.

Tested By: JNJ **Checked By:** GRS

MOISTURE-DENSITY RELATIONSHIP TEST REPORT
ASTM D 1557-12 Method A Modified

Project No.: 31191815 **Date:** 12/24/19

Project: Scenic Manor

Client: MKR Land Development, LLC

Location: SWM-59

Sample Number: S-20191224-04 **Depth:** 1.0' - 4.0'

Remarks:

MATERIAL DESCRIPTION

Description: Brown, Silty SAND

Classifications - **USCS:** SM **AASHTO:** A-2-4(0)

Nat. Moist. = 15.7 %

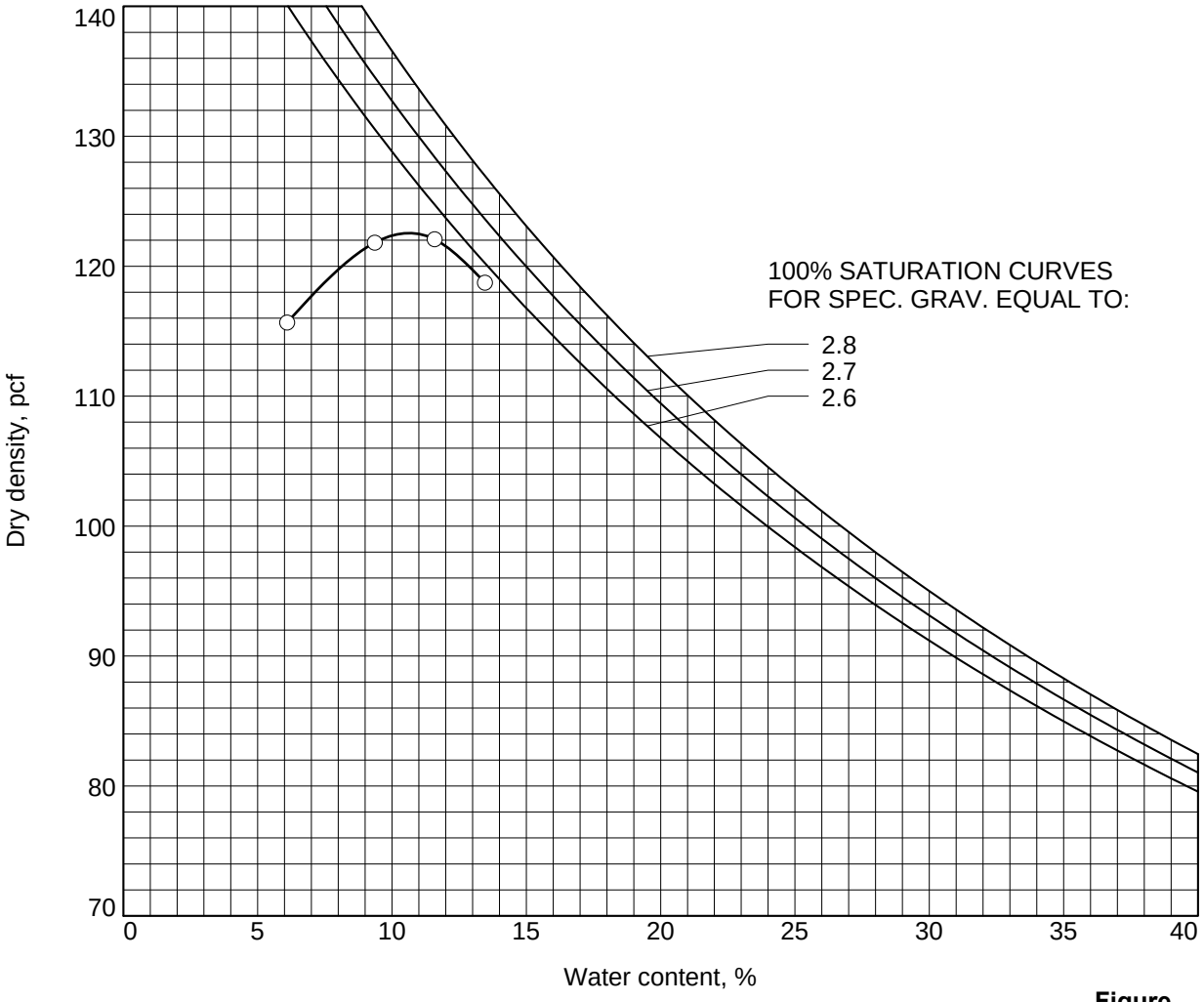
Liquid Limit = NP

Sp.G. =

Plasticity Index = NP

% < No.200 = 17.8 %

TEST RESULTS
Maximum dry density = 122.5 pcf
Optimum moisture = 10.6 %



Figure

Geo-Technology Associates, Inc.

Tested By: JNJ **Checked By:** GRS

MOISTURE-DENSITY RELATIONSHIP TEST REPORT
ASTM D 1557-12 Method A Modified

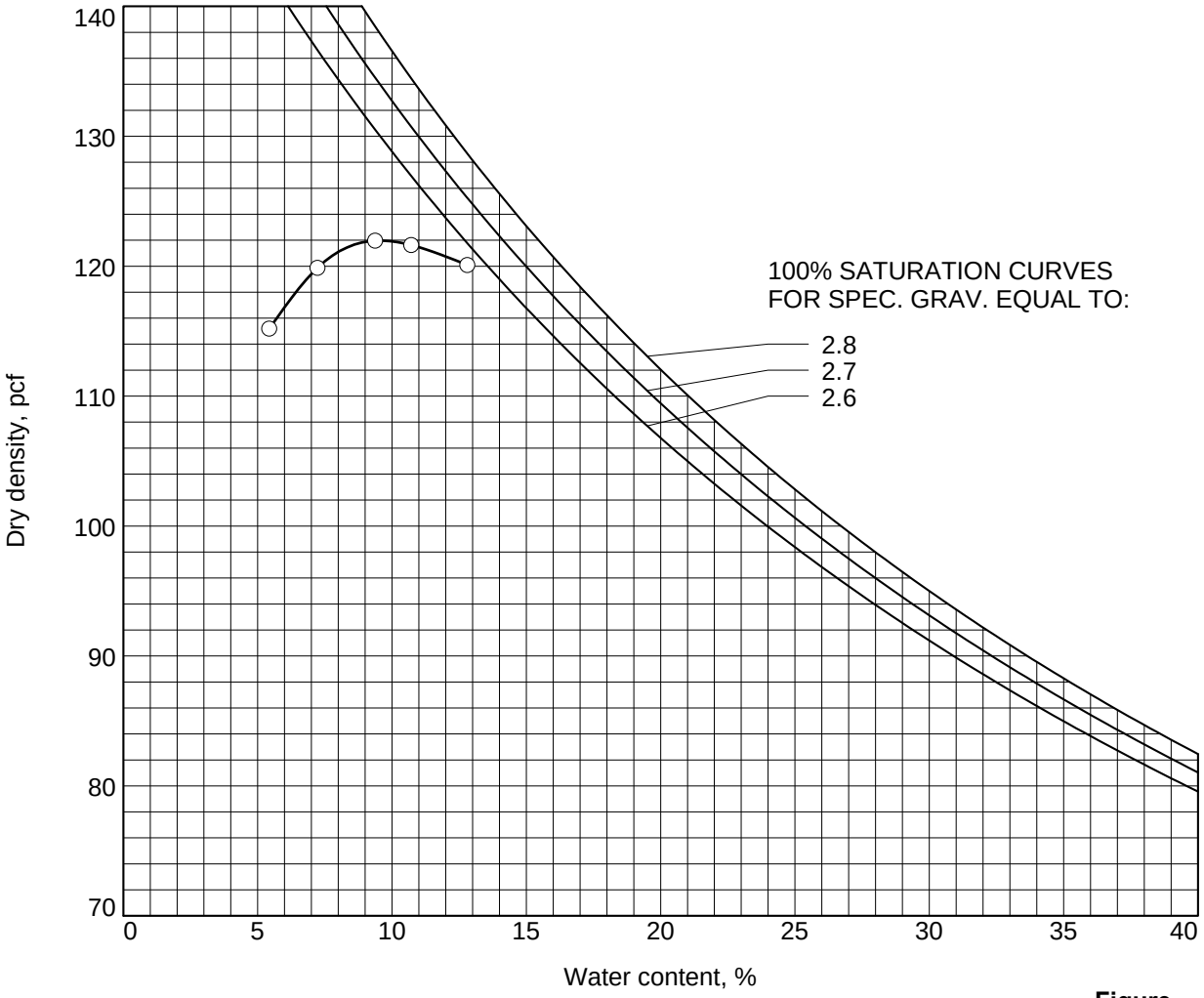
Project No.: 31191815 **Date:** 12/24/19
Project: Scenic Manor
Client: MKR Land Development, LLC
Location: SWM-71
Sample Number: S-20191224-05 **Depth:** 1.0' - 4.0'
Remarks:

MATERIAL DESCRIPTION

Description: Brown, Poorly-graded SAND with Silt

Classifications - **USCS:** SP-SM **AASHTO:** A-2-4(0)
Nat. Moist. = 8.5 % **Sp.G. =**
Liquid Limit = NP **Plasticity Index =** NP
% < No.200 = 10.7 %

TEST RESULTS
Maximum dry density = 122.0 pcf
Optimum moisture = 9.5 %

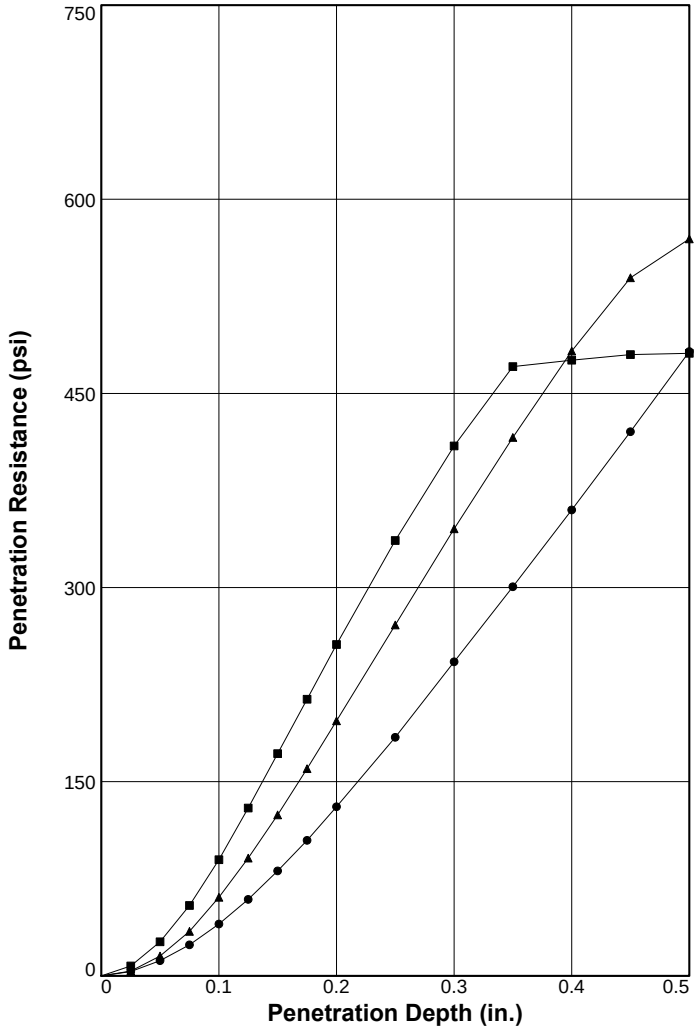


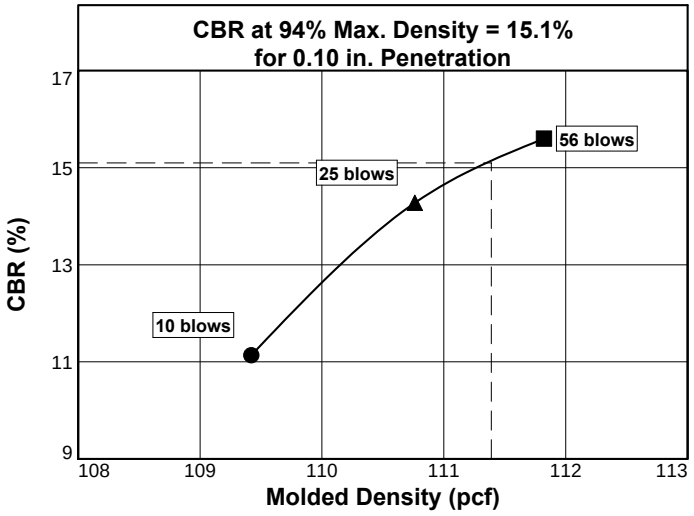
Figure

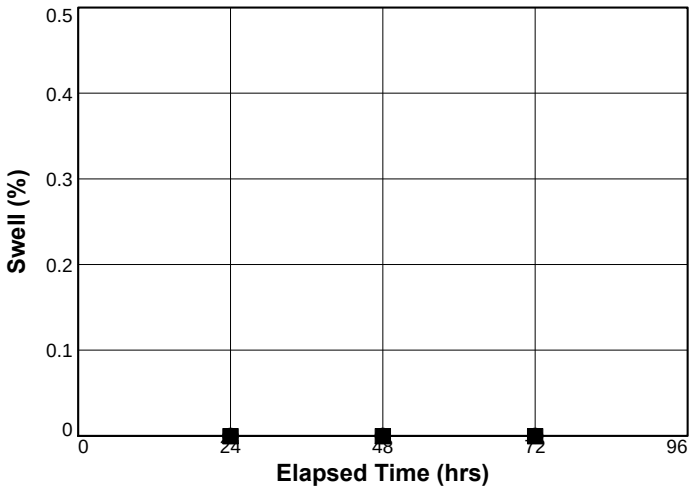
Geo-Technology Associates, Inc.

Tested By: JNJ **Checked By:** GRS

BEARING RATIO TEST REPORT
ASTM D1883-14







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ●	109.4	92.3	12.8	109.4	92.3	12.9	11.1	14.7	0.081	10	0
2 ▲	110.8	93.5	13.1	110.8	93.5	13.5	14.3	19.3	0.063	10	0
3 ■	111.8	94.3	13.6	111.8	94.4	13.3	15.6	21.4	0.041	10	0

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Gray-tan, Clayey SAND with Silt	SC-SM	118.5	10.1	23	5

Project No: 31191815

Project: Scenic Manor

Location: R-9

Sample Number: S-20191224-01 **Depth:** 1.0' - 4.0'

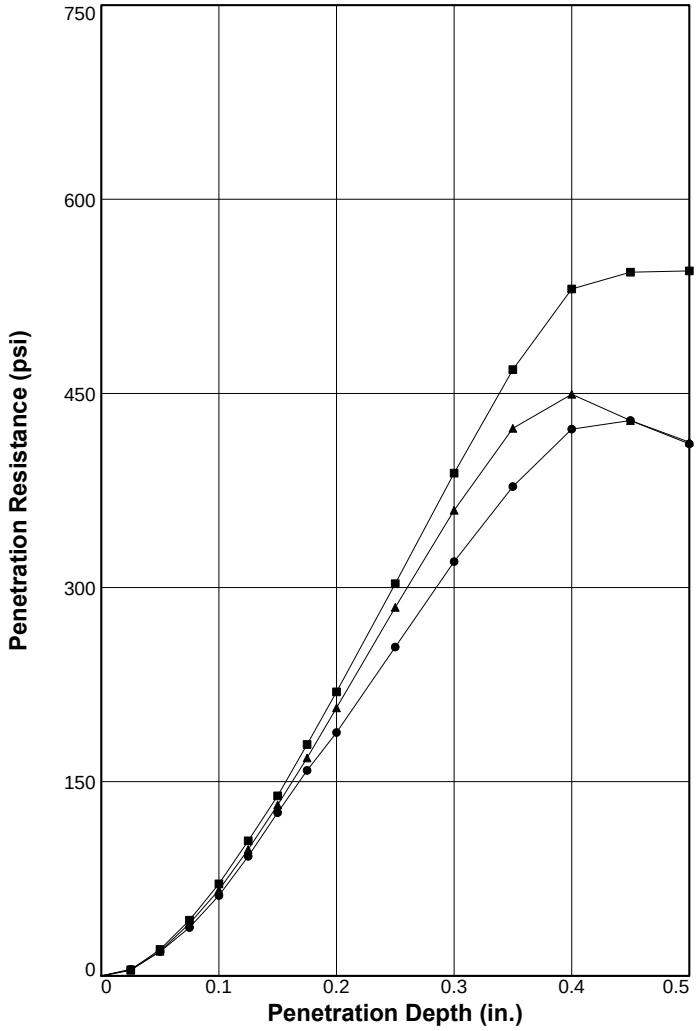
Date: 12/24/19

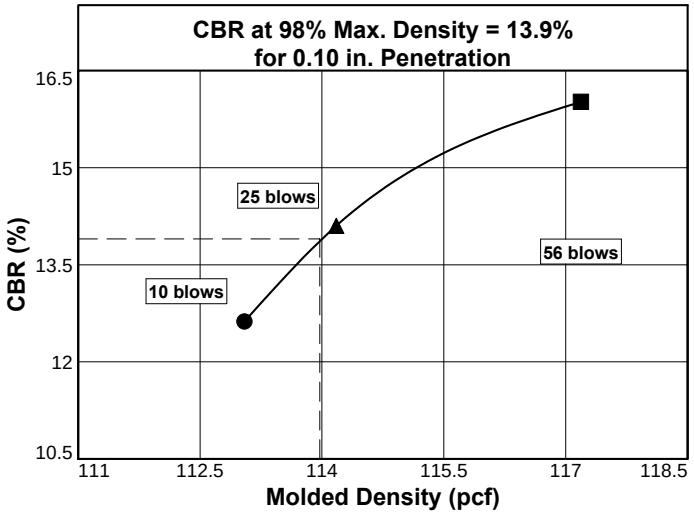
GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

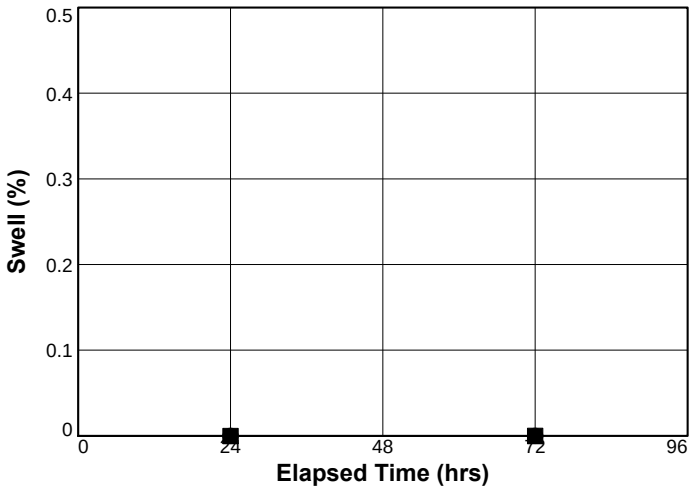
Test Description/Remarks:

Figure _____

BEARING RATIO TEST REPORT
ASTM D1883-14







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	113.0	97.2	11.9	113.0	97.2	12.1	12.6	16.9	0.050	10	0
2 △	114.2	98.2	11.2	114.2	98.2	11.9	14.1	19.6	0.056	10	0
3 □	117.2	100.8	11.5	117.2	100.8	11.5	16.0	21.7	0.063	10	0

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan, Poorly-graded SAND	SP	116.3	10.1	NP	NP

Project No: 31191815

Project: Scenic Manor

Location: SWM-17

Sample Number: S-20191224-02 **Depth:** 1.0' - 4.0'

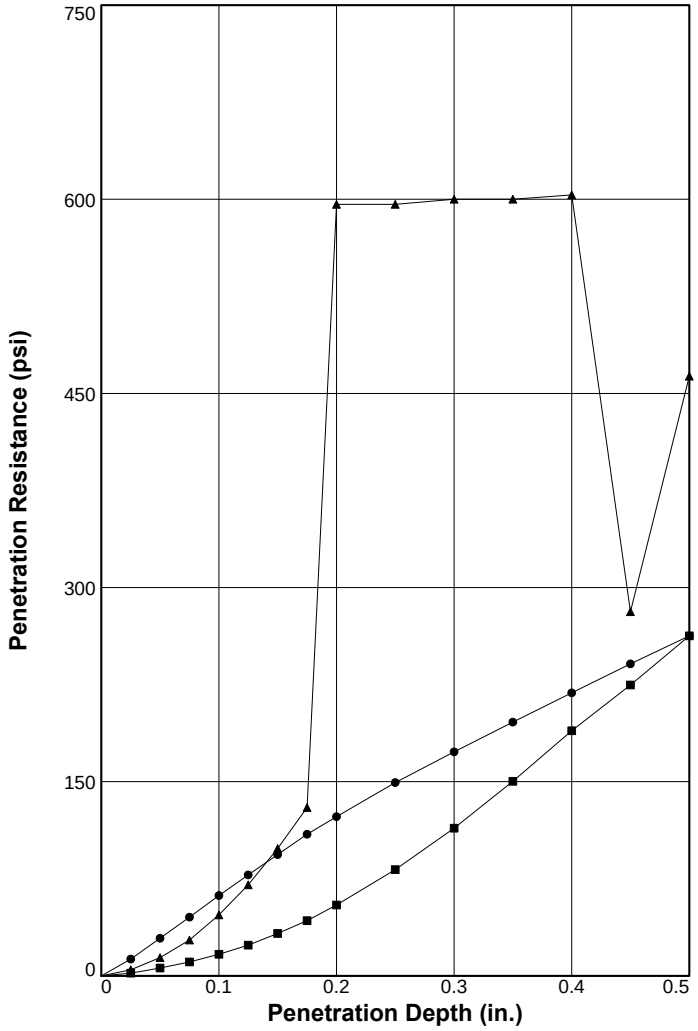
Date: 12/24/19

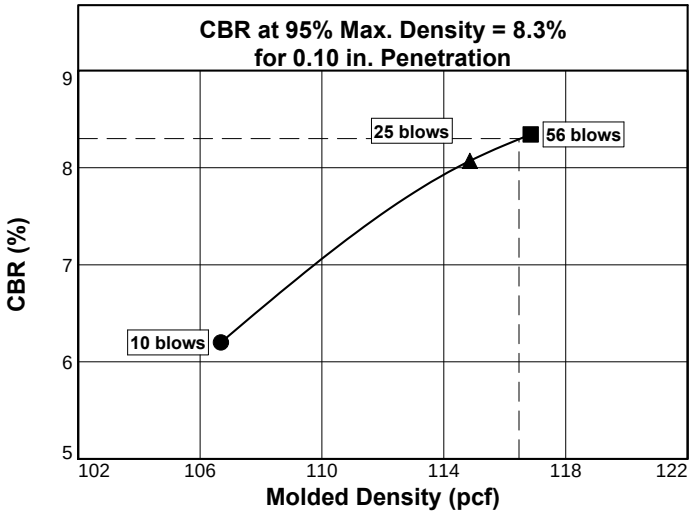
GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

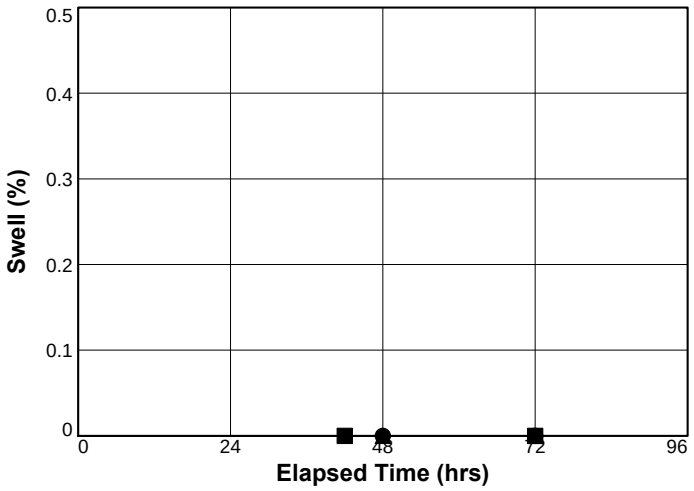
Test Description/Remarks:

Figure _____

BEARING RATIO TEST REPORT
ASTM D1883-14







	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	106.7	87	13.2	106.7	87	16.0	6.2	8.2	0.000	10	0
2 △	114.9	93.7	12.8	114.9	93.7	14.0	8.1	39.7	0.034	10	0
3 □	116.9	95.4	11.9	116.9	95.3	13.8	8.3	10.1	0.152	10	0

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Brown, Silty SAND	SM	122.6	10.1	NP	NP

Project No: 31191815

Project: Scenic Manor

Location: SWM-33

Sample Number: S-20191224-03 **Depth:** 1.0' - 4.0'

Date: 12/24/19

GEO-TECHNOLOGY ASSOCIATES, INC.
21133 Sterling Avenue, Suite 7
Georgetown, DE 19947

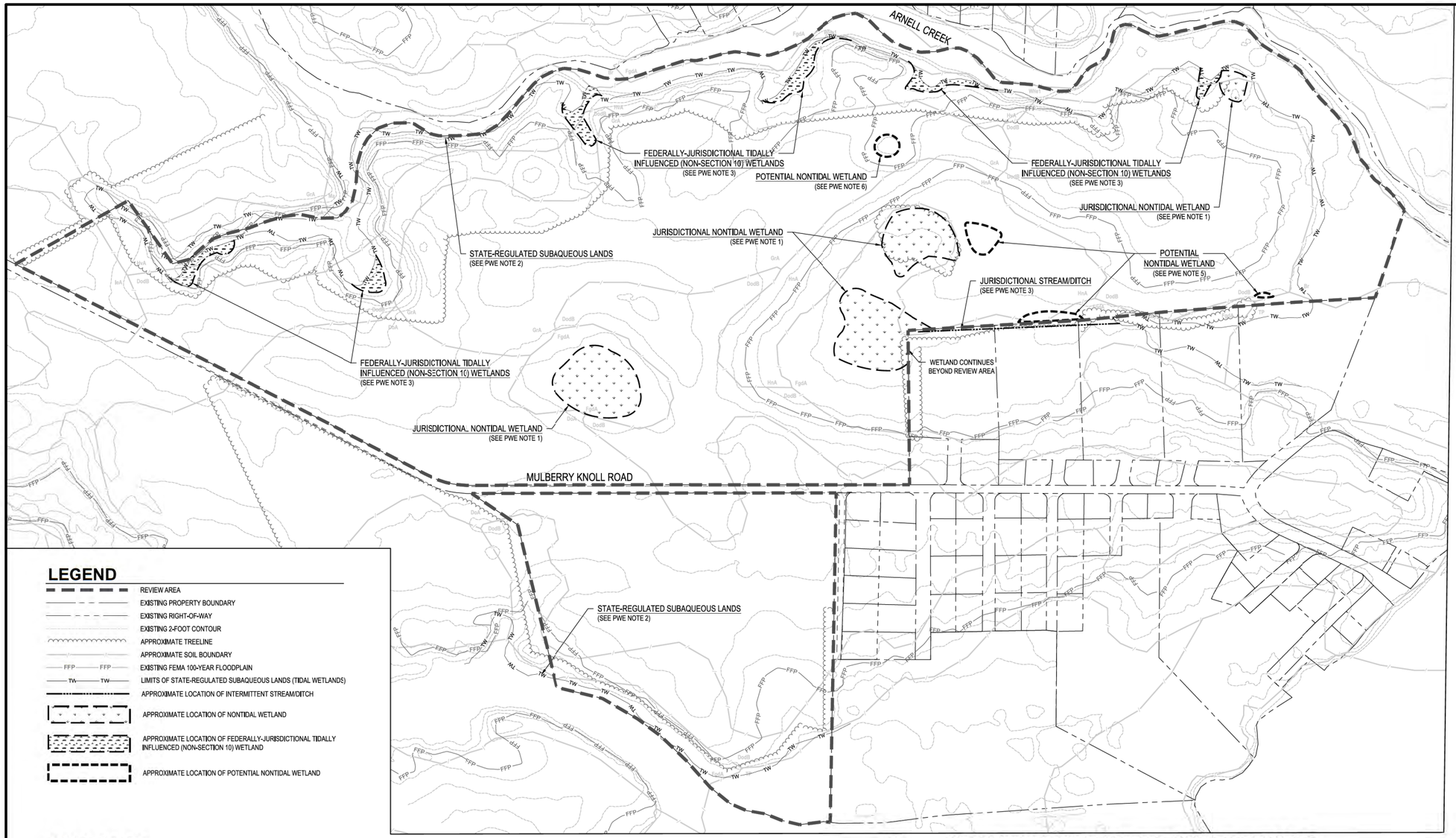
Test Description/Remarks:

Figure _____

Appendix 6 –Wetlands Exhibits

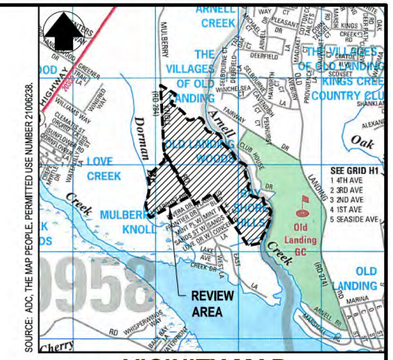
Preliminary Wetland Evaluation -GTA, July 26, 2019

Approved Jurisdictional Determination Request Exhibit – GTA, February 10, 2021



LEGEND

- REVIEW AREA
- EXISTING PROPERTY BOUNDARY
- EXISTING RIGHT-OF-WAY
- EXISTING 2-FOOT CONTOUR
- APPROXIMATE TREELINE
- APPROXIMATE SOIL BOUNDARY
- FFP FFP EXISTING FEMA 100-YEAR FLOODPLAIN
- TW TW LIMITS OF STATE-REGULATED SUBAQUEOUS LANDS (TIDAL WETLANDS)
- APPROXIMATE LOCATION OF INTERMITTENT STREAM/DITCH
- APPROXIMATE LOCATION OF NONTIDAL WETLAND
- APPROXIMATE LOCATION OF FEDERALLY-JURISDICTIONAL TIDALLY INFLUENCED (NON-SECTION 10) WETLAND
- APPROXIMATE LOCATION OF POTENTIAL NONTIDAL WETLAND



VICINITY MAP

SCALE: 1" = 2,000'

GENERAL INFORMATION

1. LOCATION: EAST AND WEST OF MULBERRY KNOLL ROAD IN THE LEWES AREA OF SUSSEX COUNTY, DELAWARE.
2. PLAN PREPARED FOR: SUSSEX LAND DEVELOPMENT, LLC
   260 HOPWELL ROAD
   CHURCHVILLE, MARYLAND 21028
   ATTN: MR. JOHN RICHARDSON
3. PLAN PREPARED BY: GEO-TECHNOLOGY ASSOCIATES, INC. (GTA)
   3445-A BOX HILL CORPORATE CENTER DRIVE
   ABINGDON, MARYLAND 21009
   ATTN: MR. MAXWELL D. POTEMBER
4. AREA OF REVIEW: APPROXIMATELY 170 ACRES
5. THE SUBJECT SITE IS IDENTIFIED AS SUSSEX COUNTY TAX PARCEL 334-18.00-43.00.
6. INFORMATION SHOWN ON THIS PLAN IS PRELIMINARY AND NOT MEANT FOR ENGINEERING OR CONSTRUCTION PURPOSES.
7. THE FLOODPLAIN SHOWN HEREON IS FROM FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) NUMBER 10005C0334K, EFFECTIVE MARCH 16, 2015.
8. THE LIMITS OF STATE-REGULATED SUBAQUEOUS LANDS SHOWN HEREON WERE ADAPTED FROM THE STATE OF DELAWARE WETLAND MAP 69.
9. SOILS SHOWN ON THIS PLAN WERE ADAPTED FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE'S WEB SOIL SURVEY, ACCESSED ON JULY 18, 2019. AVAILABLE ONLINE AT <HTTP://WWW.MD.NRCS.USDA.GOV/TECHNICAL/SOILS.HTML>.
10. THE PRELIMINARY WETLAND EVALUATION WAS PERFORMED BY GTA IN JULY 2019.
11. AS A RESULT OF THE REVIEW OF THE SITE, IT IS GTA'S PROFESSIONAL OPINION THAT THERE ARE JURISDICTIONAL "WATERS OF THE U.S.", INCLUDING WETLANDS, PRESENT WITHIN THE SUBJECT SITE.
12. GTA'S CONCLUSIONS REGARDING THIS SITE HAVE BEEN BASED ON OBSERVATIONS OF EXISTING CONDITIONS, PROFESSIONAL EXPERIENCE, AND GENERALLY ACCEPTED PROFESSIONAL ENVIRONMENTAL PRACTICE UNDER SIMILAR CIRCUMSTANCES. SEASONAL VEGETATION CYCLES AND FLUCTUATIONS IN PRECIPITATION OR WEATHER CONDITIONS CAN RESULT IN DIFFERENCES IN THE PERCEPTION OF HYDROLOGIC CONDITIONS AND THE PRESENCE OF PREDOMINANTLY HYDROPHYTIC VEGETATION, WHICH CAN ALTER GTA'S EVALUATION OF WETLANDS/WATERWAYS.
13. IT IS IMPORTANT TO NOTE THAT THIS EVALUATION IS GTA'S PROFESSIONAL OPINION, ONLY. DECISIONS REGARDING THE OFFICIAL JURISDICTIONAL STATUS OF WETLANDS/WATERWAYS ARE MADE BY FEDERAL, STATE, AND/OR LOCAL REGULATORY AGENCIES.
14. THIS PLAN WAS PREPARED BY GTA FOR THE SOLE AND EXCLUSIVE USE OF SUSSEX LAND DEVELOPMENT, LLC. ANY REPRODUCTION OF THIS PLAN BY ANY OTHER PERSON WITHOUT THE EXPRESSED WRITTEN PERMISSION OF GTA AND SUSSEX LAND DEVELOPMENT, LLC, IS UNAUTHORIZED, AND SUCH USE IS AT SOLE RISK OF THE USER.

SOILS CHART

SYMBOL[1]	NAME/DESCRIPTION[1]	HYDRIC SOIL[2]	HYDRIC COMPONENT[2]	PERCENTAGE OF MAPPING UNIT[2]	LANDSCAPE POSITION[2]
Br	BROADKILL MUCKY PEAT, VERY FREQUENTLY FLOODED, TIDAL	YES	BROADKILL, VERY FREQUENTLY FLOODED, TIDAL	70	TIDAL MARSHES
			APPOQUINIMINK, VERY FREQUENTLY FLOODED, TIDAL	15	TIDAL FLATS
			SUNKEN	10	SUBMERGED UPLAND TIDAL MARSHES
			TRANSQUAKING	5	TIDAL FLATS
DoA	DOWNER SANDY LOAM, 0 TO 2 PERCENT SLOPES, NORTHERN TIDEWATER AREA	NO	-	-	-
DodB	DOWNER SANDY LOAM, 2 TO 5 PERCENT SLOPES, NORTHERN TIDEWATER AREA	NO	-	-	-
FgdA	FALLSINGTON LOAMS, 0 TO 2 PERCENT SLOPES, NORTHERN TIDEWATER AREA	YES	FALLSINGTON, UNDRAINED	38	DRAINAGEWAYS, SWALES, DEPRESSIONS, FLATS
			FALLSINGTON, DRAINED	27	SWALES, DEPRESSIONS, FLATS
			OTHELLO	8	FLATS, DRAINAGEWAYS, SWALES, DEPRESSIONS
GrA	GREENWICH LOAM, 0 TO 2 PERCENT SLOPES	NO	-	-	-
HnA	HAMMONTON SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	HURLOCK, DRAINED	5	FLATS, DEPRESSIONS, SWALES
HvA	HURLOCK SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	HURLOCK, DRAINED	42	FLATS, DEPRESSIONS, SWALES
			HURLOCK, UNDRAINED	38	FLATS, SWALES, DEPRESSIONS, DRAINAGEWAYS
			MULLICA, DRAINED	5	FLATS, SWALES, DEPRESSIONS, DRAINAGEWAYS
IeA	INGLESIDE LOAMY SAND, 0 TO 2 PERCENT SLOPES	NO	-	-	-
Ma	MANAHAWKIN MUCK, FREQUENTLY FLOODED	YES	MANAHAWKIN	85	SWAMPS, FLOODPLAINS
			PUCKUM	10	DEPRESSIONS, FLOOD PLAINS, SWAMPS
			INDIANTOWN	5	FLOODPLAINS
TP	TRANSQUAKING AND MISPILLION SOILS, VERY FREQUENTLY FLOODED, TIDAL	YES	TRANSQUAKING	40	TIDAL MARSHES
			MISPILLION	40	TIDAL MARSHES
			SUNKEN	10	FLATS, SUBMERGED UPLAND TIDAL MARSHES
			OTHELLO, UNDRAINED	5	DRAINAGEWAYS, FLATS, DEPRESSIONS, SWALES
			HONGA	5	SUBMERGED UPLAND TIDAL MARSHES
WHe1	HERRING CREEK MUCKY SILT LOAM, 0 TO 1 METER WATER DEPTH	YES	HERRING CREEK, 0 TO 1 METER WATER DEPTH	85	ESTUARINE TIDAL STREAMS
			METEDECONK, 0 TO 1 METER WATER DEPTH	10	ESTUARINE TIDAL STREAMS
			TRUITT, 0 TO 1 METER WATER DEPTH	5	MAINLAND COVES

1. UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE'S WEB SOIL SURVEY, ON JULY 18, 2019, AT <HTTP://WEBSOILSURVEY.SC.EGOV.USDA.GOV/APP/WEBSOILSURVEY.ASPX>
2. HYDRIC SOILS INFORMATION AVAILABLE FROM THE STATE SOIL DATA ACCESS HYDRIC SOILS LIST, AT <HTTPS://WWW.NRCS.USDA.GOV/INTERNET/FSE_DOCUMENTS/NRCSEPRD1316619.HTM#REPORTREF>, ACCESSED JULY 18, 2019.

PRELIMINARY WETLAND EVALUATION (PWE) NOTES

1. JURISDICTIONAL NONTIDAL WETLAND
   GTA OBSERVED NONTIDAL WETLANDS THAT EXHIBITED INDICATORS OF WETLAND HYDROLOGY, HYDROPHYTIC VEGETATION, AND HYDRIC SOILS. THESE NONTIDAL WETLANDS ARE WITHIN 1,500 FEET OF TIDAL WATERS AND, IN GTA'S PROFESSIONAL OPINION, THESE WETLANDS WOULD BE CONSIDERED AS "NEIGHBORING WATERS" UNDER THE 2015 CLEAN WATER RULE. THEREFORE, THESE WETLANDS SHOULD BE CONSIDERED FEDERAL JURISDICTIONAL.
2. STATE-REGULATED SUBAQUEOUS LANDS
   THE LIMITS OF STATE-REGULATED SUBAQUEOUS LANDS SHOWN HEREON WERE ADAPTED FROM THE STATE OF DELAWARE WETLAND MAP 69. THESE SUBAQUEOUS LANDS ARE CONSIDERED FEDERAL AND STATE JURISDICTIONAL.
3. FEDERALLY-JURISDICTIONAL TIDALLY-INFLUENCED (NON-SECTION 10) WETLAND
   GTA OBSERVED TIDALLY-INFLUENCED WETLANDS THAT EXTEND BEYOND THE LIMITS OF THE STATE-REGULATED SUBAQUEOUS LANDS DEPICTED ON THE STATE OF DELAWARE WETLAND MAP 69. IN GTA'S PROFESSIONAL OPINION, THESE TIDALLY-INFLUENCED WETLANDS SHOULD BE CONSIDERED FEDERALLY-JURISDICTIONAL UNDER SECTION 404 OF THE CLEAN WATER ACT, BUT NOT SECTION 10 NAVIGABLE WATERS UNDER THE RIVERS AND HARBORS ACT OF 1899.
4. INTERMITTENT STREAM/DITCH
   GTA OBSERVED A STREAM/DITCH THAT EXHIBITED ORDINARY HIGH WATER MARKS AND DEFINED BED AND BANKS. IN GTA'S PROFESSIONAL OPINION, THIS STREAM/DITCH ORIGINATES FROM A JURISDICTIONAL WETLAND AND SHOULD BE CONSIDERED A WATERS OF THE U.S. AND, THEREFORE, SHOULD BE CONSIDERED FEDERAL AND STATE JURISDICTIONAL.
5. POTENTIAL NONTIDAL WETLAND
   GTA OBSERVED AREAS WITHIN AN AGRICULTURAL FIELD THAT EXHIBITED A PREDOMINANCE OF HYDROPHYTIC VEGETATION AND HYDRIC SOIL INDICATORS. HOWEVER, IN GTA'S PROFESSIONAL OPINION, THESE AREAS LACKED INDICATORS OF WETLAND HYDROLOGY AND THEREFORE, SHOULD NOT BE CONSIDERED STATE OR FEDERAL JURISDICTIONAL.
6. POTENTIAL NONTIDAL WETLAND
   GTA OBSERVED A DEPRESSION WITHIN AN AGRICULTURAL FIELD THAT EXHIBITED INDICATORS OF WETLAND HYDROLOGY AND HYDRIC SOIL INDICATORS. HOWEVER, IN GTA'S PROFESSIONAL OPINION, THIS AREA LACKED A PREDOMINANCE OF HYDROPHYTIC VEGETATION AND THEREFORE, SHOULD NOT BE CONSIDERED STATE OR FEDERAL JURISDICTIONAL.
7. POTENTIAL NONTIDAL WETLAND
   GTA OBSERVED A FORESTED DEPRESSION THAT EXHIBITED INDICATORS OF WETLAND HYDROLOGY AND A PREDOMINANCE OF HYDROPHYTIC VEGETATION. HOWEVER, IN GTA'S PROFESSIONAL OPINION, THIS AREA LACKED CONSISTENT HYDRIC SOIL INDICATORS AND THEREFORE, SHOULD NOT BE CONSIDERED STATE OR FEDERAL JURISDICTIONAL.

NORTH

0' 50' 100' 200' 400'

SCALE: 1"=200'

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4895
WWW.GTAENG.COM

PRELIMINARY WETLAND EVALUATION

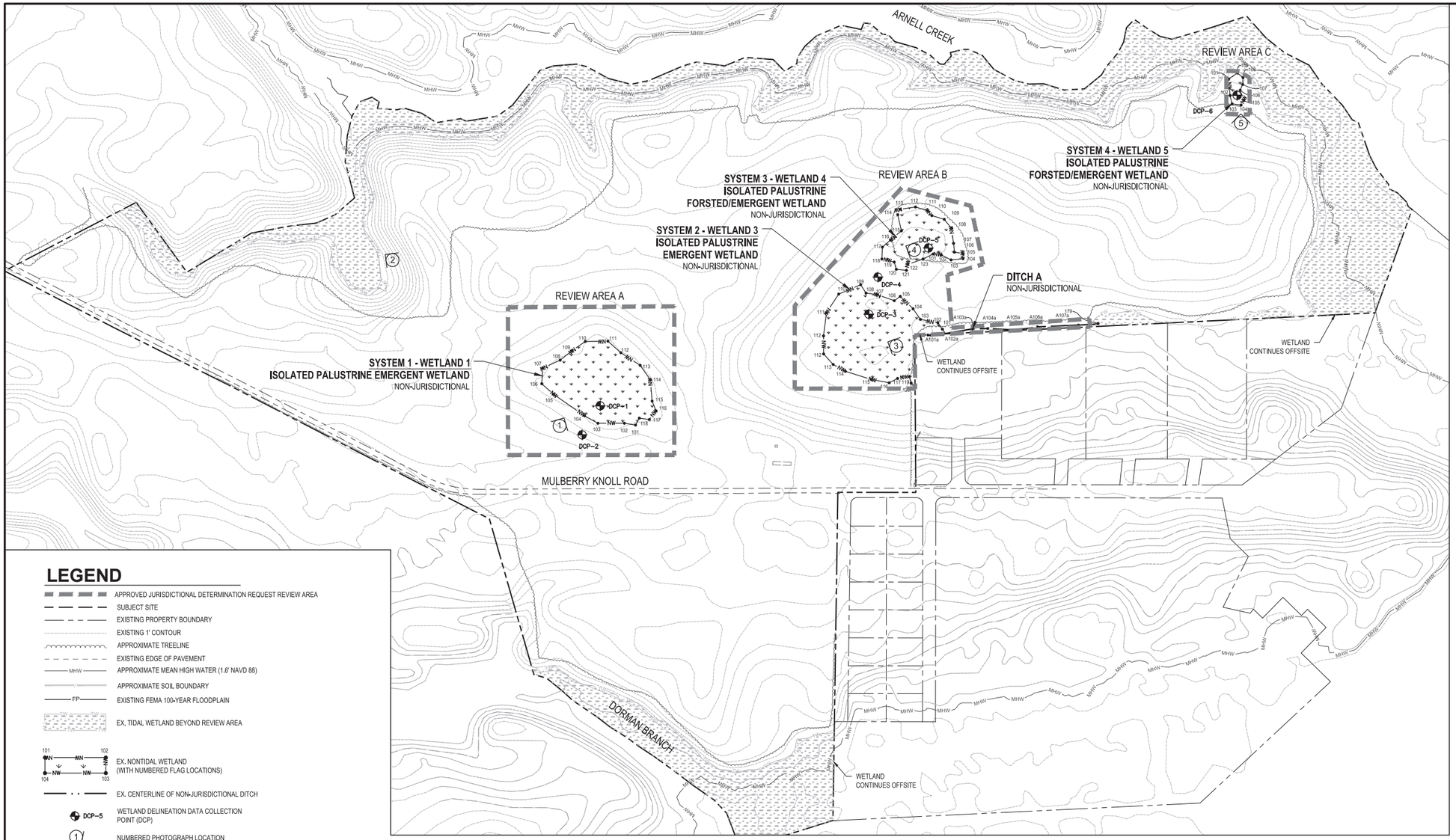
MULBERRY KNOLL

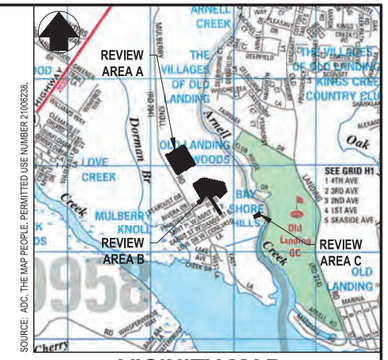
SUSSEX COUNTY, DELAWARE

DATE	REVISIONS

JOB NO:	31191080
SCALE:	1" = 200'
DATE:	JULY 26, 2019
DRAWN BY:	MDP
DESIGN BY:	
REVIEW BY:	MAJ/TAS
SHEET:	1 OF 1

L:\SHARED\PROJECT FILES\31191080 - MULBERRY KNOLL\WETCAD\PLOT\31191080 PWE.DWG





VICINITY MAP

SCALE: 1" = 2,000'

LEGEND

- APPROVED JURISDICTIONAL DETERMINATION REQUEST REVIEW AREA
- SUBJECT SITE
- EXISTING PROPERTY BOUNDARY
- EXISTING 1' CONTOUR
- APPROXIMATE TREELINE
- EXISTING EDGE OF PAVEMENT
- MHW — APPROXIMATE MEAN HIGH WATER (1.6' NAVD 88)
- APPROXIMATE SOIL BOUNDARY
- FP — EXISTING FEMA 100-YEAR FLOODPLAIN
- EX. TIDAL WETLAND BEYOND REVIEW AREA
- EX. NONTIDAL WETLAND (WITH NUMBERED FLAG LOCATIONS)
- EX. CENTERLINE OF NON-JURISDICTIONAL DITCH
- DCP-5 — WETLAND DELINEATION DATA COLLECTION POINT (DCP)
- NUMBERED PHOTOGRAPH LOCATION

GENERAL INFORMATION

1. LOCATION: EAST AND WEST OF MULBERRY KNOLL ROAD IN THE LEWES AREA OF SUSSEX COUNTY, DELAWARE.
2. PLAN PREPARED FOR: SUSSEX LAND DEVELOPMENT, LLC
   260 HOPWELL ROAD
   CHURCHVILLE, MARYLAND 21028
   ATTN: MR. JOHN RICHARDSON
3. PLAN PREPARED BY: GEO-TECHNOLOGY ASSOCIATES, INC. (GTA)
   3445-A BOX HILL CORPORATE CENTER DRIVE
   ABINGDON, MARYLAND 21009
   ATTN: MR. MAXWELL D. POTEMBER
4. AREA OF REVIEW: APPROXIMATELY 170 ACRES
5. THIS PLAN WAS PRODUCED ON A BASE MAP PROVIDED BY MORRIS & RITCHIE ASSOCIATES, INC.
6. THE SUBJECT SITE IS IDENTIFIED AS SUSSEX COUNTY TAX PARCEL 334-18.00-43.00.
7. THE FLOODPLAIN SHOWN HEREON IS FROM FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) NUMBER 10005C0334K, EFFECTIVE MARCH 16, 2015.
8. THE LIMITS OF STATE-REGULATED SUBAQUEOUS LANDS SHOWN HEREON WERE ADAPTED FROM THE STATE OF DELAWARE WETLAND MAP 69.
9. THE MEAN HIGH WATER LINE DEPICTED ON THIS PLAN WAS CALCULATED USING THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) TIDE STATION #8557380 (LEWES, DE) BASED ON AN ELEVATION OF 1.6' (NAVD88) FOR THE 1983-2001 EPOCH.
10. SOILS SHOWN ON THIS PLAN WERE ADAPTED FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE'S WEB SOIL SURVEY, ACCESSED ON NOVEMBER 4, 2020. AVAILABLE ONLINE AT <HTTP://WWW.MD.NRCS.USDA.GOV/TECHNICAL/SOILS.HTML>.
11. WETLAND DELINEATION OF THE SUBJECT SITE WAS PERFORMED BY GTA IN AUGUST 2020. WETLAND FLAG LOCATIONS WITHIN THE SUBJECT SITE WERE SURVEY LOCATED BY MORRIS & RITCHIE ASSOCIATES, INC. BETWEEN NOVEMBER 2020 AND JANUARY 2021.
12. AS A RESULT OF THE REVIEW OF THE SITE, IT IS GTA'S PROFESSIONAL OPINION THAT THERE ARE JURISDICTIONAL "WATERS OF THE U.S.", INCLUDING WETLANDS, PRESENT WITHIN THE SUBJECT SITE.
13. GTA'S CONCLUSIONS REGARDING THIS SITE HAVE BEEN BASED ON OBSERVATIONS OF EXISTING CONDITIONS, PROFESSIONAL EXPERIENCE, AND GENERALLY ACCEPTED PROFESSIONAL ENVIRONMENTAL PRACTICE UNDER SIMILAR CIRCUMSTANCES. SEASONAL VEGETATION CYCLES AND FLUCTUATIONS IN PRECIPITATION OR WEATHER CONDITIONS CAN RESULT IN DIFFERENCES IN THE PERCEPTION OF HYDROLOGIC CONDITIONS AND THE PRESENCE OF PREDOMINANTLY HYDROPHYTIC VEGETATION, WHICH CAN ALTER GTA'S EVALUATION OF WETLANDS/WATERWAYS.
14. IT IS IMPORTANT TO NOTE THAT THIS EVALUATION IS GTA'S PROFESSIONAL OPINION, ONLY. DECISIONS REGARDING THE OFFICIAL JURISDICTIONAL STATUS OF WETLANDS/WATERWAYS ARE MADE BY FEDERAL, STATE, AND/OR LOCAL REGULATORY AGENCIES.
15. THIS PLAN WAS PREPARED BY GTA FOR THE SOLE AND EXCLUSIVE USE OF SUSSEX LAND DEVELOPMENT, LLC. ANY REPRODUCTION OF THIS PLAN BY ANY OTHER PERSON WITHOUT THE EXPRESSED WRITTEN PERMISSION OF GTA AND SUSSEX LAND DEVELOPMENT, LLC, IS UNAUTHORIZED, AND SUCH USE IS AT SOLE RISK OF THE USER.

SOILS CHART

SYMBOL[1]	NAME/DESCRIPTION[1]	HYDRIC SOIL[2]	HYDRIC COMPONENT[2]	PERCENTAGE OF MAPPING UNIT[2]	LANDSCAPE POSITION[2]
Br	BROADKILL MUCKY PEAT, VERY FREQUENTLY FLOODED, TIDAL	YES	BROADKILL, VERY FREQUENTLY FLOODED, TIDAL	70	TIDAL MARSHES
			APPOQUINIMINK, VERY FREQUENTLY FLOODED, TIDAL	15	TIDAL FLATS
			SUNKEN	10	SUBMERGED UPLAND TIDAL MARSHES
			TRANSQUAKING	5	TIDAL FLATS
DoA	DOWNER SANDY LOAM, 0 TO 2 PERCENT SLOPES, NORTHERN TIDEWATER AREA	NO	-	-	-
DodB	DOWNER SANDY LOAM, 2 TO 5 PERCENT SLOPES, NORTHERN TIDEWATER AREA	NO	-	-	-
FgdA	FALLSINGTON LOAMS, 0 TO 2 PERCENT SLOPES, NORTHERN TIDEWATER AREA	YES	FALLSINGTON, UNDRAINED	38	DRAINAGEWAYS, SWALES, DEPRESSIONS, FLATS
			FALLSINGTON, DRAINED	27	SWALES, DEPRESSIONS, FLATS
			OTHELLO	8	FLATS, DRAINAGEWAYS, SWALES, DEPRESSIONS
GrA	GREENWICH LOAM, 0 TO 2 PERCENT SLOPES	NO	-	-	-
HrA	HAMMONTON SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	HURLOCK, DRAINED	5	FLATS, DEPRESSIONS, SWALES
HvA	HURLOCK SANDY LOAM, 0 TO 2 PERCENT SLOPES	YES	HURLOCK, DRAINED	42	FLATS, DEPRESSIONS, SWALES
			HURLOCK, UNDRAINED	38	FLATS, SWALES, DEPRESSIONS, DRAINAGEWAYS
			MULLICA, DRAINED	5	FLATS, SWALES, DEPRESSIONS, DRAINAGEWAYS
IeA	INGLESIDE LOAMY SAND, 0 TO 2 PERCENT SLOPES	NO	-	-	-
Ma	MANAHAWKIN MUCK, FREQUENTLY FLOODED	YES	MANAHAWKIN	85	SWAMPS, FLOODPLAINS
			PUCKUM	10	DEPRESSIONS, FLOOD PLAINS, SWAMPS
			INDIANTOWN	5	FLOODPLAINS
TP	TRANSQUAKING AND MISPILLION SOILS, VERY FREQUENTLY FLOODED, TIDAL	YES	TRANSQUAKING	40	TIDAL MARSHES
			MISPILLION	40	TIDAL MARSHES
			SUNKEN	10	FLATS, SUBMERGED UPLAND TIDAL MARSHES
			OTHELLO, UNDRAINED	5	DRAINAGEWAYS, FLATS, DEPRESSIONS, SWALES
			HONGA	5	SUBMERGED UPLAND TIDAL MARSHES
WHe1	HERRING CREEK MUCKY SILT LOAM, 0 TO 1 METER WATER DEPTH	YES	HERRING CREEK, 0 TO 1 METER WATER DEPTH	85	ESTUARINE TIDAL STREAMS
			METEDECONK, 0 TO 1 METER WATER DEPTH	10	ESTUARINE TIDAL STREAMS
			TRUITT, 0 TO 1 METER WATER DEPTH	5	MAINLAND COVES

1. UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE'S WEB SOIL SURVEY, ON JULY 18, 2019, AT <HTTP://WEBSOILSURVEY.SC.EGOV.USDA.GOV/APP/WEBSOILSURVEY.ASPX>.
2. HYDRIC SOILS INFORMATION AVAILABLE FROM THE STATE SOIL DATA ACCESS HYDRIC SOILS LIST, AT <HTTPS://WWW.NRCS.USDA.GOV/INTERNET/FSE_DOCUMENTS/NRCSEPRD1316619.HTML#REPORTREF>. ACCESSED JULY 18, 2019.

AREA OF WETLANDS WITHIN THE REVIEW AREA:

WETLAND	APPROXIMATE AREA
WETLAND 1 (ISOLATED)	96,541 SF (2.22 AC)
WETLAND 3 (ISOLATED)	105,817 SF (2.43 AC)
WETLAND 4 (ISOLATED)	43,697 SF (1.00 AC)
WETLAND 5 (ISOLATED)	5,265 SF (0.12 AC)
TOTAL WETLAND AREA	251,320 SF (5.77 AC)

0' 50' 100' 200' 400'

SCALE: 1"=200'

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4895
WWW.GTAENG.COM

APPROVED JURISDICTIONAL
DETERMINATION REQUEST EXHIBIT

SCENIC MANOR

SUSSEX COUNTY, DELAWARE

DATE	REVISIONS

JOB NO:	31191080
SCALE:	1" = 200'
DATE:	FEBRUARY 10, 2021
DRAWN BY:	RJM
DESIGN BY:	
REVIEW BY:	MAJ/TAS
SHEET:	1 OF 1

\\psmc-data\gta\Shared\Project Files\2019\31191080\x1 - Scenic Manor\WETCAD\Plot\31191080 WDP.dwg

Appendix 7 – Traffic Impact Study Approval

DelDOT – February 11, 2021

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

NICOLE MAJESKI
SECRETARY

February 11, 2021

Mr. Joe Caloggero
The Traffic Group, Inc.
9900 Franklin Square Drive
Suite H
Baltimore, Maryland 21236

Dear Mr. Caloggero:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Estates at Mulberry Knoll** (Tax Parcel 334-18.00-43.00) development has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

Troy Brestel
Project Engineer

TEB:km
Enclosures
cc with enclosures: Mr. Phillip Tolliver, Morris & Ritchie Associates, Inc.
Ms. Constance C. Holland, Office of State Planning Coordination
Mr. Jamie Whitehouse, Sussex County Planning and Zoning
Mr. Mir Wahed, Johnson, Mirmiran & Thompson, Inc.
Ms. Joanne Arellano, Johnson, Mirmiran & Thompson, Inc.
Mr. Kevin Hickman, Johnson, Mirmiran & Thompson, Inc.
DelDOT Distribution

DelDOT

DelDOT Distribution

Brad Eaby, Deputy Attorney General
J. Marc Coté, Director, Planning
Shanté Hastings, Director, Transportation Solutions (DOTS)
Mark Luszcz, Deputy Director, Traffic, DOTS
Michael Simmons, Assistant Director, Project Development South, DOTS
Todd Sammons, Assistant Director, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Kerry Yost, Traffic Calming and Subdivision Relations Manager, Traffic, DOTS
Alistair Probert, South District Engineer, South District
Gemez Norwood, South District Public Works Manager, South District
Jared Kauffman, Service Development Planner, Delaware Transit Corporation
Tremica Cherry, Service Development Planner, Delaware Transit Corporation
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
Wendy Polasko, Subdivision Engineer, Development Coordination
Richard McCabe, Sussex Review Coordinator, Development Coordination
Mark Galipo, Traffic Engineer, Traffic, DOTS
Claudy Joinville, Project Engineer, Development Coordination
Annamaria Furmato, Project Engineer, Development Coordination

February 10, 2021

Mr. Troy Brestel
Project Engineer
Development Coordination
DelDOT Division of Planning
800 Bay Road
P O Box 778
Dover, DE 19903

RE:Agreement No. 1945F
Project Number T202069012
Traffic Impact Study Services
Task 13A-Estates at Mulberry Knoll

Dear Mr. Brestel:

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Impact Study (TIS) for Estates at Mulberry Knoll, prepared by The Traffic Group dated April 1, 2020. This task was assigned as Task Number 13A. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

As discussed later in this letter, Sussex County and DelDOT agreed on October 27, 2020, to create the Henlopen Transportation Improvement District. The developer, MKR Land, LLC, has chosen to set aside their TIS and to participate in the TID. DelDOT has requested this letter to document JMT's review of the TIS and what JMT recommends with regard to off-site improvements considering the developer's participation in the TID.

The TIS evaluates the impacts of a proposed housing development containing 320 single-family detached houses in Sussex County, Delaware. The development is located on both sides of Mulberry Knoll Road (Sussex Road 284) approximately 2/3 of a mile southeast of the intersection of Delaware Route 24 and Mulberry Knoll Road. The subject property is on an approximately 170-acre parcel that is zoned as AR-1 (Agricultural Residential) and the developer does not plan to rezone the land. Two full access points are proposed along Mulberry Knoll Road and construction is anticipated to be complete in 2027.

DelDOT has several relevant and ongoing improvement projects within the study area including the *HSIP SR 24 at Camp Arrowhead Road and SR 24 at Angola Road* project (DelDOT Contract No. T201200902). This project was identified in the *SR 24-SR 30 to Love Creek Bridge Traffic Study* and was identified as a high crash location as part of DelDOT's Hazard Elimination Program (HEP) formally known as the Highway Safety Improvement Program (HSIP). This project would make operational improvements to address safety deficiencies and to accommodate future traffic volumes at these two intersections. Specifically, the improvements associated with the Delaware Route 24/Camp Arrowhead Road/Fairfield Road intersection will include extending the existing left-turn and right-turn lanes to increase capacity and providing bicycle lanes and pedestrian

facilities. Design is currently underway and construction is scheduled to start in 2021 and end in 2022. Additional information can be found on the DelDOT project website at https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201200902.

The *SR 24, Mulberry Knoll to SR 1* project (DelDOT Contract No. T200411209) involves safety, operational, and capacity improvements along Delaware Route 24 from Mulberry Knoll Road to Delaware Route 1. Delaware Route 24 will be widened to provide two travel lanes in each direction from east of Mulberry Knoll Road to Delaware Route 1. A two-way left-turn lane will be provided between the Delaware Route 24 intersections with Plantation Road/Warrington Road and Lexus Way (Beebe Medical Center Campus)/Colonial Oaks (Residence Inn). The Delaware Route 24 intersection with Lexus Way (Beebe Medical Center Campus)/Colonial Oaks (Residence Inn) will be signalized. Bicycle lanes and pedestrian facilities will be installed as well. Construction is scheduled to begin in 2020 and end in 2022. Additional information can be found on the DelDOT project website at https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T200411209.

The *SR 24, Love Creek to Mulberry Knoll* project (DelDOT Contract No. T201212201) involves safety, operational, and capacity improvements along Delaware Route 24 from the Love Creek bridge to Mulberry Knoll Road. Delaware Route 24 will be widened to provide two travel lanes in each direction from west of the Love Creek Elementary School/Beacon Middle School intersection to east of Mulberry Knoll Road. The Delaware Route 24/Mulberry Knoll Road intersection will be signalized. A two-way left turn lane will be provided from the Love Creek bridge to west of the Love Creek Elementary School/Beacon Middle School intersection. Bicycle lanes and pedestrian facilities will be installed as well. Construction is scheduled to begin in 2021 and end in 2022. Additional information can be found on the DelDOT project website at https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201212201.

DelDOT has a pavement rehabilitation and resurfacing project proposed along Cedar Grove Road, from Plantation Road to Robinsonville Road. The construction is tentatively scheduled to begin either Fall 2020 or Spring 2021.

DelDOT and Sussex County have developed the Henlopen Transportation Improvement District (TID), the formal creation of which was unanimously approved by Sussex County on October 27, 2020. The TID limits generally extend from the Delaware Coast Line Railroad Company railroad tracks and Delaware Route 1 to the north, Burton Pond and Herring Creek to the south, Arnell Creek and Rehoboth Bay to the east, and Beaver Dam Road to the west. The proposed Estates at Mulberry Knoll site is within the TID. The *Henlopen TID CTP Cost Development Report* was prepared in October 2019 by JMT and contained a summary of the traffic analysis conducted and the associated roadway concept plans and cost estimates for the TID. As part of the report, improvements were recommended at several of the TIS study intersections including the Delaware Route 24 intersections with Lexus Way (Beebe Medical Center)/Colonial Oaks (Residence Inn), Plantation Road/Warrington Road, Mulberry Knoll Road, Camp Arrowhead Road/Fairfield Road, and Jolyns Way, as well as the Mulberry Knoll Road intersection with Cedar Grove Road.

Based on our review of the TIS, we have the following comments and recommendations: The following intersections exhibit level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements. The table below incorporates the traffic analysis for the 2027 future conditions (Cases 2 and 3) with the improvements associated with the *SR 24, Mulberry Knoll to SR 1* (DelDOT Contract No. T200411209) and *SR 24, Love Creek to Mulberry Knoll* (DelDOT Contract No. T201212201) projects. Additionally, the table below does not include any signalized intersections that exhibit LOS deficiencies under Cases 1, 2, and 3 due to the utilization of the splits from the DelDOT Timing Plans and can be mitigated with signal timing optimization as the developer would not be recommended to do any additional improvements at those locations.

Intersection	LOS Deficiencies Occur			Year	Case
	AM	PM	SAT		
Mulberry Knoll Road (Sussex Road 284)/Delaware Route 24	X	X	X	2019	1 - Existing
Delaware Route 24/Spencer Lane/Williams Way	X	X	X	2019	1 – Existing
	X	X	X	2027	2 – Without Development
	X	X	X	2027	3 – With Development
Delaware Route 24/Jolyns Way (Sussex Road 289)		X		2027	3 – With Development
Delaware Route 24/Lexus Way (Beebe Medical Center Campus)/Colonial Oaks (Residence Inn)	X	X	X	2019	1 – Existing
	X	X	X	2027	2 – Without Development
	X	X	X	2027	3 – With Development

The unsignalized Mulberry Knoll Road (Sussex Road 284)/Delaware Route 24 intersection exhibits LOS deficiencies under Case 1 conditions during all study peak periods. Specifically, the deficiencies occur along the northbound and southbound Mulberry Knoll Road approaches with delays of over 1,000.0 seconds per vehicle during the Summer Saturday peak. As part of the *SR 24, Love Creek to Mulberry Knoll* project (DelDOT Contract No. T201212201), Delaware Route 24 will be widened at this intersection to provide two travel lanes in each direction. Additionally, the Delaware Route 24/Mulberry Knoll Road intersection will be signalized. The construction for this DelDOT project is anticipated to be complete in 2022. Therefore, for Cases 2 and 3 conditions the intersection as signalized would improve to operate at acceptable LOS C (29.2 seconds of delay or less per vehicle) during all peak periods. Payment of the TID fee will satisfy any obligation the developer would have to improve this intersection.

The unsignalized Delaware Route 24/Spencer Lane/Williams Way intersection exhibits LOS deficiencies under Cases 1, 2, and 3 conditions during all the study peak hours. As part of the *SR 24, Love Creek to Mulberry Knoll* project (DelDOT Contract No. T201212201), a separate right turn lane will be added along eastbound Delaware Route 24. However, this improvement would not mitigate the LOS deficiencies which occur along the northbound Williams Way and

southbound Spencer Lane approaches. Specifically, under Case 3 conditions, the northbound Williams Way and southbound Spencer Lane approaches would operate at LOS F with delays of over 1,000.0 seconds per vehicle during all the study peak hours. The installation of a dual lane roundabout or a traffic signal with one left turn lane, two through lanes, and one right turn lane along eastbound and westbound Delaware Route 24 would improve the intersection to operate at LOS B or better (11.4 seconds of delay or less) during each peak hour. However, the volumes executing turning movements from Williams Way and Spencer Lane during Case 3 (a maximum of 24 left turning vehicles from Spencer Lane and 5 left turning vehicles from Williams Way) would not meet the volume based traffic signal warrants. In addition, the calculated 95th percentile queue lengths along the Williams Way and Spencer Lane approaches are approximately 55 feet and 125 feet, respectively, under Case 3 conditions during the Summer Saturday peak hour.

Utilizing the summary crash data provided within the TIS, JMT reviewed if the Delaware Route 24/Spencer Lane/Williams Way intersection contained any crash trends. It was assumed that any crashes within milepost 38.15 to 38.41 would be at the intersection. Based on the crash data, a total of 9 crashes were assumed to occur during the three-year crash study period. Out of the 9 crashes, 5 were rear end, 2 were angle, 1 was an incident with a deer, and 1 was an incident with a utility pole. The two angle crashes were due to a vehicle failing to yield to right-of-way. One of the angle crashes resulted in injury.

To reduce the delays at the intersection, DelDOT could determine the feasibility of restricting left turning movements from Spencer Lane and Williams Way. Vehicles would then have to execute U-turning movements at the adjacent signalized intersections of Delaware Route 24 with Love Creek Elementary School/Beacon Middle School and Camp Arrowhead Road (Sussex Road 279)/Fairfield Road. A median would have to be constructed along Delaware Route 24 to restrict the left turning movements.

Delays could also be reduced by constructing a median along Delaware Route 24 to restrict the left turning movements from Spencer Lane and Williams Way and providing interconnections to access Mulberry Knoll Road. Williams Way could be extended to the south and connect to Mulberry Knoll Road. For the Harts Landing subdivision which utilizes Spencer Lane to access Delaware Route 24, an interconnection would have to be provided to Briarwood Estates and Belle Terre subdivisions to connect to Mulberry Knoll Road. DelDOT would have to determine the feasibility of providing those roadway connections.

Due to the extensive scope of the improvements and the occurrence of the deficiencies under Cases 1 and 2 conditions (when the proposed development is not built), it would be unreasonable to require the developer to improve the intersection by restricting left-turns, by converting to a roundabout, or by signalization. Payment of the TID fee will satisfy any obligation the developer would have to improve this intersection.

The unsignalized Delaware Route 24/Jolyns Way (Sussex Road 289) intersection would operate with LOS deficiencies under Case 3 conditions during the PM peak period. Specifically, the northbound Jolyns Way approach would operate at LOS E with 36.9 seconds of delay per vehicle.

This could be mitigated to operate at LOS C (23.8 seconds of delay per vehicle) with the provision of an additional through lane along eastbound and westbound Delaware Route 24. However, the total volume executing turning movements from Jolyns Way onto Delaware Route 24 is 5 vehicles during the PM peak period. Additionally, the calculated 95th percentile queue length during the Case 3 PM peak period is approximately 5 feet. As such, we do not recommend any improvements be implemented by the developer at this intersection.

The unsignalized Delaware Route 24/Lexus Way (Beebe Medical Center Campus)/Colonial Oaks (Residence Inn) intersection exhibits LOS deficiencies under Cases 1, 2, and 3 conditions during all the study peak hours. Specifically, the northbound Lexus Way and southbound Colonial Oaks approaches would operate at LOS F (over 1,000 and 674.2 seconds of delay per vehicle, respectively, during the Summer Saturday peak hour). As part of the *SR 24, Mulberry Knoll to SR 1* DelDOT project (Contract No. T200411209), this intersection will be signalized and two through lanes will be provided along Delaware Route 24. With this improvement, the intersection would operate at LOS B or better (10.4 seconds of delay during the Summer Saturday peak hour). Payment of the TID fee will satisfy any obligation the developer would have to improve this intersection.

Should Sussex County approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan. All applicable agreements (i.e. letter agreements for off-site improvements and traffic signal agreements) should be executed prior to entrance plan approval for the proposed development.

1. The developer should reconstruct Mulberry Knoll Road from the Stardust Drive intersection to the northerly limit of the site frontage to meet DelDOT's local road standards, which include eleven-foot travel lanes and five-foot shoulders. Within the same limits, the developer should provide a bituminous concrete overlay to the existing travel lanes, at DelDOT's discretion. DelDOT should analyze the existing lanes' pavement section and recommend an overlay thickness to the developer's engineer, if necessary.

   To the extent that they are not addressed by the site entrance construction (Items 2 and 3 below), the cost of the work completed here and the shared use path, addressed in Item 5a below, are deductible from the TID fee discussed in Item 4. It may be appropriate for DelDOT to require less than the work contemplated here to adjust the cost of the work with the amount of the TID fee.

2. The developer should construct a full access site entrance (Site Entrance A) for the proposed Estates at Mulberry Knoll Road development on Mulberry Knoll Road, approximately 1,900 feet north of the Mulberry Knoll Road intersection with West Lane/East Lane to be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Site Entrance A	Approach does not exist	One shared left turn/right turn lane
Westbound Site Entrance A	Approach does not exist	One shared left turn/right turn lane
Northbound Mulberry Knoll Road	One through lane	One left turn lane, and a shared through/right turn lane
Southbound Mulberry Knoll Road	One through lane	One left turn lane, one through lane, and one right turn lane

Based on DelDOT's *Development Coordination Manual*, the recommended minimum storage length is 50 feet (excluding taper) for the southbound Mulberry Knoll Road right turn lane and 50 feet (excluding taper) for the southbound and northbound Mulberry Knoll Road left turn lanes. The calculated queue lengths from the HCS analysis can be accommodated within the recommended storage lengths. The recommended storage lengths are based on a posted speed limit of 25 miles per hour per the existing speed resolution. The developer should submit a plan to DelDOT's Development Coordination section depicting the design along the site frontage. Although the northbound left turn lane is not required based on the traffic volumes, it is recommended to shadow the geometry of the southbound left turn lane. The final design of the site entrance should be determined during the Entrance Plan review process.

3. The developer should construct a full access site entrance (Site Entrance B) for the proposed Estates at Mulberry Knoll Road development on Mulberry Knoll Road, approximately 3,200 feet north of the Mulberry Knoll Road intersection with West Lane/East Lane to be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Westbound Site Entrance B	Approach does not exist	One shared left turn/right turn lane
Northbound Mulberry Knoll Road	One through lane	One shared through/right turn lane
Southbound Mulberry Knoll Road	One through lane	One left turn lane, and one through lane

Based on DelDOT's *Development Coordination Manual*, the recommended minimum storage length is 185 feet (excluding taper) for the southbound Mulberry Knoll Road left turn lane. The calculated queue lengths from the HCS analysis can be accommodated within the recommended storage length. The recommended storage length is based on a posted speed limit of 50 miles per hour as a "Begin Speed Limit 25" sign is located along

southbound Mulberry Knoll Road south of this Site Entrance B location. The developer should confirm with DelDOT the speed limit to utilize for the Site Entrance B design and submit a plan to DelDOT's Development Coordination section depicting the design along the site frontage. The final design of the site entrance should be determined during the Entrance Plan review process.

4. The developer should pay the appropriate portion of the Henlopen TID fee in lieu of making transportation improvements outside their access points and frontage roads. Because this development is occurring during the transition from DelDOT's standard development coordination process to the TID process, the developer has the option making off-site transportation improvements instead of paying the TID fee. The recommendations in this letter are based on DelDOT and JMT's understanding that the developer has chosen to pay the fee. If that is not the case, a revised letter should be requested.

5. The following bicycle, pedestrian, and transit improvements should be included:

    a. A minimum fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT along both the property frontage along both sides of Mulberry Knoll Road. Within the easement, the developer should construct a ten-foot wide shared-use path (SUP). The SUP should be designed to meet current AASHTO and ADA standards. A minimum five-foot setback should be maintained from the edge of the pavement to the SUP. If feasible, the SUP should be placed behind utility poles and street trees should be provided within the buffer area. The developer should coordinate with DelDOT's Development Coordination section during the plan review process to identify the exact location of the SUP.

    b. An internal connection should be provided from the SUP into the site.

    c. ADA compliant curb ramps and marked crosswalks should be provided along the Site Entrance A and B approaches to Mulberry Knoll Road. The use of diagonal curb ramps is discouraged.

    d. A minimum five-foot wide bicycle lane should be incorporated in the right turn lane and shoulder along the southbound Mulberry Knoll Road approach to Site Entrance A.

    e. Utility covers should be moved outside of any designated bicycle lanes and any proposed sidewalks/shared-use paths or should be flush with the pavement.

Please note that this review generally focuses on capacity and level of service issues; additional safety and operational issues will be further addressed through DelDOT's Plan Review process.

Improvements in this TIS may be considered "significant" under DelDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT's website at https://www.deldot.gov//Publications/manuals/de_mutcd/index.shtml. For any additional information regarding the work zone impact and mitigation procedures during construction please contact Mr. Don Weber, Assistant Director for Traffic Operations and Management. Mr. Weber can be reached at (302) 659-4651 or by email at Don.Weber@delaware.gov.

Additional details on our review of the TIS are attached. Please contact me at (302) 266-9600 if you have any questions concerning this review.

Sincerely,
Johnson, Mirmiran, and Thompson, Inc.

Joanne M. Arellano, P.E., PTOE

cc: Mir Wahed, P.E., PTOE
Enclosure

General Information

Report date: April 1, 2020
Prepared by: The Traffic Group
Prepared for: MKR Land, LLC
Tax Parcel: 334-18.00-43.00
Generally consistent with DelDOT's *Development Coordination Manual (DCM)*: Yes

Project Description and Background

Description: The developer seeks to develop 320 single-family detached houses.
Location: The subject site is located on both sides of Mulberry Knoll Road (Sussex Road 284), approximately 2/3 of a mile southeast of the intersection of Delaware Route 24 and Mulberry Knoll Road.
Amount of Land to be developed: An approximately 170-acre parcel.
Land Use approval(s) needed: Entrance Plan.
Proposed completion date: 2027.
Proposed access location: Two full access points are proposed along Mulberry Knoll Road.

Daily Traffic Volumes:

- 2019 Average Annual Daily Traffic on Mulberry Knoll Road: 280 vehicles per day (non-Summer)

Site Map

**Graphic is an approximation based on the Plus Plan for Estates at Mulberry Knoll prepared by Morris & Ritchie Associates, Inc. dated July 26, 2019.*

Relevant and On-going Projects

DelDOT has several relevant and ongoing improvement projects within the study area including the *HSIP SR 24 at Camp Arrowhead Road and SR 24 at Angola Road* project (DelDOT Contract No. T201200902). This project was identified in the *SR 24-SR 30 to Love Creek Bridge Traffic Study* and was identified as a high crash location as part of DelDOT's Hazard Elimination Program (HEP) formally known as the Highway Safety Improvement Program (HSIP). This project would make operational improvements to address safety deficiencies and to accommodate future traffic volumes at these two intersections. Specifically, the improvements associated with the Delaware Route 24/Camp Arrowhead Road/Fairfield Road intersection will include extending the existing left-turn and right-turn lanes to increase capacity and providing bicycle lanes and pedestrian facilities. Design is currently underway and construction is scheduled to start in 2021 and end in 2022. Additional information can be found on the DelDOT project website at https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201200902.

The *SR 24, Mulberry Knoll to SR 1* project (DelDOT Contract No. T200411209) involves safety, operational, and capacity improvements along Delaware Route 24 from Mulberry Knoll Road to Delaware Route 1. Delaware Route 24 will be widened to provide two travel lanes in each direction from east of Mulberry Knoll Road to Delaware Route 1. A two-way left-turn lane will be provided between the Delaware Route 24 intersections with Plantation Road/Warrington Road and Lexus Way (Beebe Medical Center Campus)/Colonial Oaks (Residence Inn). The Delaware Route 24

intersection with Lexus Way (Beebe Medical Center Campus)/Colonial Oaks (Residence Inn) will be signalized. Bicycle lanes and pedestrian facilities will be installed as well. Construction is scheduled to begin in 2020 and end in 2022. Additional information can be found on the DelDOT project website at https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T200411209.

The *SR 24, Love Creek to Mulberry Knoll* project (DelDOT Contract No. T201212201) involves safety, operational, and capacity improvements along Delaware Route 24 from the Love Creek bridge to Mulberry Knoll Road. Delaware Route 24 will be widened to provide two travel lanes in each direction from west of the Love Creek Elementary School/Beacon Middle School intersection to east of Mulberry Knoll Road. The Delaware Route 24/Mulberry Knoll Road intersection will be signalized. A two-way left turn lane will be provided from the Love Creek bridge to west of the Love Creek Elementary School/Beacon Middle School intersection. Bicycle lanes and pedestrian facilities will be installed as well. Construction is scheduled to begin in 2021 and end in 2022. Additional information can be found on the DelDOT project website at https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201212201.

DelDOT has a pavement rehabilitation and resurfacing project proposed along Cedar Grove Road, from Plantation Road to Robinsonville Road. The construction is tentatively scheduled to begin either Fall 2020 or Spring 2021.

DelDOT and Sussex County are developing the Henlopen Transportation Improvement District (TID). The TID limits generally extend from the Delaware Coast Line Railroad Company railroad tracks and Delaware Route 1 to the north, Burton Pond and Herring Creek to the south, Arnell Creek and Rehoboth Bay to the east, and Beaver Dam Road to the west. The proposed Estates at Mulberry Knoll site is within the TID. The *Henlopen TID CTP Cost Development Report* was prepared in October 2019 by JMT and contained a summary of the traffic analysis conducted and the associated roadway concept plans and cost estimates for the TID. As part of the report, improvements were recommended at several of the TIS study intersections including the Delaware Route 24 intersections with Lexus Way (Beebe Medical Center)/Colonial Oaks (Residence Inn), Plantation Road/Warrington Road, Mulberry Knoll Road, Camp Arrowhead Road/Fairfield Road, and Jolyns Way, as well as the Mulberry Knoll Road intersection with Cedar Grove Road. The TID was adopted by Sussex County on October 27, 2020.

Livable Delaware

(Source: Delaware Strategies for State Policies and Spending, 2015)

Location with respect to the Strategies for State Policies and Spending Map of Delaware:
The proposed development is located within Investment Level 3, Investment Level 4, and Out of Play areas.

Investment Level 3

Investment Level 3 Areas generally fall into two categories. The first category covers lands that are in the long-term growth plans of counties or municipalities where development is not necessary to accommodate expected population growth during a five-year planning period (or longer). The second category includes lands that are adjacent to or intermingled with fast-growing areas within counties or municipalities that are otherwise categorized as Investment Levels 1 or 2. Investment Level 3 is further characterized by areas with new development separated from existing development by a substantial amount of vacant land that is not contiguous with existing infrastructure, areas that are experiencing some development pressure, areas with existing but disconnected development, and possible lack of adequate infrastructure.

The state will consider investing in infrastructure within Investment Level 3 Areas once the Investment Level 1 and 2 Areas are substantially built out, or when the infrastructure or facilities are logical extensions of existing systems and deemed appropriate to serve a particular area. The priorities in the Level 3 Areas are for DelDOT to focus on regional movements between towns and other population centers. Local roadway improvements will be made by developers and property owners as development occurs. Lower priority is given to transportation system–capacity improvements and transit-system enhancements.

Investment Level 4

Delaware's Investment Level 4 Areas are rural in nature and are where the bulk of the state's open space/natural areas and agricultural industry is located. These areas contain agribusiness activities, farm complexes, and small settlements. They typically include historic crossroads or points of trade, often with rich cultural ties. Delaware's Investment Level 4 Areas are also the location of scattered residential uses, featuring almost entirely single-family detached residential structures. Delaware's Investment Level 4 Areas also include many unincorporated communities, typically with their own distinctive character and identity. Investment Level 4 Areas depend on a transportation system primarily of secondary roads linked to roadways used as regional thoroughfares for commuting and trucking.

It is the state's intent to discourage additional urban and suburban development in Investment Level 4 Areas unrelated to agriculture and to the areas' needs. In Investment Level 4 Areas, the state's investments and policies should retain the rural landscape and preserve open spaces and farmlands, support farmland-related industries, and establish defined edges to more concentrated development. The focus for the Level 4 Areas will be to preserve and maintain existing facilities in safe working order, corridor-capacity preservation, and the enhancement of transportation facilities to support agricultural business.

Out of Play

These lands which are not available for development include publicly-owned lands, private conservation lands, lands for which serious legal and/or environmental constraints on development are identified, and lands in some form of permanent open-space protection. These areas are generally not expected to be the location of private development activities such as residential

subdivisions or commercial shopping centers. However, government entities, private property owners, and conservation organizations are still expected to invest in these areas for the purposes in which they were acquired and preserved. There may also be times when private property owners could be able to build or redevelop on these lands in accordance with State and local environmental and land use regulations.

Proposed Development's Compatibility with Livable Delaware:
Majority of the site would be in the Investment Level 3 area. According to Livable Delaware, these areas may be desirable for a variety of housing types, styles, and densities in conjunction with local government comprehensive plans. The remaining portion of the site would be in Investment Lever 4 and Out of Play areas. Per Livable Delaware, the state's investments and policies should retain the rural landscape and preserve open spaces and farmlands within Level 4 areas. In addition, construction of new homes is discouraged in Level 4 areas. Out of Play areas are generally not expected to be the location of private development activities such as residential subdivisions. However, there may be times when private property owners could be able to build or redevelop on these out of play lands in accordance with State and local environmental and land use regulations. Therefore, the area of the site within Investment Level 3 is generally consistent with the 2015 update of the Livable Delaware "Strategies for State Policies and Spending" and the areas within Investment Level 4 and Out of Play are not.

Comprehensive Plans

(Source: Sussex County March 2019 Comprehensive Plan)

Sussex County Comprehensive Plan:
Per the *Sussex County Comprehensive Plan 2045 Future Land Use Map,* the proposed development is in an area designated as Coastal Area and Agricultural Preservation District.

Proposed Development's Compatibility with the Sussex County Comprehensive Plan:
Per the *Sussex County Comprehensive Plan,* a range of housing types including single-family homes should be permitted in Coastal Areas. However, areas within the Agricultural Preservation District are not considered as developable land as the County's 2045 vision directs development towards areas most suitable for future development such as Developing Areas, Town Centers, Coastal Areas, and Municipalities. Therefore, the proposed development section that is within the Coastal Area is generally consistent with the *Sussex County March 2019 Comprehensive Plan* but the area within the Agricultural Preservation District is not.

Trip Generation

The trip generation for the proposed development was determined by using the comparable land use and rates/equations contained in the *Trip Generation, 10th Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 210 (single-family detached). The trip generation was approved by DelDOT during the PTIS review.

Table 1
Estates at Mulberry Knoll Trip Generation

Land Use	ADT	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
320 Single-Family Detached Housing (ITE Code 210)	3,032	58	174	232	195	115	310	155	132	287

Overview of TIS

Intersections examined:

1. Site Entrance A/Mulberry Knoll Road (Sussex Road 284)
2. Site Entrance B/Mulberry Knoll Road
3. Mulberry Knoll Road/Delaware Route 24
4. Mulberry Knoll Road/Cedar Grove Road (Sussex Road 283)
5. Delaware Route 24/Love Creek Elementary School/Beacon Middle School
6. Delaware Route 24/Spencer Lane/Williams Way
7. Delaware Route 24/Camp Arrowhead Road (Sussex Road 279)/Fairfield Road
8. Delaware Route 24/Jolyns Way (Sussex Road 289)
9. Delaware Route 24/Plantation Road/Warrington Road (Sussex Road 275)
10. Delaware Route 24/Lexus Way (Beebe Medical Center Campus)/Colonial Oaks (Residence Inn)
11. Delaware Route 24/Bryn Mawr Drive
12. Delaware Route 24/Rehoboth Mall Service Road/Hudson Way
13. Delaware Route 1/Delaware Route 24

Conditions examined:

1. Case 1 – 2019 Existing Condition
2. Case 2 – 2027 without development
3. Case 3– 2027 with development

Committed Developments considered:

1. Belle Terre (269 single family detached houses)
2. Arbor-Lyn (142 single family detached houses)
3. Redden Ridge (84 single family detached houses)
4. Delaware State Police Troop 7 (35,385 square feet administrative facility)
5. Pelican Landing (84,576 square feet shopping center)
6. Marsh Island (139 single family detached houses)
7. Marsh Farm Estates (134 single family detached houses)
8. Saddle Ridge f.k.a. Windswept (81 single family detached houses)

9. Rehoboth Point Yacht Club f.k.a. Love Creek Marina (180 unit apartments, 5,000 square feet quality restaurant, 500 square feet retail)
10. Middle Creek Preserve (313 single family detached houses)
11. Sawgrass – North (227 single family detached houses, 15 units unbuilt)
12. Sawgrass – South (3 single family detached houses, 46 townhouses)
13. Hailey's Glen a.k.a. Kielbasa Property (68 single family detached houses)
14. Kindleton (90 single family detached houses)

Note: The committed development information listed above is from the April 1, 2020 Traffic Impact Analysis report and supersedes the information contained in the September 4, 2019 DelDOT Scoping Meeting Memorandum.

Peak hours evaluated: Weekday morning, Weekday evening, and Summer Saturday midday peak hours.

Intersection Descriptions

1. **Site Entrance A/Mulberry Knoll Road (Sussex Road 284)**
   Type of Control: Proposed two-way stop-controlled intersection
   Eastbound Approach: (Site Entrance A) Proposed one shared left turn/through/right turn lane, stop-controlled
   Westbound Approach: (Site Entrance A) Proposed one shared left turn/through/right turn lane, stop-controlled
   Northbound Approach: (Mulberry Knoll Road) Proposed one shared left turn/through/right turn lane
   Southbound Approach: (Mulberry Knoll Road) Proposed one shared left turn/through/right turn lane

2. **Site Entrance B/Mulberry Knoll Road**
   Type of Control: Proposed two-way stop-controlled intersection (T-intersection)
   Westbound Approach: (Site Entrance B) Proposed one shared left turn/right turn lane, stop-controlled
   Northbound Approach: (Mulberry Knoll Road) Proposed one shared through/right turn lane
   Southbound Approach: (Mulberry Knoll Road) Proposed one left turn lane and one through lane

3. **Mulberry Knoll Road/Delaware Route 24**
   Type of Control: Existing two-way stop-controlled intersection; Proposed signalized intersection
   Eastbound Approach: (Delaware Route 24) Existing one shared left turn/through lane and one channelized right turn lane; proposed one left turn lane, two through lanes, and one right turn lane

Westbound Approach: (Delaware Route 24) Existing one shared left turn/through lane and one channelized right turn lane; proposed one left turn lane, two through lanes, and one right turn lane
Northbound Approach: (Mulberry Knoll Road) Existing one shared left turn/through/right turn lane, stop-controlled; proposed one left turn lane and one shared through/right turn lane
Southbound Approach: (Mulberry Knoll Road) Existing one shared left turn/through/right turn lane, stop-controlled; proposed one left turn lane and one shared through/right turn lane

Note: As part of the SR 24, Love Creek to Mulberry Knoll DelDOT project (Contract No. T201212201), this intersection will be signalized, two through lanes will be provided along Delaware Route 24, and turn lanes will be added along each approach.

4. **Mulberry Knoll Road/Cedar Grove Road (Sussex Road 283)**
Type of Control: Existing two-way stop-controlled intersection (T-intersection)
Eastbound Approach: (Cedar Grove Road) Existing one shared through/right turn lane
Westbound Approach: (Cedar Grove Road) Existing one shared left turn/through lane
Northbound Approach: (Mulberry Knoll Road) Existing one shared left turn/right turn lane, stop-controlled

5. **Delaware Route 24/Love Creek Elementary School/Beacon Middle School**
Type of Control: Existing signalized intersection
Eastbound Approach: (Delaware Route 24) Existing one left turn lane, one through lane, and one right turn lane; proposed one left turn lane, two through lanes, and one right turn lane
Westbound Approach: (Delaware Route 24) Existing one left turn lane, one through lane, and one right turn lane; proposed one left turn lane, two through lanes, and one right turn lane
Northbound Approach: (Beacon Middle School) Existing one shared left turn/through lane and one right turn lane
Southbound Approach: (Love Creek Elementary School) Existing one shared left turn/through lane and one right turn lane

Note: As part of the SR 24, Love Creek to Mulberry Knoll DelDOT project (Contract No. T201212201), two through lanes will be provided along each direction of Delaware Route 24.

6. **Delaware Route 24/Spencer Lane/Williams Way**
Type of Control: Existing two-way stop-controlled intersection

Eastbound Approach: (Delaware Route 24) Existing one left turn lane and one shared through/right turn lane; proposed one left turn lane, one through lane, and one right turn lane
Westbound Approach: (Delaware Route 24) Existing one left turn lane, one through lane, and one right turn lane
Northbound Approach: (Williams Way) Existing one shared left turn/through/right turn lane, stop-controlled
Southbound Approach: (Spencer Lane) Existing one shared left turn/through lane and one right turn lane, stop-controlled

Note: As part of the SR 24, Love Creek to Mulberry Knoll DelDOT project (Contract No. T201212201), a separate right turn lane will be added along eastbound Delaware Route 24.

7. **Delaware Route 24/Camp Arrowhead Road (Sussex Road 279)/Fairfield Road**
Type of Control: Existing signalized intersection
Eastbound Approach: (Delaware Route 24) Existing one left turn lane, one through lane, and one channelized right turn lane
Westbound Approach: (Delaware Route 24) Existing one left turn lane, one through lane, and one channelized right turn lane
Northbound Approach: (Fairfield Road) Existing one left turn lane, one through lane, and one channelized right turn lane
Southbound Approach: (Camp Arrowhead Road) Existing one left turn lane and one shared through/right turn lane

8. **Delaware Route 24/Jolyns Way (Sussex Road 289)**
Type of Control: Existing two-way stop-controlled intersection (T-intersection)
Eastbound Approach: (Delaware Route 24) Existing one shared through/right turn lane
Westbound Approach: (Delaware Route 24) Existing one shared left turn/through lane
Northbound Approach: (Jolyns Way) Existing one shared left turn/right turn lane, stop-controlled

9. **Delaware Route 24/Plantation Road/Warrington Road (Sussex Road 275)**
Type of Control: Existing signalized intersection
Eastbound Approach: (Delaware Route 24) Existing one left turn lane, one through lane, and one channelized right turn lane; proposed one left turn lane, two through lanes, and one channelized right turn lane
Westbound Approach: (Delaware Route 24) Existing one left turn lane, one through lane, and one channelized right turn lane; proposed one left turn lane, two through lanes, and one right turn lane

Northbound Approach: (Warrington Road) Existing one left turn lane, one through lane, and one channelized right turn lane; proposed one left turn lane, one shared left turn/through lane, one through lane, and one right turn lane
Southbound Approach: (Plantation Road) Existing one left turn lane, one through lane, and one channelized right turn lane; proposed one left turn lane, one shared left turn/through lane, one through lane, and one right turn lane

Note: As part of the SR 24, Mulberry Knoll to SR 1 DelDOT project (Contract No. T200411209), two through lanes will be provided along each direction of Delaware Route 24, and a shared left turn/through lane will be added along northbound Warrington Road and southbound Plantation Road.

10. **Delaware Route 24/Lexus Way (Beebe Medical Center Campus)/Colonial Oaks (Residence Inn)**
Type of Control: Existing two-way stop-controlled intersection; Proposed signalized intersection
Eastbound Approach: (Delaware Route 24) Existing one shared left turn/through lane and one right turn lane; proposed one left turn lane, two through lanes, and one right turn lane
Westbound Approach: (Delaware Route 24) Existing one left turn lane and one shared through/right turn lane; proposed one left turn lane, two through lanes, and one right turn lane
Northbound Approach: (Beebe Medical Center Campus) Existing one shared left turn/through lane and one right turn lane, stop-controlled; proposed one shared left turn/through lane and one right turn lane
Southbound Approach: (Colonial Oaks/Residence Inn) Existing one shared left turn/through/right turn lane, stop-controlled; proposed one shared left turn/through/right turn lane

Note: As part of the SR 24, Mulberry Knoll to SR 1 DelDOT project (Contract No. T200411209), this intersection will be signalized and two through lanes will be provided along Delaware Route 24.

11. **Delaware Route 24/Bryn Mawr Drive**
Type of Control: Existing two-way stop-controlled intersection (T-intersection)
Eastbound Approach: (Delaware Route 24) Existing one left turn lane and two through lanes
Westbound Approach: (Delaware Route 24) Existing two through lanes and one right turn lane

Southbound Approach: (Bryn Mawr Drive) Existing one left turn lane and one channelized right turn lane, stop controlled

12. Delaware Route 24/Rehoboth Mall Service Road/Hudson Way

Type of Control: Existing signalized intersection

Eastbound Approach: (Delaware Route 24) Existing one left turn lane, two through lanes, and one channelized right turn lane

Westbound Approach: (Delaware Route 24) Existing one left turn lane, two through lanes, and one right turn lane

Northbound Approach: (Rehoboth Mall Service Road) Existing one shared left turn/through lane and one channelized right turn lane

Southbound Approach: (Hudson Way) Existing one shared left turn/through lane and one channelized right turn lane

13. Delaware Route 1/Delaware Route 24

Type of Control: Existing signalized intersection (T-intersection)

Westbound Approach: (Delaware Route 24) Existing three left turn lanes and two right turn lanes

Northbound Approach: (Delaware Route 1) Existing two left turn lanes and three through lanes

Southbound Approach: (Delaware Route 1) Existing one U-turn lane, three through lanes, and one right turn lane

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Per DelDOT Gateway, Delaware Transit Corporation (DTC) currently provides services via DART Routes 201, 203, and 215 within the study area. A designated bus stop for DART Routes 201 and 203 exists adjacent to the Delaware Route 1/Delaware Route 24 intersection. DART Route 201 provides 33 round trips from 6:26 a.m. to 10:57 p.m. Monday through Saturday. DART Route 203 operates during peak resort season and a schedule was not available on the DART website. Designated bus stops for DART Route 215 exist adjacent to the Delaware Route 24 intersections with Bryn Mawr Drive, Lexus Way (Beebe Medical Center Campus)/Colonial Oaks (Residence Inn), and Camp Arrowhead Road (Sussex Road 279)/Fairfield Road. DART Route 215 provides 11 round trips from 5:25 a.m. to 12:43 a.m. Monday through Saturday.

Planned transit service: Per email correspondence on June 19, 2020 from Mr. Jared Kauffman, DART First State Fixed-Route Planner, the DTC does not have any transit specific comments for the project. However, the DTC encourages non-motorized (pedestrian) connections between the on-site cul-de-sacs and the shared-use paths if DelDOT requests it.

Existing bicycle and pedestrian facilities: According to DelDOT's *Sussex County Bicycle Map*, Connector, Regional, and Statewide Bicycle Routes exist within the study area. The Connector

Bicycle Route travels along Camp Arrowhead Road starting at the Delaware Route 24 intersection with Camp Arrowhead Road/Fairfield Road. The Regional Bicycle Route exists along Delaware Route 24 and traverses through six study intersections (Plantation Road/Warrington Road, Mulberry Knoll Road, Love Creek Elementary School/Beacon Middle School, Spencer Lane/Williams Way, Camp Arrowhead Road/Fairfield Road, and Jolyns Way). A Regional Bicycle Route also exists along Delaware Route 1 and traverses through the Delaware Route 1/Delaware Route 24 intersection. The Statewide Bicycle Route exists along Plantation Road and Warrington Road and traverses through the Delaware Route 24 intersection. Pedestrian facilities exist at the Delaware Route 24 intersections with Delaware Route 1, Lexus Way (Beebe Medical Center Campus)/Colonial Oaks (Residence Inn), Love Creek Elementary School/Beacon Middle School, and Spencer Lane/Williams Way.

Planned bicycle and pedestrian facilities: Per email correspondence on June 17, 2020 from Mr. John Fiori, DelDOT's Bicycle Coordinator, the following improvements were recommended:

- Construct a 10-foot wide shared-use path (SUP) along both Mulberry Knoll Road property frontages.
- Due to the increase in traffic, the existing roadway curve just south of "Road G" will need to be analyzed to determine if it meets current DelDOT standards and regulations for safety. If not, then this curve should be improved as part of any roadway improvements required along Mulberry Knoll Road. It would appear any improvements to the curve would be on the development side of the road.
- There could be existing signal agreements at the intersection of Delaware Route 24 and Mulberry Knoll Road. It is assumed this site would have to enter into a signal agreement as well. Recommend contacting DelDOT Traffic for the existence of signal agreements.
- There is a DelDOT project in the area under DelDOT Contract No. T201212201 – *SR 24, Love Creek to Mulberry Knoll*. Recommend contacting DelDOT concerning the status of the project. The site may also have to contribute towards DelDOT Contract No. T201212201. Recommend discussing with DelDOT Development Coordination Section.
- The stormwater management area along Mulberry Knoll Road appears to be within the existing/proposed right-of-way/PE, in which they will need to be revised.
- An internal connection(s) from the non-motorized facility along Mulberry Knoll Road is required.
- Per the Development Coordination Manual (DCM) the site shall dedicate right-of-way per the roadway classification and establish a 15-foot wide permanent easement along the property frontages.
- All entrance, roadway and/or intersection improvements required shall incorporate bicycle and pedestrian facilities. Per the DCM, if the right turn lane is warranted, then a bike lane shall be incorporated along the right turn lane; if a left turn lane is required any roadway improvements shall include a shoulder matching the roadway functional classification or existing conditions.

Bicycle Level of Traffic Stress in Delaware: Researchers with the Mineta Transportation Institute developed a framework to measure low-stress connectivity, which can be used to evaluate and guide bicycle network planning. Bicycle LTS analysis uses factors such as the speed of traffic, volume of traffic, and the number of lanes to rate each roadway segment on a scale of 1 to 4, where

1 is a low-stress place to ride and 4 is a high-stress place to ride. It analyzes the total connectivity of a network to evaluate how many destinations can be accessed using low-stress routes. Developed by planners at the Delaware Department of Transportation (DelDOT), the bicycle Level of Traffic Stress (LTS) model will be applied to bicycle system planning and evaluation throughout the state. The Bicycle LTS for the roadways under existing conditions along the site frontage are summarized below. The Bicycle LTS was determined utilizing the map on the DelDOT Gateway.

- Mulberry Knoll Road – LTS: 4

Crash Evaluation

Per the crash data included in the TIS from October 28, 2016 to November 28, 2019 and provided by the Delaware Crash Analysis Reporting System, a total of 266 crashes were reported within the study area. Of the 266 crashes reported:

- 146 were rear-end, 46 were angle, and 36 were not collisions between two vehicles.
- 40 incidents contained injuries and there was 1 fatality.
- The fatal crash occurred along Delaware Route 24 and involved an angle incident with a vehicle failing to yield to right of way.
- Out of the 36 incidents that were not collisions between two vehicles, 17 involved incidents with a deer.

Previous Comments

Comments provided by DelDOT during the Preliminary TIS review have been addressed in the Final TIS.

General HCS Analysis Comments

(See table footnotes on the following pages for specific comments)

1. Per DelDOT's *Development Coordination Manual*, JMT used a heavy vehicle percentage of 3% for each movement greater than 100 vph in the Case 2 and Case 3 future scenario analyses, unless the existing heavy vehicle percentage was greater than 3% or there was no significant increase of vehicles along that movement, in which case the existing heavy vehicle percentage was used for analysis of future scenarios. Whereas, the TIS used the existing heavy vehicle percentage for Case 1, Case 2 and Case 3 scenarios.

2. Per DelDOT's *Development Coordination Manual* and coordination with DelDOT Planning, JMT used a heavy vehicle percentage of 5% for each movement less than 100 vph along roadways for Case 1 conditions, whereas the TIS did not.

3. Per DelDOT's *Development Coordination Manual*, JMT utilized the existing PHF for the Case 1 scenario and a future PHF for Cases 2 and 3 scenarios of 0.80 for roadways with less than 500 vph, 0.88 for roadways between 500 and 1,000 vph, and 0.92 for roadways with more than 1,000 vph or the existing PHF, whichever was higher. The TIS utilized the existing PHF for Case 1, Case 2 and Case 3 scenarios.

4. JMT incorporated the unsignalized intersections as access points within the HCS files when conducting the signalized intersection analyses along Delaware Route 24 whereas the TIS did not.

5. JMT incorporated the Proportion of Time Blocked within the unsignalized intersections analyses along Delaware Route 24 whereas the TIS did not.

6. For all signalized intersection analyses along Delaware Route 24, JMT utilized a Arrival Type of 3 consistent with the existing traffic patterns during the AM, PM and Saturday peaks whereas the TIS utilized a Arrival Type of 4.

7. For all the signalized intersections JMT utilized Field-Measured Phase Times whereas the TIS did not.

Table 2
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TIS**			**LOS per JMT**		
Site Entrance A/Mulberry Knoll Road (Sussex Road 284)	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 with development (Case 3)						
Eastbound Site Entrance A Approach	B (10.1)	B (11.2)	B (11.0)	B (10.1)	B (11.2)	B (11.0)
Westbound Site Entrance A Approach	A (8.8)	A (8.7)	A (8.8)	A (8.8)	A (8.7)	A (8.8)
Northbound Mulberry Knoll Road Left Turn	A (7.2)	A (7.3)	A (7.3)	A (7.2)	A (7.3)	A (7.3)
Southbound Mulberry Knoll Road Left Turn	A (7.3)	A (7.4)	A (7.4)	A (7.3)	A (7.4)	A (7.4)

Table 3
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection)[1]	**LOS per TIS**			**LOS per JMT**		
Site Entrance B/Mulberry Knoll Road (Sussex Road 284)	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 with development (Case 3)						
Westbound Site Entrance B Approach	A (9.5)	A (9.0)	A (9.2)	A (9.5)	A (9.0)	A (9.2)
Southbound Mulberry Knoll Road Left Turn	A (7.6)	A (7.6)	A (7.6)	A (7.6)	A (7.6)	A (7.6)

[1] For signalized and unsignalized analysis, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 4
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TIS**			**LOS per JMT**		
Mulberry Knoll Road (Sussex Road 284)/Delaware Route 24	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)						
Eastbound Delaware Route 24 Left Turn	A (8.7)	A (9.9)	A (8.8)	A (8.8)	B (11.1)	A (8.9)
Westbound Delaware Route 24 Left Turn	B (10.5)	A (9.2)	B (10.3)	B (14.1)	A (9.6)	B (14.2)
Northbound Mulberry Knoll Road Approach	D (29.7)	E (47.3)	D (33.8)	F (666.2)	F (136.5)	*
Southbound Mulberry Knoll Road Approach	B (14.8)	C (23.7)	F (693.2)	F (101.4)	D (27.9)	*
2027 without development (Case 2)						
Eastbound Delaware Route 24 Left Turn	-	-	-	A (9.3)	C (19.6)	B (11.2
Westbound Delaware Route 24 Left Turn	-	-	-	B (12.7)	B (11.3)	C (21.1)
Northbound Mulberry Knoll Road Approach	-	-	-	F (156.1)	*	*
Southbound Mulberry Knoll Road Approach	-	-	-	*	*	*
2027 without development (Case 2) *with Improvement*[2]						
Eastbound Delaware Route 24 Left Turn	-	-	-	A (9.3)	C (13.5)	B (11.2)
Westbound Delaware Route 24 Left Turn	-	-	-	B (12.7)	B (11.3)	C (21.1)
Northbound Mulberry Knoll Road Left Turn/Through Lane	-	-	-	F (669.6)	*	*
Northbound Mulberry Knoll Road Right Turn	-	-	-	D (25.2)	C (17.3)	E (36.7)
Northbound Mulberry Knoll Road Approach	-	-	-	F (121.8)	*	*
Southbound Mulberry Knoll Road Left Turn/Through Lane	-	-	-	*	*	*
Southbound Mulberry Knoll Road Right Turn	-	-	-	C (15.4)	F (110.7)	C (20.3)
Southbound Mulberry Knoll Road Approach	-	-	-	F (902.1)	*	*

*HCS reported delays of 1000 seconds per vehicle or more

[2] The improvement scenario includes to providing a shared left turn/ through lane and a channelized right turn along the northbound and southbound Mulberry Knoll Road.

Table 4 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TIS**			**LOS per JMT**		
Mulberry Knoll Road (Sussex Road 284)/Delaware Route 24	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 with development (Case 3)						
Eastbound Delaware Route 24 Left Turn	-	-	-	A (9.3)	C (19.6)	B (11.3)
Westbound Delaware Route 24 Left Turn	-	-	-	B (13.6)	B (12.6)	D (29.6)
Northbound Mulberry Knoll Road Approach	-	-	-	*	*	*
Southbound Mulberry Knoll Road Approach	-	-	-	*	*	*
2027 with development (Case 3) *with Improvement* [2]						
Eastbound Delaware Route 24 Left Turn	-	-	-	A (9.3)	B (19.6)	B (11.3)
Westbound Delaware Route 24 Left Turn	-	-	-	B (13.6)	B (12,6)	D (29.6)
Northbound Mulberry Knoll Road Left Turn/Through Lane	-	-	-	*	*	*
Northbound Mulberry Knoll Road Right Turn	-	-	-	E (47.8)	C (20.5)	E (73.7)
Northbound Mulberry Knoll Road Approach	-	-	-	*	*	*
Southbound Mulberry Knoll Road Left Turn/Through Lane	-	-	-	*	*	*
Southbound Mulberry Knoll Road Right Turn	-	-	-	C (15.3)	F (110.7)	C (19.9)
Southbound Mulberry Knoll Road Approach	-	-	-	*	*	*

*HCS reported delays of 1000 seconds per vehicle or more

Table 4 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
Mulberry Knoll Road (Sussex Road 284)/Delaware Route 24	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 without development (Case 2) *with Improvement Option I* [3]	B (20.0)	B (19.1)	C (20.4)	C (23.1)	C (28.3)	C (23.2)
2027 with development (Case 3) *with Improvement Option I* [3]	C (27.9)	C (26.6)	D (35.7)	C (25.1)	C (29.2)	C (26.5)

[3] This scenario includes the improvements associated with the *SR 24, Love Creek to Mulberry Knoll* project (DelDOT Contract No. T201212201). The improvements include signalization of the intersection with a cycle length of 150 seconds during the AM, PM and Saturday peaks and a protected/permissive left turn phase along each approach, the provision of two through lanes along eastbound and westbound Delaware Route 24, and the addition of a separate left turn lane and a shared through/right turn lane along northbound and southbound Mulberry Knoll Road.

Table 5
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection)[1]	**LOS per TIS**			**LOS per JMT**		
Mulberry Knoll Road (Sussex Road 284)/Cedar Grove Road (Sussex Road 283)	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)						
Westbound Cedar Grove Road Left Turn	A (8.3)	A (7.7)	A (8.1)	A (8.3)	A (7.8)	A (8.1)
Northbound Mulberry Knoll Road Approach	B (13.1)	B (11.0)	B (12.4)	B (12.7)	B (11.1)	B (12.6)
2027 without development (Case 2)						
Westbound Cedar Grove Road Left Turn	A (8.7)	A (8.1)	A (8.7)	A (8.6)	A (8.1)	A (8.8)
Northbound Mulberry Knoll Road Approach	C (17.9)	B (13.8)	C (18.5)	C (16.2)	B (14.0)	C (18.9)
2027 with development (Case 3)						
Westbound Cedar Grove Road Left Turn	A (8.8)	A (8.3)	A (8.9)	A (8.7)	A (8.3)	A (9.0)
Northbound Mulberry Knoll Road Approach	C (24.2)	C (17.3)	D (28.2)	C (20.3)	C (17.7)	D (29.4)

Table 6
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Love Creek Elementary School/Beacon Middle School [4, 5]	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)	C (26.3)	B (15.6)	A (8.4)	D (39.9)	C (28.3)	D (39.8)
2019 Existing (Case 1) *with signal timing optimization [6]*	-	-	-	C (20.9)	B (14.1)	A (9.4)
2027 without development (Case 2)	B (19.4)	B (12.7)	A (2.4)	C (25.3)	E (62.4)	E (70.2)
2027 without development (Case 2) *with signal timing optimization [7]*	-	-	-	B (19.4)	B (17.9)	C (31.6)
2027 without development (Case 2) *with Improvement [7]*	-	-	-	B (16.6)	B (11.1)	A (6.3)
2027 with development (Case 3)	B (18.0)	B (12.2)	A (2.4)	C (27.8)	E (59.5)	E (70.0)
2027 with development (Case 3) *with signal timing optimization [6]*	-	-	-	B (20.7)	B (16.3)	C (33.4)
2027 with development (Case 3) *with Improvement [7]*	-	-	-	B (16.6)	B (11.8)	A (6.8)

[4] JMT utilized a cycle length of 150 seconds for AM and Saturday peaks consistent with DelDOT Timing plan whereas the TIS utilized a cycle length of 120 seconds.
[5] Both the TIS and JMT incorporated this intersection with the other signalized intersections along Delaware Route 24 (with the exception of the Delaware Route 1 intersection) due to the signals operating with the same cycle lengths during the peak hours for Cases 2 and 3 conditions. JMT also did this for Case 1 conditions whereas the TIS did not.
[6] Signal timing optimization scenario include optimized splits while maintaining the existing cycle lengths.
[7] This scenario incorporates the *SR 24, Love Creek to Mulberry Knoll DelDOT Improvement project* (project no. T200411209) which adds an additional through lane along eastbound and westbound Delaware Route 24.

Table 7
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Spencer Lane/Williams Way [8]	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)						
Eastbound Delaware Route 24 Left Turn	A (8.2)	B (10.4)	A (8.8)	A (8.3)	B (12.9)	A (8.7)
Westbound Delaware Route 24 Left Turn	B (13.4)	A (8.8)	B (10.7)	B (11.4)	A (9.0)	B (12.6)
Northbound Williams Way Approach	D (27.3)	D (32.2)	D (30.8)	D (33.1)	F (561.9)	F (50.3)
Southbound Spencer Lane Left Turn	E (43.3)	F (55.5)	F (79.8)	F (81.8)	*	F (232.7)
Southbound Spencer Lane Right Turn	B (11.1)	C (18.2)	B (11.9)	B (10.7)	C (16.7)	B (10.5)
Southbound Spencer Lane Approach	E (35.3)	E (46.2)	F (57.2)	F (64.1)	*	F (158.6)
2027 without development (Case 2)						
Eastbound Delaware Route 24 Left Turn	-	-	-	A (8.9)	C (20.2)	B (10.5)
Westbound Delaware Route 24 Left Turn	-	-	-	B (13.2)	B (10.5)	D (25.1)
Northbound Williams Way Approach	-	-	-	F (83.8)	*	*
Southbound Spencer Lane Left Turn	-	-	-	F (416.7)	*	*
Southbound Spencer Lane Right Turn	-	-	-	B (12.1)	D (31.7)	C (15.2)
Southbound Spencer Lane Approach	-	-	-	F (315.5)	*	*

*HCS reported delays of 1000 seconds per vehicle or more

[8] JMT modeled the southbound Spencer Lane approach as a left turn and right turn lane consistent with the existing conditions whereas the TIS did not.

Table 7 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Spencer Lane/Williams Way	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 with development (Case 2) *with Improvement Option I* [9]						
Eastbound Delaware Route 24 Left Turn	A (8.7)	B (12.0)	A (9.9)	A (8.9)	C (20.2)	B (10.5)
Westbound Delaware Route 24 Left Turn	C (15.8)	A (9.7)	B (12.3)	B (13.2)	B (10.5)	D (25.1)
Northbound Williams Way Approach	E (46.1)	F (68.2)	F (65.3)	F (83.6)	*	*
Southbound Spencer Lane Left Turn	F (95.1)	F (151.2)	F (359.9)	F (416.6)	*	*
Southbound Spencer Lane Right Turn	B (12.7)	D (25.2)	C (15.3)	B (12.1)	D (31.7)	C (15.2)
Southbound Spencer Lane Approach	F (74.5)	F (119.7)	F (245.0)	F (315.5)	*	*
2027 with development (Case 2) *with Improvement Option II* [10]						
Eastbound Delaware Route 24 Left Turn	-	-	-	A (8.2)	B (13.5)	A (8.5)
Westbound Delaware Route 24 Left Turn	-	-	-	A (9.7)	A (8.3)	B (12.3)
Northbound Williams Way Shared Left Turn/Through Lane	-	-	-	C (17.4)	D (31.4)	C (16.9)
Northbound Williams Way Right Turn	-	-	-	A (9.8)	A (9.7)	C (16.0)
Northbound Williams Way Approach	-	-	-	B (12.3)	C (20.5)	C (16.2)
Southbound Spencer Lane Left Turn Lane	-	-	-	B (11.5)	D (32.9)	C (17.9)
Southbound Spencer Lane Right Turn	-	-	-	A (8.9)	C (17.5)	B (10.3)
Southbound Spencer Lane Approach	-	-	-	B (10.9)	D (29.1)	C (15.3)

*HCS reported delays of 1000 seconds per vehicle or more

[9] This scenario incorporates the *SR 24, Love Creek to Mulberry Knoll DelDOT improvement project* (project no. T200411209) which includes the addition of a right turn lane along eastbound Delaware Route 24.

[10] This scenario includes providing an additional through lane along the eastbound and westbound Delaware Route 24 approaches and a right turn lane along the eastbound Delaware Route 24 approach and configured northbound Williams Way as a shared left turn/through lane and a right turn lane.

Table 7 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Spencer Lane/Williams Way	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 without development (Case 3)						
Eastbound Delaware Route 24 Left Turn	-	-	-	A (9.1)	C (22.2)	B (14.3)
Westbound Delaware Route 24 Left Turn	-	-	-	B (14.9)	B (11.0))	D (28.7)
Northbound Williams Way Approach	-	-	-	F (252.8)	*	*
Southbound Spencer Lane Left Turn	-	-	-	*	*	*
Southbound Spencer Lane Right Turn	-	-	-	B (12.5)	E (35.5)	C (19.0)
Southbound Spencer Lane Approach	-	-	-	*	*	*
2027 with development (Case 3) *with Improvement Option I* [9]						
Eastbound Delaware Route 24 Left Turn	A (8.8)	B (12.2)	B (10.0)	A (9.1)	C (22.2)	B (14.3)
Westbound Delaware Route 24 Left Turn	C (15.9)	A (9.9)	B (12.6)	B (14.9)	B (11.0)	D (28.7)
Northbound Williams Way Approach	E (49.7)	F (76.6)	F (72.3)	F (251.4)	*	*
Southbound Spencer Lane Shared Left/Through Lane	F (107.9)	F (177.3)	F (430.7)	*	*	*
Southbound Spencer Lane Right Turn	B (13.2)	D (26.0)	C (15.7)	B (12.5)	E (35.5)	C (19.0)
Southbound Spencer Lane Approach	F (84.2)	F (139.5)	F (292.4)	*	*	*

*HCS reported delays of 1000 seconds per vehicle or more

Table 7 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Spencer Lane/Williams Way	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 with development (Case 3) *with Improvement Option II [10]*						
Eastbound Delaware Route 24 Left Turn	-	-	-	A (8.2)	B (14.2)	B (14.3)
Westbound Delaware Route 24 Left Turn	-	-	-	A (9.3)	A (8.5)	B (12.8))
Northbound Williams Way Shared Left Turn/Through Lane	-	-	-	B (14.3)	*	D (31.0)
Northbound Williams Way Right Turn	-	-	-	B (11.4)	B (10.2)	C (16.7)
Northbound Williams Way Approach	-	-	-	B (12.3)	*	C (20.8)
Southbound Spencer Lane Left Turn Lane	-	-	-	B (14.7)	*	D (35.0)
Southbound Spencer Lane Right Turn	-	-	-	A (9.0)	C (18.6)	C (19.1)
Southbound Spencer Lane Approach	-	-	-	B (13.3)	*	D (29.7)

*HCS reported delays of 1000 seconds per vehicle or more

Table 7 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Roundabout [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Spencer Lane/Williams Way [11]	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 without development (Case 2)	-	-	-	A (6.3)	A (6.7)	A (7.3)
2027 without development (Case 3)	-	-	-	A (6.3)	A (6.8)	A (7.4)

Table 7 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Spencer Lane/Williams Way [12]	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 without development (Case 2)	-	-	-	A (8.1)	B (11.2)	B (10.0)
2027 without development (Case 3)	-	-	-	B (10.9)	B (11.4)	B (11.1)

[11] This scenario includes providing a dual lane roundabout.

[12] This scenario includes providing a signal with a cycle length of 150 seconds during the AM, PM and Saturday peaks with a protected/permissive phase along eastbound and westbound Delaware Route 24 and split phase along northbound and southbound Spencer Lane and Williams Way. Additionally, the scenario configures the eastbound and westbound Delaware Route 24 approaches to contain one left turn lane, two through lanes, and one right turn lane.

Table 8
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Camp Arrowhead Road (Sussex Road 279)/Fairfield Road	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)	B (13.0)	B (12.1)	B (15.2)	E (61.1)	D (35.5)	E (56.5)
2019 Existing (Case 1) *with signal timing optimization* [13]	-	-	-	B (18.6)	B (15.7)	C (21.9)
2027 without development (Case 2)	B (19.6)	B (16.6)	C (26.4)	E (73.7)	D (48.5)	F (117.5)
2027 without development (Case 2) *with signal timing optimization* [13]	-	-	-	B (19.5)	B (18.9)	C (35.3)
2027 with development (Case 3)	C (24.2)	B (17.7)	C (32.3)	F (108.9)	E (55.6)	F (128.1)
2027 with development (Case 3) *with signal timing optimization* [13]	-	-	-	C (22.2)	C (22.4)	D (38.7)

[13] Signal timing optimization scenario includes optimized offset and splits while maintaining the existing signal cycle length.

Table 9
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection)[1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Jolyns Way (Sussex Road 289)	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)						
Westbound Delaware Route 24 Left Turn	A (9.1)	A (8.4)	A (9.4)	A (9.2)	A (8.5)	A (9.5)
Northbound Jolyns Way Approach	C (16.8)	C (22.9)	C (18.8)	C (17.1)	C (23.4)	C (19.2)
2027 without development (Case 2)						
Westbound Delaware Route 24 Left Turn	A (9.7)	A (9.0)	B (10.3)	A (9.8)	A (9.0)	B (10.4)
Northbound Jolyns Way Approach	C (21.1)	E (35.8)	D (26.8)	C (21.5)	D (33.5)	D (27.4)
2027 without development (Case 2) *with Improvement* [14]						
Westbound Delaware Route 24 Left Turn	-	-	-	A (9.9)	A (9.1)	B (10.5)
Northbound Jolyns Way Approach	-	-	-	C (17.6)	C (22.0)	C (19.5)
2027 with development (Case 3)						
Westbound Delaware Route 24 Left Turn	A (9.7)	A (9.2)	B (10.4)	A (9.8)	A (9.2)	B (10.6)
Northbound Jolyns Way Approach	C (22.1)	E (39.8)	D (28.7)	C (22.5)	E (36.9)	D (29.4)
2027 with development (Case 3) *with Improvement* [14]						
Westbound Delaware Route 24 Left Turn	-	-	-	A (9.9)	A (9.3)	B (10.7)
Northbound Jolyns Way Approach	-	-	-	C (18.1)	C (23.8)	C (20.5)

[14] Improvement scenario includes providing an additional through lane along eastbound and westbound Delaware Route 24.

Table 10
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Plantation Road (Sussex Road 275)/Warrington Road (Sussex Road 275)	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)	D (45.7)	D (46.8)	E (77.3)	D (39.5)	D (50.6)	D (53.4)
2019 Existing (Case 1) *with signal timing optimization* [15]	-	-	-	D (35.4)	D (44.6)	D (43.9)
2027 without development (Case 2) [16]	-	-	-	D (46.4)	F (81.3)	E (77.0)
2027 without development (Case 2) *with signal timing optimization* [15,16]	-	-	-	D (38.1)	E (69.3)	E (55.5)
2027 without development (Case 2) *with Improvement Option I* [17]	-	-	-	C (34.8)	D (40.1)	D (43.8)
2027 without development (Case 2) *with Improvement Option II* [18]	C (33.4)	D (35.4)	D (38.6)	C (32.9)	D (35.3)	D (37.8)
2027 with development (Case 3) [16]	-	-	-	D (46.9)	F (93.9)	F (78.4)
2027 with development (Case 3) *with signal timing optimization* [15,16]	-	-	-	D (40.2)	F (81.5)	E (60.6)

[15] Signal timing optimization scenario includes optimized offset and splits while maintaining the existing cycle lengths.
[16] JMT conducted an analysis with the existing lane configurations.
[17] Improvement scenario incorporates with part of the DelDOT Henlopen TID (project no. T201769002/T201966001) improvement for Delaware Route 24 intersection with Plantation Road (Sussex Road 275)/Warrington Road (Sussex Road 275) to add an extra through lane along the eastbound and westbound Delaware Route 24.
[18] This scenario incorporates with the *SR 24, Love Creek to Mulberry Knoll DelDOT improvement project* (project no. T200411209) to adding an additional through lane along the eastbound and westbound Delaware Route 24 as well as a shared left turn/through lane along the northbound and southbound of Plantation Road (Sussex Road 275)/Warrington Road (Sussex Road 275).

Table 10 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Plantation Road (Sussex Road 275)/Warrington Road (Sussex Road 275)	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 with development (Case 3) *with Improvement I* [17]	-	-	-	C (34.6)	D (40.7)	D (42.3)
2027 with development (Case 3) *with Improvement II* [18]	C (33.2)	D (36.2)	D (39.8)	C (31.9)	D (37.6)	D (37.7)

Table 11
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Lexus Way (Beebe Medical Center campus)/Colonial Oaks (Residence Inn) [19]	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)						
Eastbound Delaware Route 24 Left Turn	A (8.0)	A (9.1)	A (8.5)	A (8.0)	A (9.1)	A (8.6)
Westbound Delaware Route 24 Left Turn	B (10.5)	A (8.5)	B (10.3)	B (11.3)	A (8.6)	B (12.0)
Northbound Lexus Way Left Turn	E (46.5)	F (72.2)	E (48.9)	F (66.1)	F (100.7)	F (115.9)
Northbound Lexus Way Right Turn	B (14.5)	B (13.4)	C (18.4)	B (13.5)	B (12.5)	C (19.7)
Northbound Lexus Way Approach	C (24.3)	E (37.1)	C (24.0)	D (29.7)	E (48.1)	E (37.2)
Southbound Colonial Oaks Approach	C (24.0)	A (0.0)	B (11.7)	D (29.6)	A (0.0)	B (11.6)
2027 without development (Case 2)						
Eastbound Delaware Route 24 Left Turn	-	-	-	A (8.2)	A (9.9)	A (9.5)
Westbound Delaware Route 24 Left Turn	-	-	-	B (12.8)	A (9.2)	C (15.8)
Northbound Lexus Way Left Turn	-	-	-	F (135.5)	F (732.6)	*
Northbound Lexus Way Right Turn	-	-	-	C (18.2)	C (15.0)	D (31.4)
Northbound Lexus Way Approach	-	-	-	F (54.1)	F (304.6)	F (322.9)
Southbound Colonial Oaks Approach	-	-	-	E (46.9)	A (0.0)	B (13.7)

*HCS reported delays of 1000 seconds per vehicle or more

[19] JMT modeled the eastbound Delaware Route 24 as a shared left turn/through lane and right turn lane, and northbound Lexus Way as a left turn lane and right turn lane to be consistent with the existing conditions whereas the TIS did not.

Table 11 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Lexus Way (Beebe Medical Center campus)/Colonial Oaks (Residence Inn)	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 without development (Case 2) *with Improvement* [20]						
Eastbound Delaware Route 24 Left Turn	A (8.2)	A (9.9)	A (9.1)	A (8.2)	A (9.9)	A (8.6)
Westbound Delaware Route 24 Left Turn	B (11.9)	A (8.9)	B (11.2)	B (10.9)	A (8.0)	B (10.4)
Northbound Lexus Way Left Turn/Through Lane	F (66.8)	F (64.9)	F (59.6)	E (41.3)	B (14.0)	B (14.9)
Northbound Lexus Way Right Turn	B (12.2)	B (11.7)	B (13.5)	A (9.2)	B (10.1)	B (13.5)
Northbound Lexus Way Approach	D (29.0)	D (32.2)	C (21.9)	C (19.0)	B (11.7)	B (13.8)
Southbound Colonial Oaks Approach	C (20.0)	A (0.0)	B (10.7)	B (14.1)	A (0.0)	A (8.9)

[20] The improvement scenario contains the lane configurations associated with the *SR 24, Mulberry Knoll to Delaware Route 1 DelDOT improvement project* (project no. T200411209). This includes adding an extra through lane along eastbound and westbound Delaware Route 24, adding a left turn lane along eastbound Delaware Route 24 and configuring northbound Lexus Way as a shared left turn/through lane and a right turn lane.

Table 11 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Lexus Way (Beebe Medical Center campus)/Colonial Oaks (Residence Inn)	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 with development (Case 3)						
Eastbound Delaware Route 24 Left Turn	-	-	-	A (8.2)	B (10.3)	A (9.7)
Westbound Delaware Route 24 Left Turn	-	-	-	B (13.7)	A (9.5)	C (17.4)
Northbound Lexus Way Left Turn	-	-	-	F (221.0)	*	*
Northbound Lexus Way Right Turn	-	-	-	C (20.0)	C (15.6)	E (37.3)
Northbound Lexus Way Approach	-	-	-	F (81.6)	F (487.7)	F (674.2)
Southbound Colonial Oaks Approach	-	-	-	F (64.3)	A (0.0)	B (14.5)
2027 with development (Case 3) *with Improvement* [20]						
Eastbound Delaware Route 24 Left Turn	A (8.2)	B (10.3)	A (9.3)	A (8.2)	B (10.3)	A (8.7)
Westbound Delaware Route 24 Left Turn	B (12.4)	A (9.1)	B (11.5)	B (11.2)	A (8.1)	B (10.9)
Northbound Lexus Way Left Turn/Through Lane	F (80.8)	F (86.0)	F (68.2)	E (41.0)	C (15.1)	C (15.5)
Northbound Lexus Way Right Turn	B (12.6)	B (12.0)	B (13.9)	A (9.3)	B (10.6)	B (14.2)
Northbound Lexus Way Approach	D (33.5)	E (41.8)	C (23.7)	C (19.0)	B (12.4)	B (14.4)
Southbound Colonial Oaks Approach	C (21.4)	A (0.0)	B (11.0)	B (13.4)	A (0.0)	A (9.0)

Table 11 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Lexus Way (Beebe Medical Center campus)/Colonial Oaks (Residence Inn)	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2027 without development (Case 2) *with Improvement Option I* [21]	-	-	-	A (8.1)	B (14.7)	A (8.7)
2027 with development (Case 3) *with Improvement Option I* [21]	-	-	-	A (9.8)	B (15.2)	B (10.4)

[21]This scenario incorporates the *SR 24, Mulberry Knoll to Delaware Route 1 DelDOT improvement project* (project no. T200411209) to signalize the intersection, install an additional through lane along eastbound and westbound Delaware Route 24 as well as a left turn lane along eastbound Delaware Route 24, and configure the northbound approach to have a shared left turn/through lane and right turn lane. The northbound and southbound approaches would operate as split phase with protected and permissive left turn phasing along Delaware Route 24. A cycle length of 150 seconds would be utilized as well.

Table 12
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Unsignalized Intersection Two-Way Stop Control (T-intersection)[1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Bryn Mawr Drive [22]	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)						
Eastbound Delaware Route 24 Left Turn	A (8.6)	A (9.1)	A (8.6)	A (8.3)	A (9.0)	A (8.6)
Southbound Bryn Mawr Drive Approach	B (14.8)	C (19.3)	C (19.3)	B (13.7)	C (17.5)	C (18.6)
2027 without development (Case 2)						
Eastbound Delaware Route 24 Left Turn	A (8.9)	B (10.0)	A (9.3)	A (8.7)	A (9.7)	A (9.1)
Southbound Bryn Mawr Drive Approach	C (17.4)	D (27.1)	D (26.9)	C (15.2)	C (23.1)	D (25.0)
2027 with development (Case 3)						
Eastbound Delaware Route 24 Left Turn	A (9.0)	B (10.3)	A (9.5)	A (8.8)	A (10.0)	A (9.3)
Southbound Bryn Mawr Drive Approach	C (18.4)	D (30.9)	D (30.2)	C (15.9)	D (26.0)	D (27.8)

[22] JMT modeled southbound Mawr Drive approach right turn as a channelized right turn lane to be consistent with existing condition whereas the TIS did not.

Table 13
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 24/Rehoboth Mall Service Road/Hudson Way	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)	A (5.5)	A (9.9)	A (9.1)	B (11.2)	B (16.5)	B (15.1)
2027 without development (Case 2)	A (5.9)	B (12.7)	A (8.6)	B (13.0)	B (15.7)	B (15.3)
2027 with development (Case 3)	A (5.8)	B (12.4)	A (8.3)	B (13.1)	B (15.5)	B (15.1)

Table 14
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Estates at Mulberry Knoll
Report Dated: April 2020
Prepared By: The Traffic Group, Inc.

Signalized Intersection [1]	**LOS per TIS**			**LOS per JMT**		
Delaware Route 1/Delaware Route 24 [23, 24, 25, 26]	Weekday AM	Weekday PM	Saturday Peak	Weekday AM	Weekday PM	Saturday Peak
2019 Existing (Case 1)	B (15.5)	B (18.4)	B (17.7)	B (16.2)	B (17.5)	B (17.1)
2027 without development (Case 2)	B (18.1)	C (30.2)	C (21.5)	B (17.6)	C (21.6)	B (19.8)
2027 with development (Case 3)	B (19.0)	D (36.6)	C (23.4)	B (18.2)	C (24.7)	C (21.0)

[23] JMT included storage lengths for the left and right turn lanes along the eastbound Delaware Route 24 approaches consistent with the existing storage lengths whereas the TIS did not.
[24] JMT utilized a saturation flow rate of 1,900 to be consistent with existing traffic patterns whereas the TIS utilized a saturation flow rate of 1,750.
[25] JMT utilized the Yellow times, Red Clearance times, and offsets consistent with the DelDOT timing plan whereas the TIS did not.
[26] JMT utilized a cycle length of 150 seconds during the PM peak hour consistent with the DelDOT timing plans whereas the TIS utilized a cycle length of 120 seconds.

Appendix 8 – Sewer Concept Evaluation Study

Sussex County Engineering Department – November 25, 2019

ENGINEERING DEPARTMENT

ADMINISTRATION	(302) 855-7718
AIRPORT & INDUSTRIAL PARK	(302) 855-7774
ENVIRONMENTAL SERVICES	(302) 855-7730
PUBLIC WORKS	(302) 855-7703
RECORDS MANAGEMENT	(302) 854-5033
UTILITY ENGINEERING	(302) 855-7717
UTILITY PERMITS	(302) 855-7719
UTILITY PLANNING	(302) 855-1299
FAX	(302) 855-7799

Sussex County
DELAWARE
sussexcountyde.gov

HANS M. MEDLARZ, P.E.
COUNTY ENGINEER

JOHN J. ASHMAN
DIRECTOR OF UTILITY PLANNING

SEWER SERVICE CONCEPT EVALUATION (SSCE)

UTILITY PLANNING DIVISION

Applicant: Morris & Ritchie Associates, Inc

Date: 11/25/2019

Reviewed by: **Chris Calio**

Agreement #:**1141**

Project Name: **Estates At Mulberry Knoll**

Tax Map & Parcel(s): **334-18.00-43.00**

Sewer Tier: Tier 2 - Sussex County Planning Area

Proposed EDUs: **319**

Pump Station(s) Impacted: **Mulberry Knoll pump station, PS193 & PS 210**

List of parcels to be served, created from the base parcel: **N/A**

List of additional parcels to be served (Parcels required for continuity must be served with infrastructure):**N/A**

Connection Point(s): **Mulberry Knoll Pump Station to be constructed off Mulberry Knoll Road**

Use of Existing Infrastructure Agreement required? Yes ☒ or No ☐

Annexation Required? Yes ☒ or No ☐

Easements Required? Yes ☒ or No ☐

Fee for annexation (based on acreage):**$2,500 (Greater than 150.00 Acres)**

Current Zoning: **AR-1** Zoning Proposed: **AR-1**

Acreage: **166.83 +/-**

Additional Information: **Sussex County is currently in design of a new pump station off Mulberry Knoll Road.**

* No capacity is guaranteed until System Connection Fees are paid

All gravity sewers with three (3) or more minor branches shall be designed at minimum slope and maximum depth.

Once Construction Drawings are completed with all of the above information satisfied, please submit to:

Sussex County Public Works Department
2 The Circle
P.O. Box 589
Georgetown DE 19947

CC: John Ashman
Jayne Dickerson
Michael Brady
Noell Warren

Appendix 9 – Endangered Species Review

U.S. Fish & Wildlife Service, July 21, 2020

DNREC, July 29, 2020

United States Department of the Interior
U.S. Fish & Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
410/573 4575

Online Certification Letter

Today's date: July 21, 2020
Project: Scenic Manor

Dear Applicant for online certification:

Thank you for using the U.S. Fish and Wildlife Service (Service) Chesapeake Bay Field Office online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA).This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

Based on this information and in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), we certify that except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project area. Therefore, no Biological Assessment or further section 7 consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. For additional information on threatened or endangered species in Maryland, you should contact the Maryland Wildlife and Heritage Division at (410) 260-8573. For information in Delaware you should contact the Delaware Division of Fish and Wildlife, Wildlife Species Conservation and Research Program at (302) 735-8658. For information in the District of Columbia, you should contact the National Park Service at (202) 339-8309.

The U.S. Fish and Wildlife Service also works with other Federal agencies and states to minimize loss of wetlands, reduce impacts to fish and migratory birds, including bald eagles, and restore habitat for wildlife. Information on these conservation issues and how development projects can avoid affecting these resources can be found on our website (www.fws.gov/chesapeakebay)

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interest in these resources. If you have any questions or need further assistance, please contact Chesapeake Bay Field Office Threatened and Endangered Species program at (410) 573-4527.

Sincerely,

Genevieve LaRouche
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
Phone: (410) 573-4599 Fax: (410) 266-9127
http://www.fws.gov/chesapeakebay/
http://www.fws.gov/chesapeakebay/endsppweb/ProjectReview/Index.html

In Reply Refer To: July 21, 2020
Consultation Code: 05E2CB00-2020-SLI-1535
Event Code: 05E2CB00-2020-E-04274
Project Name: Scenic Manor

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Chesapeake Bay Ecological Services Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401-7307
(410) 573-4599

Project Summary

Consultation Code: 05E2CB00-2020-SLI-1535

Event Code: 05E2CB00-2020-E-04274

Project Name: Scenic Manor

Project Type: DEVELOPMENT

Project Description: The site is located east and west of Mulberry Knoll Road in the Lewes area of Sussex County, Delaware. The subject site is identified as Parcel 34-18.00-4.00 and encompasses approximately 170 acres.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/38.701431869140265N75.14320854082659W

Counties: Sussex, DE

Endangered Species Act Species

There is a total of 0 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

ESTUARINE AND MARINE DEEPWATER

- E1UBL

ESTUARINE AND MARINE WETLAND

- E2EM1N
- E2EM1Nd
- E2SS1P
- E2USN

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1/3R
- PFO1C
- PFO1E
- PFO1R
- PSS1T
- PSS1A
- PSS1C
- PSS1R

RIVERINE

- R1UBV

SOURCE: MAP COPYRIGHT © ADC THE MAP PEOPLE, (800) 829-6277. PERMITTED USE NUMBER 031282B.

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4895
WWW.GTAENG.COM

SITE LOCATION MAP

SCENIC MANOR

SUSSEX COUNTY, DELAWARE

JOB NO.	SCALE	DATE	DRAWN BY	REVIEW BY	FIGURE
31191080X1	1" = 2,000'	JULY 21, 2020	MHG	TAS	1

L:\Shared\Project Files\2019\31191080x1 - Scenic Manor\WET\CAD\GIS\31191080x1 SLM.mxd

SOURCE: UNITED STATES GEOLOGICAL SURVEY, FAIRMOUNT, DE AND FRANKFORD, DE QUADRANGLES, 7.5 MINUTE TOPOGRAPHIC MAP SERIES. DATED 2019.

NORTH

0 2,000

APPROXIMATE SCALE
1 INCH = 2,000 FEET

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4895
WWW.GTAENG.COM

USGS TOPOGRAPHIC MAP
SCENIC MANOR

SUSSEX COUNTY, DELAWARE

JOB NO.	SCALE:	DATE:	DRAWN BY:	REVIEW BY:	FIGURE:
31191080X1	1" = 2,000'	JULY 21, 2020	MHG	TAS	2

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SOURCE: 2017 BASE AERIAL IMAGERY PROVIDED BY THE DELAWARE ENVIRONMENTAL MONITORING AND ANALYSIS CENTER.

NORTH

0 1,000

APPROXIMATE SCALE
1 INCH = 1,000 FEET

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31191080X1	1" = 1,000'	JULY 21, 2020	MHG	TAS	3

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STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
RICHARDSON & ROBBINS BUILDING
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

OFFICE OF THE SECRETARY

PHONE
(302) 739-9000

29 July 2020

Micah Hunter-Goskie
Geo-Technology Associates, Inc.
3445-A Box Hill Corporate Center Dr.
Abingdon, MD 21009

Re: GTA 2020 Scenic Manor; Tax Parcel # 334-18.00-43.00

Dear Mr. Hunter-Goskie,

Thank you for contacting the Species Conservation and Research Program (SCRP) about information on rare, threatened and endangered species, unique natural communities, and other significant natural resources as they relate to the above referenced project.

State Natural Heritage Site
A review of our database indicates that there are currently no records of state-rare or federally listed plants, animals, or natural communities at this project site. As a result, this project does not presently lie within a State Natural Heritage Site, nor does it lie within a Delaware National Estuarine Research Reserve – two criteria that are used to identify "Designated Critical Resource Waters" in the Army Corps of Engineers (ACOE) Nationwide Permit General Condition No. 22. A copy of this letter shall be included in any permit application or pre-construction notification submitted to the Army Corps of Engineers for activities on this property.

Rare, Threatened, and Endangered species
A review of our database indicates that the following state rare, and Species of Greatest Conservation (SGCN[1]) may occur at or adjacent to the parcel.

[1] Species of greatest conservation need (SGCN) are indicative of the overall diversity and health of the State's wildlife resources. Some may be rare or declining, others may be vital components of certain habitats, and still others may have a significant portion of their population in Delaware. SGCN are identified in the Delaware Wildlife Action Plan (DEWAP) which is a comprehensive strategy for conserving the full array of native wildlife and habitats-common and uncommon- as vital components of the state's natural resources. Congress challenged the states to demonstrate comprehensive wildlife conservation. Delaware, along with all of the other States, territories and the District of Columbia are working to implement their wildlife action plans. This document can be viewed via the Division of Fish and Wildlife's website at http://www.fw.delaware.gov/dwap/Pages/default.aspx.

Scientific Name	Common Name	Taxon	State Rank[2]	State Status[3]	SGCN Tier[4]
Ambystoma tigrinum tigrinum	Eastern Tiger Salamander	Amphibian	S1	E	Tier 1

The Tiger Salamander (*Ambystoma tigrinum tigrinum*) occurs in moist, often sandy, deciduous, coniferous or mixed woodlands with adequate wetlands for breeding, such as coastal plain ponds. This species spends most of its life cycle underground and is rarely encountered except during breeding periods and when recently transformed sub-adults leave their larval pools. Egg masses are laid underwater during the winter. Larvae hatch in about four weeks and then transform into sub-adults. Availability of fishless breeding pools and adequate upland forested buffers around those pools is critical for this species.

Leaving the forest intact would be the most beneficial to species that may utilize the habitats in and around the project area. In lieu of that option, we offer the following recommendations that, if implemented, will reduce negative impacts to wildlife and their habitats:

1) Tree clearing should be restricted to the areas that are absolutely necessary for the footprint of homes and infrastructure.
2) Due to the difficulty that small animals (i.e. salamanders) have climbing vertical curbs, we recommend designing the development to exclude curbs. Our state herpetologist is concerned that if the state endangered tiger salamanders are using the seasonal ponds located on the project site, they will not be able to cross curbed roads during the breeding season.

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[2] **State Rank: S1**- extremely rare within the state (typically 5 or fewer occurrences); **S2** - very rare within the state (6 to 20 occurrences); **S3** -rare to uncommon in Delaware, **B** - Breeding; **N** - Nonbreeding; **SX** - Extirpated or presumed extirpated from the state. All historical locations and/or potential habitat have been surveyed; **SH** - Historically known, but not verified for an extended period (usually 15+ years); there are expectations that the species may be rediscovered; **SE** - Non-native in the state (introduced through human influence); not a part of the native flora or fauna., **SNR** - not yet ranked in Delaware, **SNA** - occurrences in DE of limited conservation value, **of concern due to a restricted range; **SU** - Status uncertain within the state. Usually an uncommon species which is believed to be of conservation concern, but there is inadequate data to determine the degree of rarity.

[3] **State Status: E** - Endangered, i.e. designated by the Delaware Division of Fish and Wildlife as seriously threatened with extinction in the state pursuant to State of Delaware Code (7 Del. §601 *et seq.*) and implementing regulation (Title 7, 3900, 16.0 Endangered Species) ; n/a-plants are not included in Title 7. **NL** - Not Listed

[4] **SGCN Tiers: Tier 1** SGCN are those that are most in need of conservation action on order to sustain or restore their populations. They are the focus of the DEWAP, which is based on analyzing threats to their populations and their habitats, and on developing conservation actions to eliminate, minimize or compensate for these threats. **Tier 2** SGCN are also in need of conservation action, although not with the urgency of Tier 1 species. Their distribution across the landscape will help determine where DEWAP conservation actions will be implemented on the ground. n/a-not applicable. Plant species of concern are not addressed in the DEWAP. **Tier 3** These species are for the most part still relatively common in Delaware, but are listed as SGCN for various reasons, including documented population declines, high responsibility of the Northeast region for the global population, or continued need for monitoring and/or management. This tier also includes non-breeding species that are uncommon in Delaware.

3) To avoid attracting reptiles and other amphibians to the proposed stormwater management ponds in the center of the development, we recommend installing stormwater ponds adjacent to the forests on site, far from the above mentioned ponds as possible.

4) Reptile and amphibian species need predator-free ponds in order to survive and reproduce successfully. Therefore, we recommend allowing the stormwater management ponds to dry up seasonally so that fish (predators) are not capable of inhabiting these systems.

5) Any culverts installed should be open bottom box culverts to allow for natural substrate to remain and for in-water passage of aquatic life. Additionally, culverts should be left as wide as possible to ensure that salamanders can travel through them.

Rare and Unique Natural Communities

According to our database, the forested wetlands on the project parcel support potential old-growth forest in that it has not been cleared since at least 1937 (the year of the oldest aerial image we have on file). This potential old growth forest has been identified as *core* wildlife habitat by the Delaware Ecological Network (DEN), which is habitat that is defined as containing relatively intact natural ecosystems and is of high-quality for native plants and animals. The DEN is a statewide conservation network developed using GIS and field collected datasets that help to identify and prioritize ecologically important areas for natural resource protection, including areas of especially high quality that support rare species.

Nesting/Breeding Bird Concerns

Based on aerial images, this site appears to have wetland habitat which could support sensitive marsh bird species including SGCN species such as Saltmarsh Sparrow and Black Rail. However, since SCRP does not have any records from this exact location, we would like to request a site visit to survey for potential breeding marsh birds. Please see the "*Site Visit Request*" section below for additional details.

To reduce impacts to ground-nesting marsh birds, it would be optimal if work activities are completed prior to April 1st or after July 31st. In the event that project activities extend past April 1st the following contingency plan could minimize direct impacts:

A qualified biologist should be on-site to determine if and when marsh birds have begun establishing territories and/or nesting.

If it is determined that nesting activity has <u>not</u> taken place yet:

1) To minimize impacts to shrub/scrub-nesting birds, selective clearing of woody vegetation that could be used for nesting and is within the footprint of immediate disturbance is recommended. This may discourage birds from constructing nests in habitat that will be impacted by the project anyway.

2) To minimize impacts to ground-nesting birds, place construction matting within the area of immediate disturbance. This would prohibit nesting in the project area and therefore, reduce the chance of destroying established nests, eggs and/or chicks.

If nesting activity has taken place and/or nests are found within 50ft of the project area:

1) Work activities should cease and Henrietta Bellman should be contacted at (302) 612-6197 (cell) for further recommendations.

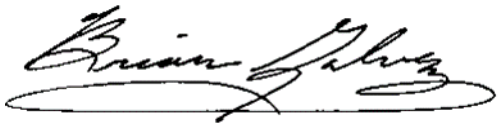
Note: If nesting activities of a Species of Conservation Concern (S1 and S2) have begun and a nest is within the area of disturbance or so close that abandonment is likely, work activities may have to cease until young are fledged or nesting attempt fails.

Site Visit Request
In order to provide informed, up-to-date comments, our Division scientists request the opportunity to conduct a survey to evaluate habitat and the site's potential to support additional species of concern. In particular, we would appreciate being able to conduct the survey during the breeding season for Eastern Tiger Salamander (January through February) and the breeding/territory-establishment season for marsh birds (April through June). The surveys will be conducted at no expense to the landowner. In the event that authorizations will be needed from DNREC's Coastal Management Program and/or Wetlands and Subaqueous Lands Section, they may request complete and up-to-date information from the Species Conservation and Research Program as part of their review. Therefore, granting access to the site may increase the efficiency of the State authorization process. The landowner is welcome to join SCRP staff during the site visit, as it could also be a good opportunity to discuss options for minimizing impacts. Please contact me at (302) 223-2446 or at Brian.Galvez@delaware.gov if the applicant should grant a site visit.

We are continually updating our records on Delaware's rare, threatened and endangered species, unique natural communities, and other significant natural resources. If the start of the project is delayed more than a year past the date of this letter, please contact us again for the latest information.

Please feel free to contact me with any questions or if you require additional information.

Sincerely,



Brian Galvez
Environmental Review Coordinator
Phone: (302) 223-2446
6180 Hay Point Landing Road
Smyrna, DE 19977

(See invoice on next page)

INVOICE - PAYMENT DUE

It is our policy to charge a fee for this environmental review service. This letter constitutes an invoice for $35.00 ($35.00/hour for a minimum of one hour). Please make your check payable to "Delaware Division of Fish and Wildlife" and submit to:

DE Division of Fish and Wildlife
89 Kings Hwy.
Dover, DE 19901
ATTN: Brandi Henderson

In order for us to properly process your payment, you must reference "GTA 2020 Scenic Manor**" on your check.**

cc: Brandi Henderson, Fish and Wildlife Accounting Specialist; Code to 72900

Appendix 10 – Archaeological Survey

“Phase 1 Archaeological Survey, Estates at Mulberry Knoll”

Ed Ottter, Inc. – February 14, 2020

Phase I Archaeological Survey, Estates at Mulberry Knoll, Rehoboth, Sussex County, Delaware

February 14, 2020

Prepared for
Morris & Ritchie Associates
18 Boulden Circle
Suite 36
New Castle, De. 19720

Prepared by:

Edward Otter, Ph. D.
Edward Otter, Inc.
1704 Camden Ave
Salisbury, Maryland 21801

Abstract

The property known as the Estates at Mulberry Knoll, tax parcel 3-34 18 43, Sussex County Delaware, is being planned for development. Of concern, is the potential for archaeological sites to exist on the property. This study, conducted by Edward Otter, Inc. was designed to determine the presence or absence of archaeological sites within the development tract. Archaeological survey consisting of controlled surface collection and regularly spaced shovel tests identified six archaeological sites on the property. These sites range in age from Middle Archaic to the mid-20th century. It is recommended that additional archaeological work be conducted at five of the sites prior to development.

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INTRODUCTION

The property known as the Estates at Mulberry Knoll, tax parcel 3-34 18 43, Sussex County Delaware, is being planned for development. One of the potential issues is the potential for archaeological sites to exist on the property. This study, conducted by Edward Otter, Inc. was designed to determine the presence or absence of archaeological sites within the development tract.

Project Location and Setting

The Mulberry Knoll property consists of two agricultural fields located on both sides of Mulberry Knoll Road (Figure 1). Arnell creek forms the eastern boundary of the property and Dorman Branch is to the west. To the south is the Mulberry Knoll subdivision and to the north are other agricultural fields. The parcel measures about 170 acres.

Elevations on the property range from near sea level to 15 feet above mean sea level. Soils on the parcel are mostly Downer sandy loam 2 to 5 percent slopes and Greenwich loam 0 to 2 percent slope. These are well drained soils that are considered prime farmland. There are two wet depressions on the property that may be geologic features known as Bay/Basins. The proximity of the well-drained soils adjacent to the streams and bay/basin figures suggests there is a high probability of finding archaeological sites on the property.

SCOPE OF WORK

The goal of a Phase I archaeological survey is to determine if archaeological sites exist within the given project area. Various methods are used, depending on terrain and vegetation to determine site locations. Also, as part of locating sites, the boundaries of any identified sites can be determined. Artifacts found at sites provide evidence for the age and function of the sites. It was the goal of this study to provide all of this information for any site discovered on the property.

RESEARCH DESIGN

This project consisted of archival research and archaeological field investigation. Archival research is used to develop a history of the region and the particular land involved in the study. It is possible to identify potential archaeological site locations through historic record research.

Archival Study

Archival research involved the examination of land records to build a chain of title since the arrival of Europeans. This assists in establishing a context for the property and can identify specific areas of archaeological potential. During this work wills, orphans court, census records, tax assessments and other records are routinely consulted. These records fill gaps between deeds and provide genealogical information necessary to follow in-family land transfers. Should archaeological sites be located, this research provides information on site occupants and a context for the interpretation of the finds.

Figure 1. Project Location. U.S.G.S. topographic map, Fairmount Quadrangle

Field Methods

Archaeological field work consisted of two strategies, surface survey within plowed fields and shovel test excavations within wooded areas. Those wooded areas not to be impacted by development due to design setbacks or other environmental factors were not included within the field survey area.

The initial step for the field survey was to establish a grid coordinate system for the property. A base point was arbitrarily established by placing a rebar in the ground. This point was designated N2500 E2500. A total station was then placed over this point. Estimating north, the station was 0-set and additional data points were established with rebar or wooden stakes. Grid coordinates were assigned based on distance and direction from the initial data point.

This grid system was extended through the wooded area to be tested using wooden stakes at major junction points. Tape measures were then used to complete the 50-foot grid for the shovel tests (Figure 2). Within the fields, a few points were established as secondary datum. These served as total station set points from which artifact locations could be recorded.

Surface survey within the fields was conducted after the fields had been plowed and disked and a substantial rain had fallen (Figure 3). Archaeologists then walked the field in approximately 10-foot intervals and placed pin flags on all identified artifacts. The total station was set over the various secondary datum points within the fields and, using a data collector, the artifact locations were recorded along with an artifact description. Certain artifacts such as projectile points, prehistoric ceramics, and unusual or significant historic artifacts were collected but most artifacts were left in the field.

Shovel Tests were dug by hand on the 50-foot grid that had been established. Soils were removed in stratigraphic layers and screened through ¼-inch mesh hardware cloth to recover any artifacts that might be present. The soil profile from each unit was recorded including Munsell color and texture. Any artifacts recovered were bagged and removed to the laboratory for analysis and curation.

In instances where artifacts were recovered, radial shovel tests were dug on 25-foot intervals. These expanded until all surrounding tests were negative. The result is that any area containing artifacts was tested on a 25-foot grid. This provides a more precise determination of site boundaries.

Laboratory Work

Artifacts removed to the laboratory are cleaned and cataloged. Cataloging terminology varies between prehistoric and historic artifacts but in all cases, when possible, artifact types are defined. Analysis of the material by location and type provides data that helps define the age and function of archeological sites. Once cataloged, the material is packaged for curation according to guidelines provided by the Delaware Office of Historical and Cultural Affairs. It is anticipated that the materials will be placed with Delaware State Museums for permanent curation.

All artifacts are cataloged by provenience from which they were recovered. Prehistoric artifacts are further cataloged according to their material and function. Type names are assigned where possible. Historic period artifacts are also cataloged by material. Additional categories might include function, color, form (for glass and ceramic containers), and type.

Figure 2. Flagged Shovel Test Locations with the Woods

Figure 3. Plowed Field

CULTURAL HISTORY

Humans have occupied the North American continent for at least 15,000 years. The span of human existence is divided into two eras, prehistoric and historic. The historic era is equivalent to the time of Euro-American occupation. The prehistoric period is divided into periods and sub-periods. Delaware and Maryland use different names and dates for these divisions. Presented here is a sort of hybrid of these.

Prehistoric Era

Extensive research has been conducted over the last half-century providing information about the people living in the Middle Atlantic region for the last 15000 years. Recent work has raised the possibility of pushing the earliest occupation date back as far as 20,000 years ago.

Paleo I (Pre-Clovis 20000+ - 13500 B.C.)

Within the last decade or so, sites such as Cactus Hill in Virginia (McAvoy & McAvoy 1997) Gault Site in Texas (Waters et al 2011), and Miles River in Talbot County, Maryland (Lowery et al 2010) provide strong evidence for the sites with these early dates. This period is called Pre-Clovis and sites are still controversial.

The closest thing to a temporally diagnostic artifact for this period is the bi-point. At least eight sites from Delmarva have produced bi-points. Most of these have been from submerged contexts (Stanford et al 2014). Associated with bi-points is a tool kit including choppers, scrapers, and prismatic blades. The Miles Point site in Talbot County produced prismatic blades (Lowery 2007; Lowery et al 2010). These artifacts were recovered from a loess deposit dated between 40,000 and 20,000 years bp (Wah, Lowery & Wagner 2012).

Paleo II (13500 - 8000 BC)

On Delmarva the Paleo II can be subdivided into three periods based on projectile point forms. The oldest is Clovis, followed by mid-paleo points, and lastly Hardaway and Dalton points. Clovis and mid-paleo points are characteristically fluted and are distinguished by their size and thickness. Mid-paleo are smaller and thinner than Clovis and at least some fit the definition of the Crowfield type. Dalton points have well defined shoulders and a deep notch in their base.

Geomorphologic analysis indicates the Clovis period is at or before the onset of the Younger Dryas. The Younger Dryas was a period in which global temperatures abruptly dropped after a period of warming. Clovis aged sites have been associated with the Tilghman paleosol (Wah, Lowery & Wagner 2012:39). This paleosol is buried under a significant loess deposit (Paw Paw Loess). The Paw Paw Loess covers a large portion of the Maryland section of Delmarva and part of Delaware with the greatest thickness on the western shoreline of the Peninsula. The source for the sediment is thought to be the ancestral Susquehanna Channel (Wah, Lowery & Wagner 2012: 37). Sediment thickness is greatest near the source and generally less than 1.8 meters. Exceptions to this are locations on the east side of confluences and major waterways. Presumably these bodies contributed sediment that settled locally.

Across Delmarva, the different types of paleo points are found together on the same sites. This suggests a similarity in subsistence/settlement patterns. Geographic settings have changed significantly since Paleo II times with large amounts of aeolian deposition and stream modifications so that present conditions may not reflect what the setting once was. Many of these sites are found eroding from the shoreline and it is likely that the Paw Paw loess deposits conceal a number of these sites.

Paleoindian points have been found in many places along the shoreline where erosion has cut through the loess deposits. Paleo points have been near Eldorado and another on the Nanticoke near Riverton. In Delaware, there is a cluster on the upper portion of the Marshyhope west of Greenwood (Custer 1989:94). The numbers of points found in the interior of the peninsula may be related to the lack of Paw Paw loess leaving Paleoindian age soils closer to the surface.

Most stone tools found from the Paleo-Indian Period are associated with the processing of foods and other raw materials acquired through these activities. The tool kit typically contained projectile points for the killing and butchering of animals, biface blades for butchering and for the manufacture of other multi-purpose bifacial tools, and flaked tools for various purposes such as working bone, antler, or hide (Raber 1985; Custer 1989, 1996).

Paleo-Indian culture is interpreted as consisting of small mobile groups subsisting through hunting, fishing, and gathering. A correlation has been noted between paleoindian site locations and specific resource areas, notably quarries (Gardner 1974, 1977; Raber 1985; Kraft 1986; Ritchie 1969). There are no primary outcrops of lithics on Delmarva only cobble deposits. These include high quality material and are peppered across the region. On Delmarva, there appears to be a correlation with spring heads and streams (Lowery 2002: 67). These, too, are spread across Delmarva. The low relief of much of Delmarva results in a uniform mosaic of environmental niches. Small changes in elevation result in differences between dry and wet soils and this factor, in conjunction with proximity to flowing surface water are seen as the major predictors of site locations for this and subsequent periods.

Archaic Period (8000 - 1000 BC)

Around 7,000 B.C., evolving Holocene environments continued to change with a gradual warming of the climate melting ice caps and raising the sea level. Spruce woodland gave way to mixed coniferous/deciduous forests establishing essentially modern floral and faunal patterns (Carbone 1976; Custer 1989). These environmental changes spurred a shift in human adaptation hunter-gatherer strategies producing new settlement-subsistence patterns based around exploitation of new seasonally rich environments including acorns, nuts, berries, and tubers with abundant fauna resources of fish, shellfish, deer, elk, bear, and a variety of small mammals.

Early Archaic Period (7000 BC – 5000 BC)

The most commonly found points of this period are Kirk and Palmer types. Amos and Charleston are less frequently found. The Early Archaic tool kit is much like that from the Paleo-Indian period (Dent, 1995; Raber et al 1998). The most notable change was in the form of scrapers which changed at this time. The remainder of the tools appear the same as those from the Paleo-Indian period.

Early Archaic site locations are generally the same as for Paleo-Indian sites, based on the current databases for site locations on Delmarva. The Crane Site assemblage from Dorchester County is

characteristic of this with Dalton/Hardaway points and Kirk/Palmers. Local stone resources, such as quartz and rhyolite, were preferred for tool manufacture instead of exotic mineral types formerly obtained from distant sources.

The Archaic people are interpreted living in small, egalitarian and mobile hunter-gatherer groups. Their economy was based on hunting, fishing, and gathering utilizing a wide range of plants. The flora and fauna became much more like that we see today although sea level was still significantly lower than the present.

The Middle Archaic Period (5000 B.C. - 3000 B.C.)

The Middle Archaic Period is poorly documented and understood. This period is marked archaeologically by the appearance of bifurcated projectile points in the earlier portion. In the later part of the period Stanly and Morrow Mountain points are found. A significant change at this time is the appearance of ground stone objects. Plant processing tools, axes and mortars appear during this period suggesting more use of plant resources. Pollen studies indicate an increase in nut producing trees, including oaks. Pollen studies also indicate a warming period across the middle Atlantic with a continued rise in sea level resulting in the inland expansion of tides and saline water.

Archaeological work has been done on relatively few sites of this period. Middle archaic sites tend to not be where early archaic sites, are suggesting a shift in either environmental setting or settlement preference. The interpretation is that settlement changes are related to environmental factors. Settlements that have been recognized are small and contain few artifacts. Only stone artifacts have been found, mostly waste flakes. The size of the sites and the relatively few artifacts suggest these were short-term camps with a small number of inhabitants (Barse & Marston 2007).

Late Archaic Period (3,000 B.C. - 800 B.C.)

In Delaware's chronology, this portion of prehistory is identified as the earlier portion of the Woodland I (Custer 1984). Two complexes are recognized, the Clyde Farm complex to the north and Barkers Landing to the south. The sites in lower Delaware and adjacent areas of Maryland fall into the Barkers Landing Complex (Custer 1989).

Projectile points characteristic of the Late Archaic period include the Otter Creek, Lamoka, Brewerton, Savannah River, Halifax, and Susquehanna and Perkiomen broadspear types.

Soapstone bowls were manufactured and used during this period and are a good temporal diagnostic for the later part of the period. Lithic materials were procured locally and from distant sources. Rhyolite and argillite from piedmont areas is common and nearly all ground stone objects are produced of foreign stone such as slate or basalt.

Climatic changes, about 2,600 B.C., produced the warmest and driest conditions of the current post-glacial period, with oak and hickory emerging as the dominant tree species in the Middle Atlantic region. These nuts provide important food sources for many species including deer and turkey. Sea level rise was slowing and the Chesapeake and Delaware estuaries were becoming more stable. This allowed for an increase in estuarine resources, shellfish in particular.

Increases in population and sedentism (and decreased foraging territory) are suggested by the new archaeological visibility of sites (Dent 1995). Sites are found in a variety of locations with larger sites found along major waterways. Areas with well drained soils along bodies of water, especially in association with freshwater springs or freshettes and bay basin features are good locations for small sites of this period.

During the beginning of the Late Archaic, there is evidence for long-distance trade/exchange, exploitation of local nuts and seeds, a wide variety of lithic resources, and new riverine focus giving rise to large settlements along fertile major waterways (possibly in response to dryer climate).

At the end of the Late Archaic period pottery technology developed with the continuation of some projectile point types. Traditionally, pottery is used to mark the beginning of the Woodland Period. Over the years research has revealed that except for the introduction of pottery the Late Archaic and the earliest part of the Woodland Period are very much alike. In Pennsylvania the term Transitional is used to refer to this period. The first pottery vessels (Marcey Creek ware) were tempered with steatite. The shape of these vessels, with flat bottoms and lug handles, suggests an imitation of earlier steatite bowls. Steatite bowl fragments have been recovered from sites on the lower shore and adjacent areas of Delaware. For this reason, the earliest ceramic wares are here included as part of the Late Archaic.

On the lower shore, Marcey Creek is found as are other recognized types of similar form. Dames Quarter is probably the second most common. It is tempered with crushed black rock, probably gneiss making it distinctive. Marcey Creek pottery is flat bottomed as are some of the Dames Quarter vessels. Ware plain, another early type is also flat bottomed.

Late Archaic site locations on Delmarva are more often not where Middle Archaic sites are found although sites of the Late Archaic are more numerous than any of the previous periods. While this is at least partly attributable to environmental change, fundamental changes in subsistence were occurring at this time. Small wild seeds, roots, and squash, were likely important components of the diet.

In Delaware, and the greater Middle Atlantic region, early varieties of cultigens and cultivars have been found in archaeological context (Adavasio & Johnson 1981; Hart & Scarry 1999; Gremillion1997). Cultivation appears to have started during the later part of the Late Archaic as cultivars have been found in terminal Archaic contexts elsewhere in the Eastern United States (Ison 1987; Purrington 1983). Tobacco may have been cultivated at this time. The presence of pipes during this cultural period suggest its use. However, there is no evidence for beans or maize at this period.

A species of setaria, S. parviflora, has been found in dated contexts 4000 – 3500 B.C. in the southwest (Austin, 2006) and within a similar time frame from southwestern Mexico (Callen 1963:237). Other relatives in this family have been domesticated in Asia. Austin claims that Setaria was the dominant grain prior to maize domestication (Austin 2006:149) noting that setaria has been recovered from sites across the United States (Austin 2006:151).

Analysis of residue on Marcey Creek ceramics recovered from the Gray Farm (7K-F-11 & 7K-F-169) resulted in the identification of plant starch grains and phytoliths. Bristlegrass (Setaria sp) and little barley grass (Hordeum sp), were recovered as was arrowhead, sometimes called indian potato or duck potato (sagittaria sp) and sedge (scirpus sp). Arrowhead and sedge are both aquatic plants. Both have been found in prehistoric contexts (Hart 2008) and there is a claim from British Columbia of a

purposefully built potato garden (Wade 2016). Given the emphasis often given to Chenopodium and Knotweed (Smith 1995), it is perhaps surprising these plants were not identified.

Squash may have been the first truly domesticated plants in North America (Smith & Yarnall 2009). Squash remains have been identified on sites of this time frame from across the eastern United States including New York, Michigan, and elsewhere (Hart 2008). Squash remains have been dated in Pennsylvania to about 5400 B.C. (McConaughy 2008). The hard-skinned winter varieties of squash can be stored for months. Leaves and flowers, available in the early spring can be eaten and fruit can be harvested green or mature. These plants can provide food for over six months of a year. They are versatile and easy to grow.

The development of horticulture and agriculture from this time to contact is poorly understood. True farming may not have taken place but simple encouragement of key plants can have an impact on plant communities. For example, removing competing plants or burning may have been used to encourage wild plant growth.

Two technological advances are seen as indicators of more sedentary lives and the use of storable surplus food supplies. These are pottery and pits. Pits appear first and are occasionally reported from non-ceramic sites such as 18TA424 near Easton, Maryland (Otter 2012). Pits are believed to have been used to store surplus foods for later use. Pottery provided a new means of preparing and storing food and, because of their fragile nature, suggest a more sedentary life. These changes continued into the Woodland Period.

Woodland Period (800 BC - A.D. 1550)

About 2,000 years before present the shorelines and landforms similar to those of today began to emerge as warm and dry climatic conditions gave way to a cooler, moister modern climate. The dominant oak-hickory forest was also superseded by oak and chestnut vegetation. The Woodland period is marked by the introduction of agriculture, intensive pottery production, and transition from spear to hunting with a bow concurrent with the progression from hunting and gathering to horticulture and eventually full agricultural-based societies with complex social structures.

Shifts in settlement pattern, and the creation of long-distance trade networks begin at this time and continue through the Early Woodland. The intensive trade and exchange network noted during the Late Archaic fades from the archaeological record, although increasing evidence of sedentism is manifested in the expanded use of storage facilities and the development of long-term residential architecture and permanent villages. Increased harvesting of plants reflects an intensification of food procurement, generally acknowledged as being spurred by population growth. Material culture of the Woodland period is typified by distinctive ceramic forms, small triangular projectile points reflective of bow-and-arrow technology.

Early Woodland Period (800 B.C. - A. D. 100)

Across the Middle Atlantic conoidal shaped ceramics with sand or crushed quartz temper spread quickly. These appear to derive possibly from Vinette I centered in lower New York and northern Pennsylvania. On Delmarva the wares are crushed quartz tempered Wolf Neck ceramics and sand tempered Accokeek ware. Analogous ceramic types spread across the eastern United States by about 500 B.C. forming a good horizon marker. In Delaware, this period is termed the Wolfe Neck complex.

Radiocarbon dates on Wolfe Neck associated features range from around 800 BC to 100 BC (Bastian 1975; Griffith 2010).

Wolfe Neck pottery is a recognized pottery type found across the Delmarva Peninsula at this time. This ware is seen as homologous to other pottery types across the Middle Atlantic region including Popes Creek in southern Maryland, Bushkill in Pennsylvania, and Prince George ware in Virginia. A riverain or maritime orientation is indicated by site settings along waterways. Numerous shell middens exist along the bay shores and brackish waterways. Settlement patterns seem very similar to the Late Archaic.

Wolfe neck pottery is often found on sites with stemmed points with Rossville being the most recognized (Custer 1989:250). Sites of this period might also contain Accokeek pottery which similarly contains crushed quartz temper and cord or net marked exteriors. Sites of the Early Woodland often coincide with sites of the Late Archaic.

With the more fully developed estuaries, shellfish are used more often. Shell deposits are found in coastal areas beginning at this period. Some are many feet thick. These are often described as trash deposits but little effort has been given to alternative explanations. In the American southeast shell deposits have been recognized as ceremonial sites.
The use of wild plants and some domesticated, or semi-domesticated plants continued. Squash almost certainly was grown at this time.

During this period a distinctive projectile point type known as Meadowood is found. This is associated with the Meadowood culture from New York. These points are not common and do not appear on all sites of this period. They are not as rare as once thought with a distribution that covers the entire Delmarva Peninsula.

One of the characteristics associated with Meadowood in New York are elaborate burials with exotic goods referred to as Middlesex (Ritchie 1969). Tubular stone pipes, birdstones, and other exotic artifacts are found in these burials. Similar items have been found on Delmarva (Lowery 2005). Materials for these items cannot be procured locally and there can be no doubt long distance trade was taking place.

However, the presence of these items might indicate something more than trade. It is possible this represents an influx of people from the north. Another possible explanation is that this material represents a stratification of society where elites possessed these exotic goods (Tache 2011). Such a society is often cited as being based on food surplus. Historically archaeologists have claimed abundant fish resources were involved. It is possible that this interpretation reflects a bias toward protein sources in the diet, on the part of archaeologists, and that the surpluses could have come from other resources such as agricultural surplus. The presence of these items spread sparsely across the region without the ceremonial burial sites found in New York suggests that whatever was going on here wasn't quite the same.

Slightly later than Meadowood, is the Delmarva Adena. Like Meadowood, there are exotic artifacts produced from materials obtained in Ohio and New York. Elaborate burials with these exotic artifacts have been found in Delaware and the Maryland coastal plain. Besides the exotic materials, other artifacts associated with Adena are Coulbourne ceramics (Custer 1984: 89; Wise, Clark & Dunn

1989:45) and Adena points. Sites such as Sandy Hill in Dorchester County, Maryland and the Frederica Site in Kent County, Delaware have produced spectacular artifacts.

Unlike the Meadowood, these are more closely associated with burial sites. Using Tache's (2011) approach, these would be more ceremonial items than trade goods. This remains a poorly understood aspect of Delmarva archaeology with no sites identifiable as Adena habitations. The major sites that have been identified mostly were found by accident and artifacts collected without the benefit of scientific archaeology.

Middle Woodland Period (A.D. 100 - A.D. 1000)

Around A.D. 100 Mockley ceramics became dominant on Delmarva and continued until about 1000 A.D (Griffith 2010). This ceramic contains crushed shell temper. Vessels are either cord marked or net marked. Sites are often defined by the presence of large amounts of oyster shell refuse. Selby Bay/Fox Creek projectiles are typically found with Mockley pottery. These are frequently made from rhyolite which must be imported from the piedmont.

Middle Woodland sites indicate the most intense maritime exploitation of all prehistoric cultures. Sites are usually located along streams and include oyster or mussel shells, fish bones, and terrestrial animals. Reptile bones are common. Sites seem to be associated with marsh areas and are generally located in settings which would provide food throughout the year including seed crops such as amaranth and chenopodium (Custer, Stiner & Watson 1983:28). Evidence exists, in the form of more numerous pit features, for increased sedentism over the Early Woodland period.

Economic changes are possibly related to environmental conditions. The period was warmer and dryer. Oyster bearing sites are found further upstream than at any other time possibly indicating an intrusion of salt water. The Taft Site in Fairfax County Virginia has a Middle Woodland component with oyster shells and a Late Woodland component of fresh water mussel. Such an intrusion would have affected all of the major streams on Delmarva.

The drastic change in pottery technology is seen as an indication of an abrupt social transformation. Site locations change with an increased focus on estuarine resources. A majority of Middle Woodland sites do not overlay Early Woodland sites. It has been proposed that changes seen in the archaeological record indicate Algonquian speakers entering the area (Luckenbach, Clark & Levy 1987).

Jacks Reef points are another type found during this time frame and are a trait of the Webb Phase (Thomas & Warren 1970; Custer 1984). These points are widely spread over Delmarva and have a date range between 500 AD and 1000 AD. They are sometimes found in association with Hell Island pottery which is tempered with finely crushed quartz. Hell Island Pottery appears to be more northerly with only minor amounts found in the lower Delaware and adjacent Maryland. Jacks Reef points are more widespread and have been found across Delmarva (Lowery 2013).

The most studied Webb Phase site in Delaware is the Island Field Site which contained a large cemetery. Exotic goods such as platform pipes were recovered. Similarities have been noted with Kipp Island sites of New England in the types of artifacts recovered (Custer et al 1990:58). Similar pipes and Jacks Reef points have been recovered from the Riverton site in Wicomico County which was destroyed by sand mining.

Late Woodland Period (1000 AD -1650 AD)

The last prehistoric period, known as the Late Woodland Period (1000 AD -1650 AD), lasted until the first contacts with European cultures. The Late Woodland was marked by settled life supported by agriculture although much of the diet continued to be drawn from wild food resources. Site locations are often the same as Middle Woodland sites suggesting a continuation of lifeways. There are more Late Woodland sites than Middle Woodland suggesting a population increase.

This is the first period where maize agriculture is known through archaeological samples in the Middle Atlantic (Thomas Point Site, St. Marys County and Rosenstock Site). Ethnographic data from the eastern shore indicate corn was grown at the time of European contact (Smith 1844). However, recent studies at Gray Farm found bristlegrass (Setaria sp), little barley (Hordeum sp) and possibly wild rye (elymus sp) and maize remains on late woodland pottery shards (Hay et al 2012). The presence of these starch grains and phytoliths indicates the diet of Native Americans during the Late Woodland was not focused on the "three sisters" corn, beans, and squash. Likely these were components of the diet but a variety of native plants would have also been consumed.

Soil type would be an important factor in site location with sites located at the most productive soil. The cooler conditions during the Little Ice Age may have increased the availability of surface water by reducing evaporation rates. Thus sites might be found in places that presently do not have reliable water sources.

Late Woodland settlements were not dense concentrations of houses but were more dispersed. John Smith's description seems appropriate: "Their houses are in the midst of their fields or gardens, which are small plots of ground. Some 20 acres, some 40, some 100, some 200. Some more, some less. In some places from 2 to 5 houses together, or but a little separated by groves of trees" (Smith 1608). It seems that the prehistoric village at Lewes, included a number of dwellings that were spread along the courses of Pagan Branch and Pothooks creek where fresh water was available.

An account by Henry Norwood in 1649 provides a glimpse of dispersed housing on the lower portion of Delmarva. Individual houses were spread across the landscape (Norwood 1649). In his travels, Norwood visits a fisherman's house, then a Queen's house and a King's house a half mile away. Work at the Chicone Reservation in Dorchester County seems to show a similar pattern with house sites along Chicone Creek and a King's house identified as having more material (Busby 2010). This explains the lack of an easily identifiable Indian town at the reservation sites. Palisaded villages are not found on Delmarva except in the far north western portion. Those villages were in areas of conflict with groups from the north.

In general, Late Woodland sites yield fewer flaked and ground stone tools than earlier periods but now include more artifacts of pottery, bone, and shell. Triangular, un-stemmed, projectile points of various shapes are characteristic of the Late Woodland Period throughout the Middle Atlantic States. Townsend/Rappahannock pottery and Killens pottery are typical for this period.

During the Late Woodland, there is a greater use of local stone material (cobbles). There is also regionalization of ceramic technology. Across the Middle Atlantic regional ceramic types such as Minquanan, Killens, Moyoane, Yeowicomico, and others have been identified. These factors suggest populations with more established territories and a reduction in long distance trade.

This is not to say trade or contact with outside groups ceased. Small amounts of non-local ceramics have been found on sites along the Nanticoke. Clemson Island pottery has been noted at sites on the Nanticoke drainage at Middleford (Mellin personal communication), at Prickly Pear Island (Archaeological files, Delaware State Museums) and near Portsville at site 7S-H-104 (Custer & Mellin 1989). This pottery type dates to the early part of the Late Woodland.

Early ethnographic reports record contact between Delmarva groups and those in Pennsylvania and New York. It is uncertain how much of that contact is a result of the impact of European contact and trade.

Ossuary burials are known from this period but single burials are also known. The reason for the two styles is unknown. Dog burials have also been found. Burials have been found in and near habitation sites and lack exotic goods seen in the earlier Adena and Webb Phase burials. True ossuary burials appear to be a late manifestation, after c. 1450 AD, with some containing European goods (Curry 1999).

Historic Era

Native lifeways of the Late Woodland continued as Europeans made their presence felt. As time went on the European disruptions increased, forever changing how the Native Americans lived. Changes came about through disease, importation of new goods and foods, alterations in trade networks and inter-group relations. As the Dutch in New York and the French in Canada expanded their trade networks and conducted war with the English, the natives were drawn into these conflicts.

European settlement of Delmarva has four origins, Cape Charles Virginia, Lewes and New Castle Delaware, and Kent Island, Maryland. Cape Charles was firmly established in the 1630's as was Kent Island. Lewes was permanently settled in 1657. The settlements expanded from their initial points. Virginians expanded north up the peninsula into what is now southern Maryland and lower Delaware. Marylanders from Kent Island moved south, north, and east up the Nanticoke, Choptank, and Chester rivers spreading into what is now Delaware. Lewes and New Castle settlers expanded westward. These movements pushed the native populations toward the center of the Peninsula.

<u>European Disruption</u>

In June 1608 Captain John Smith sailed from Jamestown to explore the Chesapeake Bay. His journey included a stop at the Kuskarawaok (Nanticoke) River. In one passage he mentions they visited two or three little houses each with a fire (Smith 1608). Being June, it is likely these were cooking fires and not for warmth. Smith mentions four groups along the river, the Sarapingh, Nause, Arseek, and Nantiquake. He refers to the Nantiquake as the best merchants of all other savages.

In 1632 the Dutch attempted a settlement on Lewes Creek. Relations with the Native Americans there, the Siconese (various spellings) did not go well and the fort was destroyed along with all of its inhabitants. In 1654 the Dutch re-settle. This time for good and it is the Natives that give ground.

The Maryland government declared war on the Nanticokes, and others in 1642 and 1647 although little fighting occurred. European settlement reached the Nanticoke in the 1670s. By 1670 Maryland claimed all of the Nanticoke drainage and issued land patents. A series of reservations were created in 1678 including Tundotank, Askiminikansen, Parahawkin, Puckamee and Chickone. The latter two

were opposite each other across the Nanticoke River and were established for the Nanticoke nation. Chicone became known as the residence of the Chief of the Nanticoke and trade with Europeans took place here. Mentions of Puckamee are short-lived in the records (Roundtree & Davidson 1997). The Chicone reservation was along the north side of the Nanticoke from Chicacone Creek to the Marshyhope (Figure 4).

By an act of General Assembly in Maryland, the Broad Creek Reservation was set aside for the Nanticokes in 1711 (Maryland Archives Online). The reservation was created near an existing Nanticoke town that had been occupied for at least one hundred years (Rountree and Davidson 1997). The three thousand-acre reservation included land on the north and south sides of Broad Creek including where the town of Laurel is now located (Figure 4). Although the Nanticoke now had land set aside for their sole use, the English continued to disregard boundaries and tensions escalated (Busby 2010). At this same time a roughly one thousand-acre reservation, Askekesky, was created on the south side of Shiles Branch of the Indian River west of present-day Millsboro.

In 1742 Maryland's Lord Proprietor entered into new treaties with the lower Eastern Shore tribes. Indian people would not be allowed to possess hunting rifles unless they were licensed. No relatives or groups from outside of the reservation were permitted to visit. Native people were not permitted to enter an English town without a prior appointment or announcement. Separate treaties were made with the groups across the shore including the Chicone and Broad Creek groups (Maryland Archives 1883A). These treaties forbade the groups from combining their leadership (Maryland Archives 1883A).

After 1742 there was a continued disintegration of the native communities (Roundtree & Davidson 1997:155). There was continual encroachment and harassment by European settlers and individuals were moving between reservations. Many reservation inhabitants went to live with the Susquehannas. Some removed to the Six Nations area where they were assimilated into the Iroquois. Others left the reservation and acculturated within English society. Because of the depopulation of the Native groups, the reservations of Chicone and Broad Creek were reclaimed by Maryland and sold off between 1768 and 1785 (Roundtree & Davidson 1997:159). Native inhabitants apparently sold off the last of the Askekesky lands by 1741 (Roundtree & Davidson 1997:156).

Those Native Americans that did not leave Delmarva bought land, and adopted European style living. They maintained their social ties and developed closed communities. In 1881 the Indian River Nanticokes incorporated and were recognized by the state of Delaware as a legal entity after the Nanticoke were recognized by social scientists as a remnant population worthy of study (Babcock 1899; Speck 1915). There exists today a tribal organization and there is a conscious effort to rebuild the tribe's identity.

Exploration and Frontier Settlement (1630 - 1730) (Contact Period)

European settlement of the Delmarva Peninsula began in Virginia about 1628, at Lewes (Swanandael) about 1630 and along the upper Chesapeake Bay about 1633. The Delaware settlements were contested between the Swedes, Dutch, and English. By 1674 the English had gained complete control of the region. After William Penn was granted the Delaware counties in 1682 the economic focus became centered around Philadelphia.

During this period, Native Americans in Delaware lost their prehistoric lifeways through various processes of resistance, discrimination, assimilation, and displacement. Earliest contacts included trading with the Europeans for goods. Native groups became entangled in the complex European politics of the day and were played by one nation against others. A significant factor in the disappearance of the Native American lifestyles was the introduction of European diseases which the Americans were not physically equipped to fend off. Between the fighting, diseases, and discrimination, the Native Americans either left the region or hid themselves either in small groups or assimilated as best as possible into the new European styled society. Native American descendants survive to the present day.

The largest groups are currently on the north side of the Indian River and in the Cheswold area of Kent County. In historical perspective, native groups from the lower Nanticoke moved up-river as Europeans encroached on their land. A reservation was established in the Laurel area in 1711 that persisted until 1768 (Roundtree & Davidson 1997).

European expansion in southwestern Sussex County came largely from Maryland. Until 1776 the boundary was not established but seems to have been generally conceded to be the Nanticoke River. Early land patents on the west side were filed in Dorchester County. Agriculture appears to have been the major economic endeavor in the region.

Intensified and Durable Occupation (1730 - 1770)

The population of lower Delmarva grew steadily during this period. Life was centered around agrarian pursuits. Farm products reached foreign markets through Philadelphia or Baltimore with the Nanticoke River being an important avenue to the Chesapeake. Iron forges came into existence along the Nanticoke, and presumably along other waterways, about 1760 and were largely gone by the Revolution. Road networks were developed and settlers moved further inland. Small hamlets like Cannon's Ferry developed at this time, mostly along river crossings (DeCunzo & Catts 1990:44).

Transformation from Colony to State (1770 - 1830)

The Revolution altered foreign markets. Food produced on Delmarva was sold in Baltimore and Philadelphia instead of Europe or the West Indies. These economic ties continued until the Civil War. Rapid population growth after the Revolution led to the clearing and tilling of marginal lands (DeCunzo & Catts 1990:53). In 1776 the Maryland/Delaware boundary was established in its present location and the lands on the west side of the Nanticoke were re-patented in Delaware.

In 1810 more than 70% of the textile mills of Delaware were in Sussex County. Flax and wool were major crops in the county. Diversified farming of grains and potatoes along with various life stock existed in the rural areas.

Industrialization and Capitalization (1830 - 1880)

The rise of Baltimore as an important overseas port siphoned Delmarva goods away from Philadelphia. Railroads reached the lower peninsula around 1850 and Seaford in 1868. This allowed farmers to raise more perishable, and lucrative, crops such as peaches. Canning also developed after the Civil War and became an important industry. Corn and wheat remained the major crops. At the

same time, it shifted the main commercial routes from water to the rail lines with new railroad towns springing up.

Urbanization and Sub-urbanization (1880 - 1940)

The term for this period is somewhat misleading for central and southern Delaware. Little urbanization occurred. The most significant changes of this period in southern Delaware were improvements in transportation and a shift to truck crops and poultry as major farm products. Some industry related to the wars, in particular the establishment of airfields, did occur. The modern poultry industry that quickly raises and markets chickens was developed in Sussex County. The need to satisfy feeding requirements of the birds shifted crops from truck items to feed crops.

PREVIOUS RESEARCH

Generalized predictive models for prehistoric site locations vary depending on the views of the creators of those models. Commonalities in the models are environmental variables used as predictors for site locations. These include soil slope, soil drainage, and distance to surface water. Slopes greater than 8 percent are generally seen as not likely to contain prehistoric sites except for specialty sites such as rock-shelters or quarries. Well drained soils are more likely to contain sites than poorly drained soils. The current project area is considered to have a high potential for containing prehistoric archaeological sites (Otter 2019). It is not surprising that archaeological sites have been reported on the property.

The archaeological site files maintained by the State identifies three previously recorded archaeological sites on the property (Figure 4). Prehistoric site 7S-G-116 was located in 1988 during a survey conducted by the University of Delaware. No datable artifacts were found. The only material reported was six fire cracked rocks and a broken chert pebble. These are attributed to Native Americans. No information is available on the archaeological site form for 7S-G-59 but it has been determined to be prehistoric in age.

Another site, 7S-G-13, was located in the 1950s. A single pit feature was excavated in 1962. The pit appeared to be an Indian refuse pit with clam and oyster shells. However, dateable artifacts from the feature were of European or American manufacture and not Native American. The artifacts suggest a date from the early to mid-18th century and was interpreted as potentially representing an historic period Native American site (Parsons et al 1962).

ARCHIVAL RESULTS

Archival records examined for this project include land records, wills, orphans court records, and judicial case files. All of these were examined to produce a history of land tenure with the goal of determining land use through time. Often, old plat maps are encountered that show buildings as well as property lines and water features. Other historic documents examined include aerial photographs and atlas maps. These documents show the locations of buildings and can be useful for determining land use for the period after the Civil War.

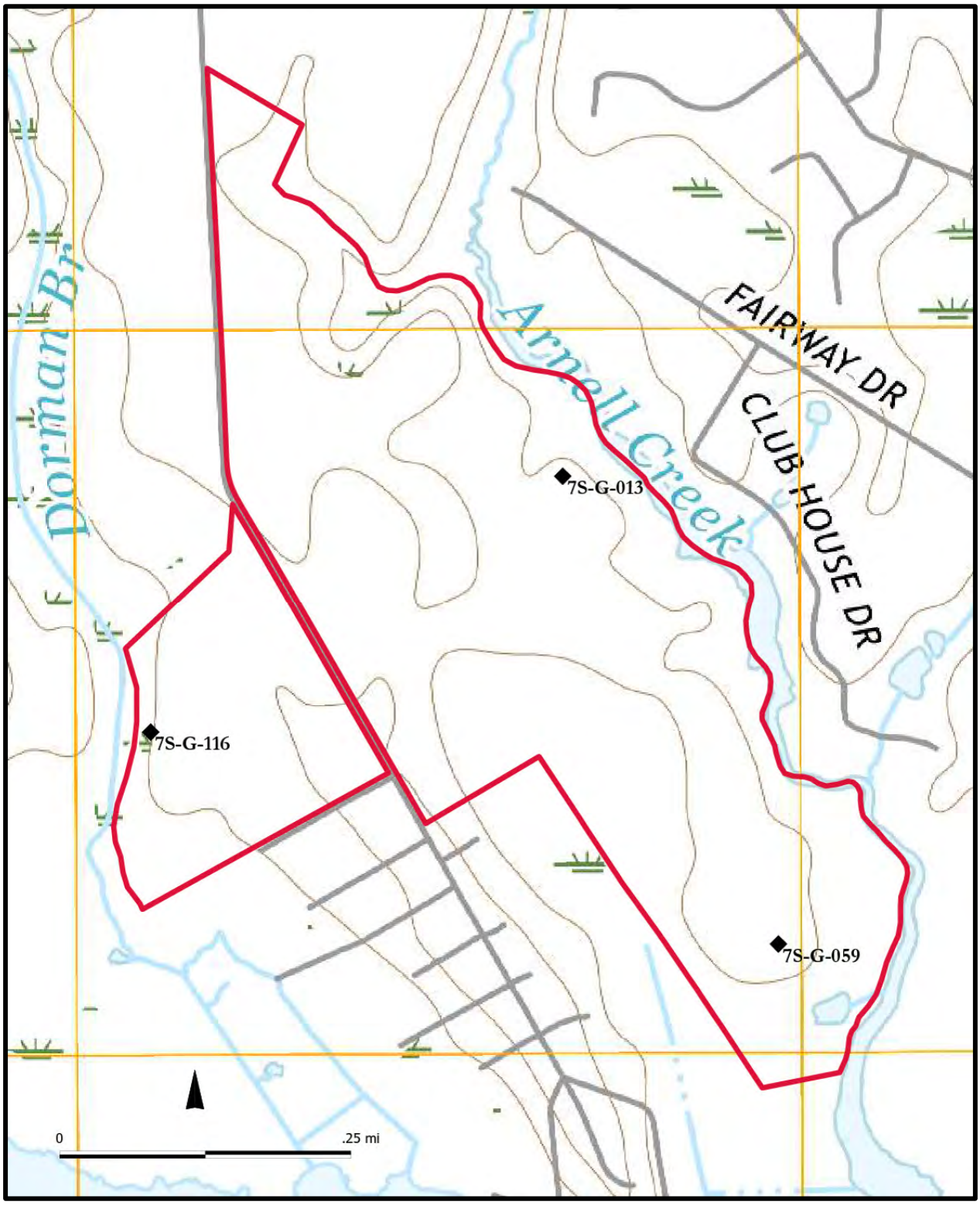

Figure 4. Previously Recorded Archaeological Sites

Land Tenure

The land history is tied closely with the Futcher family who owned the tract through several generations. The Futchers owned over 1000 acres of land that included both sides of Arnell's Creek. The large tract east of the creek was known as Peach Blossom. To the west was Warring Neck.

In 1675 William Warren received a patent for 327 acres of land called Warrens Neck (9/225). Warren signed that land over to William Futcher in 1677 (9/226). William died and the land passed to his son, William. William Jr. died in 1703 leaving the land to his son, John. The property was re-surveyed in 1714 (Figure 5).

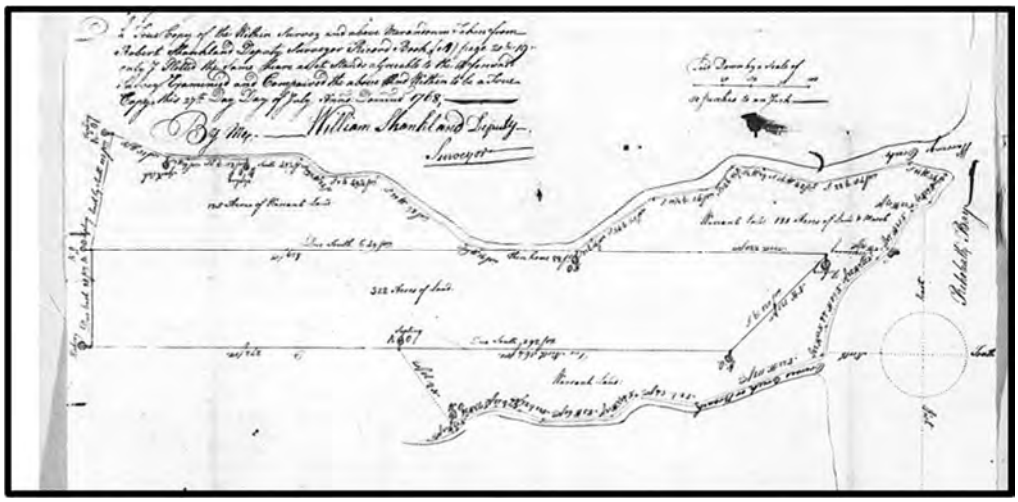

Figure 5. 1714 Plat of Warrings Neck

John died in 1720 leaving the land to his son William. William died in 1754 and the land passed to his son, John. John willed the land to his son William. When William died in 1795 it passed to his son, John, who passed the land to his son, William, by 1816. In 1836 William passed and the land was inherited by his son, John.

When John died in 1865 his land passed to his three sons, John M., Erasmus M. and Joseph F. In 1871 and 1872 Joseph F. Futcher, Erasmus M. Futcher, and John M. Futcher sold their lands to Edward C. Phillips (deeds 83/289 to 83 300). In 1901, after Edward's death, Robert and Charles Phillips sold the 307 acres of land to Captain Benjamin Robinson (135/18).

In 1926 Benjamin Robinson conveyed this land to the Sussex Trust Company (259/24). Thomas and Emily Best purchased 170 acres of the land in 1941 (330/421). The other 137 acres which now contains Mulberry Knoll subdivision, was sold to Benjamin Robinson Jr. in 1946. In 1957 Thomas Best sold the land to Thomas Best & Son, Inc and they retain ownership to the present.

The 1868 Beer's atlas of Delaware shows landowners. While not accurately drawn, the map shows Joseph F. Futcher living at the house known as Mulberry Knoll (Figure 6). His brother John M. is shown on the current tract as is R. M. Futcher, presumed to be Erasmus. Both houses shown on the property have since been demolished. There is a mobile home at the location marked R. M. Futcher. The State recorded a frame structure there in 1979 (Figure 7) along with a few outbuildings (Figure 8) and is known as the Robinson Tenancy.

Figure 6. 1868 Beer's Atlas

Figure 7. 1976 photo R. Futcher house (Cpt Robinson Tenancy CR S01001)

Figure 8. Robinson Tenancy (rear). Barn to right

The Cpt Robinson Tenancy can be seen in aerial photography from 1937 (Figure 9) and 1954 (Figure 10). The state files recoded outbuildings at the Robinson Tenancy but those have been demolished. The house known as Mulberry Knoll appears to have been the family home of the Futcher family.

No record of a cemetery was found for this property. There is a tombstone that was removed from its original location noted only as "near Mulberry Knoll." The stone, dated 1830 for William Rhodes is believed to be in private hands in Lewes. Aerial photography does not indicate a cemetery on the property.

FIELD RESULTS

Archaeological field work was conducted in two parts. One part was a surface survey within the plowed fields. The other involved shovel tests within wooded areas that are included within the proposed impact areas of the development. Within the plowed fields artifacts were identified and their location noted with a total station and data collector. Within the woods, grid points were marked at 50-foot intervals where shovel tests would be dug. Positive shovel tests were flanked at 25-foot spacing by radial tests to better determine the nature of the finds. Three small areas and one large area were tested. A total of 202 shovel tests were dug within the woods (Figure 11). Nine shovel tests were also excavated within the field to examine soil profiles (Appendix I).

Prehistoric and historic period artifacts were encountered across the project area (Appendix II). The wide-spread distribution of artifacts is indicative of field spreading which is common on Delmarva (Figure 12). However, by examining different types of artifacts and their distribution it is possible to identify sites among the spread. Typically, spread artifacts are historic in age.

Prehistoric Materials

As noted in the previous research section, three archaeological sites had been identified within the project area prior to this investigation. Two of the sites were not identified as to size or age. During this study, these three sites have been identified based on the distribution of prehistoric artifacts (Figure 13). In addition, two small previously unknown sites were identified (Figure 14).

The sites vary in content. Rhyolite and argillite lithic debitage are largely confined to site 7-S-G-59 (Figure 15). Chert debitage is found at 7S-G-116, 7S-G-13, Mulberry 1 and Mulberry 2 (Figure 16). Fire cracked rocks are widely distributed (Figure 17).

Temporally diagnostic projectile points vary by site as well. 7S-G-59 produced a Middle Archaic Morrow Mountain point and a Late Archaic contracting stemmed point (Figure 18). There was a Late Woodland triangle recovered from Mulberry 1 (Figure 19). An Early Archaic bifurcated point was found isolated within the field. Typed prehistoric ceramics found on Mulberry 1 include Late Woodland Townsend/Rappahannock and Killens pottery (Figure 20). Townsend/Rappahanncok and Wolfe Neck pottery from the Early Woodland were recovered from Mulberry 2 (Figure 21).

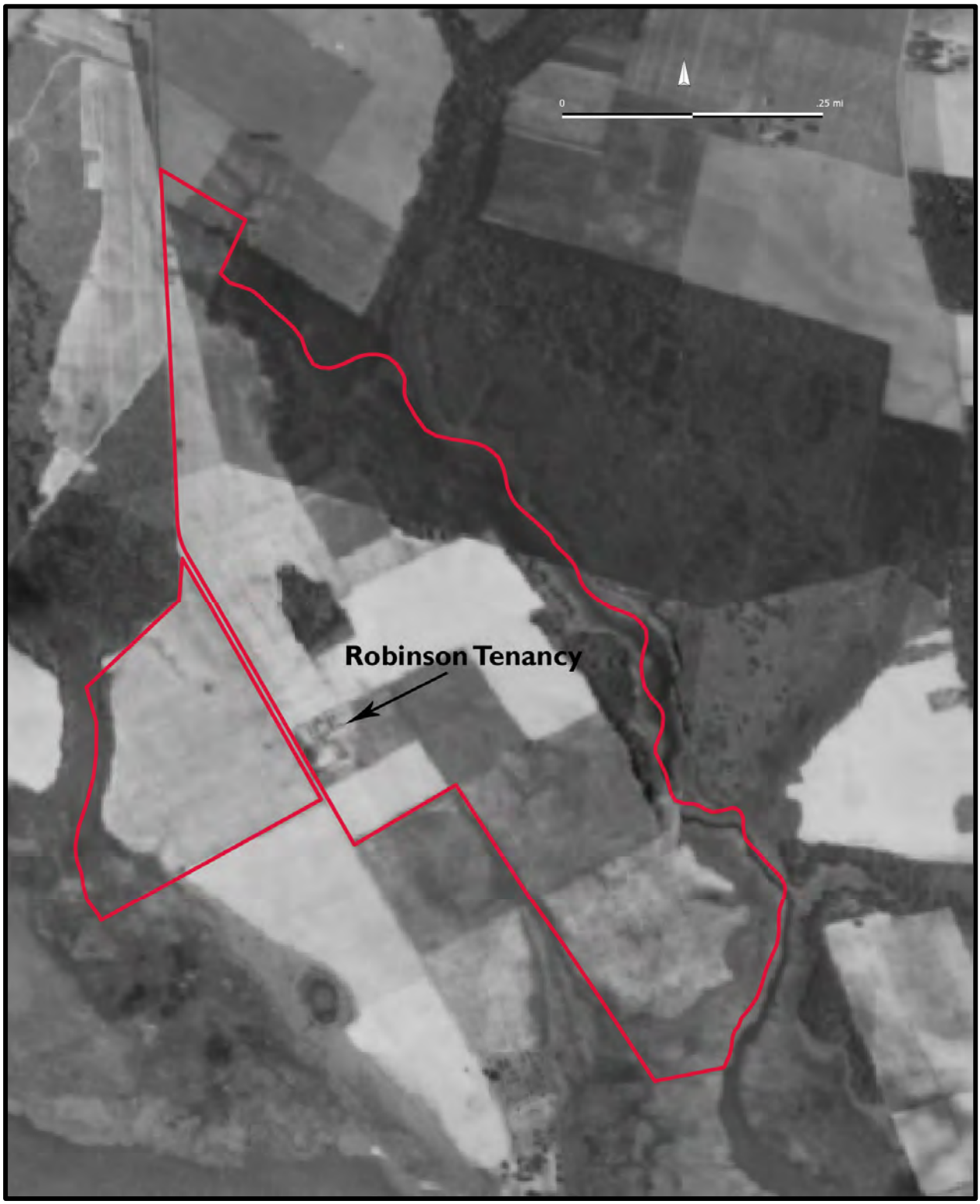

Figure 9. 1926 Aerial Photography

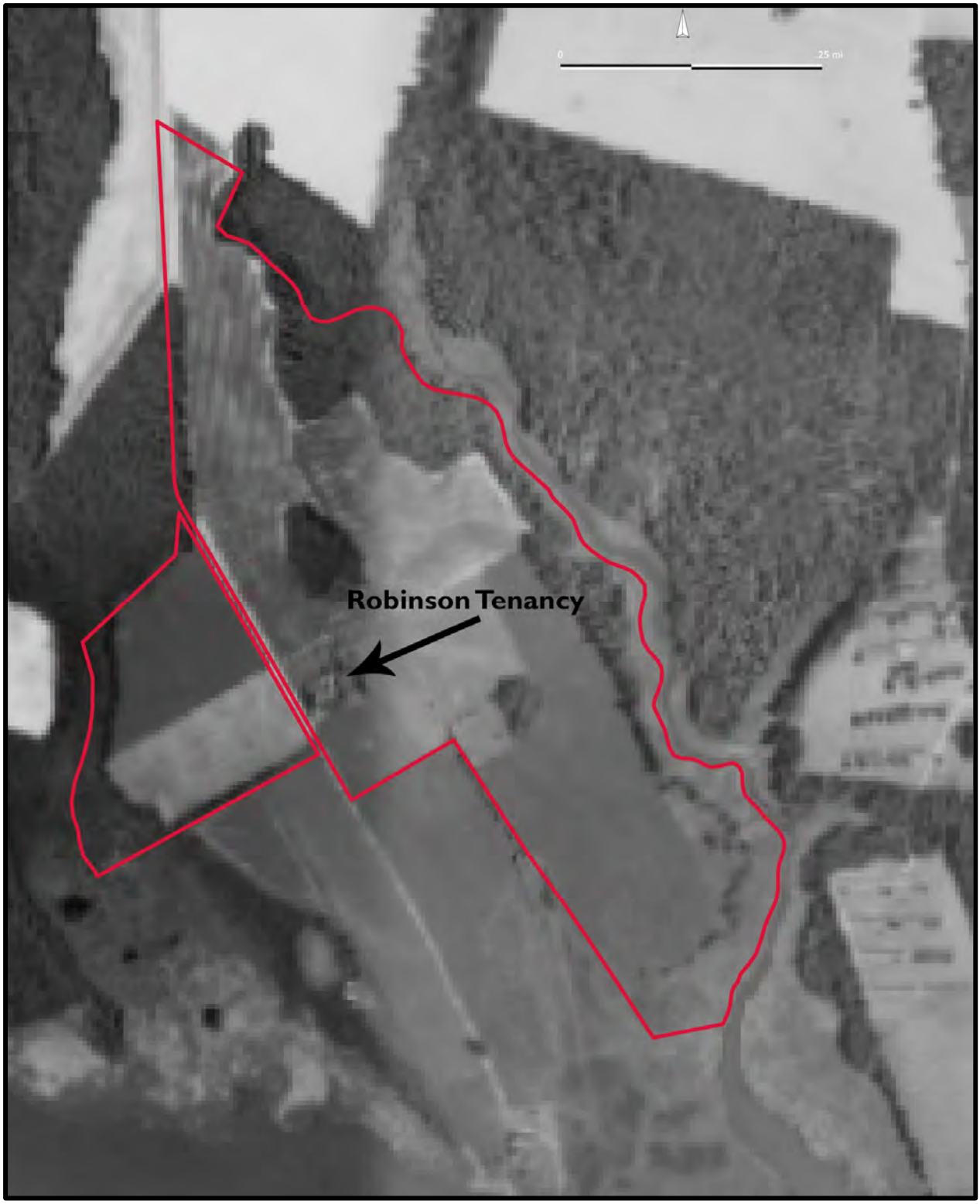

Figure 10. 1954 Aerial Photograph

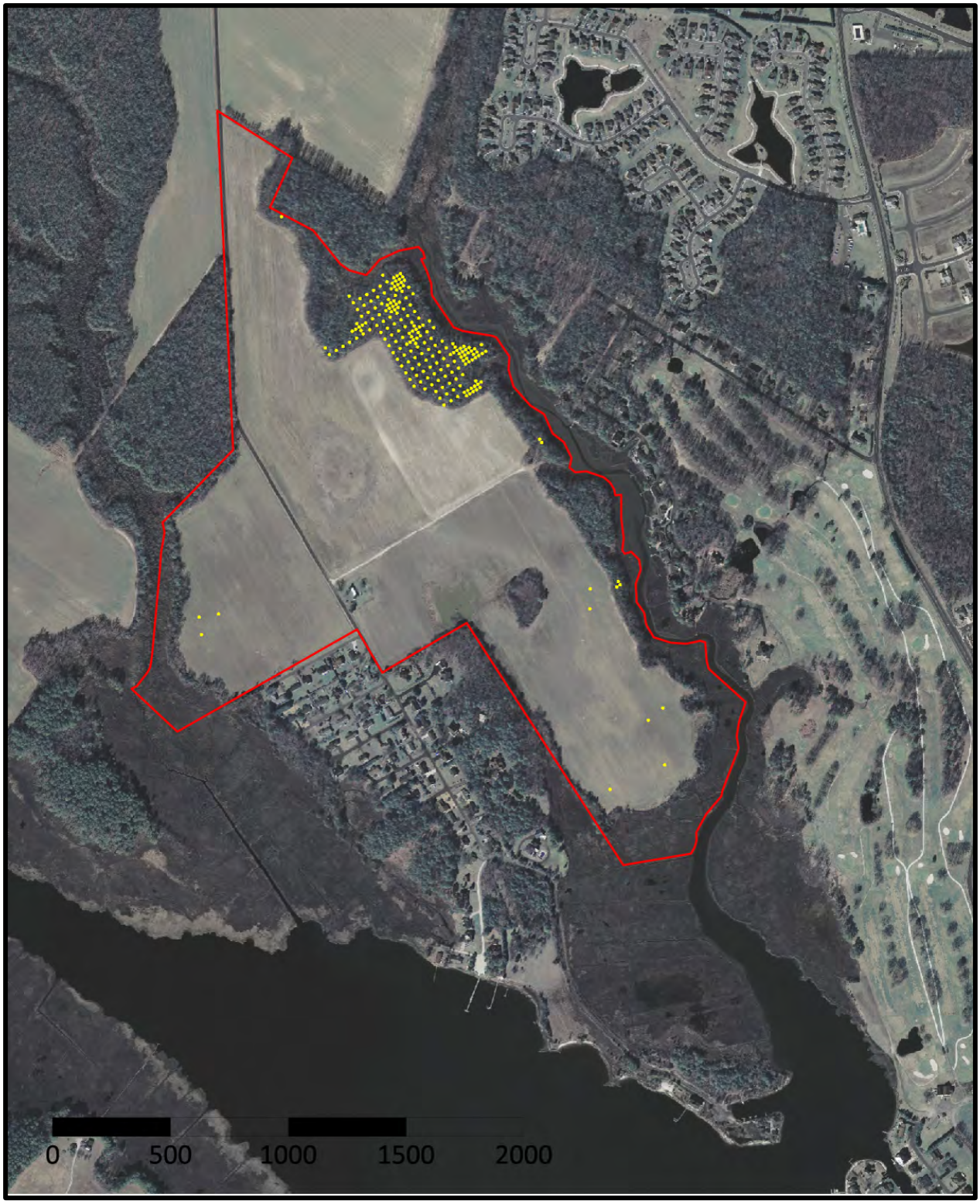

Figure 11. Shovel Test Locations

Figure 12. Distribution of All Artifacts (Red=Historic, Yellow = Prehistoric)

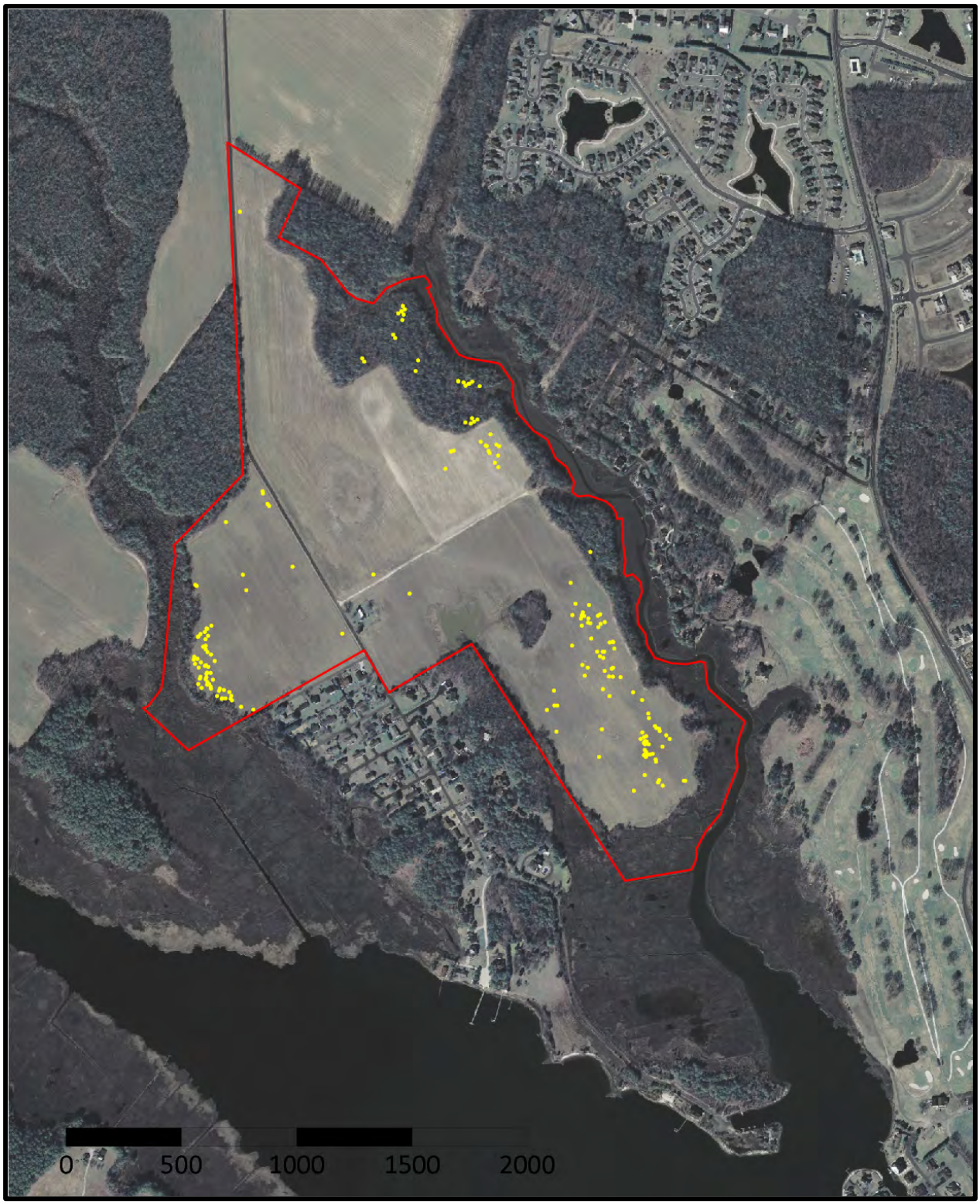

Figure 13. Distribution of All Prehistoric Artifacts

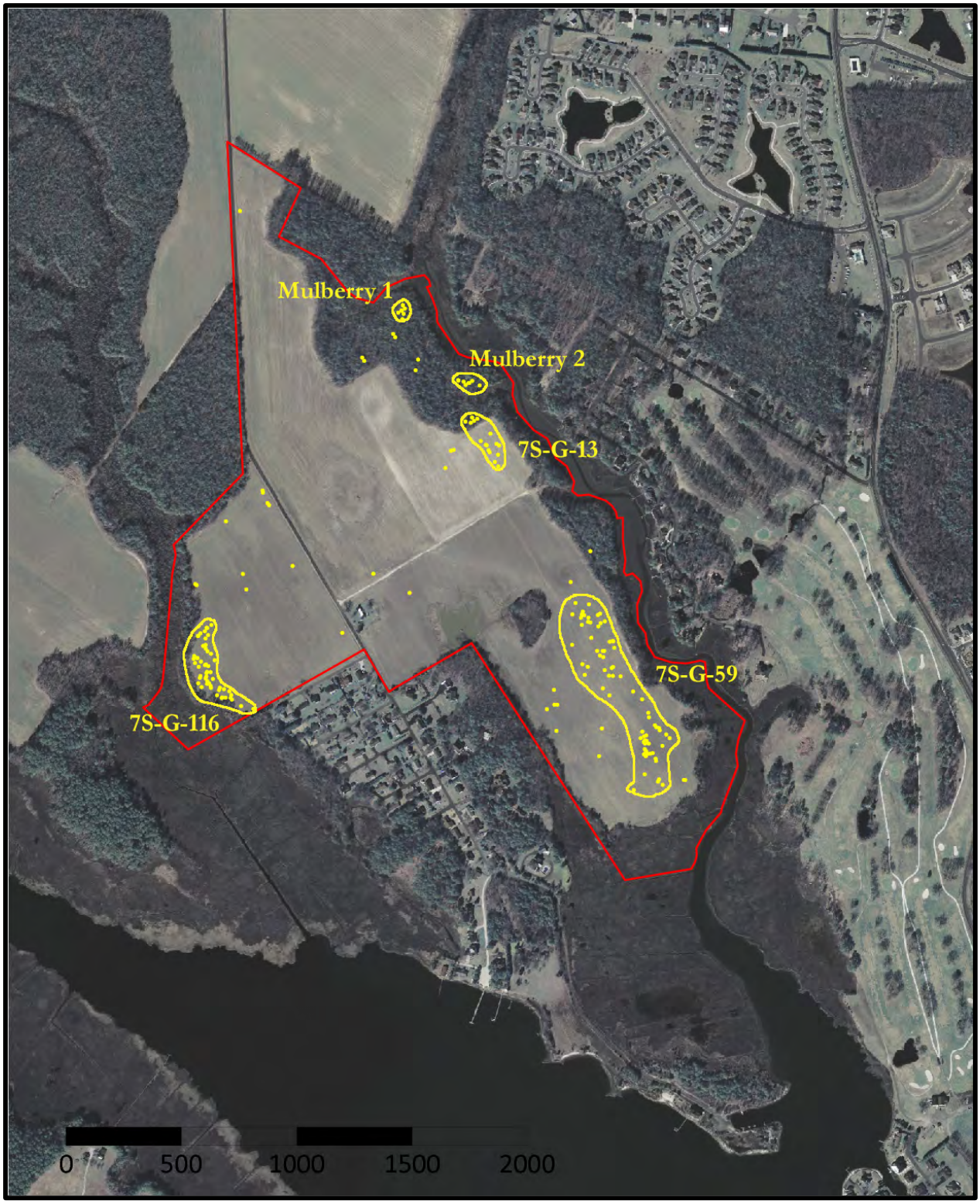

Figure 14. Aboriginal Archaeological Sites

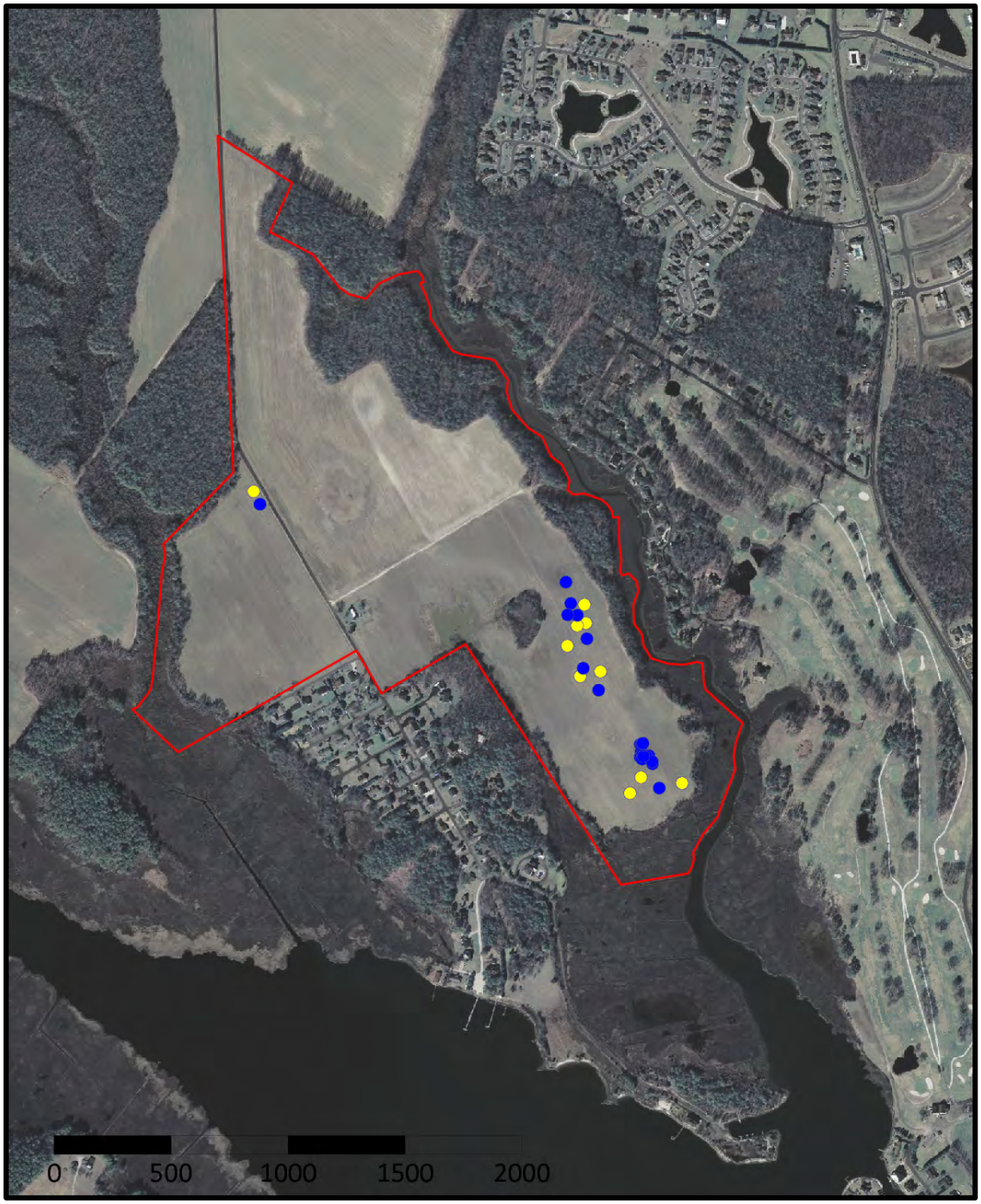

Figure 15. Rhyolite (Blue) and Argillite (Yellow) Debitage

Figure 16. Chert Debitage

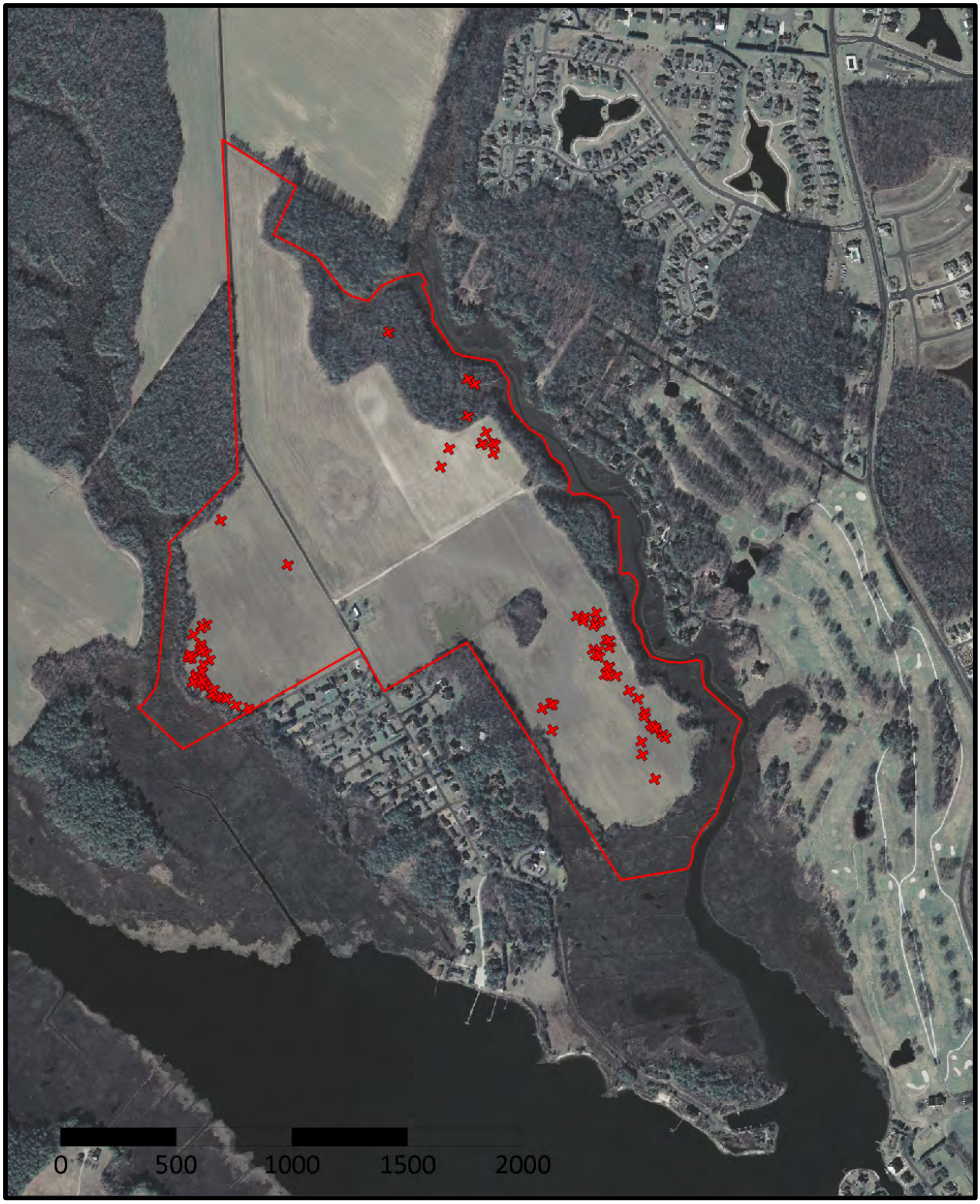

Figure 17. Fire Cracked Rock

Figure 18. Argillite Morrow Mountain and Quartz Stemmed Point from 7S-G-59

Figure 19. Late Woodland Triangular Point

Figure 20. Late Woodland Townsend Ceramics

Figure 21. Early Woodland Wolfe Neck Ceramics

In all, there are five prehistoric sites identified within the study parcel. 7S-G-13 contains prehistoric artifacts but no temporally diagnostic items were found. 7S-G-59 dates from the Middle Archaic and Late Archaic. The site along Dorman Creek, 7S-G-116 also produced no temporally diagnostic artifacts. Mulberry 1 and Mulberry 2, found along Arnell's Creek, are Late Woodland in age with an Early Woodland component at Mulberry 2.

Historic Materials

Prior to the initiation of this study, one archaeological site with historic materials was known to exist. A shell filled cultural feature had been excavated from site 7S-K-13. A historic house, the Robinson Tenancy, had been present on the property and that was assumed to be a historic site.

The distribution of historic period artifacts revealed a scatter of artifacts across most of the field (Figure 22). Using the distribution of domestic artifacts, vessel glass and ceramics, it is possible to identify historic period sites (Figure 23). One is the Robinson Tenancy. 7S-G-13 is identifiable and there is another previously unknown site. This site is in the approximate location of the house shown on the Beer's 1868 Atlas as belonging to J. M. Futcher (Figure 4). Because this site is within the boundary of prehistoric site 7S-G-59 it is included within that site number.

The distribution of solarized bottle glass, ironstone ceramics, and milk glass canning lids, items typical from the end of the 19th century and early 20th century pinpoint the Robinson Tenancy and the Futcher House (Figure 24). The distribution of Whiteware and Yellowware also show the two sites (Figure 25).

There were few 18th century artifacts found on the property. Four were widely spread but three pieces of white salt glazed stoneware, two with scratch blue decoration, were found at 7S-G-13 (Figure 26). This is the only 18th century site, and the earliest site, located on the property.

Identified Sites

In all, six archaeological sites have been identified on the Mulberry Knoll property. Two contain prehistoric and historic materials, one is historic, and three are prehistoric.

7S-G-13

This site was recorded in the 1950's after members of the Sussex Society for Archaeology and History excavated a pit feature (Parsons, Hutchinson, Marine & Maeyens 1962). The pit was found to contain ceramics dating to the early to mid-18th century. A shovel test dug within the woods on the north edge of this site encountered a deep soil with charcoal which could be a cultural feature.

This survey identified three shards of white salt glazed stoneware, two with scratch blue decoration (Appendix II). This ceramic type fits within that time frame. Nine fragments of red bodied earthenware, a type more typical pre-1850 was also found at this site.

There was a thin concentration of clam shell at this site, likely scattered contents of the shell pit excavated in the 1950s. Also present were 16 chert and one quartz flake. Seven fragments of fire cracked rock were recorded.

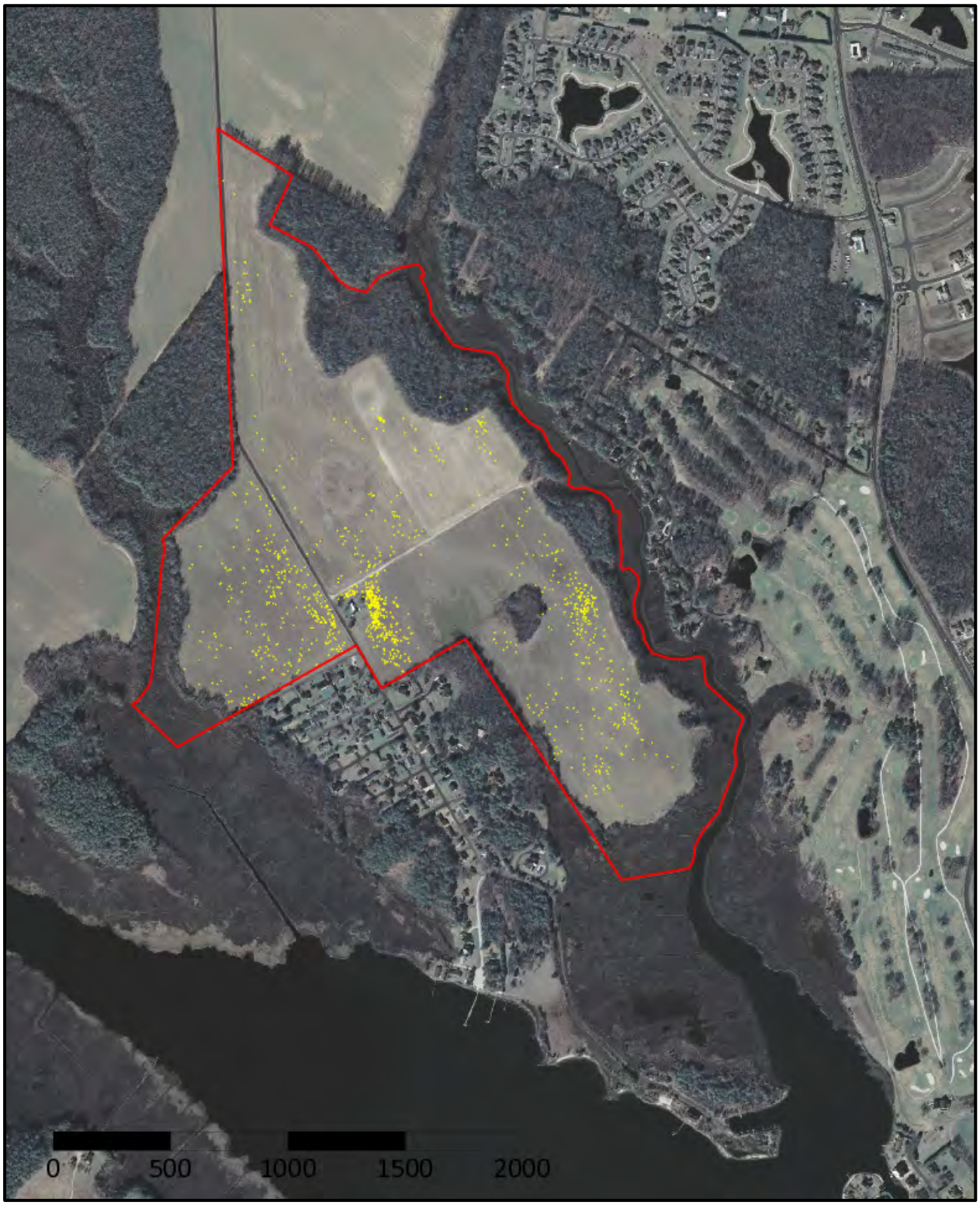

Figure 22. Distribution of Historic Artifacts

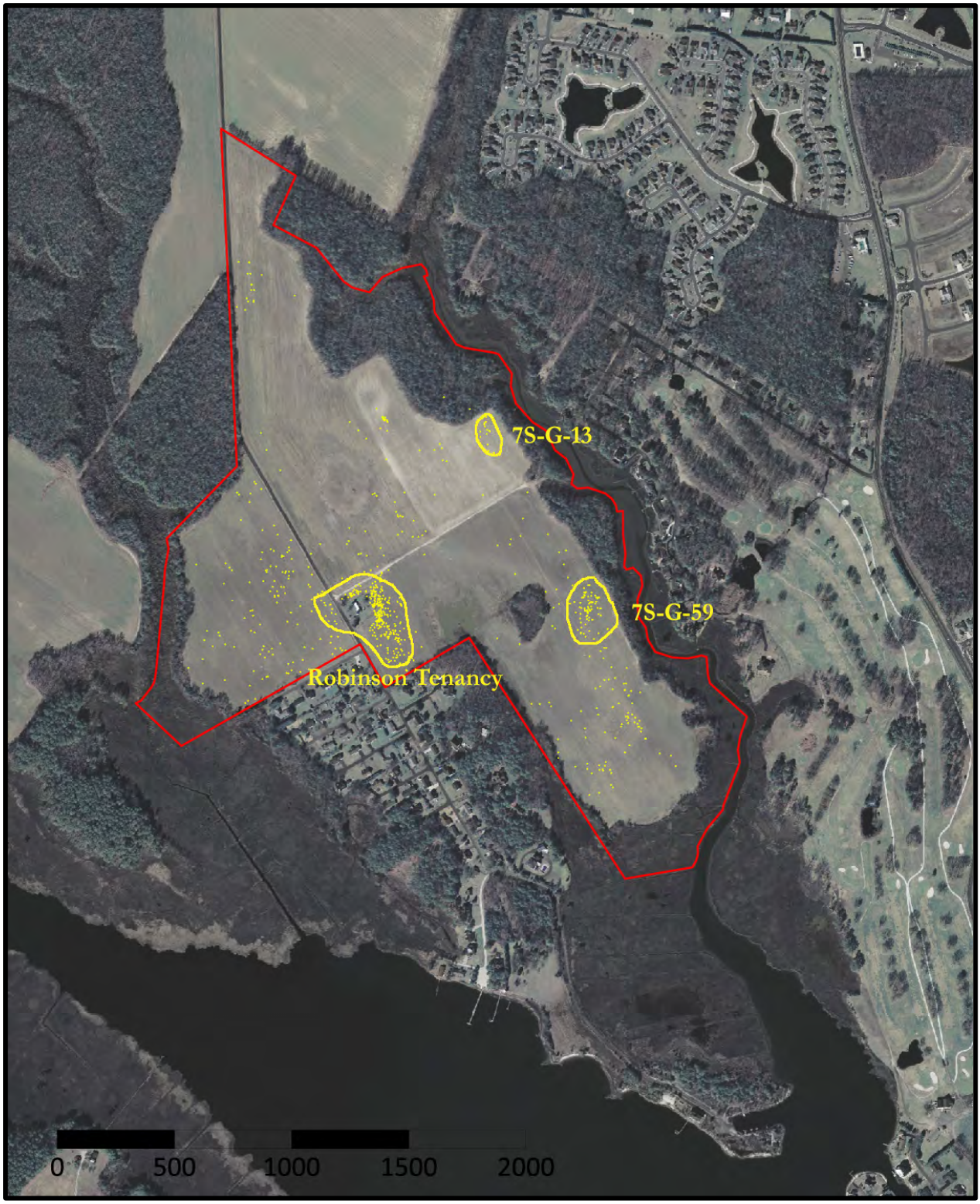

Figure 23. Domestic Artifact Distribution and Historic Period Archaeological Sites

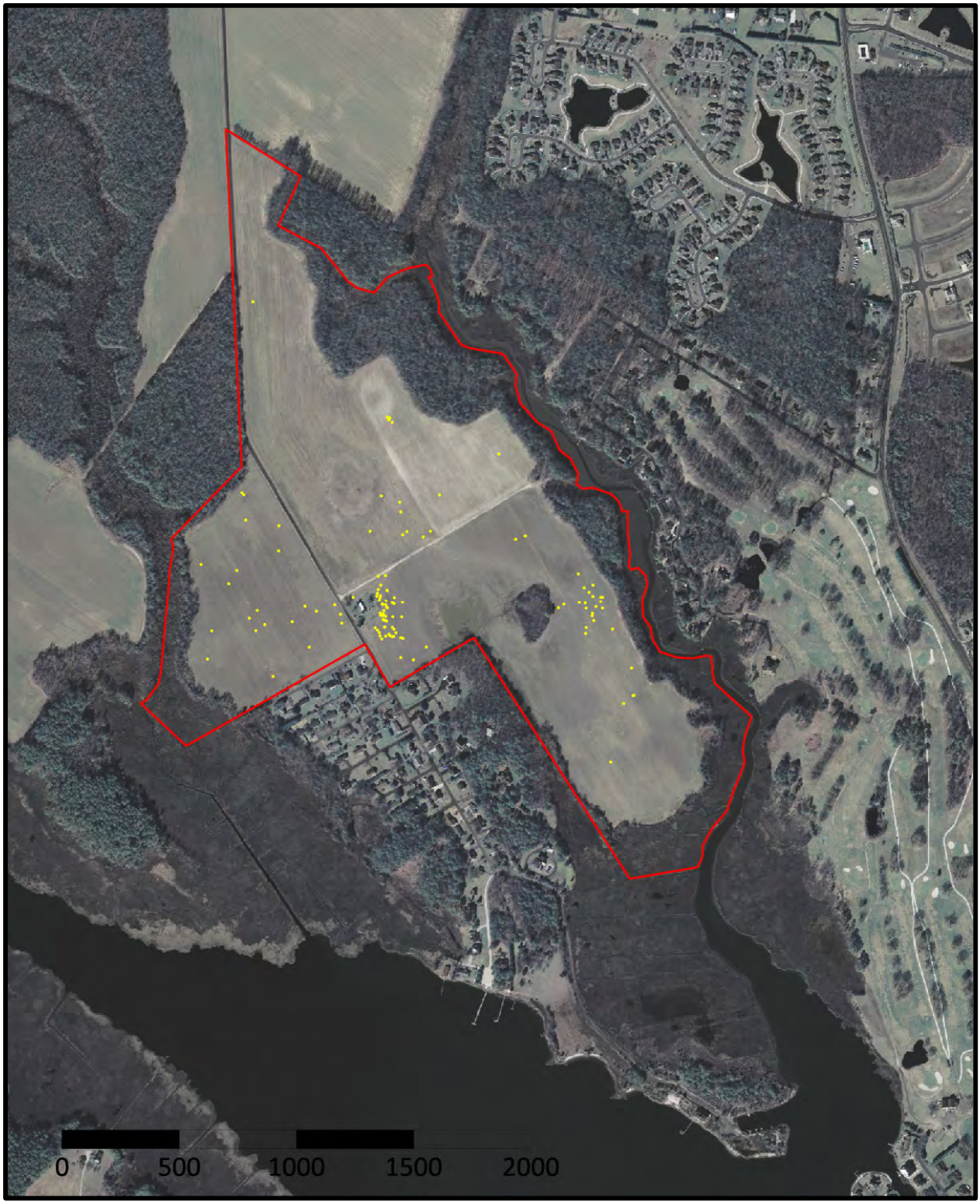

Figure 24. Ironstone, Solarized Glass and Milk Glass

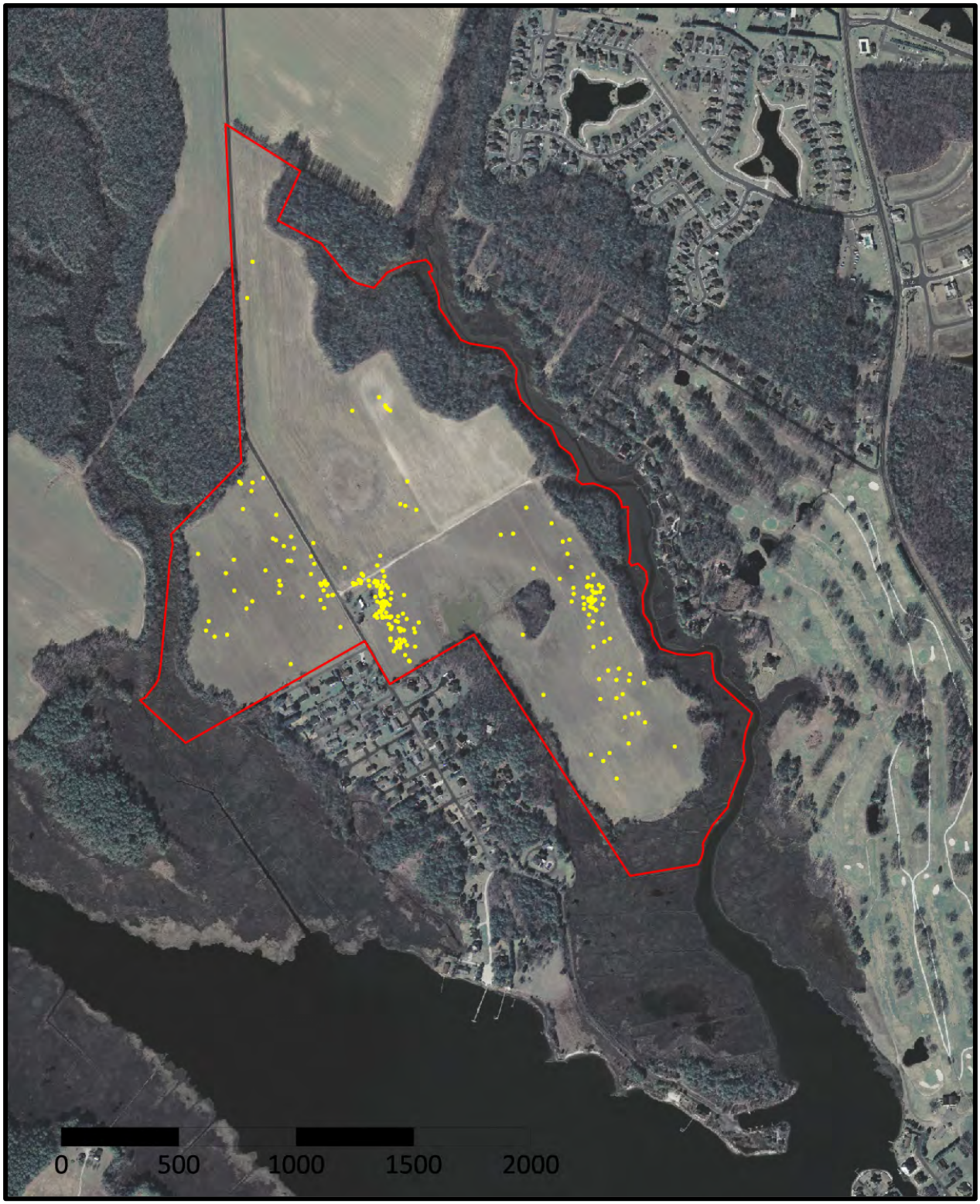

Figure 25. Distribution of Whiteware and Yellowware

Figure 26. 18th Century Artifacts

7S-G-59

The site form on file for this site has no information as to temporal affiliation. This study has identified a scatter of prehistoric artifacts that follows the course of Arnell Creek. This scatter is large enough that it includes the location of the J. M. Futcher house which was identified during this survey. Both components are included within the revised boundaries of 7S-G-59. Five shovel tests (East 1 - East 5 in Appendix II) were excavated within the limits of this site. In all cases, the tests revealed a sandy loam plow zone on top of a sandy loam subsoil. No artifacts were encountered within the B-Horizon.

Prehistoric materials from this site include 14 rhyolite and 7 argillite flakes, 2 chert pieces including a stemmed point, 12 quartz flakes and one quartzite biface. There was a mano fragment and a mortar fragment recorded and 32 fire cracked rocks (Figure 27).

Figure 27. Mano Fragments from 7S-G-59

Historic artifacts were typical of a 19th century domestic site. There were brick fragments (58) and window glass (12). Ceramics included whiteware, yellowware, ironstone, and red bodied earthenware. Four pieces of pearlware were recorded as were thee pieces of porcelain. John M. Futcher was born in 1835. Likely he built this house on land still owned by his father, probably around 1855. The house was present in 1868 and gone by 1937. This chronology is in keeping with the artifacts. Since the early 20th century, the site has been plowed.

7S-G-116

When this site was discovered in 1988, no temporally diagnostic artifacts were reported. This survey located prehistoric and historic artifacts (Appendix II). There were 34 historic period artifacts (brick, whiteware, bottle glass, etc.) that are interpreted as part of the field scatter on the property. This material is not clustered in this area. There were also 51 prehistoric artifacts.

The prehistoric artifacts include 30 fire cracked rocks. A hammerstone and a mano were recorded. Debitage consisted of three quartz flakes and 11 chert flakes. There were two broken chert cobbles and five of the flakes retained cortex indicating lithic reduction from locally procured cobbles took place here. A chert biface and a quartz biface were also found. None of the artifacts recorded are temporally diagnostic so a time period of occupation cannot be assigned to this site.

Robinson Tenancy

The house known as the Robinson Tenancy was standing in 1868 and as recently as the 1960s. It has since been replaced by a mobile home. Like the J. M. Futcher house, this building was likely erected in the mid-19th century. Scattered around where the house and outbuildings were, are many artifacts. The house, now gone, is an archaeological site.

Historic period artifacts were more concentrated in this area than anywhere else on the property. The artifacts consisted of architectural and domestic items. Ceramics on this site dated from the mid-19th century to the mid-20th century. Pearlware was not common but whiteware and ironstone ceramics were. Green Fire-King pyrex glass which dates after the 1940s was found at this site.

Mulberry 1

Mulberry 1 is a small site located on high ground overlooking Arnell's Creek. The site was located by shovel tests within the wooded portion of the property. Fourteen chert flakes and four quartz flakes were recovered (Appendix II). There were eleven sherds of Native American pottery of the Townsend/Rappahannock type (Figure 20) found at the site along with two shards typed as Killens. Both of these are indicative of the Late Woodland Period.

Mulberry 2

Mulberry 2 is similar in setting to Mulberry 1. This site was also located during the shovel tests survey. Six chert flakes were found here along with two fire cracked rocks and prehistoric pottery. Eleven of the 15 pottery shards were too small to type but there were two pieces of Late Woodland Townsend/Rappahanock and two fragments typed as Wolfe Neck (Figure 21). The Wolfe Neck shards indicate a period of occupation dating from the Early Woodland (800 B.C. - A. D. 100).

CONCLUSION AND RECOMMENDATIONS

Archaeological field survey has identified six archaeological sites on the Mulberry Knoll property. Three of these had been previously reported to the State Historic Preservation Office. Three sites, 7S-G-116, Mulberry 1 and Mulberry 2 are prehistoric in age. All of these sites are located in areas where storm water ponds or building lots are planned (Figure 28).

Archaeological sites are typically considered significant when there is scientific information about the past that can be learned from the site. At this time, the potential for these sites to contain intact deposits and scientific information is unknown. Based on the available information, the sites within the fields are likely heavily disturbed by plowing. Plowing mixes the upper layer of soils but deep deposits can persist. The prehistoric portion of site 7S-G-59, being of an Archaic age, likely does not contain subsurface pit features and is most probably totally mixed within the plow zone. The historic portion of this site may contain deep features such as a well and post holes.

7S-G-116 is of unknown cultural affiliation, other than being prehistoric. There were some clam shells near this site but it is not certain that they are associated with the prehistoric occupation. Additional investigation of this site is warranted.

The Robinson Tenancy site may contain deep features. The long period of occupancy at this site, with demolition of the house and outbuildings, and the installation of the current dwelling, likely has impacted the earlier deposits. Because of its age and length of occupation, it is believed that there is little to be gained by further investigation of this site.

Site 7S-G-13 is known to have contained at least one deep pit feature that was excavated in the 1950s. The nature of that find is intriguing as the pit appeared to be a typical Late Woodland shell filled pit like those found on other sites in the area. However, rather than containing prehistoric artifacts the pit contained materials from the 18th century. One possibility is that this represents the site of historic period Native American occupation. One shovel test dug at this site may have encountered another cultural feature. This site should be further investigated.

Mulberry 1 and Mulberry 2 are both small woodland period sites. Woodland period sites often contain deep pit features. These sites warrant further investigation to determine if any integrity remains.

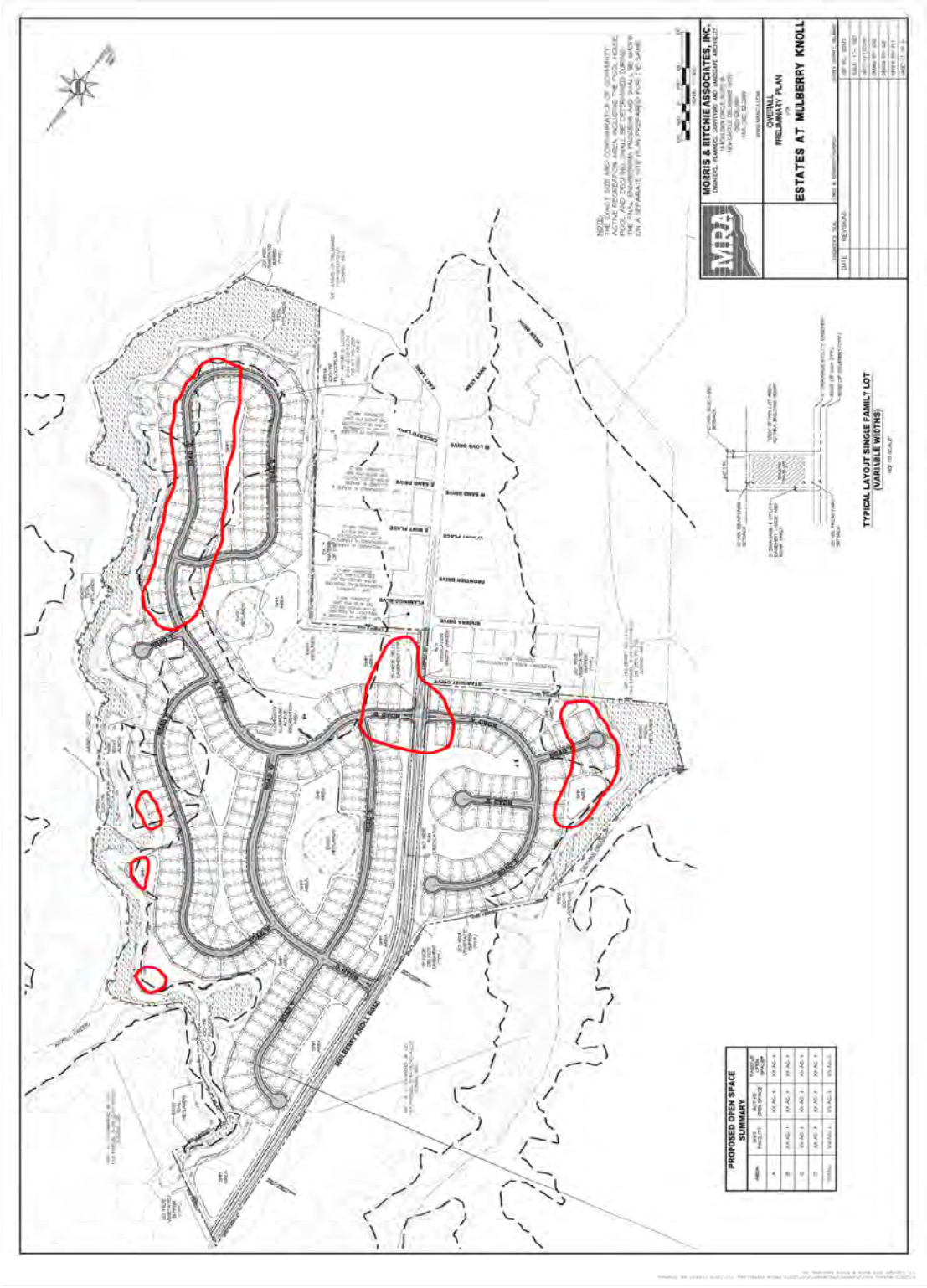

Figure 28. Site Locations on Development Plan

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APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3025	2400	0 - 0.3'	10YR 3/3	Silt Loam	Ao
	3025	2400	0.3 - 1.4'	10YR 4/2	Sandy Loam, fine	Erosional Deposit
	3025	2400	1.4 - 1.7'	10YR 6/3	Sandy Loam, fine	B
	3025	2425	0 - 0.3'	10YR 3/2	Sandy Loam	A
	3025	2425	0.3 - 0.7'	10YR 3/3	Sandy Loam	Ap
	3025	2425	0.7 - 2.0'	10YR 5/4	Sandy Loam with carbon	Feature Fill
	3025	2425	2.0 -2.6'	10YR 5/6	Sandy Loam	B
	3025	2450	0 - 0.25'		Root Mat	O
	3025	2450	0.25 - 0.4'	10YR 3/3	Loamy Sand	A
	3025	2450	0.4 - 1.0'	10YR 4/2	Sandy Loam	Ap
	3025	2450	1.0 - 1.3'	10YR 5/3	Sandy Loam	B1
	3025	2450	1.3 - 1.9'	10YR 6/4	Sandy Loam	B2
	3025	2450	1.9 - 2.2'	10YR 5/4	Sandy Loam	B3
	3025	2475	0 - 0.15'	10YR 3/2	Sandy Loam	A
	3025	2475	0.15 - 0.5'	7.5YR 4/4	Sandy Loam	Ap1
	3025	2475	0.5 - 1.1'	10YR 5/3	Sandy Loam	Ap2
	3025	2475	1.1 - 1.3'	10YR 5/4	Sandy Loam	B1
	3025	2475	1.3 - 1.6'	10YR 6/6	Sandy Loam	B2
	3025	2500	0 - 0.15'		Root Mat	O
	3025	2500	0.15 - 0.3'	7.5YR 2.5/3	Sandy Loam	A
	3025	2500	0.3 - 0.6'	7.5YR 4/4	Sandy Loam, fine	Ap
	3025	2500	0.6 - 1.0'	7.5YR 5/4	Sandy Loam, fine	B1
	3025	2500	1.0 - 1.5'	7.5YR 5/6	Sandy Loam, fine	B2
	3050	2250	0 - 0.7'	10YR 4/2	Loamy Sand	A
	3050	2250	0.7 - 1.2'	10YR 5/4	Loamy Sand	Ap
	3050	2250	1.2 - 1.7'	10YR 6/4	Loamy Sand	B1
	3050	2250	1.7 - 2.0'	10YR 5/6	Sandy Loam	B2
	3050	2300	0 - 0.4'	10YR 3/2	Loamy Sand	A
	3050	2300	0.4 - 0.8'	10YR 5/4	Loamy Sand	Ap
	3050	2300	0.8 - 1.2'	10YR 6/4	Loamy Sand	B1
	3050	2300	1.2 - 1.8'	10YR 5/6	Sandy Loam	B2
	3050	2350	0 - 0.7'	10YR 4/2	Silt Loam	A
	3050	2350	0.7 - 1.1'	10YR 3/2	Silt Loam	Ap
	3050	2350	1.1 - 1.5'	10YR 5/6	Sandy Loam, fine	B1
	3050	2350	1.5 - 1.9'	10YR 6/6	Silty Clay Loam	B2
	3050	2350	1.9'			Water Table
	3050	2400	0 - 0.5'	10YR 3/3	Silt Loam	A1
	3050	2400	0.5 - 0.7'	10YR 5/1	Sandy Loam, fine	A2
	3050	2400	0.7 - 1.1'	10YR 5/3	Loamy Sand, fine	E
	3050	2400	1.1'			Water Table
	3050	2425	0 - 0.5'	10YR 2/1	Silt Loam	20th C. Trash Midden
	3050	2425	0.5 - 1.0'	10YR 5/3	Silt Loam	B
	3050	2450	0 - 0.6'	10YR 3/3	Loamy Sand, fine	A1
	3050	2450	0.6 - 1.0'	10YR 4/2	Loamy Sand, fine	A2
	3050	2450	1.0 - 1.7'	10YR 5/3	Loamy Sand, fine	E
	3050	2450	1.7 - 2.2'	10YR 6/3	Loamy Sand, fine	B1
	3050	2450	2.2 - 2.5'	10YR 6/3	Sandy Loam, fine	B2
	3050	2475	0 - 0.15'		Root Mat	O

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AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3050	2475	0.15 - 0.3'	10YR 3/3	Loamy Sand	A
	3050	2475	0.3 -1.1'	10YR 4/3	Sandy Loam	Ap
	3050	2475	1.1 - 1.4'	10YR 5/3	Sandy Loam	B1
	3050	2475	1.4 - 1.8'	10YR 6/4	Sandy Loam	B2
	3050	2475	1.8 - 2.1'	10YR 5/6	Sandy Loam	B3
	3050	2500	0 - 0.2'	7.5Yr 2.5/2	Silt Loam	A1
	3050	2500	0.2 - 0.5'	10YR 5/3	Sandy Loam, fine	A2
	3050	2500	0.5 - 1.0'	2.5Y 5/6	Sandy Loam, fine	Ap
	3050	2500	1.0 - 1.4'	10YR 6/4	Loamy Sand, fine	B1
	3050	2500	1.4 - 1.7'	10YR 6/4	Sandy Loam, fine	B2
	3050	2500	1.7 - 2.0'	10YR 5/6	Sandy Loam, fine	B3
	3050	2525	0 - 0.1'		Root Mat	O
	3050	2525	0.1 - 0.4'	10YR 3/3	Loamy Sand	A
	3050	2525	0.4 - 0.9'	10YR 4/3	Sandy Loam	Ap
	3050	2525	0.9 - 1.2'	10YR 5/3	Sandy Loam	B1
	3050	2525	1.2 - 1.6'	10YR 6/4	Sandy Loam	B2
	3050	2525	1.6 - 2.0'	10YR 5/6	Sandy Loam	B3
	3075	2500	0- 0.2'		Root Mat	O
	3075	2500	0.2 - 0.4'	10YR 3/3	Loamy Sand	A
	3075	2500	0.4 - 0.8'	10YR 4/3	Sandy Loam	Ap
	3075	2500	0.8 - 1.1'	10YR 5/3	Sandy Loam	B1
	3075	2500	1.1 - 1.5'	10YR 6/4	Sandy Loam	B2
	3075	2500	1.5 - 1.8'	10YR 5/6	Sandy Loam	B3
	3100	2250	0 - 0.65'	10YR 4/2	Loamy Sand, fine	Ap
	3100	2250	0.65 - 1.35'	10YR 5/4	Loamy Sand, fine	B1
	3100	2250	1.35 - 1.8'	10YR 5/6	Sandy Loam	B2
	3100	2300	0 - 0.4'	10YR 3/2	Loamy Sand, fine	A
	3100	2300	0.4 - 0.85'	10YR 4/3	Loamy Sand, fine	Ap
	3100	2300	0.85 - 1.5'	10YR 5/4	Loamy Sand, fine	B1
	3100	2300	1.5 - 1.9'	10YR 5/6	Loamy Sand, fine	B2
	3100	2350	0 - 0.4'	10YR 3/2	Loamy Sand, fine	A
	3100	2350	0.4 - 0.85'	10YR 4/3	Loamy Sand, fine	Ap
	3100	2350	0.85 - 1.5'	10YR 5/4	Loamy Sand, fine	B1
	3100	2350	1.5 - 1.9'	10YR 5/6	Loamy Sand, fine	B2
	3100	2400	0 - 0.6'	10YR 3/2	Sandy Loam, fine	Ap
	3100	2400	0.6 - 1.0'	10YR 5/3	Sandy Loam	B
	3100	2400	1.0'			Water Table
	3150	2250	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3150	2250	0.2 - 0.5'	10YR 5/4	Loamy Sand	Ap
	3150	2250	0.5 - 0.9'	10YR 6/4	Loamy Sand	B1
	3150	2250	0.9 - 1.6'	10YR 6/4	Sandy Loam	B2
	3150	2300	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3150	2300	0.2 - 0.5'	10YR 5/4	Loamy Sand	Ap
	3150	2300	0.5 - 0.9'	10YR 6/4	Loamy Sand	B1
	3150	2300	0.9 - 1.6'	10YR 6/4	Sandy Loam	B2
	3150	2350	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3150	2350	0.2 - 0.5'	10YR 5/4	Loamy Sand	Ap
	3150	2350	0.5 - 0.9'	10YR 6/4	Loamy Sand	B1

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3150	2350	0.9 - 1.6'	10YR 6/4	Sandy Loam	B2
	3150	2400	0 - 1.1'	10YR 3/2	Sandy Loam	A
	3150	2400	1.1 - 1.3'	10YR 4/3	Sandy Loam	Ap
	3150	2400	1.3 - 1.7'	10YR 5/6	Sandy Loam	B1
	3150	2400	1.7 - 2.3'	10YR 5/6	Sandy Loam	B2
	3150	2450	0 - 0.2'	10YR 3/3	Loamy Sand	A
	3150	2450	0.2 - 0.5'	10YR 4/6	Loamy Sand	Ap
	3150	2450	0.5 - 1.2'	10YR 5/4	Loamy Sand	B1
	3150	2450	1.2 - 2.1'	10YR 5/6	Sandy Loam	B2
	3150	2450	2.1 - 2.5'	10YR 5/6	Sandy Loam	B3
	3200	2200	0 - 0.2'	10YR 3/3	Silt Loam	A
	3200	2200	0.2 - 0.7'	10YR 4/3	Silt Loam	Ap
	3200	2200	0.7 -1.2'	10&R 4/6	Silt Loam	B1
	3200	2200	1.2 - 1.6'	10YR 5/6	Silt Loam	B2
	3200	2250	0 - 0.2'	10YR 3/3	Silt Loam	A
	3200	2250	0.2 - 0.7'	10YR 4/3	Silt Loam	Ap
	3200	2250	0.7 -1.2'	10&R 4/6	Silt Loam	B1
	3200	2250	1.2 - 1.6'	10YR 5/6	Silt Loam	B2
	3200	2300	0 - 0.3'	10YR 4/3	Silt Loam	Ap
	3200	2300	0.3 - 1.0'	10&R 4/6	Silt Loam	B1
	3200	2300	1.0 - 1.6'	10YR 5/6	Silt Loam	B2
	3200	2350	0 - 0.3'	10YR 3/3	Silt Loam	A
	3200	2350	0.3 - 0.7'	10YR 4/3	Silt Loam	Ap
	3200	2350	0.7 - 1.1'	10&R 4/6	Silt Loam	B1
	3200	2350	1.1 - 1.4'	10YR 5/6	Silt Loam	B2
	3200	2400	0 - 0.2'	10YR 3/2	Sandy Loam	
	3200	2400	0.2 - 0.75"	10YR 4/3	Sandy Loam	Ap
	3200	2400	0.75 - 1.1'	10&R 4/6	Sandy Loam	B1
	3200	2400	1.1 - 1.6'	10YR 5/6	Sandy Loam	B2
	3200	2400	1.6 - 2.0'	10YR 5/8	Sandy Loam	B3
	3200	2450	0 - 0.35'	10YR 3/2	Sandy Loam	A
	3200	2450	0.35 - 0.9'	10YR 4/6	Sandy Loam	B1
	3200	2450	0.9 - 1.2'	10YR 5/6	Sandy Loam	B2
	3200	2500	0 - 0.55'	10YR 2/1	Sandy Loam	Ao
	3200	2500	0.55 - 1.2'	10YR 5/2	Sandy Loam	B1
	3200	2500	1.2 - 1.6'	10YR 5/8	Sandy Loam	B2
	3200	2525	0 - 0.35'		Root Mat	O
	3200	2525	0.35 - 0.5'	10YR 4/2	Loamy Sand	Ao
	3200	2525	0.5 - 0.8'	10YR 4/4	Loamy Sand	Ap
	3200	2525	0.8 - 1.4'	10YR 5/6	Loamy Sand	B
	3200	2525	1.4 - 1.6'	2.5Y 6/6	Clay Loam, Hydric	B3
	3200	2550	0 - 0.55'	10YR 2/1	Sandy Loam	Ao
	3200	2550	0.55 - 1.2'	10YR 5/2	Sandy Loam	B1
	3200	2550	1.2 - 1.6'	10YR 5/8	Sandy Loam	B2
	3200	2575	0 - 0.35'		Root Mat	O
	3200	2575	0.35 - 0.7'	10YR 3/2	Loamy Sand	A
	3200	2575	0.7 - 1.4'	10YR 5/6	Loamy Sand	B
	3200	2575	1.4'			Water Table

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3200	2600	0 - 0.45'	10YR 2/1	Silt Loam	Ao
	3200	2600	0.45 - 0.7'	10YR 4/4	Silt Loam	A
	3200	2600	0.7 - 1.0'	10YR 5/6	Silt Loam	B1
	3200	2600	1.0 - 1.4'	10YR 6/4	Silt Loam	B2
	3200	2625	0 - 0.4'		Root Mat	O
	3200	2625	0.4 - 0.65'	10YR 4/2	Silt Loam	A
	3200	2625	0.65 - 0.85'	7.5YR 2.5/3	Silt Loam	A2
	3200	2625	0.85 - 1.1'	10YR 5/6	Silt Loam	B1
	3200	2625	1.1 - 1.4'	2.5Y 5/6	Sandy Loam, fine	B2
	3200	2650	0 - 0.4'	10YR 2/1	Silt Loam	Ao
	3200	2650	0.4 - 0.6'	10YR 4/4	Silt Loam	A
	3200	2650	0.6 - 1.0'	10YR 5/6	Silt Loam	B1
	3225	2500	0 - 0.35'	10YR 2/1	Silt Loam	A
	3225	2500	0.35 - 0.6'	10YR 5/3	Sandy Loam	E
	3225	2500	0.6 - 0.9'	10YR 4/6	Silt Loam	Ap
	3225	2500	0.9 - 1.4'	10YR 6/4	Clay Loam	B1
	3225	2500	1.4 - 1.7'	10YR 7/3	Silty Clay Loam	B2
	3225	2525	0 - 0.2'		Root Mat	O
	3225	2525	0.2 - 0.4'	7.5YR 3/2	Silt Loam	A
	3225	2525	0.4 - 0.8'	10YR 4/4	Silt Loam	Ap
	3225	2525	0.8 - 1.1'	10YR 5/4	Silt Loam	B1
	3225	2525	1.1 - 1.4'	10YR 5/6	Silt Loam	B2
	3225	2525	1.4 - 1.8'	10YR 6/6	Clay Loam	B3
	3225	2575	0 - 0.5'	10YR 2/1	Silt Loam	A
	3225	2575	0.5 - 0.65'	10YR 5/3	Sandy Loam	E
	3225	2575	0.65 - 0.9'	10YR 4/6	Silt Loam	Ap
	3225	2575	0.9 - 1.3'	10YR 6/4	Clay Loam	B1
	3225	2575	1.3 - 1.7'	10YR 7/3	Silty Clay Loam	B2
	3225	2600	0 - 0.5'		Root Mat	O
	3225	2600	0.5 - 0.65'	10YR 3/2	Loamy Sand	Ao
	3225	2600	0.65 - 1.05'	10YR 4/4	Loamy Sand	Ap
	3225	2600	1.05 - 1.5'	10YR 5/6	Loamy Sand	B
	3250	2150	0 - 0.2'	10YR 3/2	Sandy Loam	A
	3250	2150	0.2 - 0.85'	10YR 4/3	Sandy Loam	Ap
	3250	2150	0.85 - 1.3'	10YR 4/6	Sandy Loam	B1
	3250	2150	1.3 - 1.8'	10YR 5/6	Sandy Loam	B2
	3250	2200	0 - 0.2'	10YR 3/2	Sandy Loam	A
	3250	2200	0.2 - 0.85'	10YR 4/3	Sandy Loam	Ap
	3250	2200	0.85 - 1.3'	10YR 4/6	Sandy Loam	B1
	3250	2200	1.3 - 1.8'	10YR 5/6	Sandy Loam	B2
	3250	2250	0 - 0.2'	10YR 3/2	Sandy Loam	A
	3250	2250	0.2 - 0.85'	10YR 4/3	Sandy Loam	Ap
	3250	2250	0.85 - 1.3'	10YR 4/6	Sandy Loam	B1
	3250	2250	1.3 - 1.8'	10YR 5/6	Sandy Loam	B2
	3250	2300	0 - 0.3'	10YR 3/2	Loamy Sand	A
	3250	2300	0.3 - 0.55'	10YR 4/3	Sandy Loam	Ap
	3250	2300	0.55 - 1.05'	10&R 4/6	Sandy Loam	B1
	3250	2300	1.05 - 1.4'	10YR 5/6	Sandy Loam	B2

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3250	2300	1.4 - 1.7'	10YR 5/8	Sandy Loam	B3
	3250	2350	0 - 0.3'	10YR 3/2	Loamy Sand	A
	3250	2350	0.3 - 0.55'	10YR 4/3	Sandy Loam	Ap
	3250	2350	0.55 - 1.05'	10&R 4/6	Sandy Loam	B1
	3250	2350	1.05 - 1.4'	10YR 5/6	Sandy Loam	B2
	3250	2350	1.4 - 1.7'	10YR 5/8	Sandy Loam	B3
	3250	2400	0 - 0.3'	10YR 3/2	Loamy Sand	A
	3250	2400	0.3 - 0.55'	10YR 4/3	Sandy Loam	Ap
	3250	2400	0.55 - 1.05'	10&R 4/6	Sandy Loam	B1
	3250	2400	1.05 - 1.4'	10YR 5/6	Sandy Loam	B2
	3250	2400	1.4 - 1.7'	10YR 5/8	Sandy Loam	B3
	3250	2450	0 - 0.3'	10YR 3/2	Loamy Sand	A
	3250	2450	0.3 - 0.65'	10YR 4/3	Sandy Loam	Ap
	3250	2450	0.65 - 1.0'	10&R 4/6	Sandy Loam	B1
	3250	2450	1.0 - 1.4'	10YR 5/6	Sandy Loam	B2
	3250	2450	1.4 - 1.8'	10YR 5/8	Sandy Loam	B3
	3250	2500	0 - 0.15'		Root Mat	O
	3250	2500	0.15 - 0.35'	10YR 2/2	Silt Loam	A1
	3250	2500	0.35 - 0.6'	10YR 4/4	Loamy Sand	A2
	3250	2500	0.6 - 1.8'	10YR 6/3	Sandy Loam	B1
	3250	2500	1.8 - 2.5'	10YR 6/4	Sandy Loam	B2
	3250	2525	0 - 0.3'		Root Mat	O
	3250	2525	0.3 - .4'	10YR 2/1	Silt Loam	A
	3250	2525	0.4 - 0.6'	10YR 5/3	Sandy Loam	E
	3250	2525	0.6 - 1.0'	10YR 4/6	Silt Loam	Ap
	3250	2525	1.0- 1.3'	10YR 6/6	Silt Loam	B1
	3250	2525	1.3 - 1.7'	10YR 6/4	Sandy Loam, fine	B2
	3250	2525	1.7 - 2.0'	10YR 5/6	Sandy Loam	B3
	3250	2550	0 - 0.15'		Root Mat	O
	3250	2550	0.15 - 0.35'	10YR 2/2	Silt Loam	A1
	3250	2550	0.35 - 0.6'	10YR 4/4	Loamy Sand	A2
	3250	2550	0.6 - 1.8'	10YR 6/3	Sandy Loam	B1
	3250	2550	1.8 - 2.5'	10YR 6/4	Sandy Loam	B2
	3250	2575	0 - 0.4'	10YR 2/1	Silt Loam	A
	3250	2575	0.4 - 0.6'	10YR 5/3	Sandy Loam	E
	3250	2575	0.6 - 0.8'	10YR 4/6	Silt Loam	Ap
	3250	2575	0.8 - 1.1'	10YR 5/6	Silt Loam	B1
	3250	2575	1.1 - 1.6'	10YR 6/4	Sandy Loam, fine	B2
	3250	2575	1.6 - 2.0'	10YR 7/3	Sandy Loam	B3
	3250	2600	0 - 0.15'		Root Mat	O
	3250	2600	0.15 - 0.35'	10YR 2/2	Silt Loam	A1
	3250	2600	0.35 - 0.6'	10YR 4/4	Loamy Sand	A2
	3250	2600	0.6 - 1.8'	10YR 6/3	Sandy Loam	B1
	3250	2600	1.8 - 2.5'	10YR 6/4	Sandy Loam	B2
	3250	2650	0 - 0.15'		Root Mat	O
	3250	2650	0.15 - 0.35'	10YR 2/2	Silt Loam	A1
	3250	2650	0.35 - 0.6'	10YR 4/4	Loamy Sand	A2
	3250	2650	0.6 - 1.8'	10YR 6/3	Sandy Loam	B1

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3250	2650	1.8 - 2.5'	10YR 6/4	Sandy Loam	B2
	3275	2500	0 - 0.25'	10YR 4/2	Silt Loam	A
	3275	2500	0.25 - 0.65'	10YR 5/4	Silt Loam	Ap
	3275	2500	0.65 - 1.05'	10YR 6/4	Silt Loam	B1
	3275	2500	1.05 - 1.8'	10YR 5/6	Silt Loam	B2
	3275	2500	1.8 - 2.2'	10YR 5/8	Silt Loam	B3
	3275	2525	0 - 0.15'		Root Mat	O
	3275	2525	0.15 - 0.4'	7.5YR 3/2	Silt Loam	A
	3275	2525	0.4 - 0.7'	10YR 4/4	Silt Loam	Ap
	3275	2525	0.7 - 0.95'	10YR 5/4	Silt Loam	B1
	3275	2525	0.95 - 1.3'	10YR 5/6	Silt Loam	B2
	3275	2525	1.3 - 1.5'	10YR 6/6	Clay Loam	B3
	3275	2550	0 - 0.3'		Root Mat	O
	3275	2550	0.3 - 0.4'	10YR 5/2	Loamy Sand	E
	3275	2550	0.4 - 0.6'	7.5Yr 3/4	Silt Loam	Ap
	3275	2550	0.6 - 1.0'	10YR 5/8	Sandy Loam, fine	B1
	3275	2550	1.0 - 1.7'	10YR 5/6	Sandy loam	B2
	3275	2575	0 - 0.3'		Root Mat	O
	3275	2575	0.3 - 0.6'	10YR 3/3	Loamy Sand	A
	3275	2575	0.6 - 0.85'	5YR 3/4	Silt Loam	Ap
	3275	2575	0.85 - 1.3'	10YR 4/6	Loamy Sand, fine	B1
	3275	2575	1.3 - 1.8'	10YR 5/6	Loamy Sand	B2
	3275	2575	1.8 - 2.4'	10YR 6/4	Loamy Sand, coarse	B3
	3300	2150	0 - 0.2'	10YR 3/2	Sandy Loam	A
	3300	2150	0.2 - 0.85'	10YR 4/3	Sandy Loam	Ap
	3300	2150	0.85 - 1.3'	10YR 4/6	Sandy Loam	B1
	3300	2150	1.3 - 1.8'	10YR 5/6	Sandy Loam	B2
	3300	2200	0 - 0.2'	10YR 3/2	Sandy Loam	A
	3300	2200	0.2 - 0.85'	10YR 4/3	Sandy Loam	Ap
	3300	2200	0.85 - 1.3'	10YR 4/6	Sandy Loam	B1
	3300	2200	1.3 - 1.8'	10YR 5/6	Sandy Loam	B2
	3300	2250	0 - 0.35'	10YR 3/2	Sandy Loam	A
	3300	2250	0.35 - 0.7'	10YR 4/3	Sandy Loam	Ap
	3300	2250	0.7 - 1.15'	2.5Y 4/4	Sandy Loam	B1
	3300	2250	1.15 - 1.5'	2.5Y 5/4	Sandy Loam	B2
	3300	2250	1.5 - 1.7'	10YR 5/6	Sandy Loam	B3
	3300	2300	0 - 0.35'	10YR 3/2	Sandy Loam	A
	3300	2300	0.35 - 0.7'	10YR 4/3	Sandy Loam	Ap
	3300	2300	0.7 - 1.15'	2.5Y 4/4	Sandy Loam	B1
	3300	2300	1.15 - 1.5'	2.5Y 5/4	Sandy Loam	B2
	3300	2300	1.5 - 1.7'	10YR 5/6	Sandy Loam	B3
	3300	2350	0 - 0.35'	10YR 3/2	Sandy Loam	A
	3300	2350	0.35 - 0.7'	10YR 4/3	Sandy Loam	Ap
	3300	2350	0.7 - 1.15'	2.5Y 4/4	Sandy Loam	B1
	3300	2350	1.15 - 1.5'	2.5Y 5/4	Sandy Loam	B2
	3300	2350	1.5 - 1.7'	10YR 5/6	Sandy Loam	B3
	3300	2400	0 - 0.3'	10YE 3/3	Sandy Loam	A
	3300	2400	0.3 - 0.7'	10YR 4/4	Sandy Loam	Ap

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3300	2400	0.7 - 1.0'	10YR 5/4	Sandy Loam	B1
	3300	2400	1.0 - 1.4'	10YR 5/6	Sandy Loam	B2
	3300	2400	1.4 - 1.8'	10YR 6/6	Sandy Loam	B3
	3300	2450	0 - 0.3'	10YE 3/3	Sandy Loam	A
	3300	2450	0.3 - 0.7'	10YR 4/4	Sandy Loam	Ap
	3300	2450	0.7 - 1.0'	10YR 5/4	Sandy Loam	B1
	3300	2450	1.0 - 1.4'	10YR 5/6	Sandy Loam	B2
	3300	2450	1.4 - 1.8'	10YR 6/6	Sandy Loam	B3
	3300	2475	0 - 0.25'	10YR 4/2	Silt Loam	A
	3300	2475	0.25 - 0.65'	10YR 5/4	Silt Loam	Ap
	3300	2475	0.65 - 1.05'	10YR 6/4	Silt Loam	B1
	3300	2475	1.05 - 1.8'	10YR 5/6	Silt Loam	B2
	3300	2475	1.8 - 2.2'	10YR 5/8	Silt Loam	B3
	3300	2500	0 - 0.4'	10YR 3/2	Sandy Loam, fine	Ao
	3300	2500	0.4 - 0.6'	10YR 4/3	Sandy Loam, fine	E
	3300	2500	0.6 - 0.95'	10YR 4/6	Sandy Loam, fine	B1
	3300	2500	0.95 - 1.5'	10YR 5/6	Sandy Loam, fine	B2
	3300	2500	1.5 - 1.9'	10YR 58	Silt Loam	B3
	3300	2525	0 - 0.25'	10YR 4/2	Silt Loam	A
	3300	2525	0.25 - 0.65'	10YR 5/4	Silt Loam	Ap
	3300	2525	0.65 - 1.05'	10YR 6/4	Silt Loam	B1
	3300	2525	1.05 - 1.8'	10YR 5/6	Silt Loam	B2
	3300	2525	1.8 - 2.2'	10YR 5/8	Silt Loam	B3
	3300	2550	0 - 0.4'	10YR 3/2	Sandy Loam, fine	Ao
	3300	2550	0.4 - 0.6'	10YR 4/3	Sandy Loam, fine	E
	3300	2550	0.6 - 0.95'	10YR 4/6	Sandy Loam, fine	B1
	3300	2550	0.95 - 1.5'	10YR 5/6	Sandy Loam, fine	B2
	3300	2550	1.5 - 1.9'	10YR 58	Silt Loam	B3
	3325	2500	0 - 0.25'	10YR 4/2	Silt Loam	A
	3325	2500	0.25 - 0.65'	10YR 5/4	Silt Loam	Ap
	3325	2500	0.65 - 1.05'	10YR 6/4	Silt Loam	B1
	3325	2500	1.05 - 1.8'	10YR 5/6	Silt Loam	B2
	3325	2500	1.8 - 2.2'	10YR 5/8	Silt Loam	B3
	3350	2150	0 - 0.3'	10YE 3/1	Sandy Loam	Ao
	3350	2150	0.3 - 0.8'	10YE 4/3	Sandy Loam	Ap
	3350	2150	0.8 - 1.2'	10YR 5/3	Sandy Loam	B1
	3350	2150	1.2 - 1.8'	10YR 6/3	Sandy Loam	B2
	3350	2200	0 - 0.3'	10YE 3/1	Sandy Loam	Ao
	3350	2200	0.3 - 0.8'	10YE 4/3	Sandy Loam	Ap
	3350	2200	0.8 - 1.2'	10YR 5/3	Sandy Loam	B1
	3350	2200	1.2 - 1.8'	10YR 6/3	Sandy Loam	B2
	3350	2250	0 - 0.3'	10YE 3/1	Sandy Loam	Ao
	3350	2250	0.3 - 0.8'	10YE 4/3	Sandy Loam	Ap
	3350	2250	0.8 - 1.2'	10YR 5/3	Sandy Loam	B1
	3350	2250	1.2 - 1.8'	10YR 6/3	Sandy Loam	B2
	3350	2300	0 - 0.1'		Root Mat	O
	3350	2300	0.1 - 0.3'	10YR 3/3	Silt Loam	A
	3350	2300	0.3 - 1.0'	10YR 4/4	Silt Loam	B1

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3350	2300	1.0 - 2.0'	10YR 4/6	Silt Loam	B2
	3350	2350	0 - 0.1'		Root Mat	O
	3350	2350	0.1 - 0.3'	10YR 3/3	Silt Loam	A
	3350	2350	0.3 - 1.0'	10YR 4/4	Silt Loam	B1
	3350	2350	1.0 - 2.0'	10YR 4/6	Silt Loam	B2
	3350	2400	0 - 0.1'		Root Mat	O
	3350	2400	0.1 - 0.3'	10YR 3/3	Silt Loam	A
	3350	2400	0.3 - 1.0'	10YR 4/4	Silt Loam	B1
	3350	2400	1.0 - 2.0'	10YR 4/6	Silt Loam	B2
	3350	2450	0 - 0.1'		Root Mat	O
	3350	2450	0.1 - 0.3'	10YR 3/3	Silt Loam	A
	3350	2450	0.3 - 1.0'	10YR 4/4	Silt Loam	B1
	3350	2450	1.0 - 2.0'	10YR 4/6	Silt Loam	B2
	3350	2500	0 - 0.4'	10YR 5/1	Sandy Loam	Ao
	3350	2500	0.4 - 0.7'	10YR 5/4	Sandy Loam	B1
	3350	2500	0.7 - 1.7'	10YR 6/4	Sandy Loam	B2
	3350	2500	1.7 - 2.0'	2.5Y 6/3	Sandy Loam	B3
	3400	2150	0 - 0.3'	10YE 3/1	Sandy Loam	Ao
	3400	2150	0.3 - 0.8'	10YE 4/3	Sandy Loam	Ap
	3400	2150	0.8 - 1.2'	10YR 5/3	Sandy Loam	B1
	3400	2150	1.2 - 1.8'	10YR 6/3	Sandy Loam	B2
	3400	2200	0 - 0.3'	10YR 3/3	Silt Loam	Ao
	3400	2200	0.3 - 0.8'	10YR 4/4	Silt Loam	Ap
	3400	2200	0.8 - 1.4'	10YR 5/4	Silt Loam	B
	3400	2250	0 - 0.25'	10YR 3/3	Silt Loam	Ao
	3400	2250	0.25 - 0.6'	10YR 4/4	Silt Loam	Ap
	3400	2250	0.6 - 1.2'	10YR 5/6	Silt Loam	B
	3400	2300	0 - 0.3'	10Yr 4/2	Sandy Loam	Ao
	3400	2300	0.25 - 0.6'	10YR 4/4	Silt Loam	Ap
	3400	2300	0.6 - 1.2'	10YR 5/6	Silt Loam	B
	3400	2350	0 - 0.3'	10YR 4/2	Sandy Loam	Ao
	3400	2350	0.3 - 0.5'	10YR 4/4	Sandy Loam	Ap
	3400	2350	0.5 - 1.4'	10YR 5/4	Sandy Loam	B
	3400	2400	0 - 0.3'	10YR 4/2	Sandy Loam	Ao
	3400	2400	0.3 - 0.5'	10YR 4/4	Sandy Loam	Ap
	3400	2400	0.5 - 1.4'	10YR 5/4	Sandy Loam	B
	3400	2450	0 - 0.25'		Root Mat	O
	3400	2450	0.25 - 0.45'	10YR 4/1	Sandy Loam, fine	E
	3400	2450	0.45 - 0.8'	10YR 4/6	Sandy Loam	A
	3400	2450	0.8 - 1.4'	10YR 6/4	Sandy Loam	B
	3450	2150	0 - 0.55'	10YR 3/3	Silt Loam	Ap
	3450	2150	0.55 - 1.1'	10YR 5/4	Silt Loam	B1
	3450	2150	1.1 - 1.4'	10YR 5/6	Silt Loam	B2
	3450	2200	0 - 0.55'	10YR 3/3	Silt Loam	Ap
	3450	2200	0.55 - 1.1'	10YR 5/4	Silt Loam	B1
	3450	2200	1.1 - 1.4'	10YR 5/6	Silt Loam	B2
	3450	2250	0 - 0.45'	10YR 3/3	Silt Loam	Ap
	3450	2250	0.45 - 0.7'	10YR 5/4	Silt Loam	B1

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3450	2250	0.7 - 1.2'	2.5Y 5/4	Silt Loam	B2
	3450	2250	1.2 - 2.2'	10YR 5/6	Silt Loam	B3
	3450	2300	0 - 0.45'	10YR 3/3	Silt Loam	Ap
	3450	2300	0.45 - 0.7'	10YR 5/4	Silt Loam	B1
	3450	2300	0.7 - 1.2'	2.5Y 5/4	Silt Loam	B2
	3450	2300	1.2 - 2.2'	10YR 5/6	Silt Loam	B3
	3450	2350	0 - 0.45'	10YR 3/3	Silt Loam	Ap
	3450	2350	0.45 - 0.7'	10YR 5/4	Silt Loam	B1
	3450	2350	0.7 - 1.2'	2.5Y 5/4	Silt Loam	B2
	3450	2350	1.2 - 2.2'	10YR 5/6	Silt Loam	B3
	3450	2400	0 - 0.5'	10YR 3/2	Silt Loam	Ao
	3450	2400	0.5 - 0.8'	7.5YR 4/4	Sandy Loam, fine	B1
	3450	2400	0.8 - 1.5'	2.5Y 4/4	Sandy Loam, fine	B2
	3450	2400	1.5 - 2.0'	10YR 5/4	Sandy Loam, fine	B3
	3475	2300	0 - 0.25'	10YR 3/3	Loamy Sand	A
	3475	2300	0.25 - 0.6'	10YR 4/3	Loamy Sand	Ap
	3475	2300	0.6 - 0.9'	10YR 5/4	Loamy Sand	B1
	3475	2300	0.9 - 1.5'	10YR 6/4	Loamy Sand	B2
	3475	2300	1.5 - 1.9'	10YR 5/6	Loamy Sand	B3
	3500	2150	0 - 0.4'	10YR 3/3	Sandy Loam	A
	3500	2150	0.4 - 0.7'	10YR 4/4	Sandy Loam	Ap
	3500	2150	0.7 - 1.15'	10YR 5/6	Sandy Loam	B1
	3500	2150	1.15 - 1.5'	10YR 6/4	Silt Loam	B2
	3500	2200	0 - 0.4'	10YR 3/3	Sandy Loam	A
	3500	2200	0.4 - 0.7'	10YR 4/4	Sandy Loam	Ap
	3500	2200	0.7 - 1.15'	10YR 5/6	Sandy Loam	B1
	3500	2200	1.15 - 1.5'	10YR 6/4	Silt Loam	B2
	3500	2250	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3500	2250	0.2 - 0.55'	10YR 4/4	Sandy Loam	Ap
	3500	2250	0.55 - 0.9'	10YR 4/6	Sandy Loam	B1
	3500	2250	0.9 - 1.2'	10YR 5/6	Sandy Loam	B2
	3500	2250	1.2 - 1.5'	10YR 5/8	Sandy Loam	B3
	3500	2275	0 - 0.25'	10YR 3/3	Loamy Sand	A
	3500	2275	0.25 - 0.6'	10YR 4/3	Loamy Sand	Ap
	3500	2275	0.6 - 0.9'	10YR 5/4	Loamy Sand	B1
	3500	2275	0.9 - 1.5'	10YR 6/4	Loamy Sand	B2
	3500	2275	1.5 - 1.9'	10YR 5/6	Loamy Sand	B3
	3500	2300	0 - 0.5'	10YR 3/2	Sandy Loam	A
	3500	2300	0.5 - 0.8'	10YR 4/6	Sandy Loam	B1
	3500	2300	0.8 - 1.4'	10YR 6/4	Sandy Loam	B2
	3500	2300	1.4 - 1.9'	10YR 5/6	Sandy Loam	B3
	3500	2325	0 - 0.25'	10YR 3/3	Loamy Sand	A
	3500	2325	0.25 - 0.6'	10YR 4/3	Loamy Sand	Ap
	3500	2325	0.6 - 0.9'	10YR 5/4	Loamy Sand	B1
	3500	2325	0.9 - 1.5'	10YR 6/4	Loamy Sand	B2
	3500	2325	1.5 - 1.9'	10YR 5/6	Loamy Sand	B3
	3500	2350	0 - 0.5'	10YR 3/2	Sandy Loam	A
	3500	2350	0.5 - 0.8'	10YR 4/6	Sandy Loam	B1

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3500	2350	0.8 - 1.4'	10YR 6/4	Sandy Loam	B2
	3500	2350	1.4 - 1.9'	10YR 5/6	Sandy Loam	B3
	3500	2400	0 - 0.5'	10YR 3/2	Sandy Loam	A
	3500	2400	0.5 - 0.8'	10YR 4/6	Sandy Loam	B1
	3500	2400	0.8 - 1.4'	10YR 6/4	Sandy Loam	B2
	3500	2400	1.4 - 1.9'	10YR 5/6	Sandy Loam	B3
	3500	2450	0 - 0.3'	10YR 2/1	Silt Loam	Ao
	3500	2450	0.3 - 0.5'	10YR 5/3	Sand	E
	3500	2450	0.5 - 0.9'	10YR 4/6	Loamy Sand	B1
	3500	2450	0.9 - 1.2'	10YR 5/6	Loamy Sand	B2
	3500	2450	1.2 - 1.8'	10YR 6/3	Loamy Sand	B3
	3525	2300	0 - 0.25'	10YR 3/3	Loamy Sand	A
	3525	2300	0.25 - 0.6'	10YR 4/3	Loamy Sand	Ap
	3525	2300	0.6 - 0.9'	10YR 5/4	Loamy Sand	B1
	3525	2300	0.9 - 1.5'	10YR 6/4	Loamy Sand	B2
	3525	2300	1.5 - 1.9'	10YR 5/6	Loamy Sand	B3
	3525	2350	0 - 0.3'	10YR 3/3	Silt Loam	A
	3525	2350	0.3 - 0.75'	10YR 3/6	Silt Loam	Ap
	3525	2350	0.75 - 1.2'	10YR 5/6	Sandy Loam	B1
	3525	2350	1.2 - 1.7'	10YR 4/6	Sandy Loam	B2
	3550	2150	0 - 0.4'	10YR 3/3	Sandy Loam	A
	3550	2150	0.4 - 0.7'	10YR 4/4	Sandy Loam	Ap
	3550	2150	0.7 - 1.15'	10YR 5/6	Sandy Loam	B1
	3550	2150	1.15 - 1.5'	10YR 5/8	Silt Loam	B2
	3550	2200	0 - 0.4'	10YR 3/3	Sandy Loam	A
	3550	2200	0.4 - 0.7'	10YR 4/4	Sandy Loam	Ap
	3550	2200	0.7 - 1.15'	10YR 5/6	Sandy Loam	B1
	3550	2200	1.15 - 1.5'	10YR 5/8	Silt Loam	B2
	3550	2250	0 - 0.2'	10YE 3/3	Sandy Loam	A
	3550	2250	0.2 - 0.45'	10YR 4/3	Sandy Loam	Ap
	3550	2250	0.45 - 0.65'	10YR 5/4	Sandy Loam	B1
	3550	2250	0.65 - 1.2'	10YR 5/6	Sandy Loam	B2
	3550	2250	1.2 - 1.6'	10YR 5/8	Silt Loam	B3
	3550	2300	0 - 0.2'	10YE 3/3	Sandy Loam	A
	3550	2300	0.2 - 0.45'	10YR 4/3	Sandy Loam	Ap
	3550	2300	0.45 - 0.65'	10YR 5/4	Sandy Loam	B1
	3550	2300	0.65 - 1.2'	10YR 5/6	Sandy Loam	B2
	3550	2300	1.2 - 1.6'	10YR 5/8	Silt Loam	B3
	3550	2325	0 - 0.3'	10YR 3/3	Silt Loam	A
	3550	2325	0.3 - 0.75'	10YR 3/6	Silt Loam	Ap
	3550	2325	0.75 - 1.2'	10YR 5/6	Sandy Loam	B1
	3550	2325	1.2 - 1.7'	10YR 4/6	Sandy Loam	B2
	3550	2350	0 - 0.2'	10YE 3/3	Sandy Loam	A
	3550	2350	0.2 - 0.45'	10YR 4/3	Sandy Loam	Ap
	3550	2350	0.45 - 0.65'	10YR 5/4	Sandy Loam	B1
	3550	2350	0.65 - 1.2'	10YR 5/6	Sandy Loam	B2
	3550	2350	1.2 - 1.6'	10YR 5/8	Silt Loam	B3
	3550	2375	0 - 0.3'		Root Mat	O

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3550	2375	0.3 - 0.6'	10YR 3/3	Sandy Loam	A
	3550	2375	0.6 - 0.9'	10YR 5/3	Sandy Loam	E
	3550	2375	0.9 - 1.3'	10YR 5/4	Sandy Loam	B1
	3550	2375	1.3 - 1.9'	10YR 5/6	Sandy Loam	B2
	3550	2400	0 - 0.2'		Root Mat	O
	3550	2400	0.2 - 0.4'	10YR 3/3	Sandy Loam	A
	3550	2400	0.4 - 0.5'	10YR 4/3	Sandy Loam	Ap
	3550	2400	0.5 - 0.75'	7.5YR 4/6	Sandy Loam	B1
	3550	2400	0.75 - 1.4'	10YR 5/4	Sandy Loam	B2
	3550	2400	1.4 - 2.0'	10YR 6/4	Sandy Loam	B3
	3550	2450	0 - 0.4'		Root Mat	O
	3550	2450	0.4 - 0.7'	7.5YR 4/3	Sandy Loam	E
	3550	2450	0.7 - 1.1'	7.5YR 4/6	Sandy Loam	B1
	3550	2450	1.1 - 1.8'	10YR 6/4	Sandy Loam	B2
	3550	2450	1.8 - 2.5'	10YR 6/3	Sandy Loam	B3
	3575	2350	0 - 0.25'	10YR 3/3	Loamy Sand	A
	3575	2350	0.25 - 0.6'	10YR 4/3	Loamy Sand	Ap
	3575	2350	0.6 - 0.9'	10YR 5/4	Loamy Sand	B1
	3575	2350	0.9 - 1.5'	10YR 6/4	Loamy Sand	B2
	3575	2350	1.5 - 1.9'	10YR 5/6	Loamy Sand	B3
	3600	2150	0 - 0.25'	10YR 4/2	Sandy Loam	A
	3600	2150	0.25 - 0.65'	10YR 4/4	Sandy Loam	Ap
	3600	2150	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3600	2200	0 - 0.25'	10YR 4/2	Sandy Loam	A
	3600	2200	0.25 - 0.55'	10YR 4/4	Sandy Loam	Ap
	3600	2200	0.55 - 1.5'	10YR 5/6	Sandy Loam	B
	3600	2250	0 - 0.25'	10YR 4/2	Sandy Loam	A
	3600	2250	0.25 - 0.55'	10YR 4/4	Sandy Loam	Ap
	3600	2250	0.55 - 1.5'	10YR 5/6	Sandy Loam	B
	3600	2300	0 - 0.25'	10YR 4/2	Sandy Loam	A
	3600	2300	0.25 - 0.55'	10YR 4/4	Sandy Loam	Ap
	3600	2300	0.55 - 1.5'	10YR 5/6	Sandy Loam	B
	3600	2350	0 - 0.15'		Root Mat	O
	3600	2350	0.15 - 0.40'	10YR 2/2	Sandy Loam	A
	3600	2350	0.40 - 0.7'	10YR 4/4	Sandy Loam	B1
	3600	2350	0.7 - 1.4'	10YR 5/6	Sandy Loam	B2
	3600	2400	0 - 0.15'		Root Mat	O
	3600	2400	0.15 - 0.40'	10YR 2/2	Sandy Loam	A
	3600	2400	0.40 - 0.7'	10YR 4/4	Sandy Loam	B1
	3600	2400	0.7 - 1.4'	10YR 5/6	Sandy Loam	B2
	3650	2150	0 - 0.25'	10YR 4/2	Sandy Loam	A
	3650	2150	0.25 - 0.65'	10YR 4/4	Sandy Loam	Ap
	3650	2150	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3650	2200	0 - 0.25'	10YR 4/2	Sandy Loam	A
	3650	2200	0.25 - 0.65'	10YR 4/4	Sandy Loam	Ap
	3650	2200	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3650	2250	0 - 0.25'	10YR 4/2	Sandy Loam	A
	3650	2250	0.25 - 0.65'	10YR 4/4	Sandy Loam	Ap

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3650	2250	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3650	2300	0 - 0.25'	10YR 4/2	Sandy Loam	A
	3650	2300	0.25 - 0.65'	10YR 4/4	Sandy Loam	Ap
	3650	2300	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3650	2350	0 - 0.35'	10YR 3/2	Sandy Loam	A
	3650	2350	0.35 - 0.6'	10YR 4/4	Sandy Loam	Ap
	3650	2350	0.6 - 1.3'	10YR 5/6	Sandy Loam	B
	3650	2400	0 - 0.2'	10YR 3/2	Sandy Loam	A
	3650	2400	0.2 - 0.4'	10YR 4/4	Sandy Loam	Ap
	3650	2400	0.4 - 1.2'	10YR 5/6	Sandy Loam	B
	3700	1800	0 - 0.25'	10YR 3/3	Sandy Loam	A
	3700	1800	0.25 - 0.6'	10YR 4/3	Sandy Loam	Ap
	3700	1800	0.6 - 0.9'	10YR 5/4	Sandy Loam	B1
	3700	1800	0.9 -1.9'	10YR 6/4	Sandy Loam	B2
	3700	1800	1.9 - 2.4'	10YR 5/6	Sandy Loam	B3
	3700	1850	0 - 0.25'	10YR 3/3	Sandy Loam	A
	3700	1850	0.25 - 0.6'	10YR 4/3	Sandy Loam	Ap
	3700	1850	0.6 - 0.9'	10YR 5/4	Sandy Loam	B1
	3700	1850	0.9 -1.9'	10YR 6/4	Sandy Loam	B2
	3700	1850	1.9 - 2.4'	10YR 5/6	Sandy Loam	B3
	3700	1900	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3700	1900	0.2 - 0.6'	10YR 4/3	Sandy Loam	Ap
	3700	1900	0.6 - 0.9'	10YR 5/4	Sandy Loam	B1
	3700	1900	0.9 - 1.5'	10YR 6/4	Sandy Loam	B2
	3700	1900	1.4 - 1.7'	10YR 5/6	Sandy Loam	B3
	3700	1950	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3700	1950	0.2 - 0.6'	10YR 4/3	Sandy Loam	Ap
	3700	1950	0.6 - 0.9'	10YR 5/4	Sandy Loam	B1
	3700	1950	0.9 - 1.5'	10YR 6/4	Sandy Loam	B2
	3700	1950	1.4 - 1.7'	10YR 5/6	Sandy Loam	B3
	3700	2000	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3700	2000	0.2 - 0.6'	10YR 4/3	Sandy Loam	Ap
	3700	2000	0.6 - 0.9'	10YR 5/4	Sandy Loam	B1
	3700	2000	0.9 - 1.5'	10YR 6/4	Sandy Loam	B2
	3700	2000	1.4 - 1.7'	10YR 5/6	Sandy Loam	B3
	3700	2050	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3700	2050	0.2 - 0.6'	10YR 4/3	Sandy Loam	Ap
	3700	2050	0.6 - 0.9'	10YR 5/4	Sandy Loam	B1
	3700	2050	0.9 - 1.5'	10YR 6/4	Sandy Loam	B2
	3700	2050	1.4 - 1.7'	10YR 5/6	Sandy Loam	B3
	3700	2100	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3700	2100	0.2 - 0.6'	10YR 4/3	Sandy Loam	Ap
	3700	2100	0.6 - 0.9'	10YR 5/4	Sandy Loam	B1
	3700	2100	0.9 - 1.5'	10YR 6/4	Sandy Loam	B2
	3700	2100	1.4 - 1.7'	10YR 5/6	Sandy Loam	B3
	3700	2150	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3700	2150	0.2 - 0.6'	10YR 4/3	Sandy Loam	Ap
	3700	2150	0.6 - 0.9'	10YR 5/4	Sandy Loam	B1

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3700	2150	0.9 - 1.5'	10YR 6/4	Sandy Loam	B2
	3700	2150	1.4 - 1.7'	10YR 5/6	Sandy Loam	B3
	3700	2200	0 - 0.3'	10YR 3/2	Sandy Loam	A
	3700	2200	0.3 - 0.7'	10YR 4/3	Sandy Loam	Ap
	3700	2200	0.7 - 1.0'	10YR 5/6	Sandy Loam	B1
	3700	2200	1.0 - 1.4'	10YR 5/8	Sandy Loam	B2
	3700	2250	0 - 0.3'	10YR 3/2	Sandy Loam	A
	3700	2250	0.3 - 0.7'	10YR 4/3	Sandy Loam	Ap
	3700	2250	0.7 - 1.0'	10YR 5/6	Sandy Loam	B1
	3700	2250	1.0 - 1.4'	10YR 5/8	Sandy Loam	B2
	3700	2300	0 - 0.25'	10YR 3/2	Sandy Loam	A
	3700	2300	0.25 - 0.7'	10YR 34/3	Sandy Loam	Ap
	3700	2300	0.7 - 1.0'	10YR 5/4	Sandy Loam	B1
	3700	2300	1.0 - 1.6'	10YR 6/3	Sandy Loam	B2
	3700	2300	1.6 - 2.1'	10YR 6/4	Sandy Loam	B3
	3700	2350	0 - 0.15'		Root Mat	O
	3700	2350	0.15 - 0.3'	10YE 3/2	Sandy Loam	Ap
	3700	2350	0.3 - 0.8'	10YR 4/6	Sandy Loam	B1
	3700	2350	0.8 1.6'	10YR 6/4	Sandy Loam	B2
	3700	2350	1.6 - 2.0'	10YR 5/6	Sandy Loam	B3
	3700	2400	0 - 0.2'		Root Mat	O
	3700	2400	0.2 - 0.4'	10YE 3/2	Sandy Loam	Ap
	3700	2400	0.4 - 0.7'	10YR 4/6	Sandy Loam	B1
	3700	2400	0.7 - 1.1'	10YR 6/4	Sandy Loam	B2
	3700	2400	1.1 - 1.8'	10YR 5/6	Sandy Loam	B3
	3725	2050	0 - 0.3'	10YR 3/3	Sandy Loam	A
	3725	2050	0.3 - 0.55'	10YR 4/3	Sandy Loam	Ap
	3725	2050	0.55 - 0.85'	10YR 5/4	Sandy Loam	B1
	3725	2050	0.85 - 1.5'	10YR 6/4	Sandy Loam	B2
	3725	2050	1.5 - 1.8'	10YR 5/6	Sandy Loam	B3
	3725	2275	0 - 0.3'	10YR 3/2	Silt Loam	A
	3725	2275	0.3 - 0.5'	10YR 4/4	Silt Loam	Ap
	3725	2275	0.5 - 1.0'	10YR 6/4	Sandy Loam	B1
	3725	2275	1.0 - 1.3'	10YR 5/4	Sandy Loam	B2
	3725	2275	1.3 - 1.8'	10YR 4/6	Sandy Loam	B3
	3725	2300	0 - 0.3'	10YR 3/2	Silt Loam	A
	3725	2300	0.3 - 0.5'	10YR 4/4	Silt Loam	Ap
	3725	2300	0.5 - 1.0'	10YR 6/4	Sandy Loam	B1
	3725	2300	1.0 - 1.3'	10YR 5/4	Sandy Loam	B2
	3725	2300	1.3 - 1.8'	10YR 4/6	Sandy Loam	B3
	3725	2325	0 - 0.1'		Root Mat	O
	3725	2325	0.1 - 0.35'	10YR 3/2	Sandy Loam	A
	3725	2325	0.35 - 0.6'	10YR 3/4	Sandy Loam	Ap
	3725	2325	0.6 - 0.8'	10YR 5/6	Sandy Loam	B1
	3725	2325	0.8 - 1.6'	10YR 6/4	Sandy Loam	B2
	3725	2325	1.6 - 1.8'	10YR 4/6	Sandy Loam	B3
	3750	1800	0 - 0.2'	10YR 3/3	Sandy Loam	A
	3750	1800	0.2 - 0.6'	10YR 4/3	Sandy Loam	Ap

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3750	1800	0.6 - 1.3'	10YR 5/6	Sandy Loam	B1
	3750	1800	1.3 - 1.7'	7.5YR 5/8	Silt Loam	B2
	3750	2000	0 - 0.4'	10YR 3/3	Loamy Sand	A
	3750	2000	0.4 - 0.75'	10YR 4/3	Loamy Sand	Ap
	3750	2000	0.75 - 1.1'	10YR 5/4	Loamy Sand	B1
	3750	2000	1.1 - 1.7'	10YR 6/4	Loamy Sand	B2
	3750	2000	1.7 - 2.2'	10YR 4/6	Loamy Sand	B3
	3750	2025	0 - 0.3'	10YR 3/3	Sandy Loam	A
	3750	2025	0.3 - 0.55'	10YR 4/3	Sandy Loam	Ap
	3750	2025	0.55 - 0.85'	10YR 5/4	Sandy Loam	B1
	3750	2025	0.85 - 1.5'	10YR 6/4	Sandy Loam	B2
	3750	2025	1.5 - 1.8'	10YR 5/6	Sandy Loam	B3
	3750	2050	0 - 0.4'	10YR 3/3	Loamy Sand	A
	3750	2050	0.4 - 0.75'	10YR 4/3	Loamy Sand	Ap
	3750	2050	0.75 - 1.1'	10YR 5/4	Loamy Sand	B1
	3750	2050	1.1 - 1.7'	10YR 6/4	Loamy Sand	B2
	3750	2050	1.7 - 2.2'	10YR 4/6	Loamy Sand	B3
	3750	2075	0 - 0.3'	10YR 3/3	Sandy Loam	A
	3750	2075	0.3 - 0.55'	10YR 4/3	Sandy Loam	Ap
	3750	2075	0.55 - 0.85'	10YR 5/4	Sandy Loam	B1
	3750	2075	0.85 - 1.5'	10YR 6/4	Sandy Loam	B2
	3750	2075	1.5 - 1.8'	10YR 5/6	Sandy Loam	B3
	3750	2100	0 - 0.25'	10YR 3/2	Loam	Ao
	3750	2100	0.25 - 0.65'	10YR 4/4	Silt Loam	Ap
	3750	2100	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3750	2150	0 - 0.25'	10YR 3/2	Loam	Ao
	3750	2150	0.25 - 0.65'	10YR 4/4	Silt Loam	Ap
	3750	2150	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3750	2200	0 - 0.25'	10YR 3/2	Loam	Ao
	3750	2200	0.25 - 0.65'	10YR 4/4	Silt Loam	Ap
	3750	2200	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3750	2250	0 - 0.25'	10YR 3/2	Loam	Ao
	3750	2250	0.25 - 0.65'	10YR 4/4	Silt Loam	Ap
	3750	2250	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3750	2275	0 - 0.3'	10YR 3/3	Sandy Loam	A
	3750	2275	0.3 - 0.55'	10YR 4/3	Sandy Loam	Ap
	3750	2275	0.55 - 0.85'	10YR 5/4	Sandy Loam	B1
	3750	2275	0.85 - 1.5'	10YR 6/4	Sandy Loam	B2
	3750	2275	1.5 - 1.8'	10YR 5/6	Sandy Loam	B3
	3750	2300	0 - 0.25'	10YR 3/2	Loam	Ao
	3750	2300	0.25 - 0.65'	10YR 4/4	Silt Loam	Ap
	3750	2300	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3750	2325	0 - 0.3'	10YR 3/2	Silt Loam	A
	3750	2325	0.3 - 0.5'	10YR 4/4	Silt Loam	Ap
	3750	2325	0.5 - 1.0'	10YR 6/4	Sandy Loam	B1
	3750	2325	1.0 - 1.3'	10YR 5/4	Sandy Loam	B2
	3750	2325	1.3 - 1.8'	10YR 4/6	Sandy Loam	B3
	3750	2350	0 - 0.2'	10YR 3/1	Loam	A

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3750	2350	0.2 - 0.4'	10YR 4/3	Sandy Loam	Ao
	3750	2350	0.4 - 0.8'	10YR 4/4	Sandy Loam	Ap
	3750	2350	0.8 - 1.5'	10YR 5/6	Sand	B
	3750	2400	0 - 0.2'	10YR 3/1	Loam	A
	3750	2400	0.2 - 0.4'	10YR 4/3	Sandy Loam	Ao
	3750	2400	0.4 - 0.8'	10YR 4/4	Sandy Loam	Ap
	3750	2400	0.8 - 1.5'	10YR 5/6	Sand	B
	3750	2450	0 - 0.35'		Root Mat	O
	3750	2450	0.35 - 0.65'	10YR 5/3	Sand	E
	3750	2450	0.65 - 1.1'	10YR 4/6	Sandy Loam	B
	3775	2050	0 - 0.3'	10YR 3/3	Sandy Loam	A
	3775	2050	0.3 - 0.55'	10YR 4/3	Sandy Loam	Ap
	3775	2050	0.55 - 0.85'	10YR 5/4	Sandy Loam	B1
	3775	2050	0.85 - 1.5'	10YR 6/4	Sandy Loam	B2
	3775	2050	1.5 - 1.8'	10YR 5/6	Sandy Loam	B3
	3775	2275	0 - 0.2'	10YR 3/2	Loamy Sand	A
	3775	2275	0.2 - 0.5'	10YR 4/6	Loamy Sand	Ap
	3775	2275	0.5 - 0.95'	10YR 5/6	Loamy Sand	B1
	3775	2275	0.95 - 1.6'	10YR 6/6	Loamy Sand	B2
	3775	2300	0 - 0.3'	10YR 3/2	Silt Loam	A
	3775	2300	0.3 - 0.5'	10YR 4/4	Silt Loam	Ap
	3775	2300	0.5 - 1.0'	10YR 6/4	Sandy Loam	B1
	3775	2300	1.0 - 1.3'	10YR 5/4	Sandy Loam	B2
	3775	2300	1.3 - 1.8'	10YR 4/6	Sandy Loam	B3
	3775	2325	0 - 0.2'	10YR 3/2	Loamy Sand	A
	3775	2325	0.2 - 0.5'	10YR 4/6	Loamy Sand	Ap
	3775	2325	0.5 - 0.95'	10YR 5/6	Loamy Sand	B1
	3775	2325	0.95 - 1.6'	10YR 6/6	Loamy Sand	B2
	3800	2100	0 - 0.3'	10YR 3/3	Loamy Sand	A
	3800	2100	0.3 - 0.85'	10YR 4/3	Loamy Sand	Ap
	3800	2100	0.85 - 1.3'	10YR 5/4	Loamy Sand	B1
	3800	2100	1.3 - 1.8'	10YR 6/4	Loamy Sand	B2
	3800	2100	1.8 - 2.3'	10YR 4/6	Loamy Sand	B3
	3800	2150	0 - 0.3'	10YR 3/3	Loamy Sand	A
	3800	2150	0.3 - 0.55'	10YR 4/3	Loamy Sand	Ap
	3800	2150	0.55 - 1.0'	10YR 5/4	Loamy Sand	B1
	3800	2150	1.0 - 1.8'	10YR 6/4	Loamy Sand	B2
	3800	2150	1.8 - 2.1'	10YR 4/6	Loamy Sand	B3
	3800	2200	0 - 0.3'	10YR 3/2	Sandy Loam	A
	3800	2200	0.3 - 0.7'	10YR 4/4	Silt Loam	Ap
	3800	2200	0.7 - 1.2'	10YR 5/6	Silt Loam	B1
	3800	2200	1.2 - 1.5'	10YR 5/8	Loamy Sand	B2
	3800	2250	0 - 0.3'	10YR 3/2	Sandy Loam	A
	3800	2250	0.3 - 0.7'	10YR 4/4	Silt Loam	Ap
	3800	2250	0.7 - 1.2'	10YR 5/6	Silt Loam	B1
	3800	2250	1.2 - 1.5'	10YR 5/8	Loamy Sand	B2
	3800	2300	0 - 0.25'	10YR 4/2	Silt Loam	A
	3800	2300	0.25 - 0.5'	10Yr 5/4	Silt Loam	Ap

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3800	2300	0.5 - 0.9'	10YR 6/4	Sandy Loam	B1
	3800	2300	0.9 - 1.4'	10YR 5/8	Sandy Loam	B2
	3800	2350	0 - 0.25'	10YR 4/2	Silt Loam	A
	3800	2350	0.25 - 0.5'	10Yr 5/4	Silt Loam	Ap
	3800	2350	0.5 - 0.9'	10YR 6/4	Sandy Loam	B1
	3800	2350	0.9 - 1.4'	10YR 5/8	Sandy Loam	B2
	3800	2400	0 - 0.25'	10YR 4/2	Silt Loam	A
	3800	2400	0.25 - 0.5'	10Yr 5/4	Silt Loam	Ap
	3800	2400	0.5 - 0.9'	10YR 6/4	Sandy Loam	B1
	3800	2400	0.9 - 1.4'	10YR 5/8	Sandy Loam	B2
	3800	2450	0 - 0.5'			
	3800	2450	0.5 - 0.55'	10YR 2/1	Root Mat	O
	3800	2450	0.55 - 0.6'	10YR 4/4	Silt Loam	A
	3800	2450	0.6 - 0.8'	10YR 3/4	Silt Loam	E
	3800	2450	0.8 - 1.2'	10R 5/6	Sandy Loam	B
	3825	2375	0 - 0.25'		Root Mat	O
	3825	2375	0.25 - 0.35'	10YR 4/1	Sandy Loam	Ao
	3825	2375	0.35 - 0.75'	10YR 4/4	Loamy Sand	Ap
	3825	2375	0.75 - 1.5'	10YR 5/4	Sand	B
	3825	2400	0 - 0.1'		Root Mat	O
	3825	2400	0.1 - 0.3'	10YR 4/1	Loamy Sand	Ao
	3825	2400	0.3 -0.7'	10YR 4/4	Loamy Sand	Ap
	3825	2400	0.7 - 1.4'	10YR 5/6	Sand	B
	3825	2425	0 - 0.25'		Root Mat	O
	3825	2425	0.25 - 0.35'	10YR 4/1	Sandy Loam	Ao
	3825	2425	0.35 - 0.75'	10YR 4/4	Loamy Sand	Ap
	3825	2425	0.75 - 1.5'	10YR 5/4	Sand	B
	3850	2100	0 - 0.25'	10YR 3/2	Loam	Ao
	3850	2100	0.25 - 0.65'	10YR 4/4	Silt Loam	Ap
	3850	2100	0.65 - 1.4'	10YR 5/6	Sandy Loam	B
	3850	2150	0 - 0.15'		Root Mat	O
	3850	2150	0.15 - 0.2'	10YR 3/2	Loam	Ao
	3850	2150	0.2 - 0.65'	10YR 4/4	Silt Loam	Ap
	3850	2150	0.65 - 1.3'	10YR 5/6	Sandy Loam	B
	3850	2200	0 - 0.15'		Root Mat	O
	3850	2200	0.15 - 0.2'	10YR 3/2	Loam	Ao
	3850	2200	0.2 - 0.65'	10YR 4/4	Silt Loam	Ap
	3850	2200	0.65 - 1.3'	10YR 5/6	Sandy Loam	B
	3850	2250	0 - 0.15'		Root Mat	O
	3850	2250	0.15 - 0.2'	10YR 3/2	Loam	Ao
	3850	2250	0.2 - 0.65'	10YR 4/4	Silt Loam	Ap
	3850	2250	0.65 - 1.3'	10YR 5/6	Sandy Loam	B
	3850	2300	0 - 0.15'		Root Mat	O
	3850	2300	0.15 - 0.2'	10YR 3/2	Loam	Ao
	3850	2300	0.2 - 0.65'	10YR 4/4	Silt Loam	Ap
	3850	2300	0.65 - 1.3'	10YR 5/6	Sandy Loam	B
	3850	2350	0 - 0.25'	10YR 3/2	Loam	Ao
	3850	2350	0.25 - 0.75'	10YR 4/4	Silt Loam	Ap

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3850	2350	0.75 - 1.2'	10YR 5/6	Sandy Loam	B
	3850	2375	0 - 0.15'		Root Mat	O
	3850	2375	0.15 - 0.30'	10YR 4/1	Sandy Loam	Ao
	3850	2375	0.30 - 0.7'	10YR 4/4	Loamy Sand	Ap
	3850	2375	0.7 - 1.6'	10YR 5/4	Sand	B1
	3850	2375	1.6 - 1.8'	10YR 4/6	Sand	B2
	3850	2400	0 - 0.15'		Root Mat	O
	3850	2400	0.15 - 0.4'	10YR 3/2	Loam	Ao
	3850	2400	0.4 - 0.8'	10YR 4/4	Silt Loam	Ap
	3850	2400	0.8 - 1.5'	10YR 5/6	Sandy Loam	B
	3850	2425	0 - 0.1'		Root Mat	O
	3850	2425	0.1 - 0.3'	10YR 4/1	Loamy Sand	Ao
	3850	2425	0.3 -0.7'	10YR 4/4	Loamy Sand	Ap
	3850	2425	0.7 - 1.4'	10YR 5/6	Sand	B
	3850	2450	0 - 0.15'		Root Mat	O
	3850	2450	0.15 - 0.3'	10YR 3/1	Loamy Sand	Ao
	3850	2450	0.3 - 0.7'	10YR 4/4	Loamy Sand	Ap
	3850	2450	0.7 - 1.5'	10YR 6/4	Sand	B
	3875	2375	0 - 0.25'		Root Mat	O
	3875	2375	0.25 - 0.35'	10YR 4/1	Sandy Loam	Ao
	3875	2375	0.35 - 0.75'	10YR 4/4	Loamy Sand	Ap
	3875	2375	0.75 - 1.5'	10YR 5/4	Sand	B
	3875	2400	0 - 0.1'		Root Mat	O
	3875	2400	0.1 - 0.3'	10YR 4/1	Loamy Sand	Ao
	3875	2400	0.3 -0.7'	10YR 4/4	Loamy Sand	Ap
	3875	2400	0.7 - 1.4'	10YR 5/6	Sand	B
	3875	2425	0 - 0.25'		Root Mat	O
	3875	2425	0.25 - 0.35'	10YR 4/1	Sandy Loam	Ao
	3875	2425	0.35 - 0.75'	10YR 4/4	Loamy Sand	Ap
	3875	2425	0.75 - 1.5'	10YR 5/4	Sand	B
	3875	2450	0 - 0.25'		Root Mat	O
	3875	2450	0 - 0.35'		Root Mat	O
	3875	2450	0.25 - 0.35'	10YR 4/1	Sandy Loam	Ao
	3875	2450	0.35 - 0.5'	10YR 4/2	Loamy Sand	Ao
	3875	2450	0.35 - 0.75'	10YR 4/4	Loamy Sand	Ap
	3875	2450	0.5 - 0.8'	10YR 4/4	Loamy Sand	Ap
	3875	2450	0.75 - 1.5'	10YR 5/4	Sand	B
	3875	2450	0.8 - 1.4'	10YR 5/6	Loamy Sand	B
	3900	2100	0 - 0.3'		Root Mat	O
	3900	2100	0.3 - 0.6'	7.5YR 2.5/3	Sandy Loam	A
	3900	2100	0.6 - 0.9'	7.5YR 4/4	Sandy Loam	B1
	3900	2100	0.9 - 1.2'	10YR 5/4	Loamy Sand	B2
	3900	2150	0 - 0.4'	10YR 2/1	Loamy Sand	Ao
	3900	2150	0.4 - .5'	10YR 4/1	Loamy Sand	E
	3900	2150	0.5 - 0.9'	7.5YR 4/4	Loamy Sand	B1
	3900	2150	0.9 - 1.4'	10YR 5/4	Sandy Loam	B2
	3900	2150	1.4 - 2.2'	10YR 6/3	Sandy Loam	B3
	3900	2200	0 - 0.4'	10YR 2/1	Loamy Sand	B2

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
	3900	2200	0 - 0.4'	10YR 2/1	Loamy Sand	B1
	3900	2200	0 - 0.4'	10YR 2/1	Loamy Sand	E
	3900	2200	0 - 0.4'	10YR 2/1	Loamy Sand	Ao
	3900	2200	0 - 0.4'	10YR 2/1	Loamy Sand	B3
	3900	2250	0 - 0.35'	2.5Y 6/6	Sandy Loam	Erosional Deposit
	3900	2250	0.35 - 0.55'	2.7Y 3/2	Sandy Loam	A
	3900	2250	0.55 - 0.95'	2.5Y 5/6	Sandy Loam	B1
	3900	2250	0.95 - 1.7'	2.5Y 7/4	Sandy Loam	B2
	3900	2250	1.7 - 2.2'	2.5Y 6/4	Sandy Loam	B3
	3900	2300	0 - 0.1'		Root Mat	O
	3900	2300	0.1 - 0.2'	10YR 3/1	Sandy Loam	Ao
	3900	2300	0.2 - 0.7'	10YR 4/4	Sandy Loam	Ap
	3900	2300	0.7 - 1.4'	10YR 5/6	Silt Loam	B
	3900	2350	0 - 0.1'		Root Mat	O
	3900	2350	0.1 - 0.2'	10YR 3/1	Sandy Loam	Ao
	3900	2350	0.2 - 0.7'	10YR 4/4	Sandy Loam	Ap
	3900	2350	0.7 - 1.4'	10YR 5/6	Silt Loam	B
	3900	2400	0 - 0.15'		Root Mat	O
	3900	2400	0.15 - 0.3'	10YR 3/1	Loamy Sand	Ao
	3900	2400	0.3 - 0.7'	10YR 4/4	Loamy Sand	Ap
	3900	2400	0.7 - 1.5'	10YR 6/4	Sand	B
	3900	2425	0 - 0.35'		Root Mat	O
	3900	2425	0.35 - 0.5'	10YR 4/2	Loamy Sand	Ao
	3900	2425	0.5 - 0.8'	10YR 4/4	Loamy Sand	Ap
	3900	2425	0.8 - 1.4'	10YR 5/6	Loamy Sand	B
	3900	2450	0 - 0.15'		Root Mat	O
	3900	2450	0.15 - 0.3'	10YR 3/1	Loamy Sand	Ao
	3900	2450	0.3 - 0.7'	10YR 4/4	Loamy Sand	Ap
	3900	2450	0.7 - 1.5'	10YR 6/4	Sand	B
	3950	2100	0 - 0.3'		Root Mat	O
	3950	2100	0.3 - 0.6'	7.5YR 2.5/3	Sandy Loam	A
	3950	2100	0.6 - 0.9'	7.5YR 4/4	Sandy Loam	B1
	3950	2100	0.9 - 1.2'	10YR 5/4	Loamy Sand	B2
	3950	2350	0 - 0.2'	10YR 4/2	Sandy Loam	Ao
	3950	2350	0.2 - 0.5'	10YR 4/4	Sandy Loam	Ap
	3950	2350	0.5 - 1.3'	10YR 5/6	Sand	B
Area2-1	1500	2600	0 - 0.4'	10YR 3/3	Silt Loam	A
Area2-1	1500	2600	0.4 - 0.8'	10YR 4/4	Silt Loam	Ap
Area2-1	1500	2600	0.8 - 1.1'	10YR 4/6	Silt Loam	B1
Area2-1	1500	2600	1.1 - 1.5'	10YR 5/6	Silt Loam	B2
Area2-2	1525	2600	0 - 0.5'	10YR 3/3	Silt Loam	A
Area2-2	1525	2600	0.5 - 0.95'	10YR 4/4	Silt Loam	Ap
Area2-2	1525	2600	0.95 - 1.2'	10YR 5/4	Silt Loam	B1
Area2-2	1525	2600	1.2 - 1.7'	10YR 6/4	Silt Loam	B2
Area2-2	1525	2600	1.7 - 2.0'	10YR 5/6	Silt Loam	B3
Area2-3	1500	2575	0 - 0.15'		Root Mat	O
Area2-3	1500	2575	0.15 - 0.3'	10YR 3/2	Silt Loam	A
Area2-3	1500	2575	0.3 - 0.7'	10YR 4/2	Silt Loam	Ap

APPENDIX I: MULBERRY KNOLL SHOVEL TEST LOG

AREA-TEST#	NORTH	EAST	DEPTH	MUNSELL	TEXTURE	INTERPRETATION
Area2-3	1500	2575	0.7 - 1.1'	10YR 6/6	Silt Loam	B1
Area2-3	1500	2575	1.1 - 1.6'	10YR 5/6	Silt Loam	B2
Area3-1	2525	2650	0 - 0.25'	10YR 3/3	Silt Loam	A
Area3-1	2525	2650	0.25 - 0.6'	10YR 4/3	Silt Loam	Ap
Area3-1	2525	2650	0.6 - 0.9'	10YR 5/4	Silt Loam	B1
Area3-1	2525	2650	0.9 - 1.2'	10YR 5/6	Silty Clay Loam	B2
Area3-2	2550	2650	0 - 0.2'	10YR 3/2	Silt Loam	A
Area3-2	2550	2650	0.2 - 0.5'	10YR 4/4	Silt Loam	Ap
Area3-2	2550	2650	0.5 - 1.0'	10YR 5/6	Sandy Loam	B1
Area3-2	2550	2650	1.0 - 1.4'	10YR 5/8	Sandy Loam	B2
Area4-1	4600	2000	0 - 0.3'	10YR 3/2	Silt Loam	A
Area4-1	4600	2000	0.3 - 1.0'	10YR 4/4	Silt Loam	Ap
Area4-1	4600	2000	1.0 - 1.7'	10YR 5/6	Sandy Loam	B1
Area4-1	4600	2000	1.7 - 2.0'	10YR 5/8	Sandy Loam	B2
East-1	1576.94	2425.839	0 - 0.8'	10YR 4/3	Sandy Loam	Ap
East-1	1576.94	2425.839	0.8 - 1.4'	10YR 5/6	Sandy Loam	B1
East-1	1576.94	2425.839	1.4 - 1.8'	10YR 6/4	Sandy Loam	B2
East-1	1576.94	2425.839	1.8 - 2.1'	10YR 5/6	Sandy Loam	B/C
East-2	1472.03	2357.463	0 - 0.85'	10YR 4/3	Sandy Loam	Ap
East-2	1472.03	2357.463	0.85 - 1.3'	10YR 5/4	Silt Loam	B1
East-2	1472.03	2357.463	1.3 - 1.6'	10YR 5/6	Loam	B2
East-3	680.712	2302.478	0 - 1.15'	10YR 4/3	Sandy Loam	Ap
East-3	680.712	2302.478	1.15 - 1.5'	10YR 5/6	Sandy Loam	B1
East-3	680.712	2302.478	1.5 - 1.7'	10YR 5/8	Silt Loam	B2
East-4	697.708	2421.263	0 - 0.8'	10YR 4/3	Sandy Loam	Ap
East-4	697.708	2421.263	0.8 - 1.2'	10YR 5/6	Sandy Loam	B1
East-4	697.708	2421.263	1.2 - 1.5'	10YR 5/8	Silt Loam	B2
East-5	384.748	2242.935	0 - 0.9'	10YR 4/4	Sandy Loam	Ap
East-5	384.748	2242.935	0.9 - 1.4'	10YR 6/6	Loamy Sand	B1
East-5	384.748	2242.935	1.4 - 1.7'	10YR 5/6	Sandy Loam	B2
East-6	434.998	1867.747	0 - 0.85'	10YR 4/4	Sandy Loam	Ap
East-6	434.998	1867.747	0.85 - 1.15'	10YR 5/3	Sandy Loam	A
East-6	434.998	1867.747	1.15 - 1.5'	10YR 5/6	Sandy Loam	B1
East-6	434.998	1867.747	1.5 - 1.8'	10YR 6/4	Sandy Loam	B2
East-6	434.998	1867.747	1.8 - 2.4'	10YR 5/8	Sandy Loam	B/C
West-1	2674.22	345.322	0 - 0.8'	10YR 4/3	Sandy Loam	Ap
West-1	2674.22	345.322	0.8 - 1.2'	10YR 5/6	Sandy Loam	B1
West-1	2674.22	345.322	1.2 - 1.6'	7.5YR 4/6	Sandy Loam	B2
West-1	2674.22	345.322	1.6 - 2.1'	7.5YR 5/6	Sandy Loam	B/C
West-2	2620.11	184.845	0 - 1.2'	10YR 4/3	Sandy Loam	Ap
West-2	2620.11	184.845	1.2 - 1.6'	10YR 5/6	Sandy Loam	B1
West-2	2620.11	184.845	1.6 - 2.2'	7.5YR 4/6	Sandy Loam	B2
West-2	2620.11	184.845	2.2 - 2.5'	7.5YR 5/6	Sandy Loam	B/C
West-3	2721.08	230.016	0 - 0.8'	10YR 4/3	Sandy Loam	Ap
West-3	2721.08	230.016	0.8 - 1.1'	10YR 5/6	Sandy Loam	B1
West-3	2721.08	230.016	1.1 - 1.4'	7.5YR 4/6	Sandy Loam	B2
West-3	2721.08	230.016	1.4 - 1.6'	7.5YR 5/6	Sandy Loam	B/C

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
7S-G-116	421	2792.537	317.732	30.118		1	fcr	A
7S-G-116	422	2789.576	285.246	29.904		1	fcr	A
7S-G-116	423	2793.911	281.85	29.809		1	fcr	A
7S-G-116	424	2780.025	260.295	29.687		1	chert primary	A
7S-G-116	425	2801.902	231.949	29.44		1	window glass	H
7S-G-116	426	2748.387	265.456	30.363		1	chert secondary	A
7S-G-116	427	2783.78	229.813	29.609		1	chert secondary	A
7S-G-116	428	2723.483	290.24	31.007		1	stoneware	H
7S-G-116	429	2737.893	239.808	30.384		1	chert primary	A
7S-G-116	430	2777.556	209.903	29.214		1	fcr	A
7S-G-116	431	2777.013	206.123	29.212		1	chert biface	A
7S-G-116	432	2702.033	218.232	30.514		1	fcr	A
7S-G-116	433	2704.884	201.063	30.128		1	chert primary	A
7S-G-116	434	2681.832	206.573	30.384		1	fcr	A
7S-G-116	435	2682.3	245.165	31.036		1	whiteware	H
7S-G-116	436	2660.755	207.019	30.252		1	fcr	A
7S-G-116	437	2635.428	218.015	30.132		1	fcr	A
7S-G-116	438	2621.348	270.594	30.393		1	whiteware	H
7S-G-116	439	2679.801	119.039	28.634		1	fcr	A
7S-G-116	440	2626.308	136.449	28.929		1	hammerstone	A
7S-G-116	441	2665.912	105.9	28.349		1	fcr	A
7S-G-116	442	2658.84	129.144	29.023		1	fcr	A
7S-G-116	443	2657.15	128.77	29.02		1	fcr	A
7S-G-116	444	2638.478	99.595	28.451		1	quartz biface	A
7S-G-116	445	2605.466	106.698	28.467		1	quartz secondary	A
7S-G-116	446	2585.203	66.937	27.37		1	porcelain	H
7S-G-116	447	2593.649	146.479	28.856		1	chert primary	A
7S-G-116	448	2565.803	81.891	27.532		1	fcr	A
7S-G-116	449	2594.612	154.593	29.119		1	chert primary	A
7S-G-116	450	2585.082	172.99	29.217		1	ironstone	H
7S-G-116	451	2549.586	135.34	27.854		1	fcr	A
7S-G-116	452	2576.927	161.715	28.81		1	fcr	A
7S-G-116	453	2544.735	127.519	27.78		1	fcr	A
7S-G-116	454	2587.859	216.759	29.36		1	fcr	A
7S-G-116	455	2549.004	85.011	27.528		1	fcr	A
7S-G-116	456	2583.499	306.062	29.743		1	brick	H
7S-G-116	457	2540.88	75.493	27.151		1	fcr	A
7S-G-116	458	2517.843	104.898	27.345		1	fcr	A
7S-G-116	459	2542.931	273.165	28.609		1	nail	H
7S-G-116	460	2526.301	114.904	27.664		1	chert cobble worked	A
7S-G-116	461	2535.901	153.695	28.032		1	chert cobble	A
7S-G-116	462	2516.706	48.408	26.663		1	fcr	A
7S-G-116	463	2497.001	104.751	27.369		1	fcr	A

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
7S-G-116	464	2484.359	53.354	26.579		1	chert secondary	A
7S-G-116	465	2484.005	94.757	27.41		1	fcr	A
7S-G-116	466	2453.358	92.475	27.267		1	doll arm	H
7S-G-116	467	2478.651	107.45	27.482		1	fcr	A
7S-G-116	468	2461.365	106.942	26.98		1	fcr	A
7S-G-116	469	2479.204	106.988	27.353		1	quartz	A
7S-G-116	470	2448.74	102.778	26.774		1	fcr	A
7S-G-116	471	2490.839	143.487	27.495		1	chert primary	A
7S-G-116	472	2387.206	110.947	25.875		1	fcr	A
7S-G-116	473	2409.34	139.541	26.42		1	fcr	A
7S-G-116	474	2418.671	151.797	26.603		1	mano	A
7S-G-116	475	2414.588	169.195	26.992		1	brick	H
7S-G-116	476	2397.098	169.116	26.764		1	chert secondary	A
7S-G-116	477	2356.989	127.356	25.804		1	fcr	A
7S-G-116	478	2392.767	194.024	26.512		1	brick	H
7S-G-116	479	2357.993	131.099	25.768		1	chert secondary	A
7S-G-116	480	2397.515	223.492	26.737		1	pearlware	H
7S-G-116	481	2345.446	149.443	25.66		1	fcr	A
7S-G-116	482	2367.88	192.067	26.334		1	quartz secondary	A
7S-G-116	483	2326.666	176.275	25.716		1	fcr	A
7S-G-116	484	2313.356	177.67	25.601		1	fcr	A
7S-G-116	485	2340.585	189.762	26.009		1	quartz secondary	A
7S-G-116	486	2306.239	205.798	25.841		1	brick	H
7S-G-116	487	2310.279	241.412	26.616		1	brick	H
7S-G-116	488	2259.458	195.841	25.817		1	brick	H
7S-G-116	489	2246.852	206.093	26.22		1	fcr	A
7S-G-116	490	2253.458	213.63	26.571		1	brick	H
7S-G-116	491	2227.922	290.578	28.15		1	brick	H
7S-G-116	492	2209.233	280.841	28.489		1	rbew	H
7S-G-116	493	2206.05	257.587	28.184		1	rbew	H
7S-G-116	494	2191.766	263.901	28.384		1	brick	H
7S-G-116	497	2214.146	316.047	28.412		1	brick	H
7S-G-116	499	2284.223	339.625	27.452		1	cobalt glass	H
7S-G-116	500	2214.323	358.09	28.325		1	brick	H
7S-G-116	503	2349.947	409.941	27.96		1	rbew	H
7S-G-116	504	2278.719	429.002	28.722		1	porcelain	H
7S-G-116	505	2273.534	469.312	29.433		1	milk glass	H
7S-G-116	506	2276.272	459.468	29.347		1	aqua bottle	H
7S-G-116	507	2340.833	491.581	29.772		1	brick	H
7S-G-116	509	2419.35	499.949	29.704		1	rbew	H
7S-G-116	510	2419.6	499.084	29.705		1	window glass	H
7S-G-116	512	2452.607	494.059	29.824		1	brick	H
7S-G-116	634	2546.126	383.447	29.397		1	clear bottle	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
7S-G-116	635	2589.96	344.384	30.246		1	whiteware	H
7S-G-116	636	2655.395	342.842	31.933		1	rbew	H
7S-G-116	637	2675.576	347.451	31.932		1	rbew	H
7S-G-116	638	2674.224	345.322	ap		9	clam	F
7S-G-116	638	2674.224	345.322	ap		1	brick	H
7S-G-116	641	2638.214	306.063	31.219		1	clam	F
7S-G-116	642	2651.153	297.769	31.375		1	clam	F
7S-G-116	643	2657.174	305.487	31.525		1	clam	F
7S-G-116	644	2664.423	299.702	31.523		1	clam	F
7S-G-116	645	2702.584	299.63	31.524		1	clam	F
7S-G-116	646	2698.154	307.348	31.576		1	clam	F
7S-G-116	647	2705.668	298.392	31.317		1	clam	F
7S-G-116	648	2715.593	319.164	31.514		1	clam	F
7S-G-116	649	2692.562	314.155	31.727		1	clam	F
7S-G-116	650	2698.952	319.023	31.73		1	clam	F
7S-G-116	651	2680.644	313.694	31.726		1	clam	F
7S-G-116	652	2676.097	314.059	31.88		1	clam	F
7S-G-116	653	2697.663	318.173	31.783		1	clam	F
7S-G-116	654	2674.051	314.618	31.874		1	clam	F
7S-G-116	655	2680.277	318.893	31.874		1	clam	F
7S-G-116	656	2660.366	310.601	31.74		1	clam	F
7S-G-116	657	2672.458	318.121	31.939		1	clam	F
7S-G-116	658	2659.57	313.648	31.72		1	clam	F
7S-G-116	659	2629.847	314.995	31.131		1	clam	F
7S-G-116	660	2619.416	319.902	31.159		1	clam	F
7S-G-116	661	2643.686	324.264	31.629		1	clam	F
7S-G-116	662	2642.409	325.039	31.63		1	clam	F
7S-G-116	663	2643.179	321.971	31.627		1	clam	F
7S-G-116	664	2653.382	328.511	31.714		1	clam	F
7S-G-116	665	2665.673	322.503	31.906		1	clam	F
7S-G-116	666	2668.764	332.114	31.91		1	clam	F
7S-G-116	667	2667.447	326.149	32.005		1	clam	F
7S-G-116	668	2671.007	335.84	31.999		1	clam	F
7S-G-116	669	2673.894	334.996	31.999		1	clam	F
7S-G-116	670	2677.359	332.393	32.006		1	clam	F
7S-G-116	671	2676.004	333.961	32.005		1	clam	F
7S-G-116	672	2681.29	332.214	31.86		1	clam	F
7S-G-116	673	2679.612	330.943	31.86		1	clam	F
7S-G-116	674	2679.581	331.044	31.86		1	clam	F
7S-G-116	675	2682.324	330.788	31.865		1	clam	F
7S-G-116	676	2694.864	323.326	31.859		1	clam	F
7S-G-116	677	2691.623	328.446	31.86		1	clam	F
7S-G-116	678	2697.856	334.578	31.796		1	clam	F

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
7S-G-116	679	2710.746	323.696	31.791	1	clam	F
7S-G-116	680	2703.144	332.223	31.644	1	clam	F
7S-G-116	681	2704.421	329.388	31.645	1	clam	F
7S-G-116	682	2708.203	335.852	31.652	1	clam	F
7S-G-116	683	2709.564	335.536	31.652	1	clam	F
7S-G-116	684	2714.826	334.481	31.455	1	clam	F
7S-G-116	685	2721.055	336.371	31.457	1	clam	F
7S-G-116	686	2728.813	340.428	31.285	1	clam	F
7S-G-116	687	2707.843	344.527	31.6	1	clam	F
7S-G-116	688	2719.982	352.392	31.063	1	clam	F
7S-G-116	689	2700.586	343.873	31.79	1	clam	F
7S-G-116	690	2720.313	354.213	31.098	1	clam	F
7S-G-116	691	2715.187	352.751	31.095	1	clam	F
7S-G-116	692	2716.211	356.072	31.108	1	clam	F
7S-G-116	693	2693.167	344.767	31.748	1	clam	F
7S-G-116	694	2705.368	354.48	31.264	1	clam	F
7S-G-116	695	2703.653	349.472	31.7	1	clam	F
7S-G-116	696	2700.127	351.937	31.489	1	clam	F
7S-G-116	697	2692.712	347.105	31.792	1	clam	F
7S-G-116	698	2697.869	356.752	31.424	1	clam	F
7S-G-116	699	2689.904	347.738	31.806	1	clam	F
7S-G-116	700	2692.141	355.244	31.635	1	clam	F
7S-G-116	701	2690.779	351.271	31.757	1	clam	F
7S-G-116	702	2690.217	358.995	31.557	1	clam	F
7S-G-116	703	2685.338	357.619	31.555	1	clam	F
7S-G-116	704	2679.307	356.238	31.552	1	clam	F
7S-G-116	705	2672.506	347.253	31.908	1	clam	F
7S-G-116	706	2674.479	356.316	31.64	1	clam	F
7S-G-116	707	2673.562	348.575	31.922	1	clam	F
7S-G-116	708	2657.034	353.287	31.67	1	clam	F
7S-G-116	709	2661.534	350.622	31.959	1	clam	F
7S-G-116	710	2646.834	351.564	31.628	1	clam	F
7S-G-116	711	2660.237	348.008	32.002	1	clam	F
7S-G-116	712	2658.926	348.968	32.002	1	clam	F
7S-G-116	713	2646.334	348.759	31.686	1	clam	F
7S-G-116	714	2649.682	348.02	31.937	1	clam	F
7S-G-116	715	2641.153	349.092	31.609	1	clam	F
7S-G-116	716	2642.318	346.326	31.837	1	clam	F
7S-G-116	717	2635.54	353.774	31.454	1	clam	F
7S-G-116	718	2632.875	342.45	31.652	1	clam	F
7S-G-116	719	2639.114	357.705	31.469	1	clam	F
7S-G-116	720	2631.684	349.219	31.447	1	clam	F
7S-G-116	721	2651.343	358.692	31.585	1	clam	F

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
7S-G-116	722	2631.314	351.569	31.566	1	clam	F
7S-G-116	723	2654.586	355.895	31.586	1	clam	F
7S-G-116	724	2612.982	348.886	31.03	1	clam	F
7S-G-116	725	2654.54	358.474	31.631	1	clam	F
7S-G-116	726	2656.329	360.309	31.634	1	clam	F
7S-G-116	727	2607.365	355.263	30.83	1	clam	F
7S-G-116	728	2671.513	355.227	31.724	1	clam	F
7S-G-116	729	2610.778	367.395	31.028	1	clam	F
7S-G-116	730	2680.539	359.846	31.58	1	clam	F
7S-G-116	731	2687.306	352.46	31.677	1	clam	F
7S-G-116	732	2643.554	365.479	31.68	1	clam	F
7S-G-116	733	2686.841	366.923	31.693	1	clam	F
7S-G-116	734	2654.303	365.54	31.687	1	clam	F
7S-G-116	735	2682.757	364.842	31.695	1	clam	F
7S-G-116	736	2682.012	365.375	31.695	1	clam	F
7S-G-116	737	2669.75	362.68	31.691	1	clam	F
7S-G-116	738	2694.243	371.302	31.632	1	clam	F
7S-G-116	739	2675.162	360.103	31.78	1	clam	F
7S-G-116	740	2695.267	370.858	31.48	1	clam	F
7S-G-116	741	2675.231	367.704	31.91	1	clam	F
7S-G-116	742	2696.816	364.268	31.49	1	clam	F
7S-G-116	743	2696.932	388.583	31.545	1	clam	F
7S-G-116	744	2684.678	386.562	31.54	1	clam	F
7S-G-116	745	2698.003	384.94	31.596	1	oyster	F
7S-G-116	746	2666.268	375.483	31.765	1	clam	F
7S-G-116	747	2677.153	388.21	31.848	1	clam	F
7S-G-116	748	2714.273	370.123	31.209	1	clam	F
7S-G-116	749	2709.628	291.652	31.385	1	oyster	F
7S-G-116	750	2705.444	374.458	31.391	1	clam	F
7S-G-13	3	2952.446	2512.581	11.742	1	rbew	H
7S-G-13	4	2944.312	2504.272	12.204	1	clam	F
7S-G-13	5	2945.014	2502.997	12.058	1	oyster	F
7S-G-13	6	2937.077	2503.788	12.235	1	clam	F
7S-G-13	7	2930.994	2506.882	12.211	1	clam	F
7S-G-13	8	2931.338	2509.124	11.928	1	clam	F
7S-G-13	9	2927.996	2509.296	12.081	1	clam	F
7S-G-13	10	2925.038	2514.325	12.036	1	clam	F
7S-G-13	11	2929.964	2509.624	12.081	1	oyster	F
7S-G-13	12	2925.721	2504.977	12.296	1	clam	F
7S-G-13	13	2922.664	2499.156	12.426	1	clam	F
7S-G-13	14	2920.84	2498.176	12.418	1	clam	F
7S-G-13	15	2924.471	2495.962	12.489	1	clam	F
7S-G-13	16	2925.848	2494.973	12.627	1	rbew	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

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Site	Name	Northing	Easting	Elevation	N		Description	Class
7S-G-13	17	2928.331	2494.136	12.633		1	rbew clear glaze	H
7S-G-13	18	2926.558	2492.894	12.638		1	clam	F
7S-G-13	19	2932.803	2493.376	12.641		1	clam	F
7S-G-13	20	2930.59	2484.421	12.963		1	clam	F
7S-G-13	21	2929.318	2484.335	12.952		1	clam	F
7S-G-13	22	2930.696	2478.358	12.991		1	brick	H
7S-G-13	23	2940.942	2476.899	12.994		1	brick	H
7S-G-13	24	2947.638	2484.725	12.675		1	clam	F
7S-G-13	25	2950.074	2474.554	12.845		1	brick	H
7S-G-13	26	2952.128	2426.525	13.445		1	oyster	F
7S-G-13	27	2939.943	2402.324	13.527		1	brick	H
7S-G-13	28	2981.084	2446.003	12.713		1	clam	F
7S-G-13	29	2946.171	2443.386	13.556		1	clam	F
7S-G-13	30	2944.994	2450.399	13.442		1	clam	F
7S-G-13	31	2942.786	2469.332	13.02		1	oyster	F
7S-G-13	32	2928.387	2455.393	13.493		1	oyster	F
7S-G-13	33	2929.356	2450.019	13.513		1	oyster	F
7S-G-13	34	2928.588	2449.669	13.652		1	clam	F
7S-G-13	35	2925.697	2443.083	13.856		1	oyster	F
7S-G-13	36	2919.166	2477.859	13.195		1	rbew	H
7S-G-13	37	2925.531	2484.707	13.044		1	clear vessel	H
7S-G-13	38	2919.999	2488.829	12.827		1	clam	F
7S-G-13	39	2915.565	2495.795	12.525		1	oyster	F
7S-G-13	40	2916.688	2500.485	12.335		1	clam	F
7S-G-13	41	2919.763	2501.208	12.334		1	clam	F
7S-G-13	42	2917.852	2506.178	12.303		1	clam	F
7S-G-13	43	2914.579	2507.242	12.294		1	clam	F
7S-G-13	44	2913.594	2511.704	12.028		1	clam	F
7S-G-13	45	2912.783	2507.026	12.056		1	brick	H
7S-G-13	46	2912.478	2501.429	12.336		1	clam	F
7S-G-13	47	2914.982	2501.385	12.339		1	clam	F
7S-G-13	48	2909.718	2499.661	12.343		1	clam	F
7S-G-13	49	2910.845	2490.563	12.832		1	clam	F
7S-G-13	50	2903.347	2511.089	12.111		1	clam	F
7S-G-13	51	2901.69	2507.276	12.131		1	clam	F
7S-G-13	52	2902.089	2501.48	12.279		1	oyster	F
7S-G-13	53	2903.854	2499.01	12.551		1	clam	F
7S-G-13	54	2905.952	2498.445	12.545		1	clam	F
7S-G-13	55	2906.681	2501.39	12.341		1	clam	F
7S-G-13	56	2904.271	2482.947	13.194		1	clam	F
7S-G-13	57	2905.845	2474.169	13.42		1	iron kettle	H
7S-G-13	58	2904.402	2453.665	13.894		1	clam	F
7S-G-13	59	2912.949	2440.957	13.942		1	clam	F

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
7S-G-13	60	2894.119	2432.55	14.182	1	scratch blue	H
7S-G-13	61	2895.105	2432.594	14.183	1	brick	H
7S-G-13	62	2891.233	2418.042	14.144	1	quartz primary	A
7S-G-13	63	2879.927	2475.47	13.725	1	rbew clear glaze	H
7S-G-13	64	2884.69	2492.199	12.917	1	clam	F
7S-G-13	65	2886.13	2504.92	12.385	1	clam	F
7S-G-13	66	2888.367	2492.43	12.954	1	clam	F
7S-G-13	67	2897.47	2493.909	12.802	1	clam	F
7S-G-13	68	2897.696	2496.583	12.612	1	clam	F
7S-G-13	69	2898.798	2496.396	12.614	1	fcr	A
7S-G-13	70	2896.292	2500.755	12.477	1	clam	F
7S-G-13	71	2895.247	2504.741	12.342	1	clam	F
7S-G-13	72	2875.403	2494.01	12.965	1	clam	F
7S-G-13	73	2868.251	2497.846	12.85	1	clam	F
7S-G-13	74	2868.88	2482.887	13.553	1	iron	H
7S-G-13	75	2862.194	2484.932	13.452	1	aqua bottle	H
7S-G-13	76	2859.174	2459.536	14.223	1	rbew	H
7S-G-13	77	2864.488	2415.005	14.226	1	scratch blue	H
7S-G-13	78	2853.297	2432.897	14.553	1	fcr	A
7S-G-13	79	2847.511	2436.539	14.547	1	fcr	A
7S-G-13	80	2847.878	2491.586	13.268	1	clam	F
7S-G-13	81	2847.938	2502.35	12.756	1	clam	F
7S-G-13	82	2841.542	2509.399	12.373	1	clam	F
7S-G-13	83	2821.623	2495.035	13.303	1	fcr	A
7S-G-13	84	2804.066	2503.955	13.058	1	fcr	A
7S-G-13	85	2815.187	2429.997	14.478	1	chert primary	A
7S-G-13	86	2813.996	2430.334	14.466	1	mussel	F
7S-G-13	87	2798.183	2429.03	14.282	1	wsg stoneware	H
7S-G-13	88	2799.489	2429.076	14.376	1	chert secondary	A
7S-G-13	89	2796.694	2392.558	13.88	1	rbew	H
7S-G-13	90	2760.604	2411.821	13.938	1	rbew slip	H
7S-G-13	91	2736.288	2435.262	13.653	1	rbew	H
7S-G-13	92	2757.266	2466.804	13.749	1	fcr	A
7S-G-13	93	2714.261	2470.912	13.372	1	oyster	F
7S-G-13	94	2728.06	2433.267	13.496	1	milk glass	H
7S-G-13	95	2728.785	2424.688	13.43	1	chert primary	A
7S-G-13	96	2692.486	2428.115	12.791	1	chert chunk	A
7S-G-13	97	2673.665	2436.621	12.829	1	brick	H
7S-G-59	797	1694.681	2238.757	25.607	1	ironstone	H
7S-G-59	798	1696.064	2281.02	26.614	1	ironstone	H
7S-G-59	800	1627.918	2305.949	27.104	1	whiteware	H
7S-G-59	801	1543.961	2282.43	27.139	1	window glass	H
7S-G-59	802	1463.507	2229.542	26.891	1	argillite secondary	A

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
7S-G-59	803	1432.998	2235.546	27.508		1	brick	H
7S-G-59	804	1442.198	2255.854	28.051		1	brick	H
7S-G-59	805	1363.698	2226.199	28.492		1	brick	H
7S-G-59	806	1354.78	2229.772	28.675		1	brick	H
7S-G-59	807	1323.024	2220.323	29.551		1	quartz contracting sten	A
7S-G-59	808	1295.225	2231.525	30.655		1	brick	H
7S-G-59	809	1289.345	2239.534	30.968		1	brick	H
7S-G-59	810	1289.893	2241.124	30.965		1	rhyolite biface	A
7S-G-59	811	1271.538	2269.234	31.856		1	brick	H
7S-G-59	813	1311.603	2272.543	36.459		1	whiteware	H
7S-G-59	814	1300.737	2283.762	36.745		1	brick	H
7S-G-59	815	1431.24	2314.685	35.115		1	whiteware	H
7S-G-59	816	1453.113	2315.268	34.818		1	rbew	H
7S-G-59	817	1465.182	2300.603	34.286		1	ironstone	H
7S-G-59	818	1468.679	2304.823	34.378		1	pearlware	H
7S-G-59	819	1494.228	2296.473	33.696		1	pearlware	H
7S-G-59	820	1494.965	2323.229	34.431		1	ironstone	H
7S-G-59	821	1523.295	2337.687	34.478		1	rbew	H
7S-G-59	822	1540.369	2317.272	33.738		1	brick	H
7S-G-59	823	1547.467	2347.218	34.474		1	whiteware	H
7S-G-59	824	1540.155	2349.875	34.716		1	argillite secondary	A
7S-G-59	825	1581.67	2325.798	33.323		1	brick	H
7S-G-59	826	1580.561	2324.773	33.249		1	brick	H
7S-G-59	827	1594.875	2342.7	33.594		1	aqua bottle	H
7S-G-59	828	1629.938	2334.483	33.136		1	rhyolite secondary	A
7S-G-59	829	1661.404	2342.061	33.115		1	whiteware	H
7S-G-59	830	1668.635	2334.284	33.069		1	olive glass	H
7S-G-59	831	1665.858	2354.127	33.48		1	brick	H
7S-G-59	832	1654.973	2370.682	33.998		1	ironstone	H
7S-G-59	833	1681.439	2389.805	34.439		1	rhyolite secondary	A
7S-G-59	834	1693.981	2390.388	34.396		1	brick	H
7S-G-59	835	1695.367	2361.052	33.558		1	whiteware	H
7S-G-59	836	1695.351	2347.859	33.215		1	brick	H
7S-G-59	845	1695.37	2411.975	35.149		1	brick	H
7S-G-59	846	1631.619	2400.36	35.064		1	ironstone	H
7S-G-59	847	1635.765	2389.271	34.717		1	brick	H
7S-G-59	848	1625.152	2382.028	34.465		1	brick	H
7S-G-59	849	1614.214	2369.585	34.183		1	brick	H
7S-G-59	850	1610.284	2381.865	34.654		1	yellowware	H
7S-G-59	851	1585.07	2374.422	34.71		1	brick	H
7S-G-59	852	1582.044	2369.669	34.569		1	fcr	A
7S-G-59	853	1572.392	2364.435	34.614		1	whiteware	H
7S-G-59	854	1498.554	2355.816	35.282		1	whiteware	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
7S-G-59	855	1477.231	2344.008	35.242	1	window glass	H
7S-G-59	856	1471.131	2333.214	35.083	1	brick	H
7S-G-59	857	1449.52	2354.885	35.782	1	whiteware	H
7S-G-59	858	1436.817	2359.045	35.873	1	rhyolite secondary	A
7S-G-59	859	1391.388	2353.862	36.161	1	creamware	H
7S-G-59	860	1370.061	2330.079	35.931	1	window glass	H
7S-G-59	861	1365.497	2360.772	36.45	1	window glass	H
7S-G-59	862	1345.215	2346.418	36.357	1	fcr	A
7S-G-59	863	1255.71	2340.959	37.198	1	porcelain button	H
7S-G-59	864	1290.41	2358.901	37.05	1	fcr	A
7S-G-59	865	1303.269	2348.637	36.942	1	whiteware	H
7S-G-59	866	1310.187	2346.095	36.826	1	fcr	A
7S-G-59	867	1396.746	2381.818	36.659	1	brick	H
7S-G-59	868	1407.188	2397.083	36.646	1	whiteware	H
7S-G-59	869	1435.348	2418.994	36.831	1	brick	H
7S-G-59	870	1476.05	2436.07	36.862	1	fcr	A
7S-G-59	871	1485.805	2459.662	36.802	1	fcr	A
7S-G-59	872	1496.237	2468.436	36.421	1	olive glass	H
7S-G-59	873	1481.694	2488.949	35.949	1	fcr	A
7S-G-59	874	1509.955	2460.222	36.541	1	whiteware	H
7S-G-59	875	1530.133	2469.532	36.261	1	brick	H
7S-G-59	876	1539.657	2472.064	36.224	1	chert	A
7S-G-59	877	1546.467	2475.918	36.029	1	ironstone	H
7S-G-59	878	1535.534	2488.113	35.681	1	whiteware	H
7S-G-59	879	1532.809	2491.089	35.531	1	clear bottle	H
7S-G-59	880	1539.963	2489.174	35.615	1	fcr	A
7S-G-59	881	1564.979	2473.661	36.062	1	window glass	H
7S-G-59	882	1577.099	2478.561	35.924	1	aqua bottle	H
7S-G-59	883	1584.815	2490.273	35.476	1	whiteware	H
7S-G-59	884	1588.313	2489.439	35.463	1	ironstone	H
7S-G-59	885	1612.353	2505.425	34.8	1	ironstone	H
7S-G-59	897	1696.568	2441.329	35.314	1	brick	H
7S-G-59	898	1696.304	2452.976	35.297	1	brick	H
7S-G-59	901	1699.612	2512.097	33.82	1	whiteware	H
7S-G-59	902	1671.288	2532.064	33.259	1	brick	H
7S-G-59	903	1660.372	2522.879	33.81	1	window glass	H
7S-G-59	904	1626.417	2507.07	34.683	1	whiteware	H
7S-G-59	905	1603.115	2509.695	34.807	1	whiteware	H
7S-G-59	906	1606.85	2514.873	34.602	1	ironstone	H
7S-G-59	907	1602.081	2521.396	34.224	1	whiteware	H
7S-G-59	908	1608.061	2477.053	35.679	1	brick	H
7S-G-59	909	1618.522	2476.038	35.637	1	brick	H
7S-G-59	910	1636.892	2484.824	35.36	1	aqua bottle	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
7S-G-59	911	1653.78	2497.892	34.852		1	rbew	H
7S-G-59	912	1683.383	2489.074	34.716		1	brick	H
7S-G-59	913	1675.167	2468.905	35.284		1	rbew	H
7S-G-59	914	1673.121	2461.69	35.308		1	rbew	H
7S-G-59	915	1679.65	2458.44	35.283		1	ironstone	H
7S-G-59	916	1665.06	2450.046	35.617		1	aqua bottle	H
7S-G-59	917	1659.514	2449.522	35.641		1	whiteware	H
7S-G-59	918	1653.882	2438.147	35.483		1	whiteware	H
7S-G-59	919	1657.952	2437.989	35.454		1	whiteware	H
7S-G-59	920	1657.881	2428.521	35.438		1	rbew	H
7S-G-59	921	1665.799	2433.934	35.392		1	brick	H
7S-G-59	922	1638.318	2430.798	35.527		1	window glass	H
7S-G-59	923	1643.355	2465.532	35.511		1	stoneware	H
7S-G-59	924	1629.005	2459.168	35.597		1	argillite secondary	A
7S-G-59	925	1622.177	2468.618	35.759		1	brick	H
7S-G-59	926	1617.45	2461.535	35.801		1	brick	H
7S-G-59	927	1620.898	2453.993	35.792		1	rbew	H
7S-G-59	928	1617.317	2452.203	35.819		1	whiteware	H
7S-G-59	929	1606.463	2462.475	35.843		1	rbew	H
7S-G-59	930	1593.557	2468.955	35.881		1	whiteware	H
7S-G-59	931	1596.37	2463.043	35.968		1	whiteware	H
7S-G-59	932	1600.265	2452.797	35.981		1	whiteware	H
7S-G-59	933	1597.329	2443.543	36.065		1	pearlware green shell	H
7S-G-59	934	1607.231	2422.216	35.66		1	brick	H
7S-G-59	935	1609.628	2400.715	35.28		1	mortar	A
7S-G-59	936	1600.5	2387.744	34.947		1	ironstone	H
7S-G-59	937	1596.055	2385.048	34.808		1	rhyolite secondary	A
7S-G-59	938	1585.007	2396.234	35.39		1	mano fragment	A
7S-G-59	939	1582.348	2395.954	35.406		1	brick	H
7S-G-59	940	1587.953	2404.599	35.538		1	whiteware	H
7S-G-59	941	1577.931	2400.292	35.601		1	whiteware	H
7S-G-59	942	1574.944	2398.73	35.621		1	whiteware	H
7S-G-59	943	1569.121	2401.867	35.795		1	porcelain	H
7S-G-59	944	1569.593	2411.962	35.967		1	whiteware	H
7S-G-59	945	1586.213	2427.954	35.918		1	whiteware	H
7S-G-59	946	1576.026	2446.528	36.244		1	ironstone	H
7S-G-59	947	1571.375	2443.77	36.264		1	brick	H
7S-G-59	948	1559.107	2439.606	36.304		1	whiteware	H
7S-G-59	949	1556.907	2426.613	36.242		1	whiteware	H
7S-G-59	950	1555.247	2425.136	36.251		1	olive glass	H
7S-G-59	951	1565.184	2425.44	36.096		1	yellowware	H
7S-G-59	952	1576.111	2428.948	36.046		1	window glass	H
7S-G-59	953	1560.018	2410.467	35.995		1	whiteware	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
7S-G-59	954	1560.335	2409.348	35.996		1	whiteware	H
7S-G-59	955	1557.229	2410.893	36.007		1	fcr	A
7S-G-59	956	1552.232	2408.113	36.019		1	whiteware	H
7S-G-59	957	1551.517	2405.114	36.035		1	ironstone	H
7S-G-59	958	1539.361	2395.144	35.911		1	ironstone	H
7S-G-59	959	1538.269	2387.436	35.685		1	whiteware	H
7S-G-59	960	1521.759	2381.747	35.591		1	olive glass	H
7S-G-59	961	1576.942	2425.839	ap		1	clam	F
7S-G-59	961	1576.942	2425.839	ap		3	brick	H
7S-G-59	961	1576.942	2425.839	ap		1	window glass	H
7S-G-59	961	1576.942	2425.839	ap		2	pearlware	H
7S-G-59	962	1530.482	2403.997	36.184		1	window glass	H
7S-G-59	963	1535.325	2394.821	36.007		1	fcr	A
7S-G-59	964	1522.322	2398.822	36.063		1	whiteware	H
7S-G-59	965	1507.036	2387.83	35.969		1	ironstone	H
7S-G-59	966	1524.625	2405.593	36.147		1	argillite	A
7S-G-59	967	1499.979	2409.63	36.255		1	whiteware	H
7S-G-59	968	1500.19	2407.855	36.258		1	whiteware	H
7S-G-59	969	1478.985	2408.278	36.349		1	brick	H
7S-G-59	970	1484.793	2393.756	36.235		1	window glass	H
7S-G-59	972	1325.992	2377.652	36.891		1	fcr	A
7S-G-59	973	1321.434	2385.079	36.954		1	quartzite biface	A
7S-G-59	974	1309.986	2379.236	36.966		1	rbew	H
7S-G-59	975	1301.58	2389.142	36.842		1	whiteware	H
7S-G-59	976	1341.413	2407.468	36.76		1	chert stemmed	H
7S-G-59	977	1399.077	2460.876	36.753		1	ironstone	H
7S-G-59	978	1365.115	2438.379	36.903		1	brick	H
7S-G-59	979	1352.982	2446.725	36.726		1	fcr	A
7S-G-59	980	1347.611	2466.75	36.178		1	fcr	A
7S-G-59	981	1343.392	2466.04	36.197		1	fcr	A
7S-G-59	982	697.708	2421.263	ap		1	fcr	A
7S-G-59	983	680.712	2302.478	ap		1	argillite secondary	A
7S-G-59	983	680.712	2302.478	ap		2	fcr	A
7S-G-59	983	680.712	2302.478	ap		1	rhyolite secondary	A
7S-G-59	983	680.712	2302.478	ap		1	rbew	H
7S-G-59	983	680.712	2302.478	ap		1	clear vessel	H
7S-G-59	986	1304.59	2451.172	35.894		1	fcr	A
7S-G-59	987	1209.94	2399.196	35.697		1	brick	H
7S-G-59	988	1210.845	2389.669	35.977		1	brick	H
7S-G-59	989	1203.441	2379.601	36.225		1	fcr	A
7S-G-59	990	1202.516	2368.736	36.558		1	fcr	A
7S-G-59	991	1124.687	2433.853	32.708		1	ironstone	H
7S-G-59	992	1055.485	2423.315	32.596		1	brick	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
7S-G-59	993	1126.485	2388.882	33.948		1	fcr	A
7S-G-59	994	1150.945	2365.574	35.462		1	brick	H
7S-G-59	995	1180.273	2353.13	36.432		1	rbew	H
7S-G-59	996	1214.52	2323.045	37.416		1	argillite secondary	A
7S-G-59	997	1168.726	2327.726	36.653		1	fcr	A
7S-G-59	998	1154.782	2348.171	35.856		1	fcr	A
7S-G-59	999	1110.07	2337.442	34.863		1	whiteware	H
7S-G-59	1000	1050.438	2365.742	33.906		1	rbew	H
7S-G-59	1001	1043.95	2378.835	33.489		1	whiteware	H
7S-G-59	1002	1000.676	2406.534	33.713		1	fcr	A
7S-G-59	1003	949.258	2424.829	33.982		1	whiteware	H
7S-G-59	1004	927.531	2429.725	33.741		1	fcr	A
7S-G-59	1005	982.504	2377.255	33.859		1	brick	H
7S-G-59	1006	987.06	2380.881	33.9		1	rbew	H
7S-G-59	1007	969.539	2355.858	34.109		1	ironstone	H
7S-G-59	1008	971.006	2349.561	34.144		1	ironstone	H
7S-G-59	1009	984.966	2347.606	34.198		1	window glass	H
7S-G-59	1010	994.138	2335.16	34.344		1	brick	H
7S-G-59	1011	997.903	2340.328	34.303		1	brick	H
7S-G-59	1012	1012.824	2347.655	34.168		1	rbew	H
7S-G-59	1013	1012.182	2351.852	34.138		1	whiteware	H
7S-G-59	1014	919.862	2390.657	33.358		1	brick glazed	H
7S-G-59	1015	872.817	2401.358	33.049		1	brick	H
7S-G-59	1016	832.42	2417.82	32.543		1	fcr	A
7S-G-59	1017	805.985	2405.549	32.532		1	fcr	A
7S-G-59	1018	862.884	2389.422	32.928		1	brick	H
7S-G-59	1019	945.225	2362.933	33.943		1	brick	H
7S-G-59	1020	917.1	2345.418	33.99		1	porcelain	H
7S-G-59	1021	930.202	2324.683	34.567		1	brick	H
7S-G-59	1022	960.197	2273.465	35.941		1	stoneware american	H
7S-G-59	1023	949.325	2234.977	36.163		1	brick	H
7S-G-59	1024	961.717	2232.539	36.22		1	pearlware	H
7S-G-59	1025	959.938	2226.498	36.206		1	whiteware	H
7S-G-59	1026	1059.585	2263.165	36.026		1	quartz primary	A
7S-G-59	1027	1057.57	2286.715	35.794		1	whiteware	H
7S-G-59	1028	1102.276	2320.302	35.221		1	brick	H
7S-G-59	1029	1122.97	2297.943	36.098		1	clear bottle	H
7S-G-59	1030	1135.483	2273.614	36.413		1	whiteware	H
7S-G-59	1031	1120.121	2251.228	36.106		1	rhyolite secondary	A
7S-G-59	1032	1113.827	2227.652	35.949		1	rbew	H
7S-G-59	1034	1185.48	2220.181	35.992		1	brick	H
7S-G-59	1035	1186.834	2220.003	36.004		1	brick	H
7S-G-59	1482	390.129	1971.443	31.106		1	brick	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
7S-G-59	1492	421.922	2238.045	33.626	1	quartz	A
7S-G-59	1493	430.825	2251.107	33.81	1	fcr	A
7S-G-59	1494	388.298	2252.903	33.092	1	rhyolite secondary	A
7S-G-59	1495	343.888	2385.559	30.385	1	quartz	A
7S-G-59	1496	432.799	2372.427	31.099	1	rbew	H
7S-G-59	1497	338.561	2392.647	30.314	1	argillite secondary	A
7S-G-59	1498	505.995	2379.687	31.471	1	yellowware	H
7S-G-59	1499	603.353	2382.692	32.07	1	quartz cobble	A
7S-G-59	1500	621.138	2449.283	31.665	1	fcr	A
7S-G-59	1501	652.467	2442.412	31.944	1	fcr	A
7S-G-59	1502	712.599	2425.382	32.587	1	fcr	A
7S-G-59	1503	726.833	2412.568	32.832	1	fcr	A
7S-G-59	1504	741.949	2411.89	32.724	1	fcr	A
7S-G-59	1505	632.357	2343.643	33.24	1	brick	H
7S-G-59	1506	553.554	2328.027	33.249	1	rbew	H
7S-G-59	1507	596.622	2305.062	33.984	1	rhyolite biface	A
7S-G-59	1508	555.474	2302.564	34.057	1	rhyolite secondary	A
7S-G-59	1509	542.513	2296.997	34.35	1	rhyolite secondary	A
7S-G-59	1510	602.704	2288.561	34.504	1	rhyolite secondary	A
7S-G-59	1511	594.1	2264.359	34.731	1	brick	H
7S-G-59	1512	602.544	2256.752	34.767	1	rhyolite secondary	A
7S-G-59	1513	612.232	2272.689	34.796	1	rhyolite secondary	A
7S-G-59	1514	606.3	2262.715	34.784	1	fcr	A
7S-G-59	1515	629.219	2276.109	34.422	1	rhyolite secondary	A
7S-G-59	1516	619.946	2262.104	34.631	1	rhyolite secondary	A
7S-G-59	1517	619.087	2252.8	34.625	1	rhyolite secondary	A
7S-G-59	1518	645.122	2274.993	34.343	1	rhyolite secondary	A
7S-G-59	1519	662.012	2315.868	33.435	1	quartz chunk	A
7S-G-59	1520	675.79	2298.988	33.871	1	rhyolite secondary	A
7S-G-59	1521	677.107	2297.185	33.88	1	rhyolite secondary	A
7S-G-59	1522	676.246	2296.357	33.999	1	rhyolite secondary	A
7S-G-59	1523	680.735	2309.182	33.488	1	rhyolite secondary	A
7S-G-59	1524	684.197	2306.095	33.528	1	rhyolite secondary	A
7S-G-59	1525	684.761	2313.269	33.516	1	rhyolite secondary	A
7S-G-59	1526	682.241	2295.956	34.037	1	quartz chunk	A
7S-G-59	1527	692.25	2305.006	33.587	1	quartz chunk	A
7S-G-59	1528	682.499	2296.883	34.066	1	rbew	H
7S-G-59	1529	715.463	2329.651	33.174	1	quartz chunk	A
7S-G-59	1530	687.415	2295.263	33.948	1	rhyolite secondary	A
7S-G-59	1531	717.767	2314.919	33.472	1	quartz chunk	A
7S-G-59	1532	749.583	2321.139	33.353	1	quartz chunk	A
7S-G-59	1533	719.138	2290.022	34.091	1	quartz chunk	A
7S-G-59	1534	751.394	2313.167	33.614	1	olive bottle	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
7S-G-59	1535	766.874	2305.737	33.742		1	rbew	H
7S-G-59	1536	768.92	2300.349	33.771		1	rbew	H
7S-G-59	1537	734.192	2299.625	33.966		1	whiteware	H
7S-G-59	1538	787.436	2306.374	33.795		1	rbew	H
7S-G-59	1539	798.286	2327.31	33.304		1	rbew	H
7S-G-59	1540	806.344	2294.953	34.415		1	whiteware	H
7S-G-59	1541	829.566	2314.504	33.886		1	rbew	H
7S-G-59	1542	856.613	2308.595	34.471		1	porcelain	H
7S-G-59	1543	878.408	2291.487	35.476		1	rbew	H
7S-G-59	1544	860.715	2277.773	35.382		1	rbew	H
7S-G-59	1545	860.299	2276.006	35.389		1	brick	H
7S-G-59	1546	850.426	2275.878	35.332		1	rbew	H
7S-G-59	1547	866.472	2266.37	35.432		1	rbew	H
7S-G-59	1548	842.692	2260.255	35.442		1	rbew	H
7S-G-59	1549	855.418	2206.941	36.219		1	brick	H
7S-G-59	1551	823.857	2257.809	35.196		1	whiteware	H
7S-G-59	1553	828.514	2208.678	35.829		1	whiteware	H
7S-G-59	1555	838.265	2220.646	35.887		1	rbew	H
7S-G-59	1556	837.897	2220.088	35.885		1	rbew	H
NEW-1		3825	2400	ap		1	quartz secondary	A
NEW-1		3850	2425	b		1	chert biface	A
NEW-1		3875	2400	ap		2	abo townsend	A
NEW-1		3875	2425	ap		2	abo killens	A
NEW-1		3875	2425	ap		3	quartz chunk	A
NEW-1		3875	2450	ap		9	abo townsend	A
NEW-1		3900	2450	ap		9	chert secondary	A
NEW-1		3900	2450	ap		2	chert chunk	A
NEW-1		3900	2450	ap		2	chert primary	A
NEW-2		3200	2600	ap		1	fcr	A
NEW-2		3250	2525	ap		1	abo ind	A
NEW-2		3250	2550	ap		2	abo townsend	A
NEW-2		3250	2550	ap		10	abo ind	A
NEW-2		3250	2550	ap		1	chert secondary	A
NEW-2		3250	2575	b		1	fcr	A
NEW-2		3275	2525	ap		1	chert secondary	A
NEW-2		3300	2500	ap		1	chert chunk	A
NEW-2		3300	2500	ap		2	chert secondary	A
NEW-2		3300	2500	ap		2	abo wolfe neck	A
NEW-2		3300	2500	ap		2	chert primary	A
Robinson Te	300	2483.885	1050.925	32.379		1	brick	H
Robinson Te	301	2484.877	1017.808	32.995		1	rbew	H
Robinson Te	302	2454.68	1041.411	32.61		1	stoneware	H
Robinson Te	303	2453.207	1045.813	32.616		1	whiteware	H

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Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
Robinson Te	304	2466.205	1015.288	32.993		1	whiteware	H
Robinson Te	305	2445.689	1045.165	32.511		1	brick	H
Robinson Te	307	2448.708	1034.401	32.645		1	brick	H
Robinson Te	309	2482.996	956.853	33.307		1	olive bottle	H
Robinson Te	555	2200.178	925.003	33.681		1	rbew	H
Robinson Te	556	2247.936	918.245	33.957		1	astbury	H
Robinson Te	557	2195.411	933.502	33.57		1	brick	H
Robinson Te	558	2167.436	955.75	32.937		1	porcelain english	H
Robinson Te	559	2155.644	974.276	32.469		1	rbew	H
Robinson Te	560	2257.871	915.877	33.981		1	window glass	H
Robinson Te	561	2174.501	974.008	32.702		1	brick	H
Robinson Te	562	2247.24	931.144	33.832		1	brick	H
Robinson Te	563	2185.215	953.066	33.228		1	pearlware	H
Robinson Te	565	2192.374	974.013	33.021		1	brick	H
Robinson Te	566	2249.502	945.976	33.7		1	brick	H
Robinson Te	567	2185.366	1001.298	32.498		1	brick	H
Robinson Te	568	2194.663	1016.939	32.402		1	brick	H
Robinson Te	569	2242.481	979.207	33.42		1	brick	H
Robinson Te	570	2255.975	978.274	33.171		1	tumbler	H
Robinson Te	571	2279.33	943.234	33.545		1	rbew	H
Robinson Te	572	2283.394	985.441	33.157		1	brick	H
Robinson Te	573	2285.111	962.459	33.53		1	brick	H
Robinson Te	574	2271.668	1021.795	32.457		1	pearlware	H
Robinson Te	576	2303.184	968.027	33.353		1	brick	H
Robinson Te	577	2309.793	985.833	33.192		1	brick	H
Robinson Te	579	2306.672	1009.261	32.854		1	mortar	A
Robinson Te	580	2308.522	1014.232	32.873		1	window glass	H
Robinson Te	582	2311.35	1021.89	32.672		1	brick	H
Robinson Te	583	2314.201	1018.105	32.681		1	brick	H
Robinson Te	584	2328.843	1029.266	32.858		1	window glass	H
Robinson Te	585	2329.015	1019.892	32.846		1	brick	H
Robinson Te	587	2332.339	1017.7	32.84		1	window glass	H
Robinson Te	589	2330.199	1013.553	32.851		1	rbew	H
Robinson Te	590	2331.056	1004.873	33.081		1	brick	H
Robinson Te	591	2383.225	952.546	33.53		1	brick	H
Robinson Te	592	2338.985	1013.499	32.942		1	brick	H
Robinson Te	593	2338.911	1019.344	32.951		1	brick	H
Robinson Te	594	2341.454	1027.617	32.96		1	brick	H
Robinson Te	595	2381.309	961.798	33.558		1	brick	H
Robinson Te	596	2348.848	1013.428	32.918		1	rbew	H
Robinson Te	597	2384.577	959.771	33.534		1	brick	H
Robinson Te	598	2349.838	1033.014	32.771		1	brick	H
Robinson Te	599	2399.318	940.506	33.696		1	brick	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
Robinson Te	600	2367.954	1014.56	32.97		1	brick	H
Robinson Te	601	2410.972	933.097	33.615		1	brick	H
Robinson Te	602	2370.843	1035.308	32.785		1	brick	H
Robinson Te	603	2369.515	1042.944	32.781		1	brick	H
Robinson Te	604	2363.189	980.59	33.467		1	brick	H
Robinson Te	605	2381.96	984.082	33.444		1	brick	H
Robinson Te	606	2366.098	985.619	33.488		1	brick	H
Robinson Te	607	2406.656	958.067	33.526		1	rbew	H
Robinson Te	608	2369.576	980.342	33.548		1	rbew	H
Robinson Te	609	2411.996	953.716	33.408		1	yellowware	H
Robinson Te	610	2396.415	981.845	33.505		1	brick	H
Robinson Te	611	2408.167	951.868	33.409		1	brick	H
Robinson Te	612	2407.93	980.858	33.598		1	aqua bottle	H
Robinson Te	613	2440.352	932.644	33.408		1	brick	H
Robinson Te	614	2426.84	952.583	33.487		1	brick	H
Robinson Te	615	2434.995	954.079	33.477		1	brick	H
Robinson Te	616	2384.324	1041.341	32.825		1	ironstone	H
Robinson Te	617	2426.136	961.612	33.368		1	brick	H
Robinson Te	618	2405.572	1031.879	32.849		1	brick	H
Robinson Te	619	2442.9	943.286	33.318		1	brick	H
Robinson Te	620	2459.009	934.667	33.338		1	brick	H
Robinson Te	621	2404.745	1023.497	33.137		1	pearlware	H
Robinson Te	622	2447.381	961.343	33.311		1	brick	H
Robinson Te	623	2452.206	963.703	33.322		1	pearlware	H
Robinson Te	624	2424.416	1039.263	32.845		1	rbew	H
Robinson Te	625	2458.054	964.513	33.234		1	brick	H
Robinson Te	626	2419.489	1053.044	32.729		1	brick	H
Robinson Te	627	2467.577	960.866	33.305		1	whiteware	H
Robinson Te	628	2482.918	934.538	33.344		1	brick	H
Robinson Te	629	2480.594	921.168	33.319		1	ironstone	H
Robinson Te	1037	2450.185	1128.728	26.74		1	clear bottle	H
Robinson Te	1038	2462.627	1161.659	26.915		1	aqua bottle	H
Robinson Te	1039	2432.226	1184.678	26.886		1	aqua bottle	H
Robinson Te	1040	2437.827	1167.037	26.911		1	ironstone	H
Robinson Te	1041	2433.205	1192.062	26.967		1	olive glass	H
Robinson Te	1042	2442.978	1185.688	26.976		1	porcelain insulator	H
Robinson Te	1043	2432.925	1194.834	26.972		1	aqua bottle	H
Robinson Te	1044	2443.979	1188.27	26.979		1	porcelain bathroom	H
Robinson Te	1045	2439.655	1190.598	26.832		1	whiteware	H
Robinson Te	1046	2449.952	1198.231	26.911		1	porcelain english	H
Robinson Te	1047	2454.581	1188.47	26.845		1	aqua bottle	H
Robinson Te	1048	2436.199	1206.758	26.939		1	whiteware	H
Robinson Te	1049	2451.392	1192.702	26.949		1	whiteware	H

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Site	Name	Northing	Easting	Elevation	N	Description	Class
Robinson Te	1050	2431.705	1209.48	26.952	1	clear vessel	H
Robinson Te	1051	2455.032	1214.174	26.9	1	clear bottle	H
Robinson Te	1052	2427.03	1224.132	27.03	1	window glass	H
Robinson Te	1053	2460.227	1226.274	27.05	1	clear bottle	H
Robinson Te	1054	2424.181	1233.426	27.119	1	whiteware	H
Robinson Te	1055	2435.686	1229.124	27.097	1	aqua bottle	H
Robinson Te	1056	2449.166	1233.691	27.056	1	whiteware	H
Robinson Te	1057	2433.018	1240.95	27.076	1	whiteware	H
Robinson Te	1058	2440.932	1239.2	27.22	1	whiteware	H
Robinson Te	1059	2472.395	1245.855	27.303	1	porcelain	H
Robinson Te	1060	2429.299	1254.103	27.119	1	clear bottle	H
Robinson Te	1061	2472.315	1269.197	27.328	1	whiteware	H
Robinson Te	1062	2457.664	1272.011	27.164	1	whiteware	H
Robinson Te	1063	2413.5	1284.026	27.265	1	stoneware utility pipe	H
Robinson Te	1064	2408.627	1281.993	27.276	1	clear vessel	H
Robinson Te	1065	2381.946	1270.676	27.533	1	whiteware	H
Robinson Te	1066	2365.948	1285.025	27.204	1	clear bottle	H
Robinson Te	1067	2354.64	1286.642	27.045	1	porcelain 20th	H
Robinson Te	1068	2357.311	1278.507	27.388	1	window glass	H
Robinson Te	1069	2331.219	1265.461	26.964	1	clear bottle	H
Robinson Te	1070	2318.007	1271.773	26.568	1	brick	H
Robinson Te	1071	2314.641	1285.845	26.299	1	brown bottle	H
Robinson Te	1072	2310.43	1270.696	26.404	1	brick	H
Robinson Te	1073	2312.678	1279.974	26.34	1	brick	H
Robinson Te	1074	2313.789	1269.238	26.603	1	rbew	H
Robinson Te	1075	2309.167	1271.472	26.313	1	window glass	H
Robinson Te	1076	2303.534	1266.606	26.296	1	terra cotta utility pipe	H
Robinson Te	1077	2312.056	1280.763	26.28	1	brown bottle	H
Robinson Te	1078	2302.35	1269.992	26.296	1	window glass	H
Robinson Te	1079	2306.379	1277.414	26.283	1	clear jar	H
Robinson Te	1080	2303.125	1271.456	26.172	1	rbew	H
Robinson Te	1081	2299.345	1271.225	26.183	1	aqua bottle	H
Robinson Te	1082	2300.485	1280.953	25.772	1	clear bottle	H
Robinson Te	1083	2305.88	1293.628	25.769	1	green fire king	H
Robinson Te	1084	2301.503	1301.403	25.293	1	milk glass	H
Robinson Te	1085	2303.672	1303.085	25.308	1	whiteware	H
Robinson Te	1086	2304.017	1292.77	25.596	1	clear vessel	H
Robinson Te	1087	2311.084	1307.985	25.197	1	aqua bottle	H
Robinson Te	1088	2314.009	1309.093	25.224	1	brick	H
Robinson Te	1089	2316.676	1290.471	26.081	1	brick	H
Robinson Te	1090	2315.704	1305.764	25.43	1	concrete	H
Robinson Te	1091	2320.625	1295.075	26.14	1	clear pressed	H
Robinson Te	1092	2318.921	1306.327	25.532	1	window glass	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
Robinson Te	1093	2323.154	1308.596	25.539		1	brick	H
Robinson Te	1094	2333.519	1305.14	25.897		1	window glass	H
Robinson Te	1095	2332.021	1298.083	26.28		1	linoleum	H
Robinson Te	1096	2336.159	1302.395	26.148		1	brown bottle clorox	H
Robinson Te	1097	2344.272	1309.127	26.066		1	linoleum	H
Robinson Te	1098	2348.089	1300.802	26.49		1	concrete	H
Robinson Te	1099	2363.766	1299.958	26.839		1	brick	H
Robinson Te	1100	2364.838	1299.823	26.863		1	linoleum	H
Robinson Te	1101	2367.448	1299.939	26.729		1	green fire king	H
Robinson Te	1102	2356.891	1308.836	26.269		1	iron bolt	H
Robinson Te	1103	2367.762	1300.971	26.668		1	window glass	H
Robinson Te	1104	2356.204	1310.237	26.147		1	whiteware	H
Robinson Te	1105	2374.289	1302.57	26.633		1	brick	H
Robinson Te	1106	2356.262	1312.275	25.998		1	window glass	H
Robinson Te	1107	2366.727	1310.755	26.231		1	brick	H
Robinson Te	1108	2377.393	1303.966	26.653		1	clear pressed	H
Robinson Te	1109	2378.639	1311.997	26.351		1	ironstone	H
Robinson Te	1110	2381.198	1307.122	26.67		1	aqua bottle	H
Robinson Te	1111	2384.403	1316.939	26.112		1	window glass	H
Robinson Te	1112	2384.13	1307.641	26.706		1	whiteware	H
Robinson Te	1113	2390.477	1318.809	26.318		1	terra cotta flower pot	H
Robinson Te	1114	2382.491	1307.844	26.504		1	window glass	H
Robinson Te	1115	2370.66	1308.378	26.492		1	brick	H
Robinson Te	1116	2390.519	1307.549	26.807		1	window glass	H
Robinson Te	1117	2392.524	1308.58	26.811		1	window glass	H
Robinson Te	1118	2391.023	1312.655	26.446		1	window glass	H
Robinson Te	1119	2400.059	1306.768	26.937		1	nail cut	H
Robinson Te	1120	2397.544	1312.976	26.494		1	coal	H
Robinson Te	1121	2419.72	1320.426	26.647		1	coal	H
Robinson Te	1122	2416.794	1324.605	26.512		1	porcelain english	H
Robinson Te	1123	2447.652	1332.371	26.821		1	window glass	H
Robinson Te	1124	2438.69	1326.599	26.848		1	nail	H
Robinson Te	1125	2433.419	1345.116	26.161		1	clear bottle	H
Robinson Te	1126	2409.452	1337.572	25.974		1	clear bottle	H
Robinson Te	1127	2399.61	1344.147	25.639		1	clear bottle	H
Robinson Te	1128	2396.169	1329.57	26.182		1	solarized glass vessel	H
Robinson Te	1129	2384.861	1336.156	25.661		1	clear bottle	H
Robinson Te	1130	2386.048	1327.665	26.049		1	clear jar	H
Robinson Te	1131	2376.208	1335.649	25.47		1	aqua bottle	H
Robinson Te	1132	2378.681	1329.067	25.593		1	whiteware	H
Robinson Te	1133	2377.532	1331.66	25.69		1	clear bottle	H
Robinson Te	1134	2361.666	1328.972	25.414		1	brown bottle	H
Robinson Te	1135	2364.861	1326.63	25.605		1	window glass	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
Robinson Te	1136	2363.194	1321.688	25.72	1	whiteware	H
Robinson Te	1137	2354.603	1320.44	25.736	1	ironstone	H
Robinson Te	1138	2351.185	1332.246	25.124	1	window glass	H
Robinson Te	1139	2348.416	1332.511	25.117	1	window glass	H
Robinson Te	1140	2331.293	1323.261	25.065	1	whiteware	H
Robinson Te	1141	2344.094	1336.586	24.735	1	whiteware	H
Robinson Te	1142	2347.269	1336.241	24.984	1	clear bottle	H
Robinson Te	1143	2324.716	1319.991	25.102	1	whiteware	H
Robinson Te	1144	2337.909	1332.924	24.872	1	window glass	H
Robinson Te	1145	2329.059	1332.084	24.667	1	window glass	H
Robinson Te	1146	2328.707	1329.675	24.673	1	window glass	H
Robinson Te	1147	2317.539	1311.783	25.281	1	whiteware	H
Robinson Te	1148	2327.827	1333.045	24.514	1	whiteware	H
Robinson Te	1149	2322.054	1331.251	24.498	1	aqua bottle	H
Robinson Te	1150	2311.29	1321.892	24.563	1	asbestos siding	H
Robinson Te	1151	2306.467	1332.467	24.074	1	milk glass canning	H
Robinson Te	1152	2305.43	1322.73	24.482	1	cobalt glass	H
Robinson Te	1153	2298.923	1330.403	23.944	1	window glass	H
Robinson Te	1154	2293.899	1328.949	23.967	1	window glass	H
Robinson Te	1155	2302.214	1324.437	24.094	1	clear vessel	H
Robinson Te	1156	2287.455	1321.728	24.112	1	whiteware	H
Robinson Te	1157	2301.622	1315.637	24.741	1	whiteware	H
Robinson Te	1158	2287.47	1316.682	24.344	1	linoleum	H
Robinson Te	1159	2287.976	1310.546	24.775	1	clear bottle	H
Robinson Te	1160	2292.378	1302.09	25.163	1	clear vessel	H
Robinson Te	1161	2303.464	1356.925	22.997	1	brown bottle	H
Robinson Te	1162	2302.906	1363.909	22.747	1	brick	H
Robinson Te	1163	2318.694	1345.348	23.958	1	solarized glass	H
Robinson Te	1164	2309.19	1364.731	22.704	1	whiteware	H
Robinson Te	1165	2318.316	1345.817	23.966	1	glass	H
Robinson Te	1166	2318.785	1352.873	23.486	1	window glass	H
Robinson Te	1167	2336.567	1343.382	24.388	1	clear vessel	H
Robinson Te	1168	2330.259	1361.472	23.29	1	whiteware	H
Robinson Te	1169	2360.399	1358.759	24.056	1	whiteware	H
Robinson Te	1170	2360.195	1374.372	23.151	1	milk glass vessel	H
Robinson Te	1171	2363.051	1374.358	23.101	1	milk glass canning	H
Robinson Te	1172	2394.198	1356.875	25.042	1	porcelain	H
Robinson Te	1173	2373.626	1372.482	23.585	1	pearlware transfer	H
Robinson Te	1174	2402.332	1356.557	25.277	1	clear vessel	H
Robinson Te	1175	2382.382	1382.994	23.139	1	whiteware	H
Robinson Te	1176	2411.398	1357.756	25.41	1	solarized glass vessel	H
Robinson Te	1177	2416.927	1392.319	23.667	1	whiteware	H
Robinson Te	1178	2433.062	1365.415	25.491	1	clear vessel	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
Robinson Te	1179	2448.399	1414.186	23.122		1	ironstone	H
Robinson Te	1180	2467.959	1374.87	25.113		1	ironstone	H
Robinson Te	1181	2463.935	1391.01	24.254		1	pearlware	H
Robinson Te	1182	2464.938	1380.525	24.878		1	stoneware utility pipe	H
Robinson Te	1183	2455.64	1427.554	22.685		1	iron hardware	H
Robinson Te	1184	2460.835	1430.875	22.625		1	iron	H
Robinson Te	1185	2451.231	1475.223	21.193		1	brick	H
Robinson Te	1188	2298.615	1388.791	21.487		1	ironstone	H
Robinson Te	1189	2287.231	1376.201	21.971		1	pearlware	H
Robinson Te	1190	2278.487	1361.293	22.551		1	metal knob	H
Robinson Te	1191	2276.825	1360.064	22.588		1	safety glass	H
Robinson Te	1192	2273.262	1360.476	22.58		1	solarized glass	H
Robinson Te	1193	2271.974	1365.978	22.082		1	whiteware	H
Robinson Te	1194	2264.731	1366.421	22.175		1	solarized glass	H
Robinson Te	1195	2251.952	1418.11	20.438		1	rbew	H
Robinson Te	1196	2265.529	1444.76	20.067		1	aqua bottle	H
Robinson Te	1197	2244.432	1416.746	20.598		1	linoleum	H
Robinson Te	1198	2226.574	1425.401	20.393		1	clear vessel	H
Robinson Te	1199	2216.759	1423.618	20.499		1	clear vessel	H
Robinson Te	1200	2217.457	1426.719	20.353		1	whiteware	H
Robinson Te	1201	2210.453	1425.463	20.437		1	nail	H
Robinson Te	1202	2210.225	1424.943	20.447		1	clear vessel	H
Robinson Te	1203	2135.876	1456.181	19.201		1	brick	H
Robinson Te	1204	2061.818	1413.919	20.147		1	brick	H
Robinson Te	1205	2021.697	1414.841	19.789		1	whiteware	H
Robinson Te	1206	2021.355	1407.203	19.423		1	brick	H
Robinson Te	1207	1922.342	1395.39	19.58		1	solarized glass	H
Robinson Te	1208	1980.757	1361.475	20.634		1	whiteware	H
Robinson Te	1209	2004.925	1369.008	20.465		1	yellowware annular	H
Robinson Te	1210	2016.305	1361.865	20.736		1	aqua bottle	H
Robinson Te	1211	2026.205	1356.192	21.007		1	brick	H
Robinson Te	1212	2079.825	1362.07	21.035		1	whiteware	H
Robinson Te	1213	2120.763	1359.167	21.323		1	whiteware	H
Robinson Te	1214	2124.867	1365.122	21.038		1	rbew	H
Robinson Te	1215	2127.123	1365.417	21.058		1	brick	H
Robinson Te	1216	2166.663	1362.779	21.571		1	solarized pressed vess	H
Robinson Te	1217	2204.616	1366.117	21.724		1	clear bottle	H
Robinson Te	1218	2176.371	1361.651	21.741		1	brick	H
Robinson Te	1219	2220.113	1344.022	22.602		1	clear bottle	H
Robinson Te	1220	2240.887	1343.126	22.648		1	stoneware utility pipe	H
Robinson Te	1221	2245.705	1338.298	23.081		1	window glass	H
Robinson Te	1222	2239.932	1332.174	23.117		1	window glass	H
Robinson Te	1223	2250.807	1329.68	23.327		1	porcelain	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
Robinson Te	1224	2278.518	1331.226	23.808	1	emerald glass	H
Robinson Te	1226	2274.796	1320.788	24.074	1	cast iron	H
Robinson Te	1227	2283.79	1307.238	24.77	1	green fire king	H
Robinson Te	1228	2270.083	1314.435	24.25	1	milk glass canning	H
Robinson Te	1229	2281.648	1302.63	24.897	1	brick	H
Robinson Te	1230	2272.626	1314.504	23.769	1	brick	H
Robinson Te	1231	2287.019	1298.252	25.138	1	whiteware	H
Robinson Te	1232	2277.291	1315.124	24.397	1	cast iron	H
Robinson Te	1233	2297.863	1300.821	25.326	1	stoneware american	H
Robinson Te	1234	2277.4	1315.931	24.313	1	nail cut	H
Robinson Te	1235	2294.651	1270.411	26.099	1	green fire king	H
Robinson Te	1236	2264.05	1316.811	24.043	1	window glass	H
Robinson Te	1237	2263.23	1315.664	24.07	1	ironstone	H
Robinson Te	1238	2262.281	1302.111	24.558	1	coca cola	H
Robinson Te	1239	2240.637	1307.955	24.066	1	whiteware	H
Robinson Te	1240	2253.015	1297.431	24.433	1	whiteware	H
Robinson Te	1241	2246.371	1293.248	24.577	1	clear jar	H
Robinson Te	1242	2229.077	1308.721	23.994	1	whiteware	H
Robinson Te	1243	2244.551	1293.092	24.571	1	green bottle	H
Robinson Te	1244	2218.742	1305.155	24.162	1	clear bottle	H
Robinson Te	1245	2235.473	1293.976	24.415	1	whiteware	H
Robinson Te	1246	2208.829	1319.114	23.295	1	aqua bottle	H
Robinson Te	1247	2212.39	1315.096	23.65	1	whiteware	H
Robinson Te	1248	2195.588	1332.904	22.577	1	aqua bottle	H
Robinson Te	1249	2196.839	1314.861	23.399	1	ironstone	H
Robinson Te	1250	2223.635	1287.133	24.488	1	whiteware	H
Robinson Te	1251	2233.711	1279.672	24.868	1	whiteware	H
Robinson Te	1252	2182.282	1272.04	25.049	1	whiteware	H
Robinson Te	1253	2239.538	1279.684	24.824	1	green fire king	H
Robinson Te	1254	2187.548	1267.614	25.109	1	window glass	H
Robinson Te	1255	2253.403	1282.174	24.907	1	whiteware	H
Robinson Te	1256	2194.978	1267.059	25.314	1	ironstone	H
Robinson Te	1257	2259.551	1288.355	24.759	1	ironstone	H
Robinson Te	1258	2202.021	1262.15	25.639	1	milk glass canning	H
Robinson Te	1259	2246.114	1272.664	24.963	1	milk glass canning	H
Robinson Te	1260	2253.197	1271.412	24.99	1	whiteware	H
Robinson Te	1261	2210.749	1267.857	25.3	1	rbew	H
Robinson Te	1262	2237.379	1271.692	24.965	1	milk glass vessel	H
Robinson Te	1263	2211.13	1267.336	25.362	1	whiteware	H
Robinson Te	1264	2229.871	1267.396	25.305	1	whiteware	H
Robinson Te	1265	2226.558	1267.394	25.312	1	whiteware	H
Robinson Te	1266	2222.576	1278.278	25.045	1	milk glass jar	H
Robinson Te	1267	2215.452	1262.729	25.503	1	clear bottle	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
Robinson Te	1268	2232.231	1252.645	25.482	1	green bottle	H
Robinson Te	1269	2220.913	1262.392	25.594	1	clear bottle milk bottle	H
Robinson Te	1270	2237.782	1261.319	25.646	1	milk glass vessel	H
Robinson Te	1271	2248.513	1258.796	25.481	1	clear bottle	H
Robinson Te	1272	2247.575	1253.338	25.676	1	solarized glass	H
Robinson Te	1273	2251.605	1252.706	25.54	1	yellow glass	H
Robinson Te	1274	2259.518	1259.074	25.586	1	solarized tumbler	H
Robinson Te	1275	2271.73	1261.291	25.821	1	whiteware	H
Robinson Te	1276	2274.885	1258.838	25.944		20th century dump	H
Robinson Te	1277	2209.307	1253.791	25.48	1	solarized glass	H
Robinson Te	1278	2203.552	1244.118	25.827	1	whiteware	H
Robinson Te	1279	2143.622	1287.411	23.899	1	whiteware	H
Robinson Te	1280	2106.479	1296.492	23.089	1	whiteware annular	H
Robinson Te	1281	2136.936	1327.546	22.392	1	rbew	H
Robinson Te	1282	2093.754	1305.526	22.825	1	whiteware	H
Robinson Te	1283	2122.66	1324.129	22.325	1	whiteware	H
Robinson Te	1284	2098.258	1309.919	22.63	1	porcelain chinese 20th	H
Robinson Te	1285	2123.398	1324.992	22.217	1	rbew	H
Robinson Te	1286	2079.222	1332.549	21.735	1	rbew	H
Robinson Te	1287	2064.042	1310.597	22.517	1	rbew	H
Robinson Te	1288	2033.894	1310.074	22.416	1	brick	H
Robinson Te	1289	2028.387	1310.141	22.221	1	whiteware	H
Robinson Te	1290	2016.549	1328.304	21.381	1	rbew	H
Robinson Te	1291	1903.569	1315.125	21.44	1	whiteware	H
Robinson Te	1292	1932.039	1305.902	21.879	1	green bottle	H
Robinson Te	1293	1892.986	1307.674	21.67	1	rbew	H
Robinson Te	1294	1876.151	1308.179	21.377	1	pearlware	H
Robinson Te	1295	1895.32	1282.482	22.494	1	ironstone	H
Robinson Te	1296	1891.186	1234.069	24.066	1	whiteware	H
Robinson Te	1297	1905.144	1226.759	24.711	1	rbew	H
Robinson Te	1298	1906.252	1227.49	24.753	1	brick	H
Robinson Te	1299	1947.298	1230.999	24.708	1	whiteware	H
Robinson Te	1300	1949.298	1252.889	23.993	1	rbew	H
Robinson Te	1301	1958.775	1234.951	24.582	1	yellowware	H
Robinson Te	1302	1969.948	1251.455	24.066	1	whiteware	H
Robinson Te	1303	1976.056	1225.564	25.175	1	whiteware	H
Robinson Te	1304	2025.906	1285.506	22.817	1	rbew	H
Robinson Te	1305	2036.507	1285.788	23.146	1	whiteware	H
Robinson Te	1306	2046.608	1297.54	22.86	1	stoneware 20th	H
Robinson Te	1307	2056.846	1288.52	23.204	1	stoneware 20th	H
Robinson Te	1308	2051.444	1280.268	23.447	1	olive bottle	H
Robinson Te	1309	2080.515	1261.707	24.646	1	window glass	H
Robinson Te	1310	2087.429	1254.6	24.843	1	stoneware 20th	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
Robinson Te	1311	2214.6	1254.974	29.271	1	milk glass canning	H
Robinson Te	1312	2212.788	1245.9	29.286	1	brick	H
Robinson Te	1313	2211.211	1243.996	29.159	1	whiteware	H
Robinson Te	1314	2212.293	1240.411	29.316	1	whiteware	H
Robinson Te	1315	2209.194	1245.022	29.312	1	whiteware	H
Robinson Te	1316	2211.29	1235.541	29.275	1	asbestos	H
Robinson Te	1317	2207.777	1246.762	29.263	1	brick	H
Robinson Te	1318	2206.504	1237.582	29.131	1	whiteware	H
Robinson Te	1319	2204.426	1248.271	29.128	1	whiteware	H
Robinson Te	1320	2200.225	1241.305	28.976	1	window glass	H
Robinson Te	1321	2193.47	1231.903	28.966	1	aqua bottle	H
Robinson Te	1322	2199.039	1250.998	29.052	1	clear bottle	H
Robinson Te	1323	2185.663	1226.606	28.845	1	clear bottle	H
Robinson Te	1324	2201.642	1255.88	29.098	1	porcelain	H
Robinson Te	1325	2185.389	1220.841	28.989	1	window glass	H
Robinson Te	1326	2183.969	1206.967	28.982	1	whiteware	H
Robinson Te	1327	2202.857	1200.031	29.415	1	whiteware	H
Robinson Te	1328	2206.829	1214.313	29.38	1	whiteware	H
Robinson Te	1329	2195.427	1183.464	29.243	1	ironstone	H
Robinson Te	1330	2175.441	1187.939	28.973	1	ironstone	H
Robinson Te	1331	2182.835	1171.861	29.265	1	clear bottle	H
Robinson Te	1332	2156.025	1189.048	29.504	1	milk glass canning	H
Robinson Te	1333	2146.603	1170.393	29.419	1	amethyst glass	H
Robinson Te	1334	2135.295	1182.48	29.455	1	solarized glass	H
Robinson Te	1335	2164.111	1224.817	29.205	1	clear vessel	H
Robinson Te	1336	2167.202	1235.043	29.144	1	stoneware american	H
Robinson Te	1337	2113.693	1181.94	29.507	1	ironstone	H
Robinson Te	1338	2169.276	1238.372	29.093	1	solarized glass	H
Robinson Te	1339	2178.743	1239.37	29.04	1	whiteware	H
Robinson Te	1340	2072.947	1161.26	29.423	1	clear bottle	H
Robinson Te	1341	2193.306	1268.91	28.948	1	aqua bottle	H
Robinson Te	1342	2200.405	1271.881	28.957	1	clear bottle	H
Robinson Te	1343	2067.869	1181.544	29.751	1	cobalt glass	H
Robinson Te	1344	2179.663	1257.579	28.897	1	window glass	H
Robinson Te	1345	2067.338	1181.829	29.697	1	aqua bottle	H
Robinson Te	1346	2173.342	1256.325	28.92	1	aqua jar	H
Robinson Te	1347	2175.951	1262.999	28.885	1	green fire king	H
Robinson Te	1348	2115.337	1212.393	29.789	1	solarized glass	H
Robinson Te	1349	2179.405	1272.365	28.789	1	clear jar	H
Robinson Te	1350	2118.503	1218.102	29.681	1	aqua bottle	H
Robinson Te	1351	2165.076	1244.523	29.048	1	whiteware	H
Robinson Te	1352	2156.333	1262.662	29.052	1	whiteware	H
Robinson Te	1353	2084.765	1209.28	29.907	1	window glass	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
Robinson Te	1354	2167.529	1282.938	28.638		1	aqua bottle	H
Robinson Te	1355	2148.263	1279.336	28.906		1	whiteware annular	H
Robinson Te	1356	2105.201	1236.704	29.859		1	solarized pressed vess	H
Robinson Te	1357	2141.481	1277.365	29.009		1	stoneware 20th	H
Robinson Te	1358	2115.628	1236.623	29.759		1	ironstone	H
Robinson Te	1359	2119.774	1256.986	29.452		1	aqua bottle	H
Robinson Te	1360	2125.9	1279.842	28.958		1	milk glass canning	H
Robinson Te	1361	2111.304	1247.627	29.708		1	whiteware	H
Robinson Te	1362	2107.995	1276.705	29.066		1	amethyst glass	H
Robinson Te	1363	2099.413	1279.106	28.947		1	milk glass canning	H
Robinson Te	1364	2090.464	1245.632	29.639		1	ironstone	H
Robinson Te	1365	2094.061	1271.007	29.215		1	bone china	H
Robinson Te	1366	2096.961	1264.4	29.214		1	aqua bottle	H
Robinson Te	1367	2083.422	1246.624	29.641		1	whiteware	H
Robinson Te	1368	2092.41	1292.867	28.255		1	aqua bottle	H
Robinson Te	1369	2077.571	1243.134	29.747		1	whiteware	H
Robinson Te	1370	2085.098	1286.187	28.593		1	rbew	H
Robinson Te	1371	2082.304	1290.541	28.507		1	porcelain 20th	H
Robinson Te	1372	2057.261	1288.16	28.621		1	window glass	H
Robinson Te	1373	2073.516	1302.358	27.785		1	wsg sw basket weave	H
Robinson Te	1374	2053.734	1291.446	28.393		1	clear vessel	H
Robinson Te	1375	2043.727	1305.15	27.659		1	rbew	H
Robinson Te	1376	2044.575	1296.09	28.137		1	window glass	H
Robinson Te	1377	2037.392	1294.574	28.107		1	whiteware	H
Robinson Te	1378	2025.812	1292.789	28.278		1	amber glass	H
Robinson Te	1379	2008.741	1290.131	28.224		1	pearlware	H
Robinson Te	1380	1977.131	1277.484	28.651		1	whiteware	H
Robinson Te	1381	1965.891	1277.3	28.824		1	whiteware	H
Robinson Te	1382	1937.689	1276.227	28.513		1	whiteware	H
Robinson Te	1383	1926.63	1266.857	28.92		1	window glass	H
Robinson Te	1384	1842.382	1237.022	29.576		1	whiteware	H
Robinson Te	1385	1902.14	1224.319	30.212		1	rbew	H
Robinson Te	1386	1848.576	1235.839	29.769		1	whiteware	H
Robinson Te	1387	1915.012	1218.257	30.425		1	brick	H
Robinson Te	1388	1949.134	1222.132	30.303		1	milk glass canning	H
Robinson Te	1389	1993.843	1256.623	29.598		1	whiteware	H
Robinson Te	1390	1992.195	1230.306	30.218		1	whiteware	H
Robinson Te	1391	1997.347	1250.728	29.747		1	aqua bottle embossed	H
Robinson Te	1392	1936.465	1205.174	30.634		1	olive bottle	H
Robinson Te	1393	2017.37	1204.393	30.409		1	whiteware	H
Robinson Te	1394	1959.303	1207.137	30.667		1	whiteware	H
Robinson Te	1395	2029.417	1208.007	30.416		1	whiteware	H
Robinson Te	1396	1949.884	1185.497	30.524		1	whiteware	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
Robinson Te	1397	2028.637	1210.506	30.506		1	whiteware	H
Robinson Te	1398	1949.443	1174.799	30.345		1	olive bottle	H
Robinson Te	1399	2001.284	1193.088	30.494		1	cast iron	H
Robinson Te	1400	1948.496	1167.101	30.106		1	aqua bottle	H
Robinson Te	1401	1977.19	1164.535	30.109		1	cast iron	H
Robinson Te	1402	1963.968	1173.347	30.325		1	porcelain	H
	98	2934.203	2239.134	11.111		1	fcr	A
	99	2938.91	2221.614	11.175		1	chert cobble worked	A
	100	2961.068	2172.729	12.328		1	rbew	H
	101	2931.387	2169.792	12.503		1	aqua bottle	H
	102	2844.525	2152.052	13.476		1	rbew	H
	103	2863.426	2133.93	13.83		1	rbew	H
	104	2862.755	2132.52	13.971		1	fcr	A
	105	2896.243	2130.793	13.817		1	brick	H
	106	2947.66	2122.283	13.933		1	rbew	H
	107	2994.043	2041.914	15.134		1	rbew	H
	108	3003.817	2040.92	15.101		1	brick	H
	109	3128.641	2039.471	15.034		1	brick	H
	110	3144.438	2101.677	14.628		1	brick	H
	111	3109.172	2111.529	14.547		1	brick	H
	112	3209.53	2082.864	14.62		1	brick	H
	115	3363.127	1947.606	14.479		1	whiteware	H
	116	3298.47	1953.421	15.144		1	stoneware american	H
	117	3293.147	1952.522	15.187		1	solarized	H
	118	3292.047	1951.621	15.239		1	amethyst glass	H
	119	3289.871	1952.056	15.237		1	rbew	H
	120	3292.944	1951.832	15.24		1	brick	H
	121	3288.368	1951.73	15.244		1	whiteware	H
	122	3287.449	1952.238	15.236		1	stoneware utility pipe	H
	123	3289.235	1949.977	15.245		1	aqua bottle	H
	124	3280.001	1951.968	15.237		1	ironstone	H
	125	3280.083	1949.064	15.274		1	ironstone	H
	126	3278.645	1951.015	15.272		1	ironstone	H
	127	3275.849	1959.468	15.084		1	aqua bottle	H
	128	3273.435	1955.545	15.252			19th century porcelain	H
	129	3272.541	1954.743	15.259		1	whiteware	H
	130	3272.061	1951.038	15.26		1	aqua bottle	H
	131	3265.121	1965.849	15.034		1	aqua bottle	H
	132	3263.373	1965.813	15.034		1	aqua bottle	H
	133	3254.27	1963.302	15.15		1	stoneware utility pipe	H
	134	3254.284	1962.753	15.15		1	solarized glass	H
	135	3286.839	1964.482	15.102		1	solarized glass	H
	136	3206.785	1932.085	15.756		1	aqua bottle	H

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Site	Name	Northing	Easting	Elevation	N		Description	Class
	137	3242.886	1903.522	16.162		1	coal	H
	138	3241.951	1901.579	16.053		1	window glass	H
	139	3305.928	1777.668	16.767		1	clear bottle	H
	140	3379.728	1758.493	17.066		1	whiteware	H
	141	3433.346	1703.979	16.828		1	brick	H
	142	3331.03	1619.134	14.658		1	brick	H
	143	3235.126	1793.492	17.033		1	coal	H
	144	3056.761	1833.663	17.304		1	aqua bottle	H
	145	2704.244	1976.008	14.623		1	solarized	H
	146	2704.739	1974.152	14.631		1	brick	H
	148	4333.032	1567.272	25.278		1	whiteware	H
	149	4376.316	1532.073	25.155		1	coal	H
	150	4443.681	1605.682	24.983		1	brick	H
	151	4407.398	1626.334	24.797		1	brick	H
	152	4394.647	1619.717	24.859		1	brick	H
	153	4390.313	1614.372	24.906		1	coal	H
	154	4367.916	1611.769	25.03		1	ironstone	H
	155	4348.669	1638.738	24.869		1	slag	H
	156	4355.389	1645.494	24.576		1	coal	H
	157	4410.847	1681.894	24.024		1	coal	H
	158	4419.912	1666.477	24.529		1	rbew	H
	159	4447.82	1684.155	24.298		1	rbew	H
	160	4448.273	1687.113	24.201		1	coal	H
	161	4488.228	1638.176	24.622		1	brick	H
	162	4519.949	1701.234	23.905		1	coal	H
	163	4510.387	1716.471	23.848		1	whiteware	H
	164	4466.843	1772.615	22.495		1	coal	H
	165	4576.348	1747.185	23.454		1	coal	H
	166	4576.352	1747.187	23.454		1	coal	H
	167	4614.018	1692.412	23.617		1	coal	H
	168	4968.773	1875.712	21.883		1	quartz chunk	A
	169	4982.138	1913.384	22.387		1	window glass	H
	170	5088.955	1898.955	23.239		1	brick	H
	171	4244.158	1881.784	21.178		1	coal	H
	172	3852.372	1629.025	23.632		1	brick	H
	173	3910.569	1635.347	23.566		1	brick	H
	174	3956.051	1643.769	23.338		1	brick	H
	175	4100.898	1512.705	26.282		1	concrete	H
	176	3943.661	1408.442	24.302		1	brick	H
	177	3715.548	1286.795	23.354		1	brick	H
	178	3617.307	1242.757	22.93		1	coal	H
	179	3569.225	1249.229	23.033		1	brick	H
	180	3505.809	1217.133	22.69		1	coal	H

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Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
	181	3351.064	1222.57	22.259	1	coal	H
	182	3364.632	1254.311	22.619	1	brick	H
	183	3360.215	1347.383	21.579	1	brick	H
	184	3203.758	1115.827	20.461	1	brick	H
	185	3226.224	1118.649	20.581	1	brick	H
	186	3233.947	1205.472	21.441	1	brick	H
	187	3084.988	1198.103	20.628	1	brick	H
	188	2988.809	1184.055	20.148	1	brick	H
	189	2784.324	1153.447	19.827	1	brick	H
	190	2797.557	1111.426	19.429	1	whiteware	H
	191	2819.664	1192.838	19.819	1	brick	H
	192	2822.809	1223.891	20.045	1	brick	H
	194	2893.472	1668.177	25.828	1	brick	H
	195	2892.563	1658.941	25.678	1	prosser button	H
	196	2892.509	1658.423	25.679	1	solarized glass	H
	197	2911.135	1655.557	25.341	1	rbew	H
	198	2913.163	1640.622	24.915	1	rbew	H
	199	2817.277	1601.822	26.583	1	brick	H
	200	2812.841	1560.279	25.435	1	brick	H
	201	2797.605	1736.148	28.108	1	ironstone	H
	202	2813.061	1788.655	28.159	1	brick	H
	203	2817.156	1820.36	27.62	1	whiteware	H
	204	2735.257	1723.112	26.938	1	brick	H
	205	2740.75	1711.22	26.93	1	ironstone	H
	206	2718.897	1707.743	26.539	1	stoneware gray	H
	207	2708.234	1705.291	26.331	1	aqua bottle	H
	208	2705.288	1720.674	26.424	1	aqua bottle	H
	209	2692.821	1729.693	26.159	1	yellowware	H
	210	2634.75	1774.833	25.651	1	whiteware	H
	211	2537.967	1805.964	25.453	1	ironstone	H
	212	2559.259	1777.531	25.639	1	brick	H
	213	2527.237	1774.188	25.666	1	clear bottle	H
	214	2530.72	1747.765	25.07	1	ironstone	H
	215	2550.102	1717.978	24.652	1	aqua bottle	H
	216	2581.204	1689.464	24.147	1	brick	H
	217	2646.444	1708.81	25.296	1	brick	H
	218	2658.921	1665.252	25.752	1	brick	H
	219	2717.683	1641.445	27.235	1	brick	H
	220	2613.644	1676.995	24.756	1	ironstone	H
	221	2610.758	1644.054	24.719	1	ironstone	H
	222	2558.101	1589.1	22.859	1	brick	H
	223	2522.956	1585.102	21.692	1	brick	H
	224	2513.782	1555.637	21.435	1	brick	H

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Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
	225	2513.852	1478.448	22.122		1	brick	H
	226	2546.45	1499.098	22.566		1	coal	H
	227	2563.455	1508.527	23.145		1	window glass	H
	228	2595.556	1506.144	24.109		1	block glass	H
	229	2547.13	1462.418	23.063		1	brick	H
	230	2513.307	1441.734	22.941		1	brick	H
	231	2507.252	1428.579	23.241		1	whiteware	H
	232	2531.978	1414.339	24.276		1	brick	H
	233	2525.537	1405.476	24.494		1	brick	H
	234	2521.064	1401.29	24.595		1	brick	H
	235	2509.206	1378.161	25.169		1	porcelain	H
	236	2525.787	1379.81	25.38		1	chert cobble worked	A
	237	2522.083	1338.985	26.329		1	porcelain	H
	238	2530.757	1402.686	24.702		1	brick	H
	239	2552.962	1414.408	24.569		1	brick	H
	240	2602.068	1405.898	25.025		1	canning lid liner	H
	241	2575.882	1373.853	25.844		1	brick	H
	242	2632.386	1381.037	25.889		1	aqua bottle	H
	243	2637.091	1366.775	25.877		1	cobalt glass	H
	244	2670.236	1391.293	26.053		1	brick	H
	245	2706.803	1428.553	26.234		1	brick	H
	246	2735.016	1427.687	25.755		1	brick	H
	247	2738.955	1479.952	26.229		1	ironstone	H
	248	2781.789	1407.974	24.405		1	brick	H
	249	2809.621	1403.201	23.982		1	brick	H
	250	2812.535	1402.06	23.923		1	brick	H
	251	2808.725	1403.466	24		1	aqua bottle	H
	252	2822.272	1350.278	23.999		1	brick	H
	253	2780.829	1349.632	24.415		1	brick	H
	254	2773.138	1364.119	24.663		1	brick	H
	255	2739.9	1358.279	25.427		1	aqua bottle	H
	256	2730.22	1338.8	25.609		1	brick	H
	257	2564.414	1224.571	26.588		1	brick	H
	258	2560.943	1198.14	26.384		1	whiteware	H
	259	2541.423	1182.437	26.402		1	brick	H
	260	2510.02	2166.932	24.974		1	brick	H
	261	2540.835	2234.299	23.673		1	porcelain insulator	H
	264	2686.558	590.527	31.509		1	whiteware	H
	265	2707.412	922.067	32.591		1	brick	H
	266	2682.161	604.019	31.34		1	ironstone	H
	267	2707.104	853.85	32.595		1	rbew	H
	268	2684.337	772.044	32.415		1	rbew	H
	269	2707.564	803.349	32.417		1	whiteware	H

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Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
	270	2687.786	771.619	32.414	1	brick	H
	271	2691.885	798.053	32.33	1	brick	H
	272	2691.884	775.927	32.464	1	doll arm	H
	273	2681.401	792.805	32.395	1	whiteware	H
	274	2677.204	796.291	32.297	1	whiteware	H
	275	2669.43	734.992	32.009	1	brick	H
	276	2670.221	839.155	32.424	1	aqua bottle	H
	277	2661.532	744.827	32.172	1	brick	H
	278	2665.474	957.289	31.804	1	brick	H
	279	2660.483	726.417	31.858	1	brick	H
	280	2656.819	964.595	31.802	1	brick	H
	281	2643.298	762.421	32.067	1	whiteware	H
	282	2638.649	995.554	31.162	1	whiteware	H
	283	2629.752	773.358	32.324	1	brick	H
	284	2603.915	1053.529	31.43	1	brick	H
	285	2600.031	1045.071	31.425	1	brick	H
	286	2616.061	931.578	31.991	1	brick	H
	287	2621.07	996.4	31.291	1	bennington	H
	288	2630.417	976.292	31.522	1	brick	H
	289	2556.822	1014.249	32.196	1	whiteware	H
	290	2573.649	952.112	32.124	1	brick	H
	291	2547.741	1031.49	32.183	1	whiteware	H
	292	2552.775	975.692	32.45	1	brick	H
	293	2554.905	1046.427	32.114	1	whiteware	H
	294	2547.874	964.129	32.504	1	rbew	H
	295	2529.613	1050.935	32.197	1	whiteware	H
	296	2528.167	1040.487	32.332	1	whiteware	H
	297	2543.922	1014.432	32.523	1	whiteware	H
	298	2526.453	1014.312	32.53	1	brick	H
	299	2509.339	1009.333	32.922	1	whiteware	H
	306	2513.744	952.242	33.092	1	window glass	H
	308	2545.776	876.022	32.16	1	stoneware	H
	310	2520.217	919.967	32.884	1	brick	H
	311	2517.383	920.903	32.889	1	brick	H
	312	2541.951	804.785	32.282	1	aqua bottle	H
	313	2711.75	846.254	32.765	1	brick	H
	314	2717.644	839.613	32.521	1	aqua bottle	H
	315	2726.096	879.1	32.606	1	brick	H
	316	2737.241	907.073	32.568	1	pearlware	H
	317	2732.667	990.234	31.468	1	brick	H
	318	2761.979	956.234	31.608	1	aqua bottle	H
	319	2738.76	1002.688	31.049	1	brick	H
	320	2771.128	975.702	31.089	1	brick	H

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Site	Name	Northing	Easting	Elevation	N	Description	Class
	321	2727.942	1024.366	30.765	1	brick	H
	322	2772.157	1002.481	30.642	1	brick	H
	323	2733.421	1054.353	30.532	1	whiteware	H
	324	2752.205	918.372	32.388	1	rbew	H
	325	2682.248	1047.486	30.776	1	yellowware	H
	326	2727.895	816.172	32.529	1	brick	H
	327	2746.807	794.5	32.494	1	rbew	H
	328	2730.025	766.44	32.092	1	rbew	H
	329	2800.832	975.473	30.881	1	window glass	H
	330	2772.514	822.996	32.544	1	aqua bottle	H
	331	2774.242	932.474	32.178	1	whiteware	H
	332	2785.017	880.057	32.142	1	brick	H
	333	2783.169	934.828	32.043	1	brick	H
	334	2764.668	877.079	32.363	1	brick	H
	335	2779.511	909.156	32.411	1	rbew	H
	336	2793.528	897.062	31.984	1	porcelain	H
	337	2786.452	915.987	32.319	1	whiteware	H
	338	2843.994	881.146	31.931	1	rbew	H
	339	2833.787	989.813	30.669	1	whiteware	H
	340	2837.286	845.437	32.413	1	brick	H
	341	2839.685	984.344	30.735	1	brick	H
	342	2809.026	763.454	31.959	1	whiteware	H
	343	2841.735	962.896	31.078	1	fcr	A
	344	2864.644	935.859	31.318	1	brick	H
	345	2871.177	944.605	31.304	1	brick	H
	346	2875.213	955.179	31.002	1	rbew	H
	347	2878.549	942.621	31.172	1	whiteware	H
	348	2879.262	993.002	30.514	1	brick	H
	349	2886.443	947.789	31.126	1	pearlware	H
	350	2884.808	988.747	30.578	1	aqua bottle	H
	351	2893.902	954.663	31.032	1	brick	H
	352	2900.949	986.555	30.71	1	brick	H
	353	2887.707	1005.4	30.559	1	rbew	H
	354	2916.597	949.222	31.169	1	brick	H
	355	2905.122	1012.991	30.51	1	whiteware	H
	356	2908.752	936.629	31.379	1	brick	H
	357	2864.07	852.022	32.224	1	aqua bottle	H
	358	2936.457	1048.754	30.526	1	pearlware	H
	359	2846.437	811.706	32.16	1	rbew	H
	360	2855.92	820.674	32.059	1	pearlware	H
	361	2936.562	920.47	31.786	1	stoneware	H
	362	2858.406	810.892	31.908	1	rbew	H
	363	2864.506	809.679	31.909	1	brick	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
	364	2955.494	909.247	31.918		1	whiteware	H
	365	2980.8	958.405	31.328		1	brick	H
	366	2934.994	821.937	31.286		1	rbew	H
	367	3011.99	994.431	30.979		1	pipe stem	H
	368	2968.205	852.315	31.55		1	rbew	H
	369	2981.489	849.713	31.492		1	brick	H
	370	2982.886	935.301	31.562		1	brick	H
	371	2987.506	911.017	31.573		1	brick	H
	372	3015.211	942.532	31.558		1	brick	H
	373	3085.082	917.409	31.54		1	brick	H
	374	3071.424	1005.594	31.52		1	stoneware	H
	375	3086.548	927.352	31.549		1	porcelain insulator	H
	376	3133.767	1042.289	31.771		1	brick	H
	377	3194.536	1054.453	31.395		1	brick	H
	378	3154.067	1053.906	31.633		1	brick	H
	379	3254.685	1039.418	31.611		1	rhyolite selby bay	A
	380	3191.462	1051.842	31.624		1	brick	H
	381	3248.582	1042.077	31.612		1	brick	H
	382	3263.871	1047.689	31.811		1	brick	H
	383	3271.932	1037.967	31.495		1	quartz secondary	A
	384	3312.242	1058.225	31.669		1	whiteware	H
	385	3345.409	1048.105	31.14		1	argillite secondary	A
	386	3357.314	1053.739	31.088		1	chert biface tip	A
	387	3359.475	1045.714	31.071		1	porcelain	H
	388	3373.681	1045.146	31.246		1	clear vessel	H
	389	3323.844	984.656	29.743		1	whiteware	H
	390	3281.525	951.293	30.416		1	whiteware	H
	391	3373.198	915.769	30.314		1	stoneware	H
	392	3213.321	845.929	31.017		1	stoneware	H
	393	3356.626	919.337	30.507		1	stoneware	H
	394	3176.104	819.118	30.306		1	brick	H
	395	3068.774	840.191	31.04		1	brick	H
	396	3312.153	748.241	28.54		1	fcr	A
	397	3017.683	811.276	30.407		1	brick	H
	398	2931.182	722.406	30.436		1	brick	H
	399	3078.938	737.449	29.426		1	window glass	H
	400	2847.714	684.577	30.858		1	aqua bottle	H
	401	2851.412	667.634	31.058		1	window glass	H
	402	2965.628	663.29	31.32		1	chert stemmed	A
	403	2811.537	632.242	30.82		1	brick	H
	404	2969.03	644.96	31.051		1	brick	H
	405	2869.082	629.784	30.831		1	quartzite stemmed	A
	406	2971.235	629.457	31.16		1	stoneware	H

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Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
	407	2880.639	584.28	31.055		1	brick	H
	408	2993.61	624.083	31.265		1	rbew	H
	409	2860.561	584.023	31.031		1	brick	H
	410	3030.297	618.711	31.231		1	clear vessel	H
	411	2870.459	562.763	31.544		1	window glass	H
	412	2926.507	550.322	31.43		1	brick	H
	413	3193.901	560.204	29.117		1	brick	H
	414	2925.121	541.435	31.416		1	stoneware	H
	415	2811.289	554.935	31.643		1	brick	H
	416	3121.209	455.826	28.653		1	stoneware	H
	417	2803.339	528.642	31.721		1	whiteware	H
	418	3111.845	431.663	28.311		1	brick	H
	419	3071.347	367.838	27.396		1	chert triangle	A
	420	3061.07	371.735	27.514		1	chert primary	A
	495	2184.848	281.875	28.399		1	brick	H
	496	2189.652	264.247	28.388		1	fcr	A
	498	2194.601	325.159	28.658		1	aqua bottle	H
	501	2185.231	368.215	28.737		1	brick	H
	502	2187.012	372.356	28.499		1	brick	H
	508	2387.242	515.2	29.793		1	rbew	H
	511	2430.229	503.908	29.795		1	brick	H
	513	2436.927	527.186	29.798		1	rbew	H
	514	2287.412	531.917	30.044		1	brick	H
	515	2284.483	539.024	30.335		1	brick	H
	516	2289.074	542.287	30.498		1	brick	H
	517	2451.236	545.846	30.241		1	rbew	H
	518	2556.062	542.366	30.966		1	aqua bottle	H
	519	2405.374	555.34	30.211		1	rbew	H
	520	2577.322	528.826	31.074		1	iron pipe	H
	521	2376.386	566.244	30.165		1	aqua bottle	H
	522	2411.192	582.482	30.187		1	aqua bottle	H
	523	2431.981	583.014	30.229		1	brick	H
	524	2633.5	553.069	31.839		1	brick	H
	525	2666.732	535.514	32.034		1	stoneware american	H
	526	2651.61	590.174	31.293		1	aqua bottle	H
	527	2581.652	597.582	31.367		1	ironstone	H
	528	2505.106	608.942	30.893		1	brick	H
	529	2475.671	621.972	31.025		1	brick	H
	530	2459.512	617.858	30.803		1	brick	H
	531	2356.057	588.108	30.384		1	brick	H
	532	2331.746	589.516	30.503		1	brick	H
	533	2410.921	643.889	31.186		1	rbew	H
	534	2230.584	579.606	30.647		1	rbew	H

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Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
	535	2410.258	653.744	31.564		1	brick	H
	536	2222.086	588.751	30.576		1	whiteware	H
	537	2339.733	697.809	31.82		1	brick	H
	538	2229.164	616.566	31.026		1	rbew	H
	539	2274.11	620.122	30.983		1	rbew	H
	540	2273.153	650.189	31.499		1	brick	H
	541	2246.897	710.808	32.069		1	porcelain button	H
	542	2267.104	650.246	31.525		1	rbew	H
	543	2247.425	652.547	31.631		1	brick	H
	544	2253.984	719.483	32.125		1	brick	H
	545	2190.669	659.045	31.599		1	rbew	H
	546	2268.02	741.15	32.553		1	brick	H
	547	2197.932	675.417	31.823		1	brick	H
	548	2282.199	740.469	32.6		1	brick	H
	549	2170.338	793.059	32.571		1	brick	H
	550	2309.9	762.722	32.419		1	ironstone	H
	551	2153.751	895.432	32.805		1	wsg stoneware	H
	552	2274.476	801.775	32.813		1	rbew	H
	553	2298.635	835.969	32.907		1	brick	H
	554	2180.816	891.163	33.159		1	porcelain under glaze	H
	564	2301.406	874.802	33.352		1	rbew	H
	575	2351.417	801.293	32.662		1	brick	H
	578	2456.912	801.158	32.674		1	pearlware	H
	581	2504.981	755.146	32.339		1	ironstone	H
	586	2379.606	894.672	33.13		1	window glass	H
	588	2385.284	885.182	33.034		1	brick	H
	630	2534.659	762.449	32.155		1	brick	H
	631	2487.974	723.46	32.169		1	brick	H
	632	2556.408	651.831	31.83		1	brick	H
	633	2565.524	632.59	31.39		1	brick	H
	751	2408.858	2484.656	26.567		1	rbew	H
	752	2380.29	2452.599	27.266		1	brick	H
	753	2303.747	2464.396	29.467		1	brick	H
	754	2296.335	2436.699	29.589		1	brick	H
	755	2282.073	2373.006	30.043		1	whiteware	H
	756	2196.802	2301.868	30.95		1	ironstone	H
	757	2210.315	2239.884	31.246		1	ironstone	H
	758	2185.532	2216.177	31.223		1	whiteware	H
	759	2008.356	2145.455	29.615		1	pearlware	H
	760	1897.809	2441.528	26.295		1	whiteware	H
	761	1944.308	2436.433	27.59		1	window glass	H
	762	1978.722	2456.748	29.094		1	whiteware	H
	763	1978.984	2461.523	29.23		1	window glass	H

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Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N		Description	Class
	764	1980.752	2473.443	29.407		1	brick	H
	765	1966.615	2499.705	29.373		1	whiteware	H
	766	1916.006	2646.381	28.852		1	chert triangle	A
	767	1882.152	2665.213	27.774		1	stoneware	H
	768	1811.957	2741.094	26.241		1	porcelain	H
	769	1900.195	2703.04	29.069		1	brick	H
	770	1930.396	2668.733	29.573		1	clear vessel	H
	771	2008.17	2662.154	29.184		1	window glass	H
	772	2017.763	2648.224	29.353		1	olive glass	H
	773	2088.529	2647.429	28.886		1	brick	H
	774	2111.738	2654.157	28.791		1	brick	H
	775	2233.447	2364.175	29.455		1	brick	H
	776	2262.122	2352.064	29.601		1	brick	H
	777	2299.961	2258.448	29.951		1	brick	H
	778	2221.689	2146.441	30.007		1	whiteware	H
	779	1975.494	2184.362	27.774		1	brick circle	H
	780	2026.457	2198.266	29.335		1	brick circle	H
	781	2031.039	2241.167	29.942		1	brick circle	H
	782	2068.724	2294.347	29.283		1	brick circle	H
	783	2037.168	2325.911	28.006		1	brick circle	H
	784	2006.247	2370.36	26.698		1	brick circle	H
	785	1993.337	2400.428	26.397		1	brick circle	H
	786	1986.491	2435.519	26.622		1	brick circle	H
	787	1933.297	2427.076	26.001		1	brick circle	H
	788	1885.147	2386.136	26.235		1	brick circle	H
	789	1864.472	2366.511	26.814		1	brick circle	H
	790	1841.226	2336.876	27.838		1	brick circle	H
	791	1825.109	2281.45	28.145		1	brick circle	H
	792	1866.348	2239.663	27.599		1	brick circle	H
	793	1810.03	2252.424	27.162		1	glass pressed	H
	794	1688.691	2181.681	25.151		1	brick	H
	795	1599.896	2171.747	25.249		1	porcelain	H
	796	1576.942	2178.234	25.432		1	pearlware	H
	799	1788.592	2317.578	28.142		1	whiteware	H
	837	1809.519	2372.625	33.415		1	brick	H
	838	2090.819	2406.893	33.736		1	brick	H
	839	2114.293	2456.793	33.592		1	whiteware	H
	840	2046.711	2435.444	33.164		1	brick	H
	841	1813.051	2434.196	33.637		1	rhyolite secondary	A
	842	1813.598	2419.408	33.46		1	whiteware	H
	843	1762.182	2411.12	34.704		1	brick	H
	844	1755.255	2418.944	34.832		1	rbew	H
	886	1802.502	2496.649	33.417		1	brick	H

APPENDIX II: MULBERRY KNOLL ARTIFACT INVENTORY

Class: F=Faunal, H=Historic, A=Aboriginal

Site	Name	Northing	Easting	Elevation	N	Description	Class
	887	1774.623	2479.676	34.134	1	window glass	H
	888	1784.404	2449.205	34.34	1	brick	H
	889	1814.672	2461.536	33.488	1	window glass	H
	890	1755.357	2444.793	34.884	1	brick	H
	891	1735.822	2476.651	34.518	1	brick	H
	892	1730.794	2484.716	34.274	1	brick	H
	893	1703.194	2471.489	34.923	1	whiteware	H
	894	1714.582	2448.229	35.065	1	brick	H
	895	1720.327	2449.282	35.035	1	brick	H
	896	1719.744	2447.225	35.042	1	window glass	H
	899	1704.799	2503.566	34.144	1	ironstone	H
	900	1705.963	2508.61	33.974	1	brick	H
	1033	1119.152	2196.706	34.927	1	whiteware	H
	1036	1255.762	2197.253	35.428	1	argillite secondary	A
	1186	2416.184	1722.096	21.275	1	aqua bottle	H
	1187	2298.12	1513.547	19.735	1	bifurcate	A
	1403	1610.963	1933.981	30.511	1	whiteware	H
	1404	1645.317	1914.756	30.541	1	brick	H
	1405	1659.071	1896.459	30.467	1	brick circle	H
	1406	1629.568	1879.63	30.593	1	brick circle	H
	1407	1626.427	1850.296	30.653	1	brick circle	H
	1408	1689.311	1833.255	30.707	1	brick circle	H
	1409	1715.082	1837.94	30.637	1	brick circle	H
	1410	1747.988	1862.035	30.532	1	brick circle	H
	1411	1715.32	1914.628	31.657	1	brick circle	H
	1412	1716.446	1832.651	30.54	1	aqua bottle	H
	1413	1574.075	1911.806	30.522	1	brick	H
	1414	1219.758	2158.649	33.78	1	brick	H
	1415	1288.752	1978.182	30.963	1	brick	H
	1416	1281.561	2070.357	31.226	1	brick	H
	1417	1277.684	1977.477	30.863	1	hammerstone	A
	1418	1221.936	1989.312	31.286	1	brick	H
	1419	1290.954	1844.561	30.591	1	brick	H
	1420	1214.038	1987.812	31.339	1	brick	H
	1421	1286.249	1819.592	30.068	1	brick	H
	1422	1193.033	1955.095	31.485	1	brick	H
	1423	1248.914	1800.653	29.999	1	aqua bottle	H
	1424	1229.065	1798.302	30.169	1	brick	H
	1425	1184.331	1945.861	31.45	1	fcr	A
	1426	1219.489	1845.29	30.654	1	whiteware	H
	1427	1194.617	1930.367	31.443	1	fcr	A
	1428	1195.15	1873.808	31.156	1	fcr	A
	1429	1197.996	1900.665	31.425	1	porcelain	H

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Site	Name	Northing	Easting	Elevation	N		Description	Class
	1430	1189.529	1805.154	30.049		1	brick	H
	1431	1157.487	1825.606	30.707		1	brick	H
	1432	1170.172	1898.34	31.479		1	rbew	H
	1433	1161.643	1847.184	30.869		1	brick	H
	1434	1172.636	1863.12	31.136		1	brick	H
	1435	1102.785	1835.651	30.763		1	brick	H
	1436	1044.528	1852.873	31.508		1	fcr	A
	1437	1037.604	1877.09	31.97		1	brick	H
	1438	1104.864	2001.904	31.855		1	brick	H
	1439	1016.949	1821.273	30.966		1	brick	H
	1440	1079.872	2036.769	32.208		1	brick	H
	1441	1037.47	1877.559	31.974		1	brick	H
	1442	1044.702	2043.319	33.017		1	rbew	H
	1443	969.916	1825.454	31.479		1	rbew	H
	1444	925.622	1812.049	31.215		1	brick	H
	1445	1026.291	1958.409	32.712		1	rbew	H
	1446	898.325	1782.66	30.549		1	rbew	H
	1447	887.206	1823.728	31.65		1	brick	H
	1448	964.043	2016.406	34.411		1	brick	H
	1449	884.977	1799.346	30.924		1	brick	H
	1450	938.154	2007.611	34.6		1	rbew	H
	1451	867.267	1764.483	30.295		1	rbew	H
	1452	886.871	1980.139	34.384		1	aqua bottle embossed	H
	1453	763.873	1828.427	31.919		1	porcelain button	H
	1454	740.652	1902.912	33.442		1	whiteware	H
	1455	771.024	1926.438	33.68		1	window glass	H
	1456	712.097	1885.373	33.094		1	pearlware	H
	1457	673.42	1894.411	33.219		1	rbew	H
	1458	990.599	2086.183	34.594		1	whelk	F
	1459	564.852	1809.481	30.108		1	rbew	H
	1460	1008.529	2136.984	34.734		1	whiteware	H
	1461	968.049	2123.911	35.697		1	pipe stem	H
	1462	665.843	1948.025	33.93		1	whiteware	H
	1463	940.32	2139.949	36.437		1	brick	H
	1464	691.691	1961.137	34.417		1	rbew	H
	1465	903.319	2110.145	36.436		1	quartz cobble	A
	1466	761.126	2001.034	34.5		1	abo killens	A
	1467	850.441	2101.654	35.738		1	rbew	H
	1468	743.832	2000.648	34.487		1	brick	H
	1469	716.062	2014.336	34.722		1	brick	H
	1470	687.147	2007.731	34.598		1	stoneware american	H
	1471	669.87	1991.186	34.723		1	clear vessel	H
	1472	659.074	1966.321	34.45		1	aqua bottle	H

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Site	Name	Northing	Easting	Elevation	N		Description	Class
	1473	641.553	1960.502	34.348		1	brick	H
	1474	650.886	1964.554	34.248		1	rbew	H
	1475	596.593	1887.225	32.749		1	brick	H
	1476	575.333	1886.82	32.385		1	brick	H
	1477	543.79	1868.789	31.567		1	porcelain 20th	H
	1478	539.593	1927.261	32.594		1	brick	H
	1479	546.047	1959.781	33.584		1	rbew	H
	1480	527.208	1961.428	33.498		1	whiteware	H
	1481	610.016	2000.806	34.315		1	aqua bottle	H
	1483	631.277	2005.568	34.432		1	pearlware blue shell	H
	1484	642.115	2032.769	34.864		1	brick	H
	1485	341.443	2056.331	30.386		1	mano	A
	1486	755.979	2079.778	34.488		1	brick	H
	1487	675.91	2142.167	35.029		1	whiteware	H
	1488	457.947	2077.194	32.487		1	argillite secondary	A
	1489	665.175	2143.254	34.839		1	brick	H
	1490	605.436	2184.464	35.236		1	brick	H
	1491	506.985	2189.686	34.791		1	argillite morrow mt	A
	1550	857.637	2196.181	36.239		1	brick	H
	1552	786.359	2139.297	35.152		1	rbew	H
	1554	699.129	2191.256	34.688		1	olive bottle	H
		3025	2425	ap		1	chert secondary	A
		3025	2450	ap		7	chert secondary	A
		3025	2475	ap		3	chert secondary	A
		3050	2400	ap		1	chert primary	A
		3050	2450	ap		1	fcr	A
		3050	2450	ap		1	iron	H
		3200	2350	ap		1	iron nut	H
		3500	2300	ap		2	chert secondary	A
		3550	2350	ap		4	chert primary	A
		3725	2050	ap		1	quartziite secondary	A
		3750	2050	ap		1	chert secondary	A
		3750	2300	b		1	quartziite secondary	A
		3775	2300	b		1	fcr	A

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS,
AND LANDSCAPE ARCHITECTS

Date: June 1, 2020

Office of State Planning Coordination
122 Martin Luther King Jr. Blvd. South
Dover, DE 19901

Attention: Ms. Constance C. Holland, Director

Subject: Scenic Manor
(Formerly Estates at Mulberry Knoll)
PLUS Review 2019-08-06

Dear Ms. Holland:

We are in receipt of your comment letter dated September 26, 2019 with regard to Concept Plan associated with the proposed Scenic Manor (formerly known as Estates at Mulberry Knoll) residential subdivision proposed in Sussex County and respond as follows:

Strategies for State Policies and Spending

Comment 1: This project is located in Investment Levels 3, 4, and Out of Play according to the Strategies for State Policies and Spending. Investment Level 3 reflects areas where growth is anticipated by local, county, and state plans in the longer term future, or areas that may have environmental or other constraints to development. State investments may support future growth in these areas, but may have priorities for the near future. Level 3 area means there may be environmental concerns on or near the parcel and we would encourage you to design the site with respect for the environmental features which are present.

Investment Level 4 indicates where State investments will support agricultural preservation, natural resource protection, and the continuation of the rural nature of these areas. New development activities and suburban development are not supported in Investment Level 4 areas. These areas are comprised of prime agricultural lands and environmentally sensitive wetlands and wildlife habitats, which should be, and in many cases have been preserved.

Out of Play reflects lands that, at the time the State Strategies were developed, were not available for private development due to public ownership and / or preservation.

Because the development is inconsistent with the Strategies for State Policies and Spending, the State does not support development in Level 4 areas. We respectfully request that the proposed development in the Level 4 area be removed and the areas that are in Level 3 be designed with the maximum protection for the environmentally sensitive feature on the site.

Response: *Comment acknowledged. The project is located within the Sussex County Coastal Area growth zone and has access to public water and sewer infrastructure. Site design, including preservation and protection of existing natural resources, will be performed in*

accordance with requirements of the Sussex County Code in effect at the time of the Preliminary Plan application.

Code Requirements/Agency Permitting Requirements

Department of Transportation - Contact Bill Brockenbrough 760-2109

Comment 2: The site access on Mulberry Knoll Road (Sussex Road 284) must be designed in accordance with DelDOT's Development Coordination Manual, which is available at https://www.deldot.gov/Business/subdivisions/index.shtml?dc=changes

Response: *Comment acknowledged; the site access will be designed in accordance with the Development Coordination Manual.*

Comment 3: Pursuant to Section P.3 of the Manual, a Pre-Submittal Meeting is required before plans are submitted for review. The form needed to request the meeting and guidance on what will be covered there and how to prepare for it is located at https://deldot.gov/Business/subdivisions/pdfs/Meeting_Request_Form.pdf?08022017

Response: *Comment acknowledged; a Pre-Submittal Meeting with the DelDOT Subdivision Section will be scheduled prior to submittal of plans for review.*

Comment 4: Section P.5 of the Manual addresses fees that are assessed for the review of development proposals. DelDOT anticipates collecting the Initial Stage Fee when the record plan is submitted for review and the Construction Stage Fee when construction plans are submitted for review.

Response: *Comment acknowledged; review fees are anticipated to be provided in accordance with current DelDOT policy.*

Comment 5: Per Section 2.2.2.1of the Manual, Traffic Impact Studies (TIS) are warranted for developments generating more than 500 vehicle trip ends per day or 50 vehicle trip ends per hour in any hour of the day. From the PLUS application, the total daily trips are estimated at 3,032 vehicle trip ends per day and DelDOT confirms this number. A TIS scoping meeting was held on August 15, 2019.

Response: *Comment addressed; the Preliminary TIS report was approved by DelDOT on March 23, 2020. The Final TIS Report was submitted for DelDOT review / approval on April 1, 2020.*

Comment 6: The purpose of a TIS is to identify offsite improvements that the developer should build or contribute toward. Even without the benefit of the TIS, DelDOT anticipates requiring the developer to improve Mulberry Knoll Road to meet Local Road standards, including two eleven-foot travel lanes and two five-foot shoulders, within the limits of their frontage. This requirement may include a bituminous concrete overlay to the existing travel lanes, at DelDOT's discretion. It may also include a realignment to ease the curve in Mulberry Knoll Road between the Road A/D and Road G intersections. If DelDOT requires an overlay, they will analyze the existing travel lanes' pavement section specify the overlay thickness.

Response: *Comment acknowledged; Mulberry Knoll Road will be improved for the site frontage to typical DelDOT standards for Local Roads. We will coordinate with the Development Coordination Section and DelDOT Material Section to determine paving section to be utilized for Mulberry Knoll Road improvements.*

Comment 7: As necessary, in accordance with Section 3.2.5 and Figure 3.2.5-aof the Manual, DelDOT will require dedication of right-of-way along the site's frontage on Mulberry Knoll Road. By this regulation, this dedication is to provide a minimum of 30 feet of right-of-way from the physical centerline. The following right-of-way dedication note is required, "An X-foot wide right-of-way is hereby dedicated to the State of Delaware, as per this plat."

Response: *Comment addressed; as shown on the Preliminary Plan, Mulberry Knoll Road access through the subject parcel is currently within an easement area. It is the intent of the Scenic Manor plan to provide the full right-of-way dedication for Mulberry Knoll Road to current DelDOT standards for the entire frontage on the subject parcel. Dedication of this right-of-way will be noted no final Record Plans utilizing DelDOT standard language requirements.*

Comment 8: In accordance with Section 3.2.5.1.2 of the Manual, DelDOT will require the establishment of a 15-foot wide permanent easement across the property frontage on Mulberry Knoll Road. The location of the easement shall be outside the limits of the ultimate right-of-way. The easement area can be used as part of the open space calculation for the site. The following note is required, "A 15-foot wide permanent easement is hereby established for the State of Delaware, as per this plat."

Response: *Comment addressed; the requested easement area has been shown on the plan. The Record Plan will include the requested easement note in accordance with DelDOT requirements.*

Comment 9: Referring to Section 3.4.2.1of the Manual, the following items, among other things, are required on the Record Plan:

- A Traffic Generation Diagram. See Figure 3.4.2-a for the required format and content.
- Depiction of all existing entrances within 600 feet of the entrances on Mulberry Knoll Road.
- Notes identifying the type of off-site improvements, agreements (signal, letter) contributions and when the off-site improvements are warranted.

Response: *Comment acknowledged; Record Plans will be prepared in and submitted for DelDOT review in accordance with current DelDOT requirements.*

Comment 10: Section 3.5 of the Manual provides DelDOT's requirements with regard to connectivity. The requirements in Sections 3.5.1 through 3.5.3 shall be followed for all development projects having access to state roads or proposing DelDOT maintained public streets for subdivisions. DelDOT recommends that 15-foot wide permanent easement for a pedestrian path be provided from the cul-de-sac on Road F to the north property line, along the east edge of the storm water management basin.

Response: *Comment addressed; with the prior development of the lands to the southeast of the subject site, and the wetlands areas occupying a significant portion of the remaining site perimeter, the opportunities for vehicular interconnections are severely limited. As shown on the preliminary plan, pedestrian interconnections from the internal subdivision cul-de-sacs have been extended to the shared use path area to be provided along Mulberry Knoll Road. Pedestrian access easement will be provided for these areas on the Record Plans.*

Comment 11: Section 3.5.4.2 of the Manual addresses requirements for shared-use paths and sidewalks. For projects in Level 1 and 2 Investment Areas, installation of paths or sidewalks along the frontage on State-maintained roads is required. DelDOT anticipates requiring the developer to build Shared Use Paths along their frontage on both sides of Mulberry Knoll Road.

Response: *Comment addressed; the easement area for a Shared Use Path has been shown on the plan as noted above. The requirement to provide the Shared Use Path will be discussed with the Subdivision Engineer to determine whether construction along the limited frontage area, or payment of the fee in lieu would be a better alternative at this location.*

Comment 12: Section 3.5.4.4 of the Manual addresses access-ways, essentially Shared Use Paths connecting subdivision streets either to each other or to the road on which the property DelDOT anticipates requiring the developer to build three access-ways, from the cul-de-sacs on Roads A, B and F to the Shared Use Paths along Mulberry Knoll Road.

Response: *Comment addressed; as noted above, pedestrian linkages from the internal subdivision streets to the shared use paths along Mulberry Knoll Road have been shown on the Preliminary Plan.*

Comment 13: Referring to Section 3.5.5 of the Manual, existing and proposed transit stops and associated facilities as required by the Delaware Transit Corporation (DTC) or DelDOT shall be shown on the Record Plan.

Response: *Comment acknowledged; the project site is not located along any current DART routes. Therefore, no transit stops or associated facilities are anticipated to be required for this project. We will confirm any changes to this approach with DTC and revise Record Plan accordingly.*

Comment 14: In accordance with Section 3.8 of the Manual, storm water facilities, excluding filter strips and bio swales, shall be located a minimum of 20 feet from the ultimate State right-of-way along Mulberry Knoll Road.

Response: *Comment addressed; all SWM areas are shown a minimum of 20' beyond the area of DelDOT Right-of-Way dedication.*

Comment 15: In accordance with Section 5.2.9 of the Manual, the Auxiliary Lane Worksheet should be used to determine whether auxiliary lanes are warranted at the site entrances and how long those lanes should be. The worksheet can be found at https://deldot.gov/Business/subdivisions/index.shtml.

Response: *Comment acknowledged; site entrance will be designed in accordance with current DelDOT requirements. Supporting design calculations will be provided as part of the plan review package. Design deviation requests will be submitted for DelDOT consideration in accordance with current DelDOT policy.*

Comment 16: In accordance with Section 5.14 of the Manual, all existing utilities must be shown on the plan and a utility relocation plan will be required for any utilities that need to be relocated.

Response: *Comment acknowledged; plans will be developed and submitted for DelDOT review in accordance with current DelDOT requirements.*

State Historic Preservation Office - Contact Carlton Hall 736-7400

Comment 17: The Delaware SHPO does not recommend development in a Level 4 area.

Response: *Comment acknowledged. The project is located within the Sussex County Coastal Area growth zone and has access to public water and sewer infrastructure. Site design, including preservation and protection of existing natural resources, will be performed in accordance with requirements of the Sussex County Code in effect at the time of the Preliminary Plan application.*

Comment 18: There are three known archaeological sites on the parcel. One on the western (507909), northeastern (500593) and one on the southern part of the parcel (S007S5). There is also a historic farm known as the Captain Robinson Tenant Farm (501001) near the middle of the parcel.

Response: *Comment acknowledged. A Phase I Archaeological Survey was performed in February 2020 to determine extent of existing historical resources on site.*

Comment 19: The Arnell Creek has a string of prehistoric and historic sites along it. The area was being settled by the Dutch and Maryland settlers in the 17th century. There are collections from all those sites, and an Archeolog article, which documents that 500593 was an early historic site, certainly 18th century and possibly earlier, with evidence of prehistoric occupation as well. The article notes that Wm. Futcher originally patented this area in 1681. The Beers Atlas Map shows Futcher properties mapped closer to the creek which was usual for mid-19th century properties. One of the properties is the same location as archaeological site 500593 located on the northeastern part of the parcel.

Response: *Comment acknowledged. A Phase I Archaeological Survey was performed in February 2020 to determine extent of existing historical resources on site.*

Comment 20: There is high potential for additional archaeological sites and a family cemetery to be present in the area. Therefore, the State Historic Preservation Office is recommending an archaeological survey of the project area. Abandoned or unmarked family cemeteries are very common in the State of Delaware. They are usually in rural or open space areas, within or near the boundary of a historic farm site. If you have any questions, inquires or concerns, feel free to contact us for assistance at302-736-1400.

If any project or development proceeds, the developer should be aware of the Unmarked Human Burials and Human Skeletal Remains Law (Del. C. Title 7, Ch.54). Prior to any demolition or ground-disturbing activities, the developer should hire an archaeological consultant to examine the parcel for archaeological resources, including unmarked human burials or human skeletal remains, to avoid those sites or areas.

Response: *Comment acknowledged. A Phase I Archaeological Survey was performed in February 2020. No evidence of burial sites were found during this process.*

Comment 21: If there is federal involvement, in the form of licenses, permits, or funds, the federal agency, often through its client, is responsible for complying with Section 106 of the National Historic Preservation Act (36 CFR 800) and must consider their project's effects on any known or potential cultural or historic resources. For further information on the Section 106 process please review the Advisory Council on Historic Preservation's website at: www.achp.gov

Response: *Comment acknowledged.*

Delaware State Fire Marshall's Office - Contact Duane Fox 259-7037

Comment 22: At the time of formal submittal, the applicant shall provide; completed application, fee, and three sets of plans depicting the following in accordance with the Delaware State Fire Prevention Regulation:

Fire Protection Water Requirements:

- Where a water distribution system is proposed for single-family dwellings it shall be capable of delivering at least 500 gpm for 1-hour duration, at 20-psi residual pressure. Fire hydrants with 1000 feet spacing on centers are required.
- The infrastructure for fire protection water shall be provided, including the size of water mains.

Accessibility:

- All premises, which the fire department may be called upon to protect in case of fire, and which are not readily accessible from public roads, shall be provided with suitable gates and access roads so that all buildings on the premises are accessible to fire apparatus. If a "center island" is placed at an entrance into other streets in the subdivision, it shall be arranged in such a manner that it will not adversely affect quick and unimpeded travel of fire apparatus, .Additionally, where trees are to be situated adjacent to travel roads in the subdivision, some forethought should be exercised regarding how future growth of the trees may affect fire department travel throughout the subdivision.
- Fire department access shall be provided in such a manner so that fire apparatus will be able to locate within 100 ft. of the front door.
- Any dead end road more than 300 feet in length shall be provided with a turn-around or cul-de-sac arranged such that fire apparatus will be able to turn around by making not more than one backing maneuver. The minimum paved radius of the cul-de-sac shall be 38 feet. The dimensions of the cul-de-sac or turn-around shall be shown on the final plans. Also, please be advised that parking is prohibited in the cul-de-sac or turn around.
- The use of speed bumps or other methods of traffic speed reduction must be in accordance with Department of Transportation requirements.
- The local Fire Chief, prior to any submission to our Agency, shall approve in writing the use of gates that limit fire department access into and out of the development or property

Gas Piping and System Information:

- Provide type of fuel proposed, and show locations of bulk containers on plan.

Required Notes:

- Provide a note on the final plans submitted for review to read " All fire lanes, fire hydrants, and fire department connections shall be marked in accordance with the Delaware State Fire Prevention Regulations"
- Name of Water Supplier
- Proposed Use
- National Fire Protection Association O{FPA) Construction Type
- Maximum Height of Buildings (including number of stories)
- Provide Road Names, even for County Roads

Response: *Comment acknowledged; plans will be prepared and submitted to the SFMO in accordance with the current Delaware Fire Regulations.*

Recommendations/Additional Information

This section includes a list of site specific suggestions that are intended to enhance the project. These suggestions have been generated by the State Agencies based on their expertise and subject area knowledge. These suggestions do not represent State code requirements. They are offered here in order to provide proactive ideas to help the applicant enhance the site design, and it is hoped (but in no way required) that the applicant will open a dialogue with the relevant agencies to discuss how the suggestions can benefit the project.

Department of Transportation - Bill Brockenbrough 760-2109

Recommendation 1: The applicant should expect a requirement that any substation and/or wastewater facilities will be required to have access from an internal driveway with no direct access to Mulberry Knoll Road.

Response: *Comment acknowledged; no substations ow wastewater facilities are anticipated to be constructed by the Developer as part of the proposed Scenic Manor project.*

Recommendation 2: The applicant should expect a requirement that all PLUS and Technical Advisory Committee (TAC) comments be addressed prior to submitting plans for review.

Response: *Comment acknowledged; plans will be submitted to DelDOT with revisions to address TAC and PLUS comments as noted above.*

Recommendation 3: Please be advised that the Standard General Notes have been updated and posted to the DelDOT website. Please begin using the new versions and look for the revision dates of March 21, 2019 and March 25, 2019. The notes can be found at https://www.deldot.gov/Business/subdivisions/.

Response: *Comment acknowledged; plans to be submitted to DelDOT will referenced latest General Notes for Record Plans, Entrance Plans, and Maintenance of Traffic Plans.*

Department of Natural Resources and Environmental Control - Contact Michael Tholstrup 735-3352

Rare, Threatened, and Endangered species

Scientific Name	Common Name	Taxon	State Rank	State Status	SGCN Tier
Ambystoma tigrinum	Eastern Tiger Salamander	Amphibian	S1	E	Tier 1

A review of our database indicates that the following state rare, and Species of Greatest Conservation (SGCN) may occur at or adjacent to the project site.

The Tiger Salamander (Ambystoma tigrinum tigrinum) occurs in moist, often sandy, deciduous, coniferous or mixed woodlands with adequate wetlands for breeding, such as coastal plain ponds. This species spends most of its life cycle underground and is rarely encountered except during breeding periods and when recently transformed sub-adults leave their larval pools. Eggs are laid during the winter in masses underwater. Larvae hatch in about four weeks and then transform

into sub-adults. Availability of fishless breeding pools and adequate upland forested buffers around those pools is critical for this species.

SGCN are identified in the Delaware Wildlife Action Plan (DEWAP) which is a comprehensive strategy for conserving the full array of native wildlife and habitats common and uncommon- as vital components of the state's natural resources. This document can be viewed via the Division of Fish and Wildlife's website at http://www.dnrec.delaware.gov/fw/dwap/Pages/default.aspx.

Leaving the forest intact would be the most beneficial to state rare species that may utilize the habitats in and around the project area. In lieu of that option, DNREC offers the following recommendations that, if implemented, will reduce negative impacts to wildlife and their habitats:

Recommendation 4: Tree clearing should be restricted to the areas that are absolutely necessary for the footprint of homes and infrastructure.

Response: *Comment acknowledged; tree clearing is anticipated to be limited to those areas necessary for construction of road, residential lots, and infrastructure directly associated with the proposed residential subdivision. This may include those areas required to accommodate grading to elevate the residential lots and essential access above the FEMA floodplain elevation.*

Recommendation 5: Due to the difficulty that small animals (i.e. salamanders) have climbing vertical curbs, DNREC recommends designing the development to exclude curbs. Our state herpetologist is concerned that if the state endangered tiger salamanders are using the seasonal ponds located on the project site, they will not be able to cross curbed roads during the breeding season.

Response: *Comment acknowledged; all streets will be designed in accordance with State and County design standards. It is anticipated that internal subdivision streets will include rolled curbs to eliminate a vertical barrier to any wildlife that may be crossing proposed road areas.*

Recommendation 6: To avoid attracting reptiles and other amphibians to the proposed stormwater management ponds in the center of the development, DNREC recommends installing stormwater ponds adjacent to the forests on site, far from the above mentioned ponds as possible.

Response: *Comment acknowledged; stormwater BMPs have been dispersed throughout the community in accordance with recommendations from DNREC Sediment and Stormwater Management Program. Several of the facilities located in the interior portion of the site will be located in portions where wetlands already exist.*

Recommendation 7: Reptile and amphibian species need predator-free ponds in order to survive and reproduce successfully. Therefore, DNREC recommends allowing the stormwater management ponds to dry up seasonally so that fish (predators) are not capable of inhabiting these systems.

Response: *Comment acknowledged; stormwater BMPs will be designed in accordance with the Regulatory Guidance Documents from DNREC Sediment and Stormwater Management Program.*

Recommendation 8: Any culverts installed should be open bottom box culverts to allow for natural substrate to remain and for in-water passage of aquatic life. Additionally, culverts should be left as wide as possible to ensure that salamanders can travel through them.

Response: *Comment acknowledged; no existing drainage ways or streams cross through the project site area. Stormwater drainage, including on-site conveyance and stormwater management outfalls will be designed in accordance with State and County Code requirements.*

Rare and Unique Natural Communities

According to DNREC's Division of Fish and Wildlife database, the forested wetlands on the project parcel support potential old-growth forest, in that it has not been cleared since at least 1937 (the year of the oldest aerial image DNREC has on file).

The potential old growth forest on this site has been identified as core wildlife habitat by the Delaware Ecological Network (DEN), which is habitat that is defined as containing relatively intact natural ecosystems, and is of high-quality for native plants and animals. The DEN is a statewide conservation network developed using GIS and field collected datasets that help to identify and prioritize ecologically important areas for natural resource protection, including areas of especially high quality that support rare species.

Response: *Comment acknowledged; as noted above, tree clearing is anticipated to be limited to those areas necessary for construction of road, residential lots, and infrastructure directly associated with the proposed residential subdivision. This may include those areas required to accommodate grading to elevate the residential lots and essential access above the FEMA floodplain elevation.*

Fisheries

DNREC fisheries staff has determined that Love Creek supports a large number of juvenile migratory fish. Several species of particular commercial and recreational importance utilize the creek and could be impacted by this project. It is possible that striped bass (Morone saxitilis) spawn in upper Love Creek due to the number of young-of-the-year (YOY) caught during sampling efforts. A primary species of concern for this project is summer flounder (Paralichthys dentatus), which also utilizes the creek as a spawning and nursery habitat.

Recommendation 9: If dredging is to occur for this project, DNREC recommends that dredging occur from September through December to allow these species time to mature and migrate out of the stream system prior to disturbance. This window should minimize the number of YOY flounder impacted by the dredging operation.

Response: *Comment acknowledged; no dredging is anticipated to be proposed by this project. Should this be required, the developer will coordinate with DNREC agencies to determine all requirements for such operations.*

Park/Boat Launch Area

Recommendation 10: DNREC requests additional details regarding the park/boat launch area. This area is a tidal wetland, and falls under the jurisdiction of waters of the U.S. under the

Clean Water Act. If a proper boat ramp is to be built here, a U.S. Army Corp of Engineers and DE Wetlands and Subaqueous Lands permit will be required to dredge for the boat ramp, and a time of year restriction (TOYR) will be recommended to address fisheries concerns.

Response: *Comment acknowledged; the community area is anticipated to be utilized as a kayak launch area and will only include those facilities necessary to accommodate such activities. We will coordinate with ACOE and the DNREC Wetlands and Subaqueous Lands Section to determine what, if any, requirements will be required to permit the proposed activity.*

Nesting/Breeding Bird

Based on aerial images this site appears to have wetland habitat which could support sensitive marsh bird species including SGCN species such as Saltmarsh Sparrow and Black Rail. However, since SCRP does not have any records from this exact location, DNREC would like to request a site visit to survey for potential breeding marsh birds. Please see the "Site Visit Request" section below for additional details.

To reduce impacts to ground-nesting marsh birds, it would be optimal if work activities are completed prior to April 1st. In the event that project activities extend past April 1st the following contingency plan could minimize direct impacts:

A qualified biologist should be on-site to determine if and when marsh birds have begun establishing territories and / or nesting.

Note: If nesting activities of a Species of Conservation Concern (S 1 and 52) have begun and a nest is within the area of disturbance or so close that abandonment is likely, work activities may have to cease until young are fledged or nesting attempt fails.

Response: *Comment acknowledged; the developer has determined to decline the request for site visit at this time. The development site is currently utilized for agricultural purposes, and will continue to operate as such until such time that on-site construction is initiated. The developer / contractor will comply with all State regulatory requirements related to Nesting/Breeding Birds*

Recommendation 11: If it is determined that nesting activity has <u>not</u> taken place yet:

1) To minimize impacts to shrub/scrub-nesting birds, selective clearing of woody vegetation that could be used for nesting and is within the footprint of immediate disturbance is recommended. This may discourage birds from constructing nests in habitat that will be impacted by the project anyway.

2) To minimize impacts to ground-nesting birds, place construction matting within the area of immediate disturbance. This would prohibit nesting in the project area and therefore, reduce the chance of destroying established nests, eggs, and/or chicks.

If nesting activity has taken place and/or nests are found in or within 50ft of the project area, work activities should cease and the Division of Fish and Wildlife should be contacted for further recommendations. Henrietta Bellman can be reached at (302) 735-8677

Response: *Comment acknowledged; the developer / contractor will comply with all State regulatory requirements related to Nesting/Breeding Birds*

Marsh Buffer

According to the site plan, the applicant proposes a +/- 25' buffer from the Limit of Disturbance (LOD) to the tidal wetland demarcation line. To protect the function and integrity of wetlands, a minimum 100- foot buffer should be left intact around the perimeter of the forested wetlands. This recommendation is based on peer-reviewed scientific literature that shows an adequately sized buffer that effectively protects wetlands and streams - in most circumstances - is about 100' in width. Upland buffers also serve as habitat for many terrestrial species that are dependent on aquatic and wetland habitats for a portion of their annual life cycle. Lot lines, roadways, and infrastructure should not be placed within this buffer zone. Buffers are an integral component of aquatic and wetland habitats, reducing the amount of sediments, pollutants, and other non-point source material that may affect the function and integrity of habitat and the condition and survivability of aquatic organisms.

Recommendation 12: Given the benefit of trees in erosion control and flood abatement, tree removal for construction activities and stormwater management should be minimized. The site plan should be designed in a way that allows for preservation of as much of this wooded area as feasible.

Response: *Comment acknowledged; a 50' buffer is provided to all tidal wetlands as shown on the Preliminary Plan for the Scenic Manor site in accordance with Sussex County Code requirements. As noted above, ; tree clearing is anticipated to be limited to those areas necessary for construction of road, residential lots, and infrastructure directly associated with the proposed residential subdivision. This may include those areas required to accommodate grading to elevate the residential lots and essential access above the FEMA floodplain elevation.*

Recommendation 13: Restrict forest clearing and soil disturbance to the footprint of homes and infrastructure.

Response: *Comment acknowledged, tree clearing is anticipated to be limited to those areas necessary for construction of road, residential lots, and infrastructure directly associated with the proposed residential subdivision. This may include those areas required to accommodate grading to elevate the residential lots and essential access above the FEMA floodplain elevation.*

Recommendation 14: Re-seed and stabilize disturbed areas as soon as practicable. Landscape with native species.

Response: *Comment acknowledged; seeding / stabilization of disturbed areas will be performed within 14 days in accordance with Sussex Conservation District & DNREC standards. Landscape plans will be developed for the site by a licensed Landscape Architect in accordance with County Code requirements; consideration will be given to utilization of native species for open space, buffer, on-lot landscaping, and stormwater plantings as appropriate.*

Recommendation 15: To reduce impacts to nesting birds and other wildlife species that utilize forests for breeding, forest clearing should not occur from April 1st to July 31st.

Response: *Comment acknowledged; all site clearing will be performed in accordance with Sussex County and DNREC Code requirements.*

Recommendation 16: Love Creek Natural Area is directly adjacent to the project parcel. Efforts should be made to avoid diverting surface water from roadways and stormwater facilities into this area. Water and habitat quality could be detrimentally affected by run-off which may contain oil and other pollutants, such as fertilizers and other chemicals applied by homeowners.

Response: *Comment acknowledged; it is assumed that the Love Creek Natural Area is located at the southerly end of Mulberry Knoll Road. Runoff from this portion of the Scenic Manor site will be conveyed to on-site SWM facilities to the maximum extent practicable. Discharge from the facilities will be directed to Arnell Creek to minimize the impact to the Love Creek Natural area.*

Recommendation 17: Maintain inputs to natural wetlands at pre-construction levels. Avoid causing increases or decreases in water levels.

Response: *Comment acknowledged; the on-site grading will attempt to maintain the drainage patterns of the undeveloped site. Discharge from the site will utilize techniques to provide for non-erosive discharge from all SWM facilities. Consideration of runoff volumes with regard to input to interior wetlands areas will be given throughout the grading and SWM design for the developed site condition.*

Recommendation 18: Low spillage lightbulbs (those that reflect light directly downward onto the illuminated area) should be used on roads and homes within 750-feet of the forested wetlands on site. Fluorescent and mercury vapor lighting should not be used.

Response: *Comment acknowledged; cutoff style light fixtures will be utilized throughout the community for the road lighting purposes. It is anticipated that these fixtures will utilize LED technology. Recommendations for any exterior lighting on the proposed residential structures will be shared with potential builders for their consideration.*

Recommendation 19: To deter waterfowl from taking up residence in the stormwater ponds, DNREC recommends planting the surrounding open space with a mix of native wildflower plantings (to be planted in accordance with the Sediment and Stormwater Plan approval agency requirements). In addition to deterring nuisance waterfowl, the native wildflower mix will also serve to attract bees, butterflies, and other pollinators, and reduce run-off, which can contain oil and other pollutants from the parking areas. Our program botanist, Bill McAvoy would gladly assist in drafting a list of plants suitable for this site. Bill can be contacted at (302) 735-8668 or William.McAvoy@delaware.gov.

Response: *Comment acknowledged; buffer areas around the SWM facilities will be planted with materials to discourage waterfowl per SCD recommendations. Plant material selection will be made by licensed Landscape Architect in accordance DNREC Stormwater Section guidelines as well as Sussex County and SCD requirements.*

Recommendation 20: Small animals, such as salamanders, have difficulty climbing vertical curbs. DNREC recommends designing the development to exclude curbs to prevent

mortality from vehicle traffic. If road curbing must be installed, DNREC recommends curbing styles such as Cape Cod curbing, which allows small animals to climb out of the roadbed.

Response: *Comment acknowledged; all streets will be designed in accordance with State and County design standards. It is anticipated that internal subdivision streets will include rolled curbs to eliminate a vertical barrier to any wildlife that may be crossing proposed road areas.*

Recommendation 21: Avoid installing sewers with grates, which can create a hazard for amphibians and reptiles. Consider working with the Sussex Conservation District to implement safer alternatives.

Response: *Comment acknowledged; all streets will be designed in accordance with State and County design standards. As such, inlet and grate styles will utilize typical DelDOT details.*

Site Visit Request

In order to provide informed, up-to-date comments, DNREC's Division of Fish and Wildlife scientists request the opportunity to conduct a survey to evaluate habitat and the site's potential to support additional species of concern. In particular, DNREC would appreciate being able to conduct the survey during the breeding season for Eastern Tiger Salamander (January through February) and the breeding/territory-establishment season for marsh birds (April through June). The surveys will be conducted at no expense to the property owner. In the event that authorizations will be needed from DNREC's Coastal Management Program and / or Wetlands and Subaqueous Lands Section, they may request complete and up-to-date information from the Species Conservation and Research Program as part of their review. Therefore, granting access to the site may increase the efficiency of the State authorization process. Applicants/ property owners are welcome to join DNREC staff during the site visit, as it could also be a good opportunity to discuss options for minimizing impacts. Please contact Brian Galvez at (302) 223-2446 or Brian.Galvez@delaware.gov to schedule a site visit.

Response: *Comment acknowledged; the developer has determined to decline the request for site visit at this time. We understand this requirement may be required in the event that certain regulatory permits are required.*

Water Quality

DNREC mapping has identified hydric soils (e.g., Hurlock, Fallsington, & Broadkill) and non-tidal and tidally-influenced wetlands (e.g., Palustrine & Estuarine) within the project parcel. DNREC strongly discourages building on hydric soils because they are functionally important source of water storage (functions as a "natural sponge");the loss of water storage through excavation, filling, or grading of intact native hydric soils increases the probability for more frequent and destructive flooding. Moreover, destruction of hydric soils increases the amount pollutant runoff which contributes to lower observed water quality in regional waterbodies and wetlands.

The applicant should contact the DNREC Subaqueous Lands section for regulatory information about tidal wetlands, at (302) 739-9943. The 25-foot buffer proposed by the applicant is insufficiently protective of water quality.

It is not considered an environmentally-acceptable practice to fill or remove wetlands or wetland vegetation or hydric soils to site or accommodate a SWM structure.

Recommendation 22: The applicant should contact a licensed (Delaware Class D) soil scientist to make a site specific assessment (i.e., soil survey mapping) and conduct a US Army Corps of Engineers approved wetlands delineation. A list of licensed Class D soil scientists can be obtained at the following web link: http://www.dnrec.delaware.gov/wr/Information/GWDInfo/Pages/GroundWaterDischargesLicensesand Licensees.aspx

Response: *Comment acknowledged; a Preliminary Wetlands Evaluation was conducted on-site by Geo-Technology Associates, Inc. (GTA) in July 2019. A Final Wetlands Delineation and ACOE Jurisdictional Determination will be obtained prior to Record Plan approval.*

Recommendation 23: Generally, a 100-foot vegetated buffer is sufficiently protective of water quality.

Response: *Comment acknowledged; a minimum 50' buffer is to be provided adjacent to all tidal wetlands as shown on the Preliminary Plan for the Scenic Manor site in accordance with Sussex County Code requirements.*

Recommendation 24: The applicant should consider employing green-technology storm water management and a rain gardens (in lieu of open-water management structures) as best management practices to mitigate or reduce nutrient and bacterial pollutant runoff. If open-water stormwater management is selected for use, they should be employed for their intended function - that is, the management of stormwater - not for the creation of additional pond acreage to enhance property/aesthetic values. It should also be noted that open-water stormwater ponds attract nuisance geese (i.e., waste leads to increases in nutrient and bacterial pollutants) and nuisance algae (i.e., potentially source for a poisonous neurotoxin and low oxygen concentrations in water) that contribute to the degradation of water quality of waters in the greater Inland Bays watershed.

Response: *Comment acknowledged; consideration to green technology / infiltration based SWM practices will be performed during the SWM strategy development. Due to high groundwater table conditions anticipated for the site, the applicability of these practices was anticipated to be severely limited. As noted above, buffer areas around the SWM facilities will be planted with materials to discourage waterfowl per SCD recommendations. Plant material selection will be made by licensed Landscape Architect in accordance DNREC Stormwater Section guidelines as well as Sussex County and SCD requirements.*

State Natural Areas

The southeast and southwest portions of the property are within the Love Creek Natural Area. The Love Creek Natural Area also borders the western portion of the property. State Natural Areas are composed of areas of land and/or water, whether in public or private ownership, which have retained or reestablished its natural

character (although it need not be undisturbed), has unusual flora or fauna, or has biotic, geological, scenic or archaeological features of scientific or educational value.

Recommendation 25: Avoid impacts to forested areas within the natural area as well as avoid/minimize impacts to wetlands and forested riparian habitat adjacent to the natural area.

Response: *Comment acknowledged; no disturbance is proposed to the forest wetland areas on site. As noted above, tree clearing is anticipated to be limited to those areas necessary for construction of road, residential lots, and infrastructure directly associated with the proposed residential subdivision. This may include those areas required to accommodate grading to elevate the residential lots and essential access above the FEMA floodplain elevation. More than 66% of the existing wooded areas are anticipated to be retained on the project site.*

Sustainable Development Recommendations

Recommendation 26: The applicant should consider the use of recycled, energy efficient materials, and renewable energy infrastructure.

Response: *Comment acknowledged; opportunities to incorporate sustainable materials will be discussed with developer, approval agencies, and contractor throughout the plan development process.*

Recommendation 27: The Division of Climate, Coastal, & Energy offers incentives for clean transportation (EV Charging) and energy efficiency. These programs address climate change goals of reducing greenhouse gas emissions and improving overall air quality (www.de.gov/greenenergy, http://www.de.gov/cleantransportation, www.de.gov/eeif.

Response: *Comment acknowledged; incentive programs will be shared with developer and builders for their consideration in incorporating these facilities into the residential and community amenities.*

Delaware State Fire Marshall's - Contact Duane Fox259-7037

Recommendation 28: Although not a requirement of the State Fire Prevention Regulations, the Office of the State Fire Marshal encourages home builders to consider the benefits of home sprinkler protection in dwellings. The Office of the State Fire Marshal also reminds home builders that they are obligated to comply with requirements of Subchapter III of Chapter 36 of Title 6 of the Delaware Code which can be found at the following website: http://delcode.delaware.gov/title6/c036/sc03/index.shtml

Response: *Comment acknowledged; recommendation will be shared with home builder for their consideration.*

Recommendation 29: Preliminary meetings with fire protection specialists are encouraged prior to formal submittal. Please call for appointment. Applications and brochures can be downloaded from our website: www.statefiremarshal.delaware.gov, technical services link, plan review, applications or brochures.

Sussex County Housing - Contact Brandy Naurman

In addition to the comments above our office has received a letter from Brandy Nauman, Sussex County Housing Coordinator & Fair Housing Compliance Officer. A copy of that letter is enclosed wit this letter.

Response: Comment acknowledged; information will be shared with developer and home builder for their consideration.

A Preliminary Plan application has been submitted to Sussex County Department of Planning and Zoning review and approval. If you should require additional information regarding this PLUS application, please contact me to discuss at 302-326-2200.

Very Truly Yours,
MORRIS & RITCHIE ASSOCIATES, INC.

Christopher J. Flathers, P.E.
Senior Project Manager

cc: J. Whitehouse, Sussex County
J. Richardson, MKR Land, LLC
J. Fuqua, Esq.
P. Tolliver, MRA
File

Preliminary Land Use Service (PLUS)

Delaware State Planning Coordination

122 Martin Luther King Jr. Blvd., South • Dover, DE 19901 • Phone: 302-739-3090 • Fax: 302-739-5661

Purpose of PLUS - -The PLUS process is intended to provide consolidated State comments regarding the proposed project. The Applicant is encouraged to submit the application during the concept stages of planning as this process often offers recommendations for changes to the plan. The application should be submitted after the pre-application meeting with the local jurisdiction but before formal application is made.

Please complete this PLUS application in its entirety. **All questions must be answered. If a question is unknown at this time or not applicable, please explain.** Unanswered questions on this form could lead to delays in scheduling your review. This form will enable the state staff to review the project before the scheduled meeting and to have beneficial information available for the applicant and/or developer at the time of review. If you need assistance or clarification, please call the State Planning Office at (302) 739-3090.

PLUS Number (to be completed by OSPC): 2019-08-06

Investment Level Per Strategies for State Policies and Spending (to be determined by OSPC): 3/4/Out of Play

1. Project Title/Name: Estates at Mulberry Knoll
2. Location (please be specific): East and west sides of Mulberry Knoll Road, approx. 6,200' south of Route 24 (John J. Williams Hwy.)
3. Parcel Identification #: 334-18.00-43.00
4. County or Local Jurisdiction Name: where project is located: Sussex County
5. If contiguous to a municipality, are you seeking annexation: N/A
6. Owner's Name: Thomas Best and Sons, Inc.

Address: 32258 Janice Road		
City: Lewes	State: DE	Zip: 19958
Phone:	Fax:	Email:

7. Equitable Owner/Developer **(This Person is required to attend the PLUS meeting)**: MKR Land, LLC (Mr. Shawn Pyle)

Address: 260 Hopewell Road		
City: Churchville, MD	State: MD	Zip: 21028
Phone: 410-838-2030	Fax:	Email: JRichardson@dxiconstruction.com

8. Project Designer/Engineer: Morris & Ritchie Associates, Inc.

Address: 18 Boulden Circle, Suite 36		
City: New Castle	State: DE	Zip: 19720
Phone: 302-326-2200	Fax:	Email: cflathers@mragta.com

9. **Please Designate a Contact Person, including phone number, for this Project:** Christopher J. Flathers, P.E.

Information Regarding Site:

10. Type of Review: ☐ Rezoning, if not in compliance with certified comprehensive plan ☐ Site Plan Review ■ Subdivision

11. Brief Explanation of Project being reviewed: **Proposed residential subdivision for 320 detached single-family dwelling units**

If this property has been the subject of a previous LUPA or PLUS review, please provide the name(s) and date(s) of those applications. N/A

12. Area of Project (Acres +/-): 170 ac. +/- | Number of Residential Units: 302 | Commercial square footage: N/A

13. Present Zoning: AR-1

14. Proposed Zoning: AR-1

15. Present Use: Agricultrual

16. Proposed Use: Residential (Single Family Detached)

17. Water: ☐ Central (Community system) ☐ Individual On-Site ■ Public (Utility)
Service Provider Name: Tidewater Utilities

Will a new public well be located on the site? ☐ Yes ■ No

18. Wastewater: ☐ Central (Community system) ☐ Individual On-Site ■ Public (Utility)
Service Provider Name: **Sussex County**

Will a new community wastewater system be located on this site? ☐ Yes ■ No

19. If residential, describe style and market segment you plan to target (Example- Age restricted):
Market rate single family

20. Environmental impacts:

How many forested acres are presently on-site? **26.6 +/-** How many forested acres will be removed? **8.8 +/-**

To your knowledge, are there any wetlands, as defined by the U.S. Army Corps of Engineers or the Department of Natural Resources and Environmental Control, on the site? ■ Yes ☐ No

Are the wetlands: ■ Tidal Acres: **18.0**
■ Non-tidal Acres: **4.6**

If "Yes", have the wetlands been delineated? ■ Yes ☐ No

Has the Army Corps of Engineers signed off on the delineation? ☐ Yes ■ No

Will the wetlands be directly impacted and/or do you anticipate the need for wetland permits? ☐ Yes ■ No If "Yes", describe the impacts: **Modification / elimination of existing tax ditch**

How close do you anticipate ground disturbance to wetlands, streams, wells, or waterbodies? **25' +/-**

21. Does this activity encroach on or impact any tax ditch, public ditch, or private ditch (ditch that directs water off-site)? ☐ Yes ■ No

22. List the proposed method(s) of stormwater management for the site:
Infiltration basins, ED wet ponds

23. Is open space proposed? ■ Yes ☐ No If "Yes," how much? Acres: **85.9 ac. +/-**

What is the intended use of the open space (for example, active recreation, passive recreation, stormwater management, wildlife habitat, historical or archeological protection)? **Active recreation, passive recreation, SWM management, resource protection.**

24. Are you considering dedicating any land for community use (e.g., police, fire, school)? ☐ Yes ■ No

25. Please estimate How many vehicle trips will this project generate on an average weekday? A trip is a vehicle entering or exiting. If traffic is seasonal, assume peak season: 3,032 AADT

What percentage of those trips will be trucks, excluding vans and pick-up trucks? 0

26. Will the project connect to state maintained roads? ☒ Yes ☐ No Mulberry Knoll Road (Rd. No. 284)

27. Please list any locations where this project physically could be connected to existing or future development on adjacent lands and indicate your willingness to discuss making these connections.
N/A - Perimeter is primarily bounded by wetlands or previously subdivided.

28. Are there existing sidewalks? ☐ Yes ☒ No; bike paths ☐ Yes ☐ No
Are there proposed sidewalks? ☒ Yes ☐ No; bike paths ☐ Yes ☐

Is there an opportunity to connect to a larger bike, pedestrian, or transit network? ☐ Yes ☒ No

29. To your knowledge, is this site in the vicinity of any known historic/cultural resources or sites? ☐ Yes ☒ No

Has this site been evaluated for historic and/or cultural resources? ☐ Yes ☒ No

Would you be open to a site evaluation by the State Historic Preservation Office? ☐ Yes ☒ No

30. To promote an accurate review of your parcel's features, would you permit a State agency site visit? ☐ Yes ☒ No
Person to contact to arrange visit: _____ phone number: _____

31. Are any federal permits, licensing, or funding anticipated? ☐ Yes ☒ No

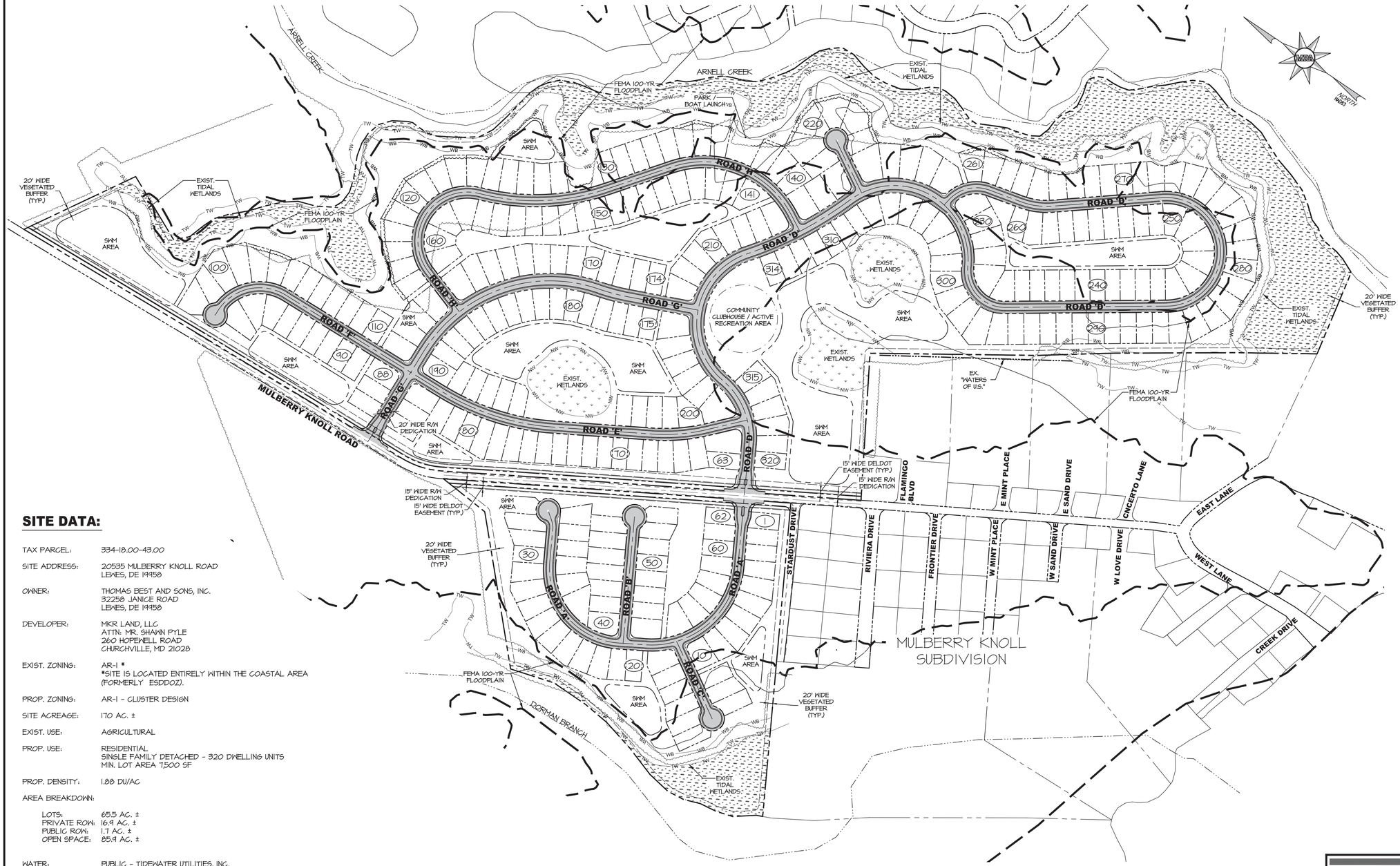
I hereby certify that the information on this application is complete, true and correct, to the best of my knowledge.

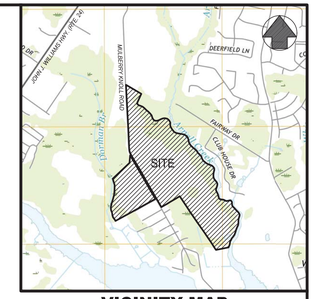
Signature of property owner — Date: 8-1-19

Signature of Person completing form (If different than property owner) — Date: 8/1/19

Signed application must be received before application is scheduled for PLUS review.

This form should be returned to the Office of State Planning **electronically** at plus@state.de.us **along with an electronic copy of any site plans and development plans for this site**. Site Plans, drawings, and location maps should be submitted as image files (JPEG, GIF, TIF, etc.) or as PDF files. GIS data sets and CAD drawings may also be submitted. If electronic copy of the plan is not available, contact The Office of State Planning Coordination at (302) 739-3090 for further instructions. A signed copy should be forwarded to the Office of State Planning, 122 William Penn Street, Dover, DE 19901. Thank you for this input. Your request will be researched thoroughly. **Please be sure to note the contact person** so we may schedule your request in a timely manner.





VICINITY MAP
SCALE: 1"=2000'

LEGEND

- EXIST. PARCEL BOUNDARY
- EXIST. RIGHT-OF-WAY
- EXIST. LOT LINE
- ZONING: AR-1 — EXIST. ZONING
- EXIST. WOODS
- PROP. WOODS TO REMAIN
- PROP. CURB
- PROP. SIDEWALK
- PROP. LOT LINE
- PROP. RIGHT-OF-WAY
- PROP. ROAD CENTERLINE
- PROP. SWM AREA
- EXIST. WETLANDS
- EXIST. TIDAL WETLANDS
- PROP. TIDAL WETLAND BUFFER
- EXIST. "WATERS OF U.S."
- EXIST. DITCH

200 100 0 100 200 400
SCALE: 1" = 200'

SITE DATA:

TAX PARCEL:	334-18.00-43.00
SITE ADDRESS:	20535 MULBERRY KNOLL ROAD LEWES, DE 19958
OWNER:	THOMAS BEST AND SONS, INC. 32258 JANICE ROAD LEWES, DE 19958
DEVELOPER:	MKR LAND, LLC ATTN: MR. SHANN PYLE 260 HOPEWELL ROAD CHURCHVILLE, MD 21028
EXIST. ZONING:	AR-1 * *SITE IS LOCATED ENTIRELY WITHIN THE COASTAL AREA (FORMERLY ESDDOZ).
PROP. ZONING:	AR-1 - CLUSTER DESIGN
SITE ACREAGE:	170 AC. ±
EXIST. USE:	AGRICULTURAL
PROP. USE:	RESIDENTIAL SINGLE FAMILY DETACHED - 320 DWELLING UNITS MIN. LOT AREA 7,500 SF
PROP. DENSITY:	1.88 DU/AC
AREA BREAKDOWN:	
LOTS:	65.5 AC. ±
PRIVATE ROW:	16.9 AC. ±
PUBLIC ROW:	1.7 AC. ±
OPEN SPACE:	85.9 AC. ±
WATER:	PUBLIC - TIDEWATER UTILITIES, INC.
SEWER:	PUBLIC - SUSSEX COUNTY
WETLANDS:	A PRELIMINARY WETLAND EVALUATION WAS PERFORMED BY GEO-TECHNOLOGY ASSOCIATES, INC. (GTA) IN JULY 2019. BASED ON THIS REVIEW, IT IS GTA'S PROFESSIONAL OPINION THAT THERE ARE JURISDICTIONAL "WATERS OF THE U.S.", INCLUDING WETLANDS PRESENT WITHIN THE SUBJECT SITE.

NOTE: INFORMATION SHOWN HEREON IS BASED UPON GIS DATA OBTAINED THROUGH THE STATE OF DELAWARE GIS WEBSITE (FIRSTMAP-DELAWARE.OPENDATA.ARCGIS.COM) AND DOES NOT REPRESENT FIELD RUN TOPOGRAPHIC OR BOUNDARY SURVEY. WETLANDS LINES AREA BASED ON PRELIMINARY WETLAND EVALUATION. SITE LAYOUT IS SUBJECT TO REVISION PENDING FIELD SURVEY AND FINAL WETLAND DELINEATION.

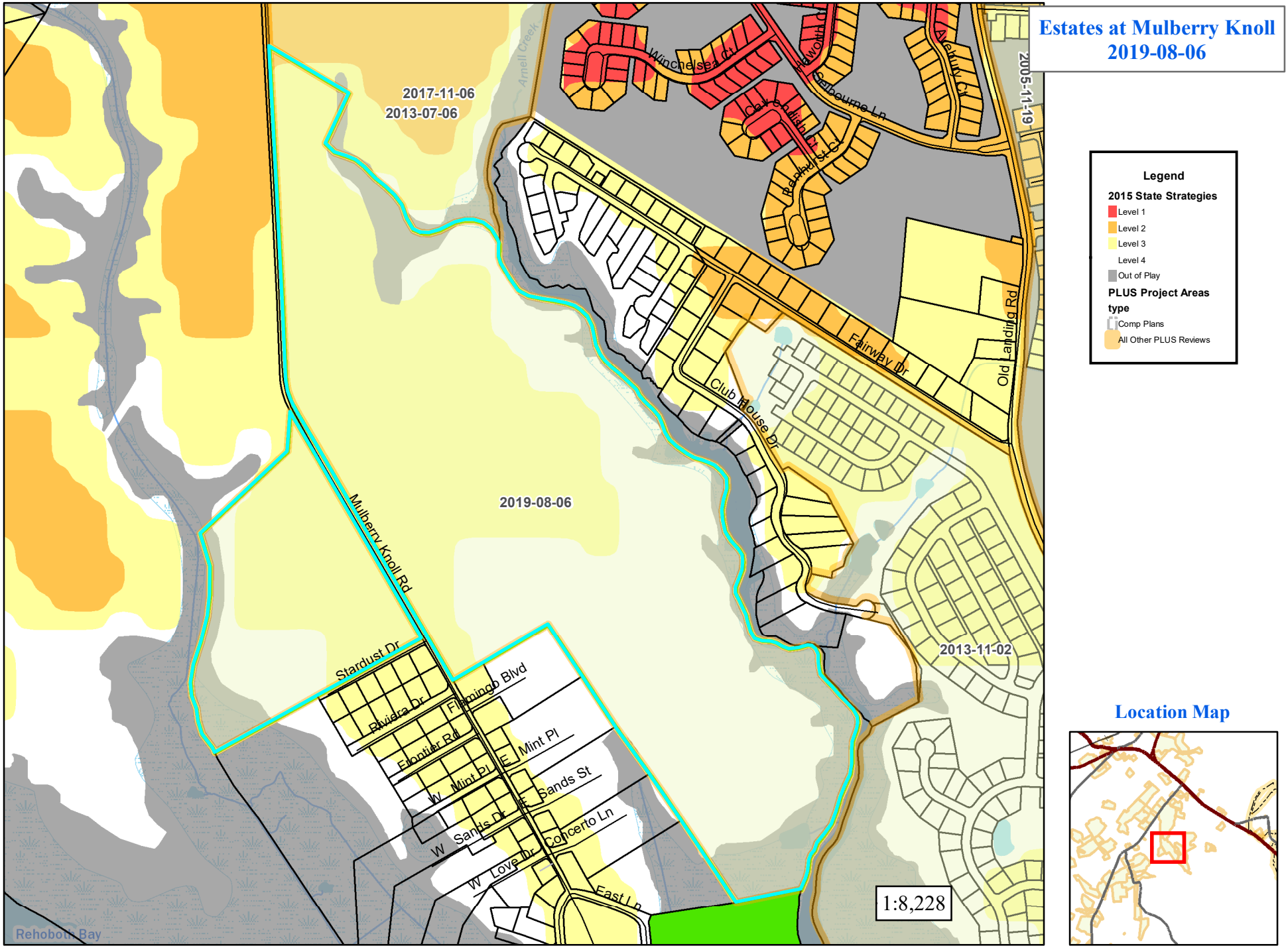
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36
WILMINGTON, DE 19720
(302) 326-2200
FAX: (302) 326-2399
MRAGTA.COM

CHRISTOPHER J. FAITHEN — LICENSE — No. 14787 — DELAWARE — PROFESSIONAL ENGINEER — 08/01/19
ENGINEER'S SEAL

PLUS PLAN
FOR
ESTATES AT MULBERRY KNOLL
SUSSEX COUNTY, DE

DATE	REVISIONS	
		JOB NO.: 20572
		SCALE: 1"=200'
		DATE: 7/26/19
		DRAWN BY: CJF
		DESIGN BY: CJF
		REVIEW BY: PLT
		SHEET: 1 OF 1

Preliminary Land Use Service (PLUS)



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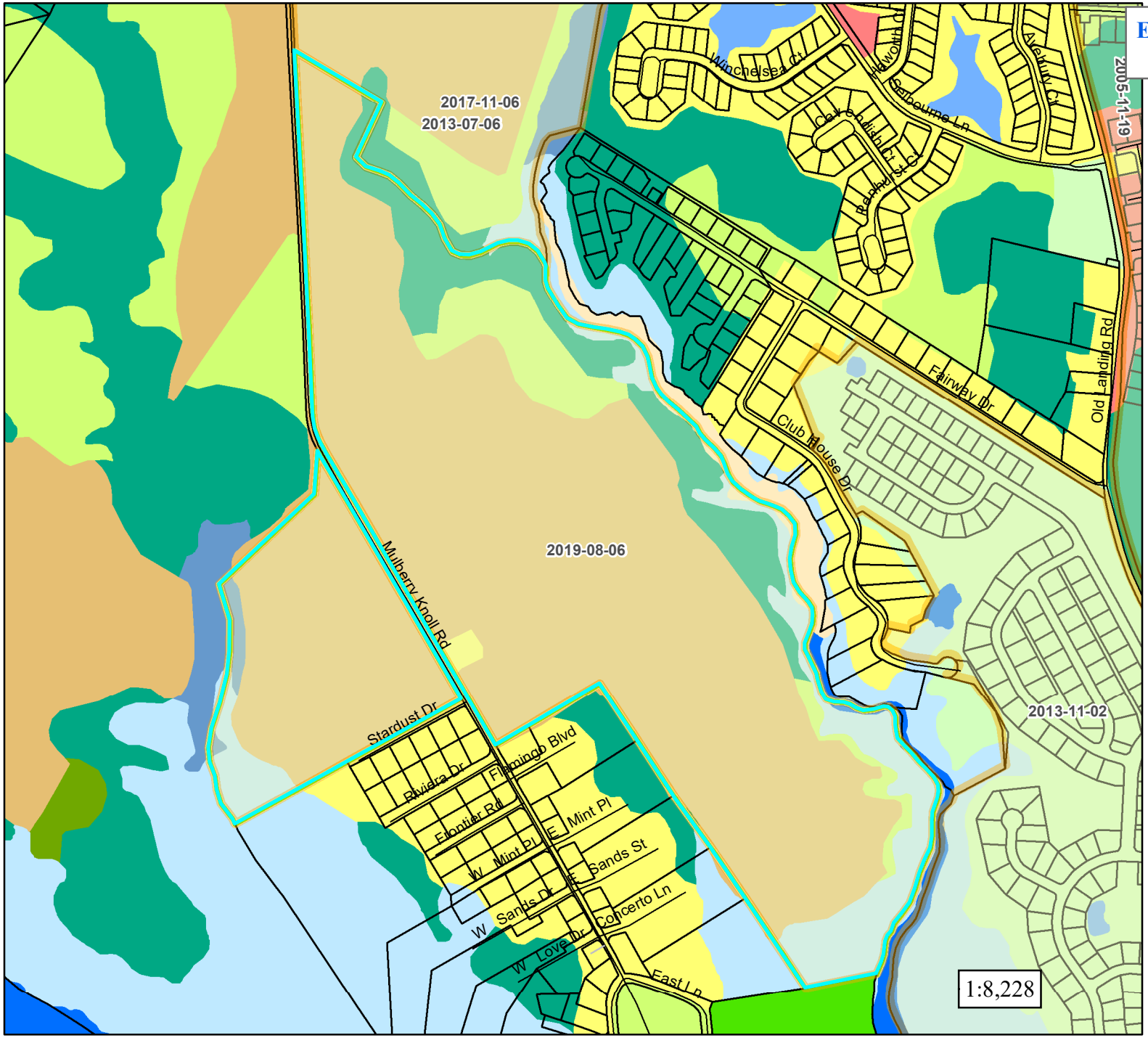


Estates at Mulberry Knoll
2019-08-06

Legend

2012 Land Use

LULC Category

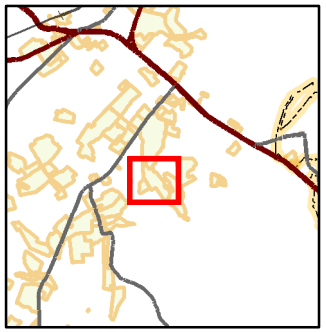
- 110
- Single Family Dwellings
- Multi-Family Dwellings
- Mobile Home Parks/Courts
- Commercial
- Industrial
- Transportation/Communication/Utilities
- Mixed Urban/Built-up
- Institutional/Governmental
- Recreational
- Farms, Pasture, Cropland
- Confined Animal Feeding Operations/Feedlots/Holding
- Rangeland
- Orchards/Nurseries/Horticulture
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Brush Rangeland
- Clear-cut
- Man-made Reservoirs and Impoundments
- Marinas/Port Facilities/Docks
- Open Water
- Emergent Wetlands - Tidal and Non-tidal
- Forested Wetlands - Tidal and Non-tidal
- Scrub/Shrub Wetlands - Tidal and Non-tidal
- Sandy Areas and Shoreline
- Extraction and Transitional

PLUS Project Areas

type

- Comp Plans
- All Other PLUS Reviews

Location Map



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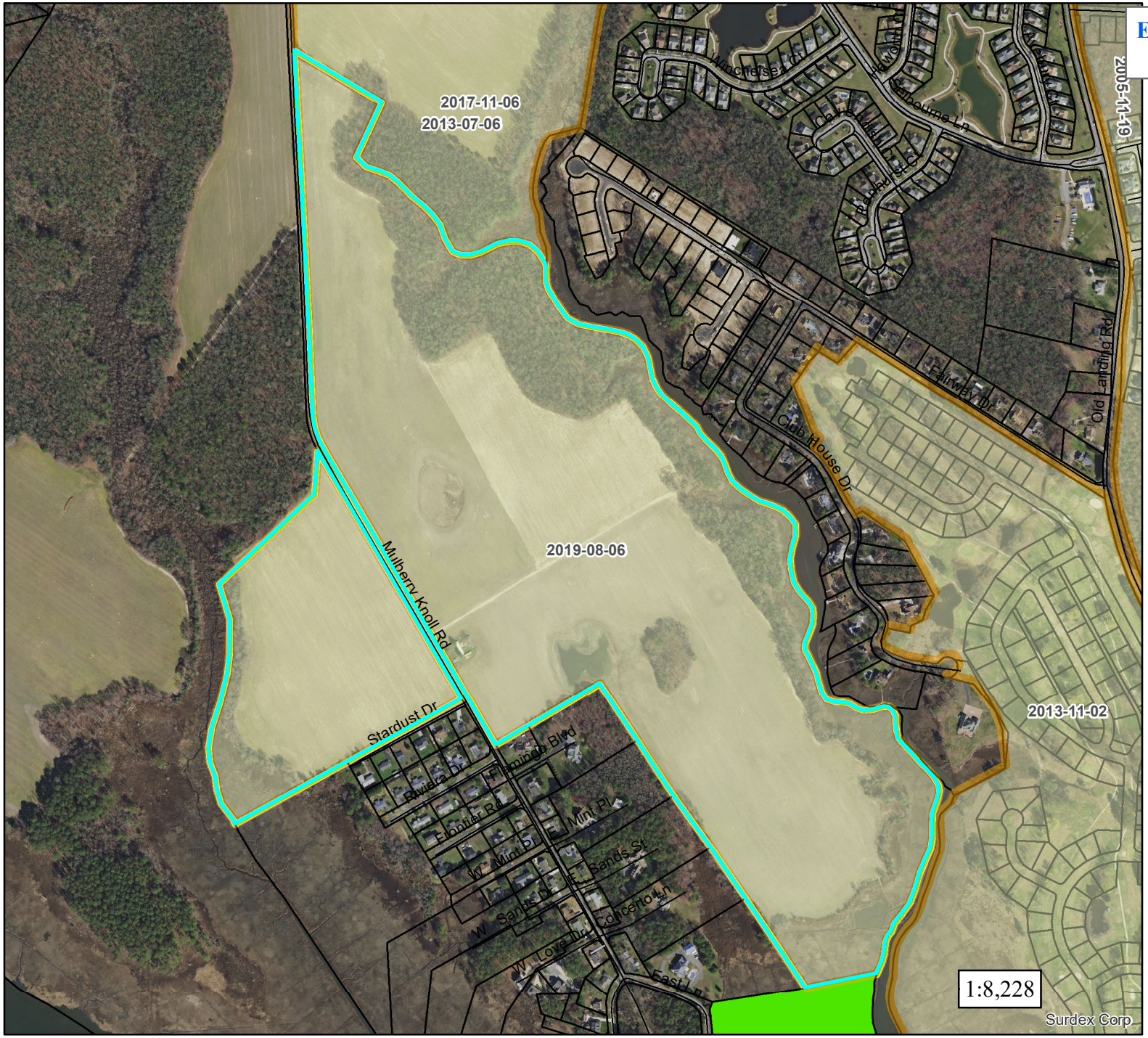

Estates at Mulberry Knoll
2019-08-06

Legend

PLUS Project Areas
type
- Comp Plans
- All Other PLUS Reviews

Location Map