APPENDIX A

GIS DATA CATALOGUE

Baseline GIS Data Repository

- Anne Arundel County
    - StormWater_AsBuilt (digitized from pdfs)
    - StormWater_Infrastructure_AACo
    - TidalPermits
- RestorationProjects.mpkx
    - SW Infrastructure Program Points
    - BMP Points
    - AltBMP Polygons
- Case Manager Export
    - ComplaintsAsParcels
- FEMA
    - AnneArundelCounty_MD_NFIPDataSet
        - ActivePolicies
        - RepetitiveLoss
- ShadySideProject.gdb (AACo BWPR)
    - AOI_Polygon
    - AOI_Rectangle
    - Dem
    - DrainageLine
    - DrainageLine1
    - Hydrodem
    - NuissanceFlooding2020
    - RoadFlooding
- DEMDifference.lpkx
- AnneArundelCounty_Vulnerability_Analysis.gdb
    - Geodatabase containing shapefiles resulting from the vulnerability assessment for the 2050, 2065 and 2100 SLR scenarios across all of Anne Arundel County. Layers included for each SLR scenario are as follows:
        - Buildings_inundated
        - CountyMaintainedRoads
        - Flooded_bridges
        - Flooded_HistoricRoads
        - HistoricResourceInventory
        - Inundated_Septic
        - Inundated_Wells
        - Landcover_inundated
        - MajorRoads
        - Sewer_Main
        - StormPipe
        - WaterMain
- HazusData.gdb
    - Geodatabase containing shapefiles resulting from Hazus analysis conducted within Region 9. Layers included are as follows:
        - OceanBayOverlay
        - Reg9_AtRiskStructures
        - Reg9_AtRiskStructures_LossEstimates

        - Reg9_DebrisGeneration
        - Reg9_ShelterNeeds
        - Reg9_UDF_BuildingFootprints
        - Region9_Boundary
- Region9_ShorelineErosion_Analysis.gdb
    - Geodatabase containing shapefiles resulting from shoreline erosion analysis conducted within Region 9. Layers included are as follows:
        - Erosion_Rates
        - Suitable_for_Living_Shoreline
- Region9_Vulnerability_Analysis.gdb
    - Geodatabase containing shapefiles resulting from the vulnerability assessment for the 2050, 2065 and 2100 SLR scenarios within Region 9. Vulnerability to each SLR scenario is distinguished with the layer attributes by a field provided for each scenario and "Vulnerable" included when impacted by the corresponding scenario. Layers included for each SLR scenario are as follows:
        - Bridges_Region9
        - Critical Areas_Region9
        - FEMA_2015FloodPlain_Reg9
        - HistoricResource_Region9
        - LandCover_Reg9
        - Parks_Reg9 -
        - Properties_with_Wells
        - Region9_CriticalFacilities
        - Region9_SepticSystems
        - Region9_SewerMain
        - Region9_SewerManhole
        - Region9_SewerPumpStations
        - Region9_SewerTreatmentPlant
        - Region9_StormInlet
        - Region9_StormManhole
        - Region9_StormOutfall
        - Region9_StormPipe
        - Region9_WaterMains
        - Region9_WaterTreatmentPlant
        - Roads_Streets_Region9
        - Region9_Scenic_and_Historic_Roads
- SLR_BathtubModel
    - Folders contain both shapefiles and rasters of countywide inundation depths and extents for the 2050, 2065 and 2100 SLR scenarios.
- Other
    - Maryland_Shoreline_Inventory_-_StabilizationStructures_AOI
    - MyCoastReports

DealeShadySLRData.gdb Data Index

Layer Name	Description
ExistingSwale	Field verified SWM infrastructure during field assessments.
ExistingPipe	Field verified SWM infrastructure during field assessments.
ExistingInlet	Field verified SWM infrastructure during field assessments.
ExistingDrivewayCulvertSwale	Field verified SWM infrastructure during field assessments.
ExistingCulvert	Field verified SWM infrastructure during field assessments.
StormwaterVulnerability_Integrated	This layer integrates modeled stormwater flood depths with land cover-based runoff potential to map stormwater vulnerability across the Deale–Shady Side Peninsula. Vulnerability scores range from 1 to 10, with higher values representing greater risk. Modeled flood depths were preserved where available, while unmodeled areas were estimated using impervious surface data. Wetlands were assigned minimal scores to avoid duplicating tidal vulnerability.
SLR_FloodDepth_2050	This layer represents projected tidal flood depths for the year 2050 based on bathtub-model simulations. Flood depths were classified using a standardized vulnerability scale, where greater depth corresponds to higher risk. Areas with projected inundation depths greater than three feet were classified as high-risk zones.
SLR_FloodDepth_2065	This layer represents projected tidal flood depths for the year 2065 based on bathtub-model simulations. Depths were reclassified to a 1–10 vulnerability scale, with higher risk assigned to deeper inundation. These projections illustrate expanded tidal

	flooding into previously unaffected areas.
SLR_FloodDepth_2100	This layer shows projected tidal flood depths for 2100 under sea level rise scenarios, based on bathtub-model outputs. Areas experiencing more than three feet of inundation were classified as high risk. The 2100 scenario reflects widespread exposure in low-lying regions as sea levels continue to rise.
BuildingsInundated_2050	This layer represents building inundation vulnerability for the year 2050. A density analysis was applied to identify clusters of structures at risk of tidal flooding under projected sea level rise. Higher vulnerability scores were assigned to neighborhoods with greater concentrations of flood-exposed buildings, reflecting the potential for significant impacts to homes and infrastructure.
BuildingsInundated_2065	This layer represents building inundation vulnerability for the year 2065. Density of flood-exposed structures was analyzed to assess vulnerability escalation across developed areas. Neighborhoods with high building density in flood zones were assigned higher vulnerability scores, indicating increased potential for widespread structural and socioeconomic impact.
BuildingsInundated_2100	This layer shows building inundation vulnerability under projected 2100 sea level rise conditions. The analysis highlights areas where building density in projected flood zones is greatest, resulting in high vulnerability scores. These locations are considered particularly at risk for large-scale damages to residential, commercial, and community infrastructure.
AccessDisruption_2050	This layer represents access disruption in 2050 based on a cost-distance

	analysis of travel to emergency services and evacuation routes under projected sea level rise. It identifies areas with constrained access due to road segments expected to be permanently inundated by 2050.
AccessDisruption_2065	This layer shows accessibility impacts by 2065, calculated using cost-distance analysis that accounts for permanent inundation of roadways under projected sea level rise. It highlights increasing isolation of some neighborhoods from emergency services and evacuation routes.
AccessDisruption_2100	This layer illustrates projected loss of access to emergency services and evacuation routes by 2100, based on cost-distance calculations that incorporate permanent roadway inundation from sea level rise. It emphasizes long-term disruptions to critical access corridors across the Peninsula.
ErosionVulnerability	This layer represents shoreline erosion vulnerability across the Deale–Shady Side Peninsula, classified from interpolated erosion rates and proximity to eroding shorelines. Vulnerability scores reflect shoreline retreat severity and inland exposure, with hardened or protected shorelines assigned low scores and unassessed areas given moderate values. A kriging model was used to interpolate point-based erosion data into a continuous vulnerability surface.
LandCoverVulnerability_2050	This layer represents land cover-based flood vulnerability for the year 2050. Natural land covers such as wetlands and open space were assigned low vulnerability scores due to their ability to buffer floodwaters, while impervious developed areas were scored higher

	based on their susceptibility to damage and runoff generation.
LandCoverVulnerability_2065	This layer shows land cover-based vulnerability to flooding in 2065 under projected sea level rise. As inundation expands inland, developed land cover types near the waterfront receive higher vulnerability scores. The layer highlights a shift from natural floodplain inundation to increased exposure of residential and commercial areas.
LandCoverVulnerability_2100	This layer depicts land cover vulnerability to flooding in 2100, reflecting widespread inundation of residential and commercial development in low-lying zones. Vulnerability scores are based on land cover susceptibility, with impervious areas assigned high scores and natural areas scored lower. By 2100, regular or permanent flooding impacts most developed areas in flood-prone parts of the Peninsula.
CompositeVulnerability	This layer represents the composite flood vulnerability surface developed through a weighted overlay analysis of multiple contributing factors: flood depth, stormwater flooding, land cover susceptibility, inundated building density, shoreline erosion, and emergency access constraints. Each factor was assigned a weight reflecting its relative influence on flood vulnerability, with higher weights for inundated buildings and emergency access. The output highlights priority areas for flood mitigation, including low-lying, densely developed neighborhoods with limited access and direct Bay exposure.
PriorityRoads_ShortTerm	This layer identifies road segments prioritized for near-term elevation based on their flood vulnerability, emergency access role, and proximity

	to high-density residential or critical infrastructure areas. These segments experience frequent stormwater or tidal inundation and serve as primary evacuation or access routes.
PriorityRoads_LongTerm	This layer identifies road segments prioritized for long-term monitoring, study, or design due to anticipated exposure to future flood risks from sea level rise and storm surge. These roads are essential to maintaining access in the face of rising water levels and inform adaptive, phased infrastructure planning.
TideGatePriority	This layer identifies priority locations for tide gate installation based on modeled stormwater flooding, tidal backflow vulnerability, and community-reported drainage issues. It highlights outfalls where chronic tidal flooding contributes to inland inundation, particularly in low-lying, densely developed neighborhoods. The prioritization supports both near-term mitigation and long-term resilience planning under projected sea level rise conditions.
StormwaterConveyance_ShortTerm	This layer identifies short-term priority areas for stormwater infrastructure improvements, including clearing, resizing, or realigning swales and culverts. These areas currently experience frequent flooding or pooling due to inadequate conveyance capacity and are targeted for immediate action to improve drainage functionality and resilience.
StormwaterConveyance_LongTerm	This layer highlights long-term stormwater system improvement zones where larger-scale, phased enhancements are planned to improve connectivity and system-wide capacity. These areas are prioritized for future infrastructure investments that will

	support Peninsula-wide drainage integration under changing environmental conditions.
StormwaterConveyance_Monitor	This layer designates stormwater areas that require continued monitoring to evaluate system performance and assess future upgrade needs. These zones may not currently experience chronic issues but are susceptible to future drainage challenges as sea levels rise and precipitation patterns shift.
Avalon_Shores_Existing_100YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Avalon_Shores_Existing_10YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Avalon_Shores_Existing_2YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Broadwater_Point_Existing_100YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Broadwater_Point_Existing_10YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Broadwater_Point_Existing_2YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Cedarhurst_Existing_100YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Cedarhurst_Existing_10YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Cedarhurst_Existing_2YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Franklin_Manor_Existing_100YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Franklin_Manor_Existing_10YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Franklin_Manor_Existing_2YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Idlewilde_Shores_Existing_100YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Idlewilde_Shores_Existing_10YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Idlewilde_Shores_Existing_2YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Owings_Beach_Existing_100YR_STORM	2050 SLR and specified rainfall event with no storm surge.

Owings_Beach_Existing_10YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Owings_Beach_Existing_2YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Snug_Harbor_Existing_100YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Snug_Harbor_Existing_10YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Snug_Harbor_Existing_2YR_STORM	2050 SLR and specified rainfall event with no storm surge.
Avalon_Shores_Existing_100YR_STORM	2050 SLR and specified rainfall and surge event.
Avalon_Shores_Existing_10YR_STORM	2050 SLR and specified rainfall and surge event.
Avalon_Shores_Existing_2YR_STORM	2050 SLR and specified rainfall and surge event.
Broadwater_Point_Existing_100YR_STORM	2050 SLR and specified rainfall and surge event.
Broadwater_Point_Existing_10YR_STORM	2050 SLR and specified rainfall and surge event.
Broadwater_Point_Existing_2YR_STORM	2050 SLR and specified rainfall and surge event.
Cedarhurst_Existing_100YR_STORM	2050 SLR and specified rainfall and surge event.
Cedarhurst_Existing_10YR_STORM	2050 SLR and specified rainfall and surge event.
Cedarhurst_Existing_2YR_STORM	2050 SLR and specified rainfall and surge event.
Franklin_Manor_Existing_100YR_STORM	2050 SLR and specified rainfall and surge event.
Franklin_Manor_Existing_10YR_STORM	2050 SLR and specified rainfall and surge event.
Franklin_Manor_Existing_2YR_STORM	2050 SLR and specified rainfall and surge event.
Idlewilde_Shores_Existing_100YR_STORM	2050 SLR and specified rainfall and surge event.
Idlewilde_Shores_Existing_10YR_STORM	2050 SLR and specified rainfall and surge event.
Idlewilde_Shores_Existing_2YR_STORM	2050 SLR and specified rainfall and surge event.
Owings_Beach_Existing_100YR_STORM	2050 SLR and specified rainfall and surge event.
Owings_Beach_Existing_10YR_STORM	2050 SLR and specified rainfall and surge event.

Owings_Beach_Existing_2YR_STORM	2050 SLR and specified rainfall and surge event.
Snug_Harbor_Existing_100YR_STORM	2050 SLR and specified rainfall and surge event.
Snug_Harbor_Existing_10YR_STORM	2050 SLR and specified rainfall and surge event.
Snug_Harbor_Existing_2YR_STORM	2050 SLR and specified rainfall and surge event.
Avalon_Shores_Existing_10YR_STORM	2065 SLR and specified rainfall and surge event.
Broadwater_Point_Existing_10YR_STORM	2065 SLR and specified rainfall and surge event.
Cedarhurst_Existing_10YR_STORM	2065 SLR and specified rainfall and surge event.
Franklin_Manor_Existing_10YR_STORM	2065 SLR and specified rainfall and surge event.
Idlewilde_Shores_Existing_10YR_STORM	2065 SLR and specified rainfall and surge event.
Owings_Beach_Existing_10YR_STORM	2065 SLR and specified rainfall and surge event.
Snug_Harbor_Existing_10YR_STORM	2065 SLR and specified rainfall and surge event.

APPENDIX B

HYDROLOGIC ANALYSIS

Hydrologic Soil Group—Anne Arundel County, Maryland
(Shady Side Peninsula)

Map Scale: 1:54,100 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 500 1000 2000 3000

Feet: 0 2500 5000 10000 15000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Anne Arundel County, Maryland
Survey Area Data: Version 23, Sep 6, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 29, 2022—Aug 13, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CxA	Cumberstone-Mattapex complex, 0 to 2 percent slopes	C/D	45.1	0.6%
CxB	Cumberstone-Mattapex complex, 2 to 5 percent slopes	C/D	292.9	4.2%
CxC	Cumberstone-Mattapex complex, 5 to 10 percent slopes	C/D	0.9	0.0%
CyB	Cumberstone-Mattapex-Urban land complex, 0 to 5 percent slopes	D	159.8	2.3%
DcA	Deale-Shadyoak complex, 0 to 2 percent slopes	C/D	2,195.7	31.6%
DeA	Deale-Shadyoak-Urban land complex, 0 to 2 percent slopes	C/D	711.0	10.2%
MZA	Mispillion and Transquaking soils, 0 to 1 percent slopes, tidally flooded	A/D	306.3	4.4%
SoA	Shadyoak-Elkton complex, 0 to 2 percent slopes	B/D	2,137.3	30.8%
SpA	Shadyoak-Elkton complex, 0 to 2 percent slopes, frequently ponded	B/D	596.9	8.6%
SrA	Shadyoak-Elkton-Urban land complex, 0 to 2 percent slopes	B/D	429.1	6.2%
SsA	Shrewsbury loam, 0 to 2 percent slopes	B/D	0.9	0.0%
UxB	Udorthents, loamy, sulfidic substratum, 0 to 5 percent slopes	C	8.7	0.1%
W	Water		56.6	0.8%
WdaA	Woodstown sandy loam, 0 to 2 percent slopes, Northern Coastal Plain	C	3.3	0.0%
Totals for Area of Interest			**6,944.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOAA Atlas 14, Volume 2, Version 3
Location name: Shady Side, Maryland, USA*
Latitude: 38.8315°, Longitude: -76.5036°
Elevation: 6 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	**2**	**5**	**10**	**25**	**50**	**100**	**200**	**500**	**1000**
5-min	**0.351** (0.318-0.387)	**0.420** (0.380-0.463)	**0.500** (0.452-0.551)	**0.558** (0.503-0.615)	**0.631** (0.566-0.697)	**0.685** (0.611-0.757)	**0.738** (0.656-0.818)	**0.789** (0.696-0.878)	**0.853** (0.745-0.956)	**0.902** (0.782-1.02)
10-min	**0.560** (0.508-0.618)	**0.671** (0.608-0.740)	**0.800** (0.723-0.882)	**0.892** (0.805-0.984)	**1.00** (0.901-1.11)	**1.09** (0.974-1.21)	**1.17** (1.04-1.30)	**1.25** (1.10-1.39)	**1.35** (1.18-1.51)	**1.42** (1.23-1.60)
15-min	**0.700** (0.635-0.772)	**0.844** (0.765-0.930)	**1.01** (0.915-1.12)	**1.13** (1.02-1.24)	**1.27** (1.14-1.41)	**1.38** (1.23-1.53)	**1.48** (1.32-1.64)	**1.58** (1.39-1.76)	**1.70** (1.48-1.90)	**1.78** (1.54-2.01)
30-min	**0.960** (0.870-1.06)	**1.16** (1.06-1.28)	**1.44** (1.30-1.59)	**1.63** (1.48-1.80)	**1.89** (1.69-2.08)	**2.08** (1.86-2.30)	**2.27** (2.02-2.52)	**2.46** (2.17-2.74)	**2.70** (2.36-3.03)	**2.89** (2.50-3.26)
60-min	**1.20** (1.08-1.32)	**1.46** (1.32-1.61)	**1.84** (1.67-2.03)	**2.13** (1.92-2.35)	**2.51** (2.25-2.78)	**2.82** (2.52-3.12)	**3.13** (2.78-3.47)	**3.44** (3.04-3.84)	**3.88** (3.38-4.34)	**4.22** (3.65-4.76)
2-hr	**1.42** (1.28-1.57)	**1.73** (1.57-1.91)	**2.19** (1.98-2.41)	**2.54** (2.29-2.80)	**3.04** (2.73-3.35)	**3.45** (3.08-3.80)	**3.88** (3.43-4.28)	**4.32** (3.80-4.79)	**4.95** (4.29-5.52)	**5.45** (4.68-6.12)
3-hr	**1.54** (1.39-1.70)	**1.87** (1.69-2.06)	**2.37** (2.14-2.62)	**2.77** (2.49-3.05)	**3.33** (2.98-3.67)	**3.80** (3.37-4.19)	**4.29** (3.78-4.74)	**4.81** (4.20-5.34)	**5.55** (4.78-6.21)	**6.16** (5.24-6.94)
6-hr	**1.90** (1.72-2.10)	**2.30** (2.09-2.54)	**2.90** (2.63-3.21)	**3.40** (3.06-3.76)	**4.14** (3.70-4.58)	**4.77** (4.22-5.27)	**5.44** (4.77-6.04)	**6.18** (5.35-6.88)	**7.26** (6.18-8.16)	**8.18** (6.86-9.25)
12-hr	**2.29** (2.06-2.58)	**2.77** (2.49-3.12)	**3.52** (3.15-3.96)	**4.17** (3.71-4.69)	**5.16** (4.54-5.80)	**6.03** (5.25-6.77)	**7.00** (6.02-7.88)	**8.08** (6.84-9.13)	**9.72** (8.06-11.1)	**11.1** (9.06-12.8)
24-hr	**2.65** (2.40-2.97)	**3.22** (2.92-3.60)	**4.17** (3.77-4.66)	**4.99** (4.50-5.58)	**6.26** (5.60-6.94)	**7.37** (6.54-8.15)	**8.62** (7.59-9.50)	**10.0** (8.74-11.0)	**12.2** (10.5-13.4)	**14.1** (11.9-15.4)
2-day	**3.07** (2.78-3.42)	**3.73** (3.38-4.16)	**4.82** (4.36-5.37)	**5.76** (5.20-6.40)	**7.18** (6.43-7.96)	**8.42** (7.49-9.30)	**9.80** (8.65-10.8)	**11.4** (9.93-12.5)	**13.7** (11.8-15.1)	**15.7** (13.4-17.3)
3-day	**3.24** (2.95-3.60)	**3.93** (3.58-4.37)	**5.07** (4.61-5.63)	**6.04** (5.47-6.69)	**7.50** (6.75-8.29)	**8.77** (7.85-9.67)	**10.2** (9.04-11.2)	**11.8** (10.3-12.9)	**14.1** (12.3-15.5)	**16.2** (13.9-17.8)
4-day	**3.41** (3.12-3.78)	**4.14** (3.78-4.59)	**5.32** (4.85-5.88)	**6.32** (5.75-6.98)	**7.83** (7.07-8.62)	**9.13** (8.20-10.0)	**10.6** (9.42-11.6)	**12.2** (10.8-13.4)	**14.6** (12.7-16.0)	**16.6** (14.4-18.3)
7-day	**3.96** (3.63-4.36)	**4.78** (4.38-5.25)	**6.04** (5.53-6.64)	**7.12** (6.50-7.82)	**8.73** (7.92-9.54)	**10.1** (9.12-11.0)	**11.6** (10.4-12.7)	**13.3** (11.8-14.5)	**15.7** (13.8-17.2)	**17.8** (15.5-19.5)
10-day	**4.50** (4.16-4.90)	**5.41** (5.00-5.88)	**6.74** (6.22-7.33)	**7.86** (7.23-8.53)	**9.47** (8.67-10.3)	**10.8** (9.86-11.7)	**12.3** (11.1-13.3)	**13.8** (12.4-14.9)	**16.1** (14.3-17.4)	**18.0** (15.9-19.5)
20-day	**6.06** (5.64-6.51)	**7.21** (6.72-7.75)	**8.72** (8.12-9.37)	**9.94** (9.24-10.7)	**11.6** (10.8-12.5)	**13.0** (12.0-14.0)	**14.4** (13.3-15.5)	**15.9** (14.6-17.1)	**18.0** (16.3-19.3)	**19.6** (17.7-21.1)
30-day	**7.49** (7.01-8.00)	**8.88** (8.30-9.48)	**10.6** (9.88-11.3)	**11.9** (11.1-12.7)	**13.8** (12.8-14.7)	**15.2** (14.1-16.3)	**16.7** (15.5-17.8)	**18.3** (16.8-19.5)	**20.3** (18.6-21.7)	**21.9** (20.0-23.5)
45-day	**9.43** (8.90-9.99)	**11.1** (10.5-11.8)	**13.0** (12.3-13.8)	**14.5** (13.6-15.3)	**16.4** (15.4-17.3)	**17.8** (16.8-18.9)	**19.3** (18.0-20.4)	**20.6** (19.3-21.9)	**22.5** (20.9-23.8)	**23.8** (22.1-25.3)
60-day	**11.2** (10.6-11.9)	**13.2** (12.5-14.0)	**15.3** (14.4-16.2)	**16.8** (15.9-17.8)	**18.8** (17.7-19.9)	**20.3** (19.1-21.4)	**21.7** (20.3-22.9)	**23.0** (21.5-24.3)	**24.7** (23.0-26.2)	**25.9** (24.1-27.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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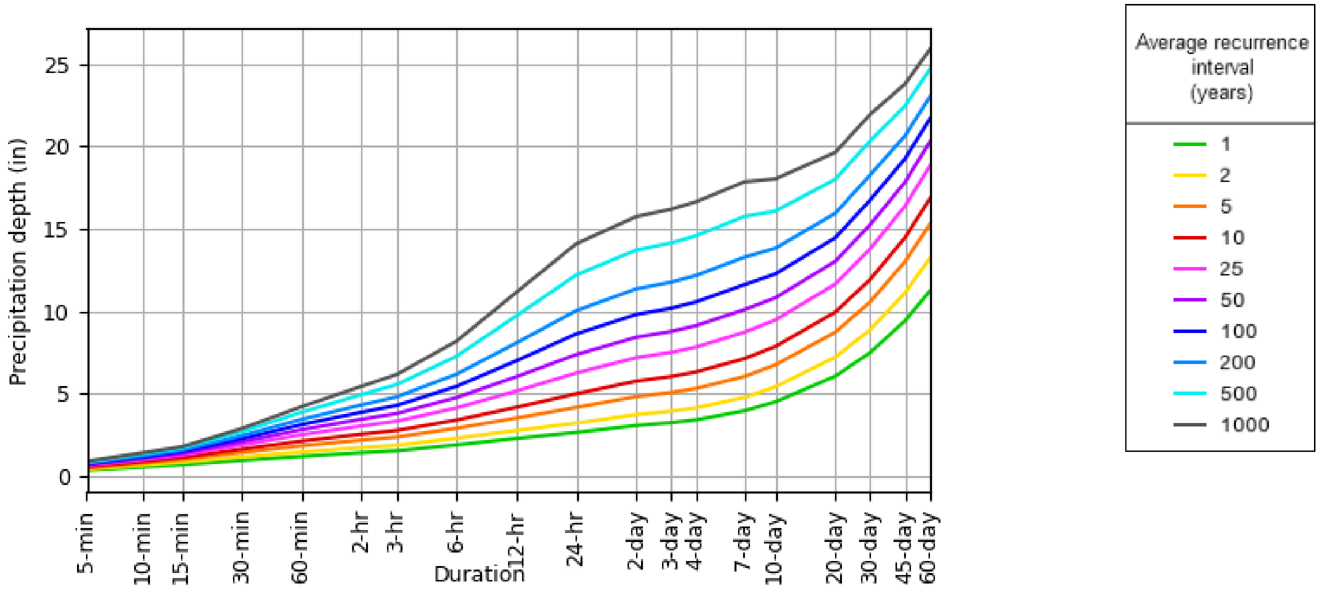
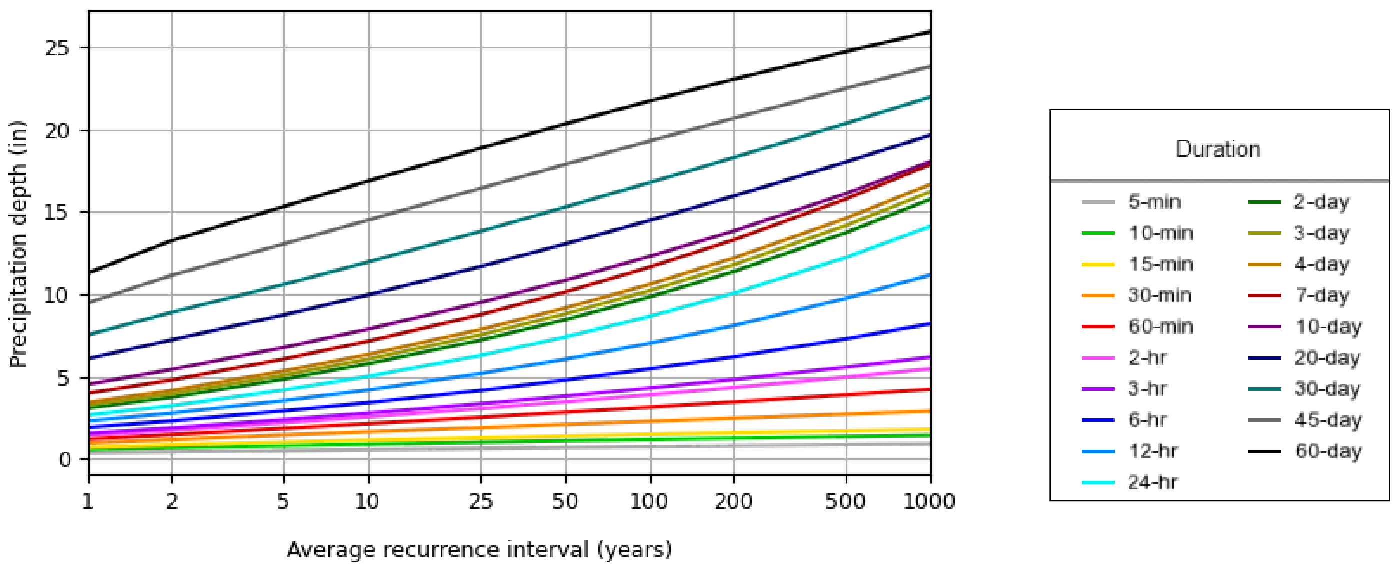
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 38.8315°, Longitude: -76.5036°





NOAA Atlas 14, Volume 2, Version 3 Created (GMT): Fri Jul 5 17:10:41 2024

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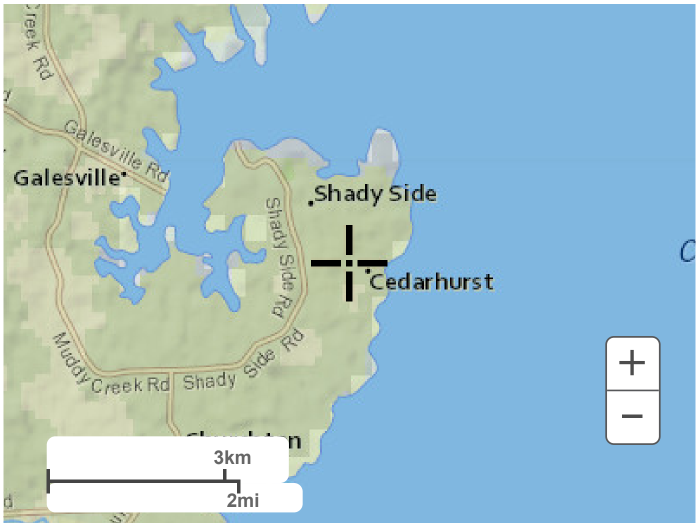
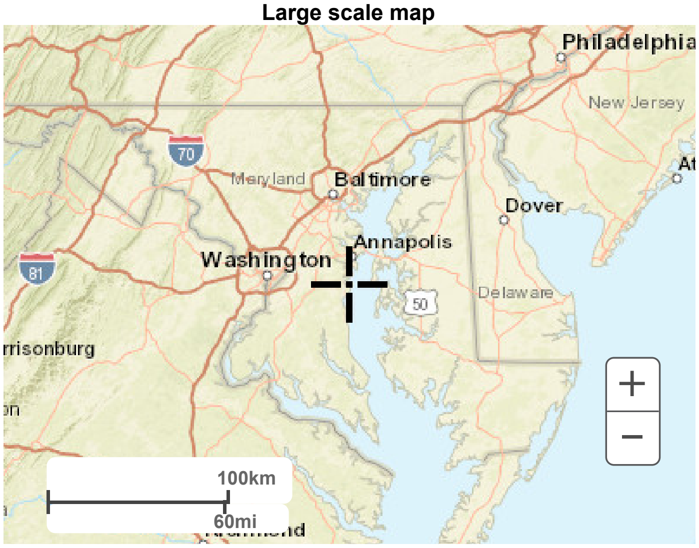
Maps & aerials

Small scale terrain

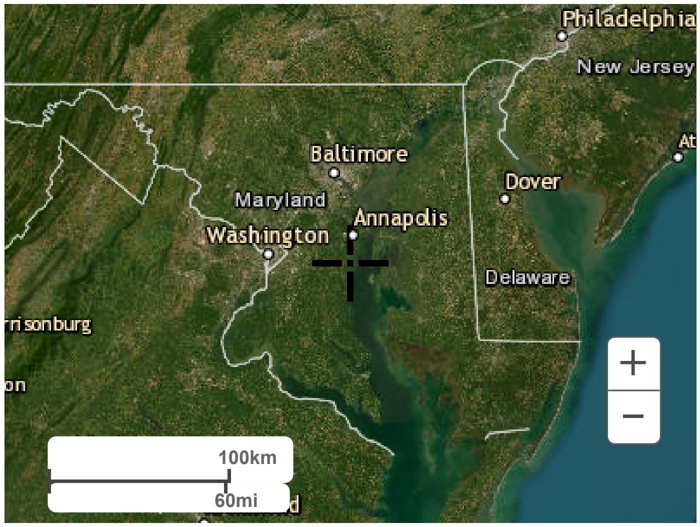


Large scale terrain

Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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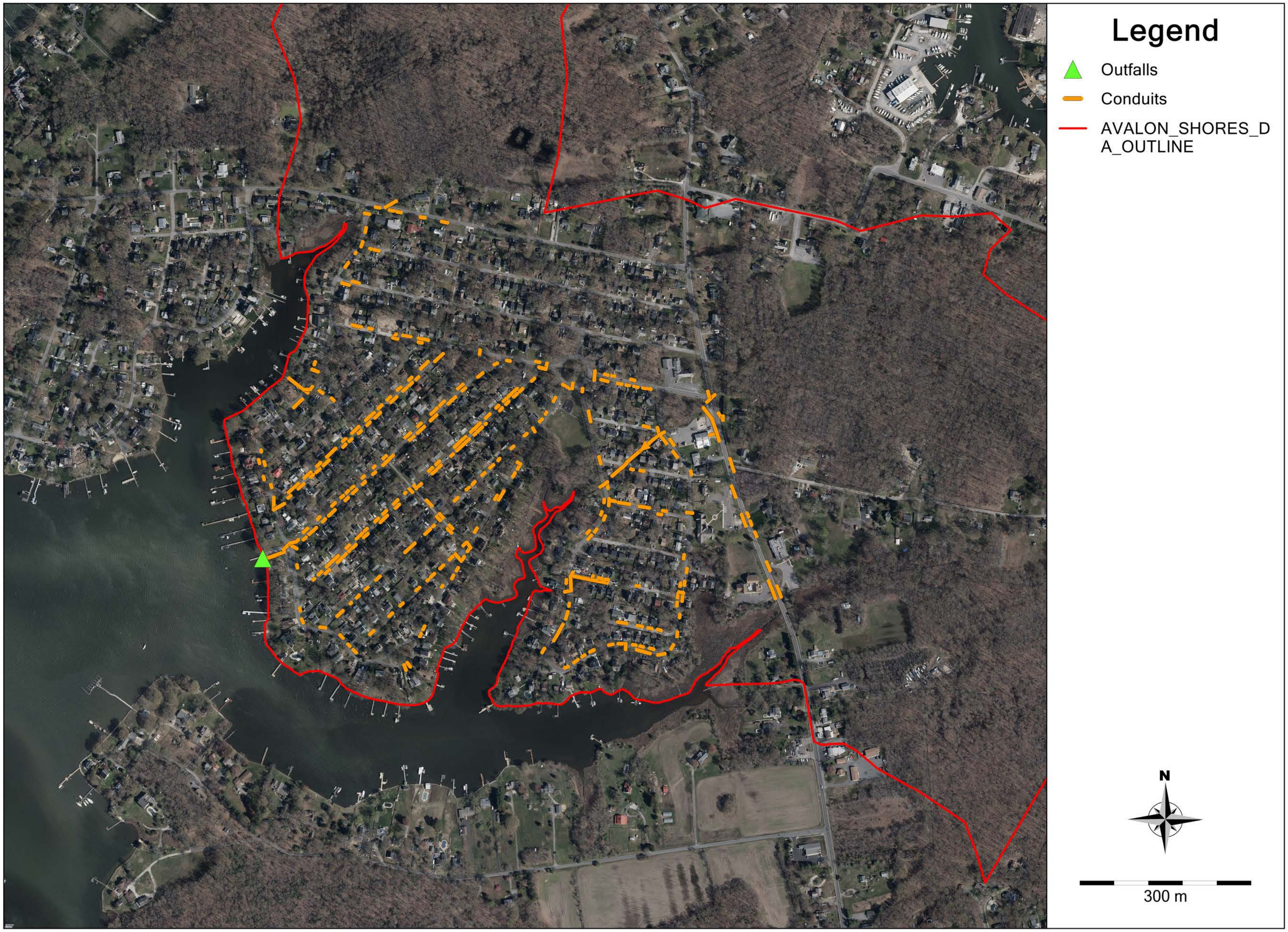
APPENDIX C

HYDRAULIC ANALYSIS

2050 NO STORM SURGE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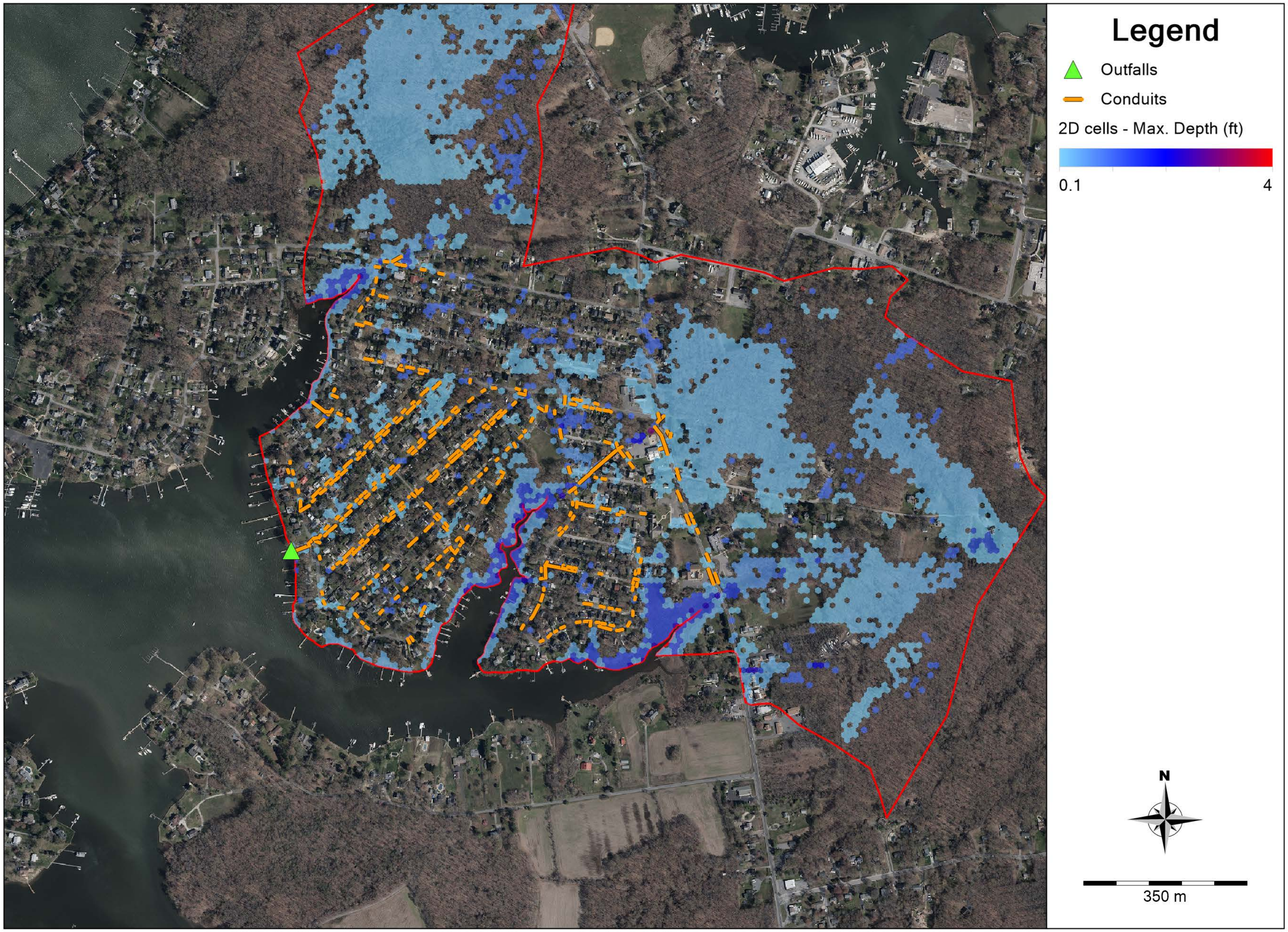
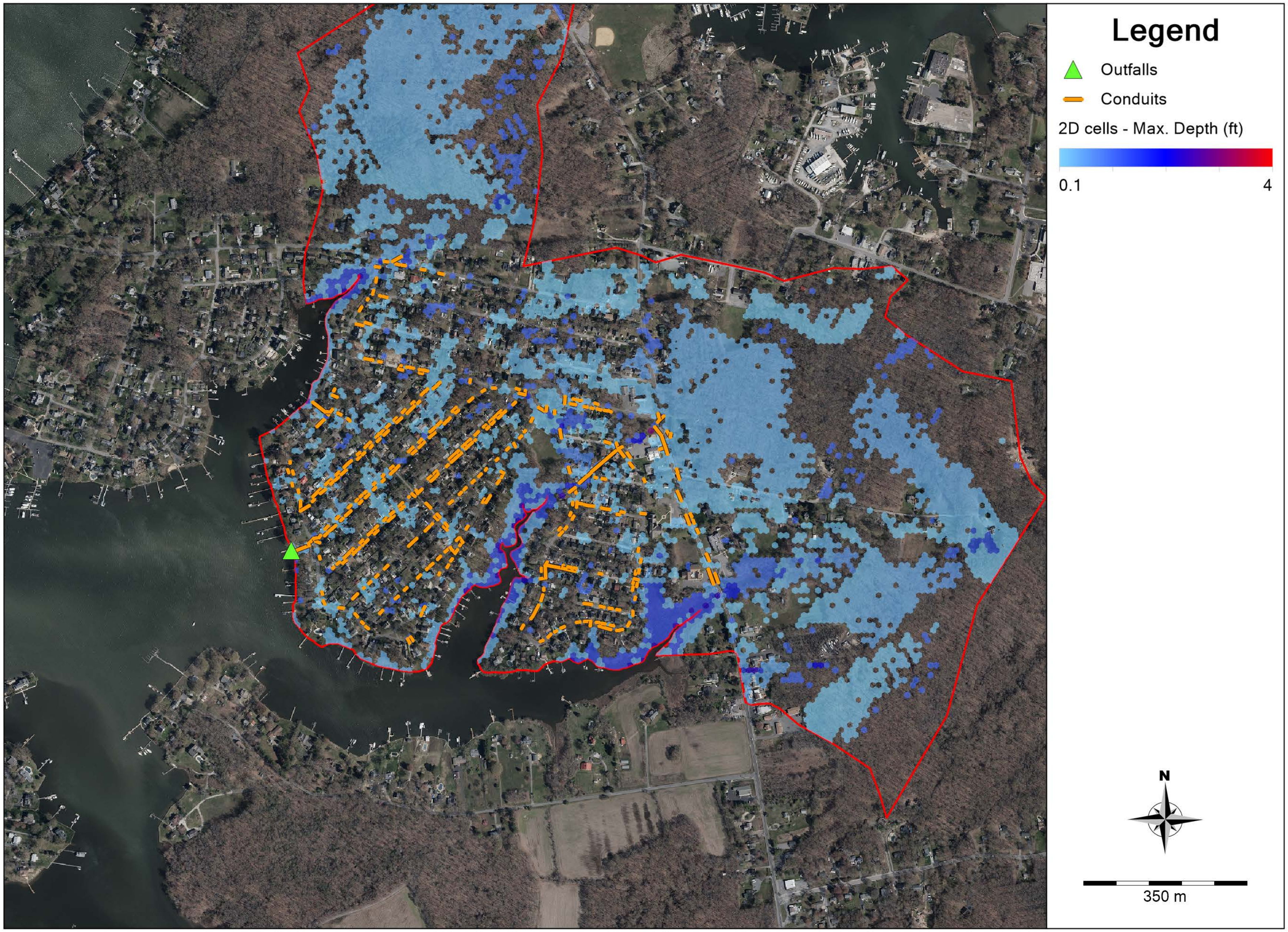
Outfalls
Conduits
AVALON_SHORES_DA_OUTLINE
N
300 m



Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
350 m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Outfalls
Conduits
2D cells - Max. Depth (ft)
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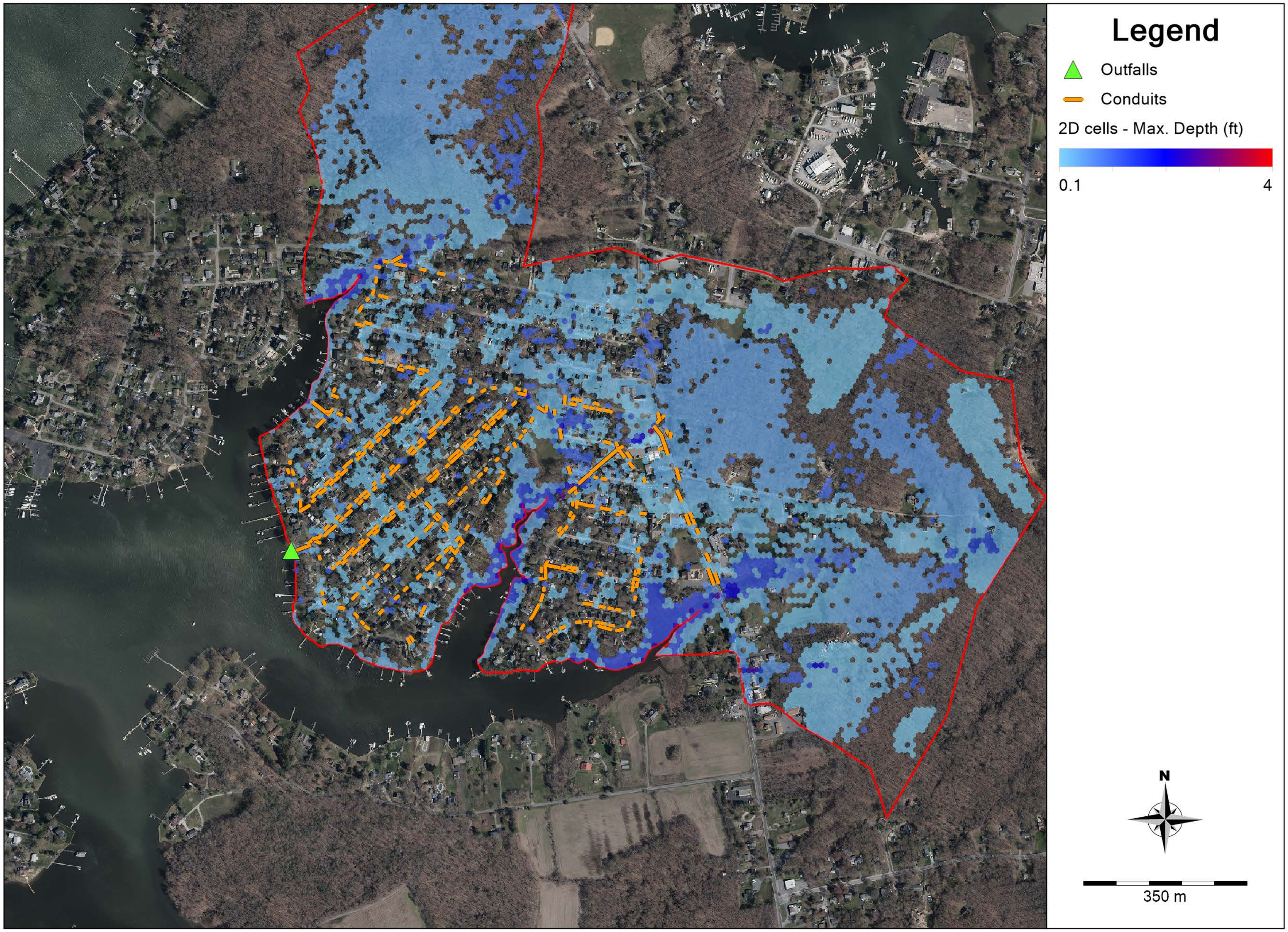
N
350 m



Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
350 m

Legend
BROADWATER_POINT_DA_OUTLINE
N
400 m

Legend

2D cells - Max. Depth (ft)

0.1 4

N

450 m

Legend
2D cells - Max. Depth (ft)
0.1
4
N
450 m

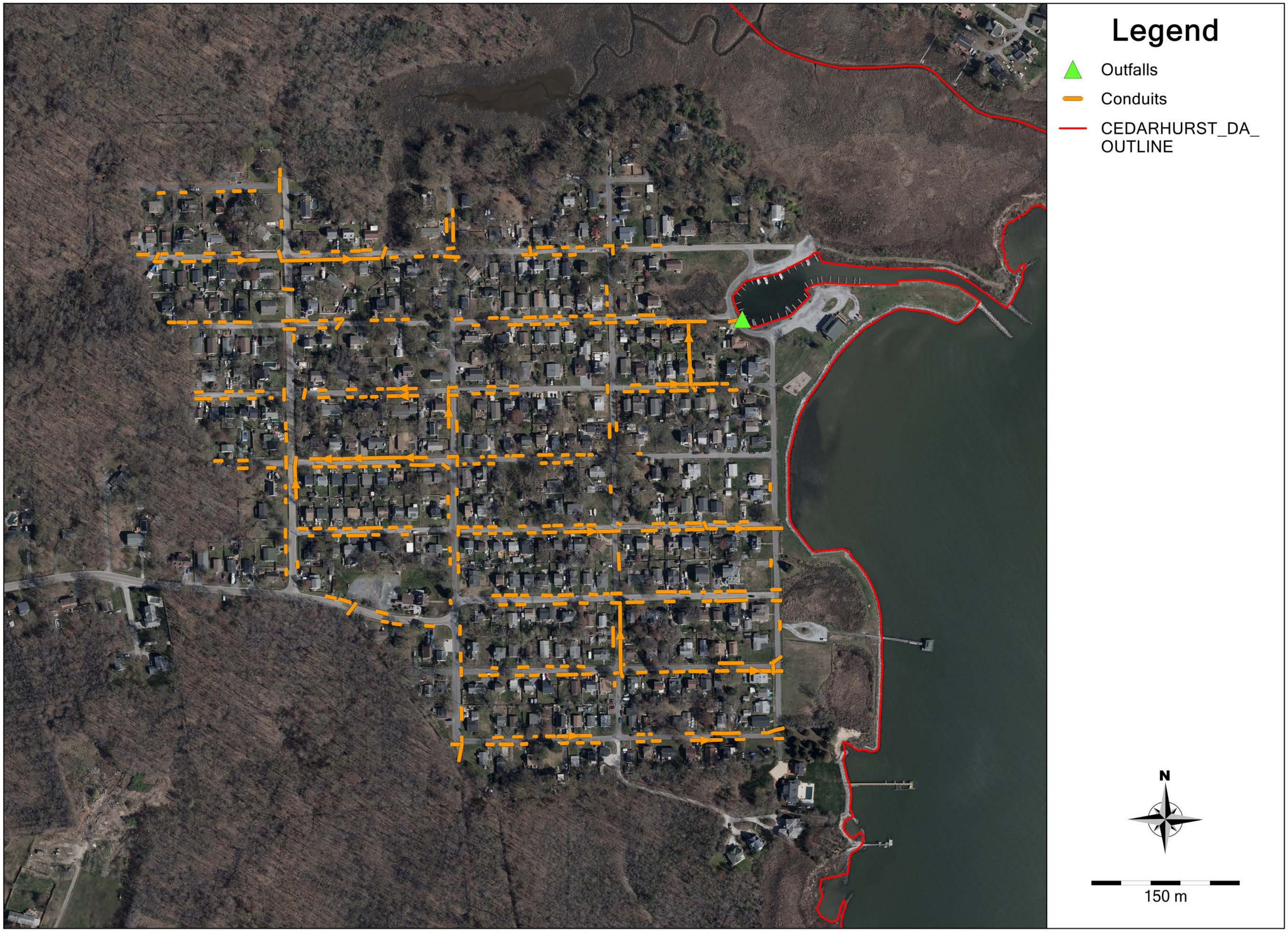
Legend

2D cells - Max. Depth (ft)

0.1 — 4

N

450 m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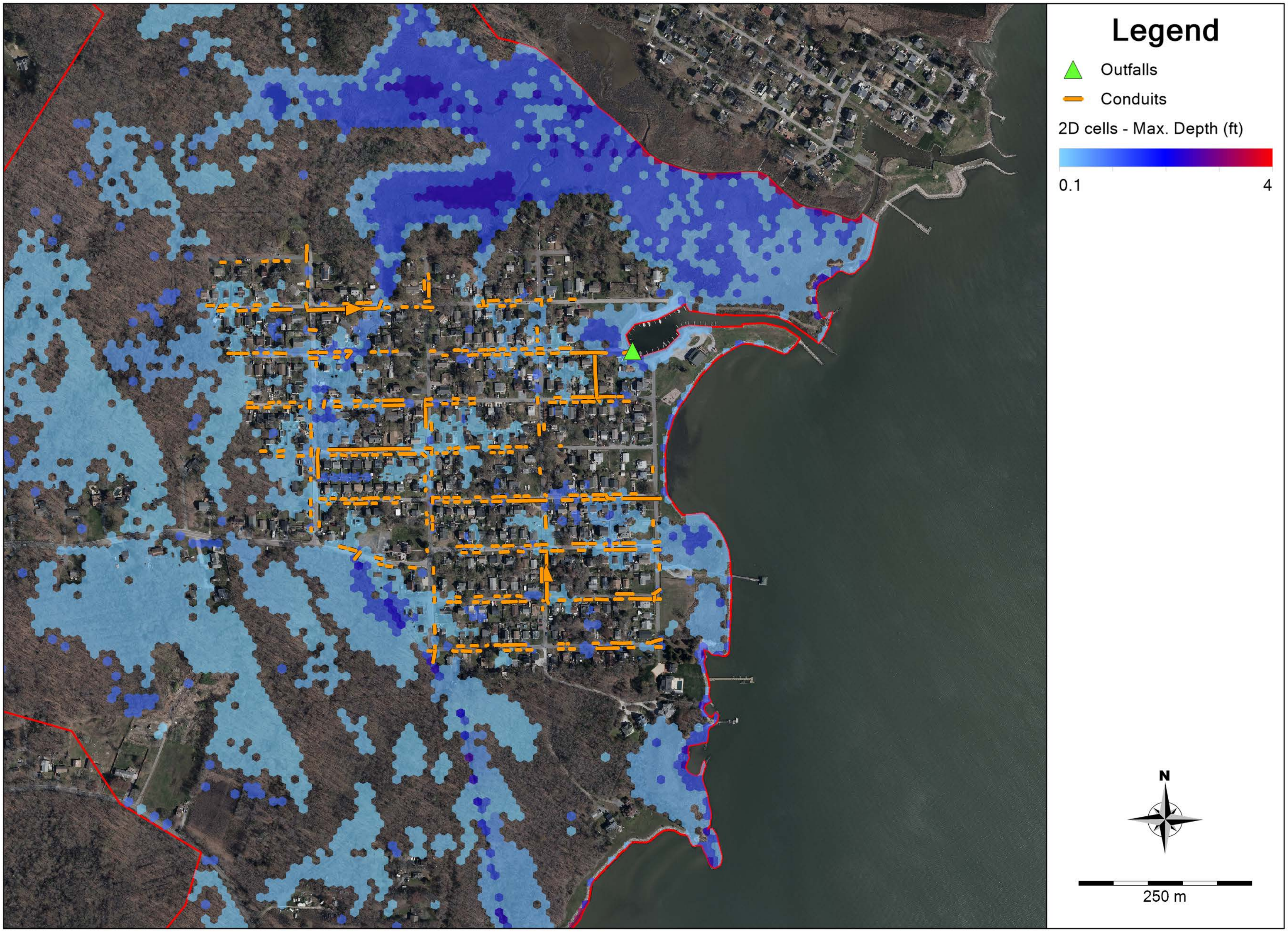
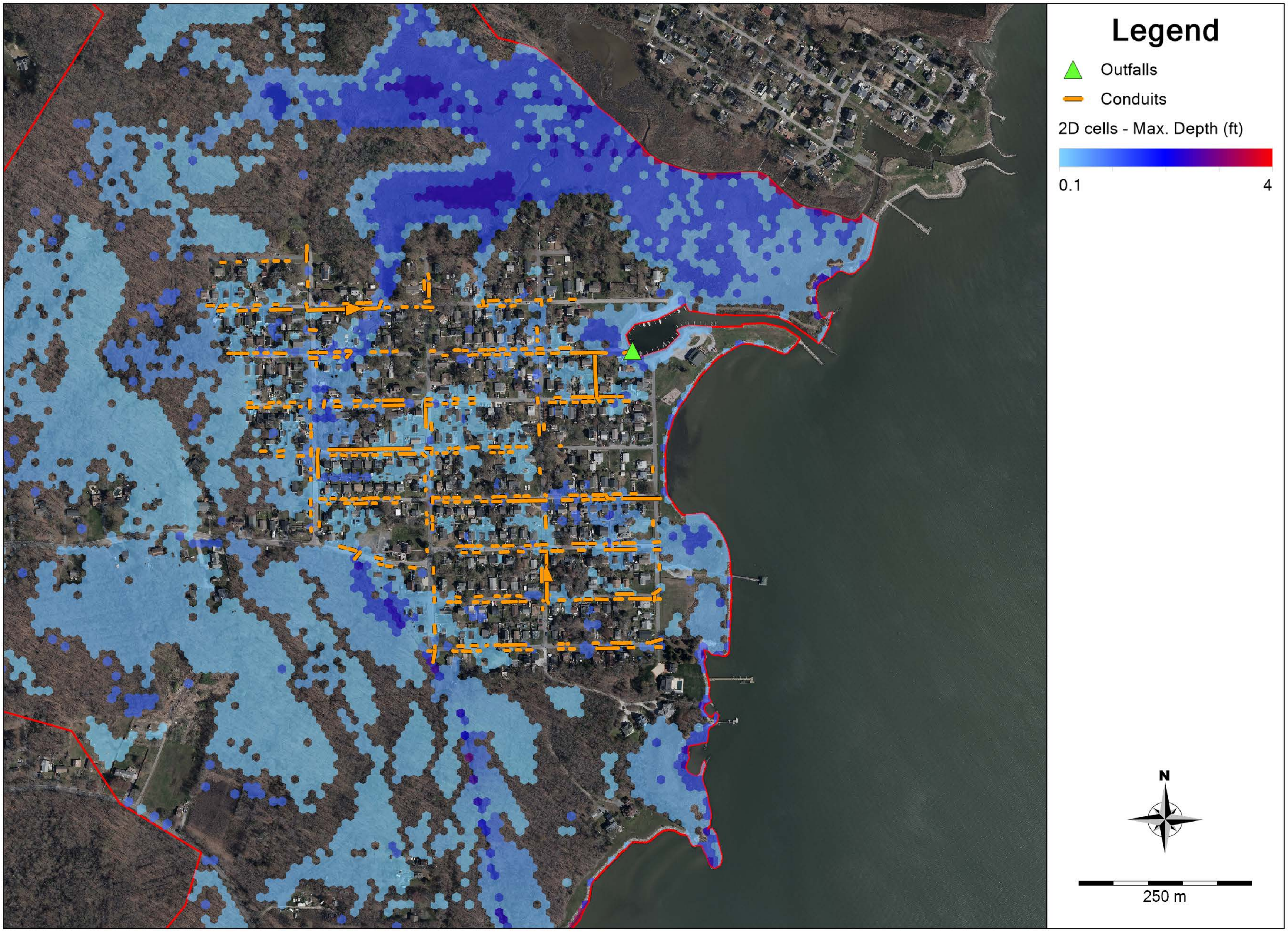
Outfalls
Conduits
CEDARHURST_DA_
OUTLINE
N
150 m



Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
250 m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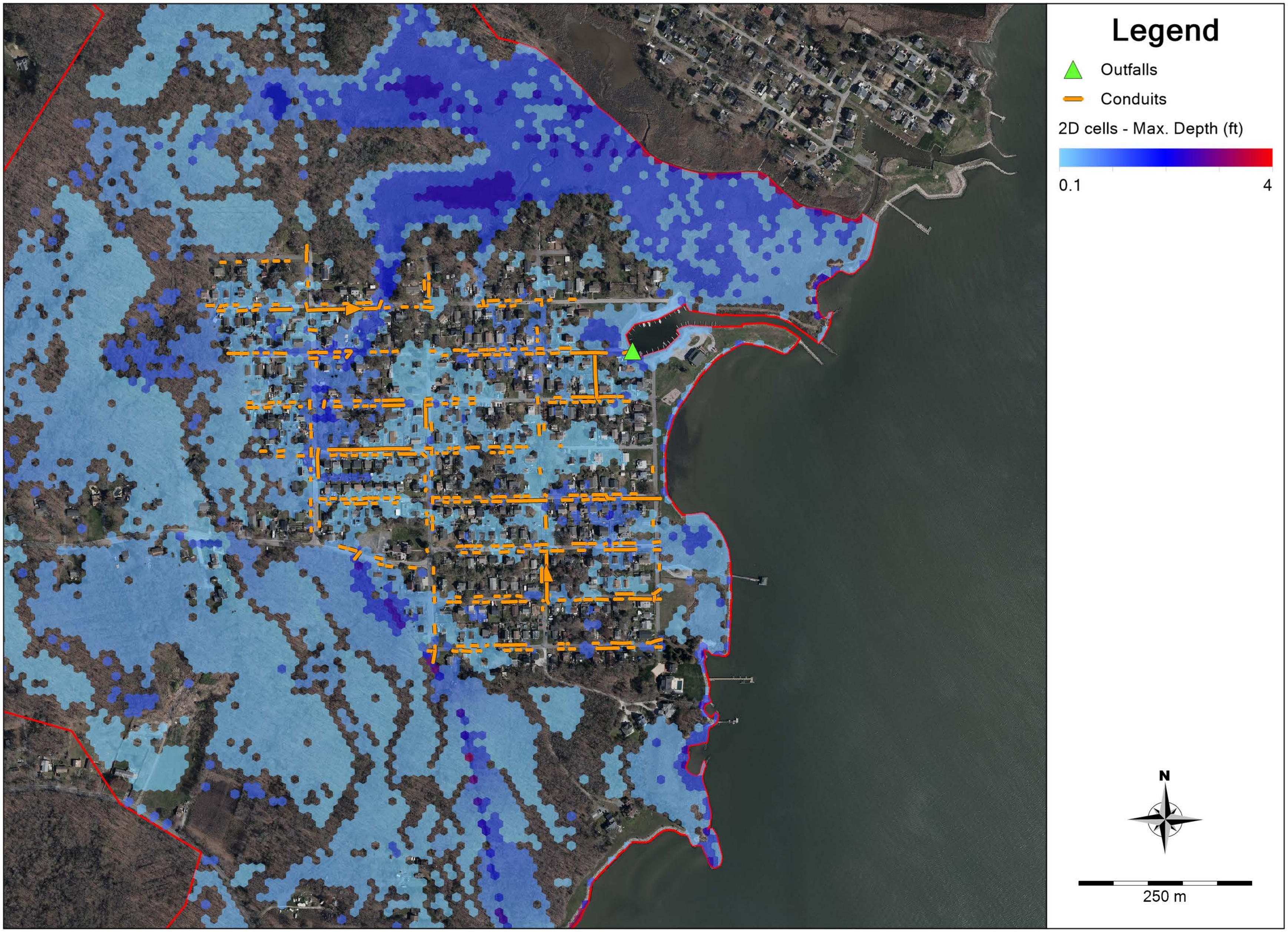
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
250 m


Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
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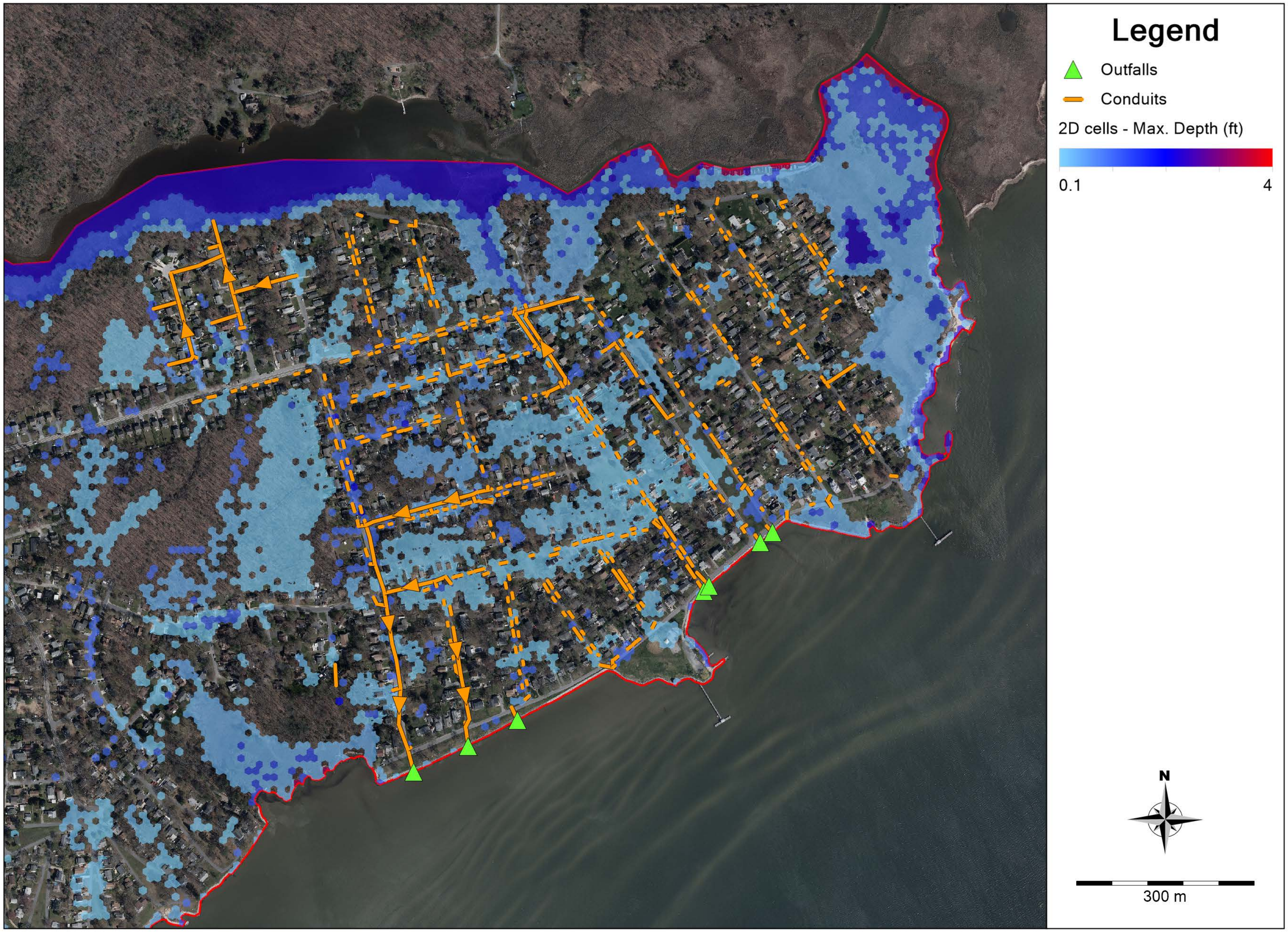
4
N
250 m

Legend
Outfalls
Conduits
FRANKLIN_MANOR_
DA_OUTLINE
N
250 m



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Outfalls
Conduits
2D cells - Max. Depth (ft)
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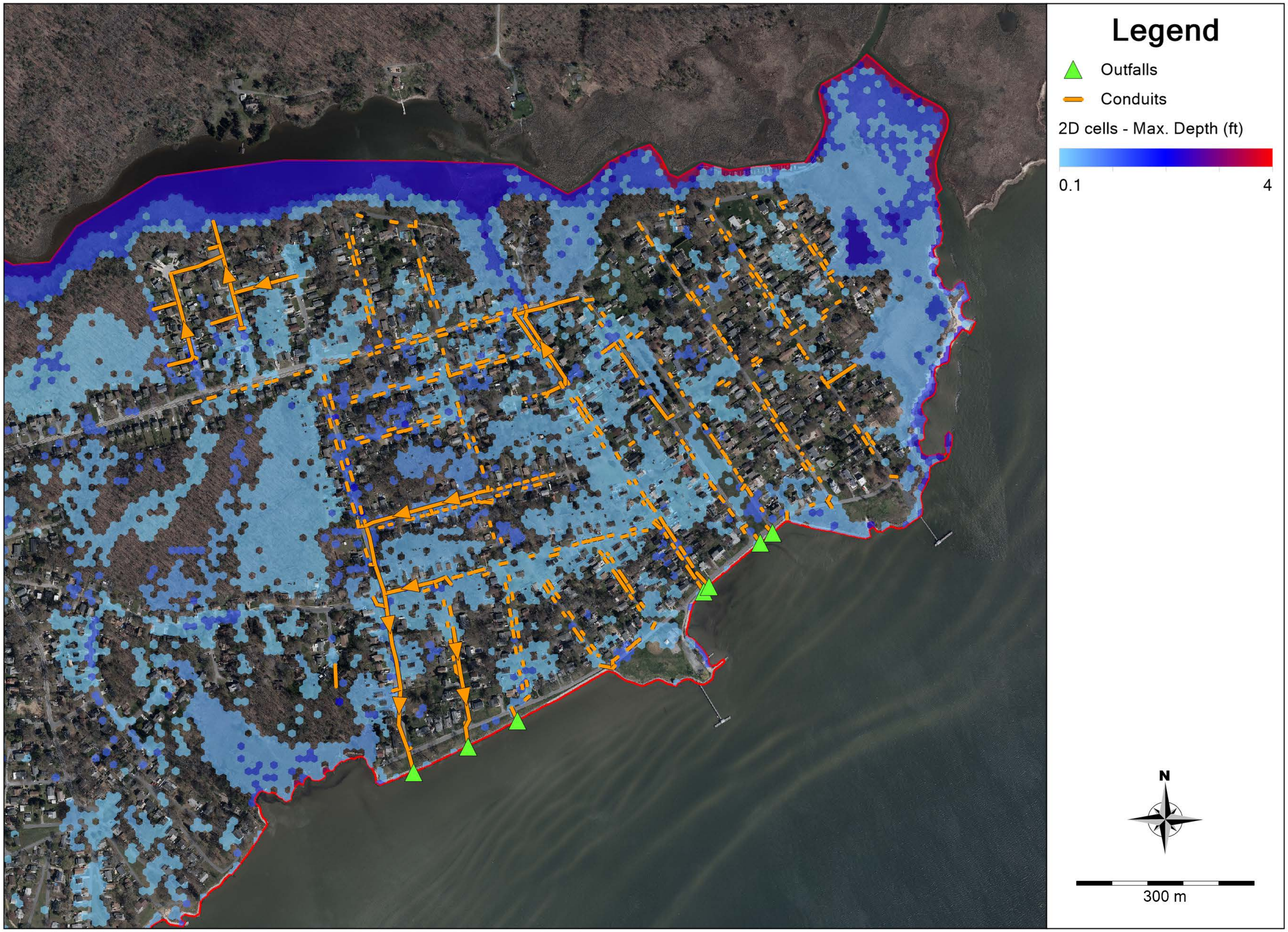
4
N
300 m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Conduits
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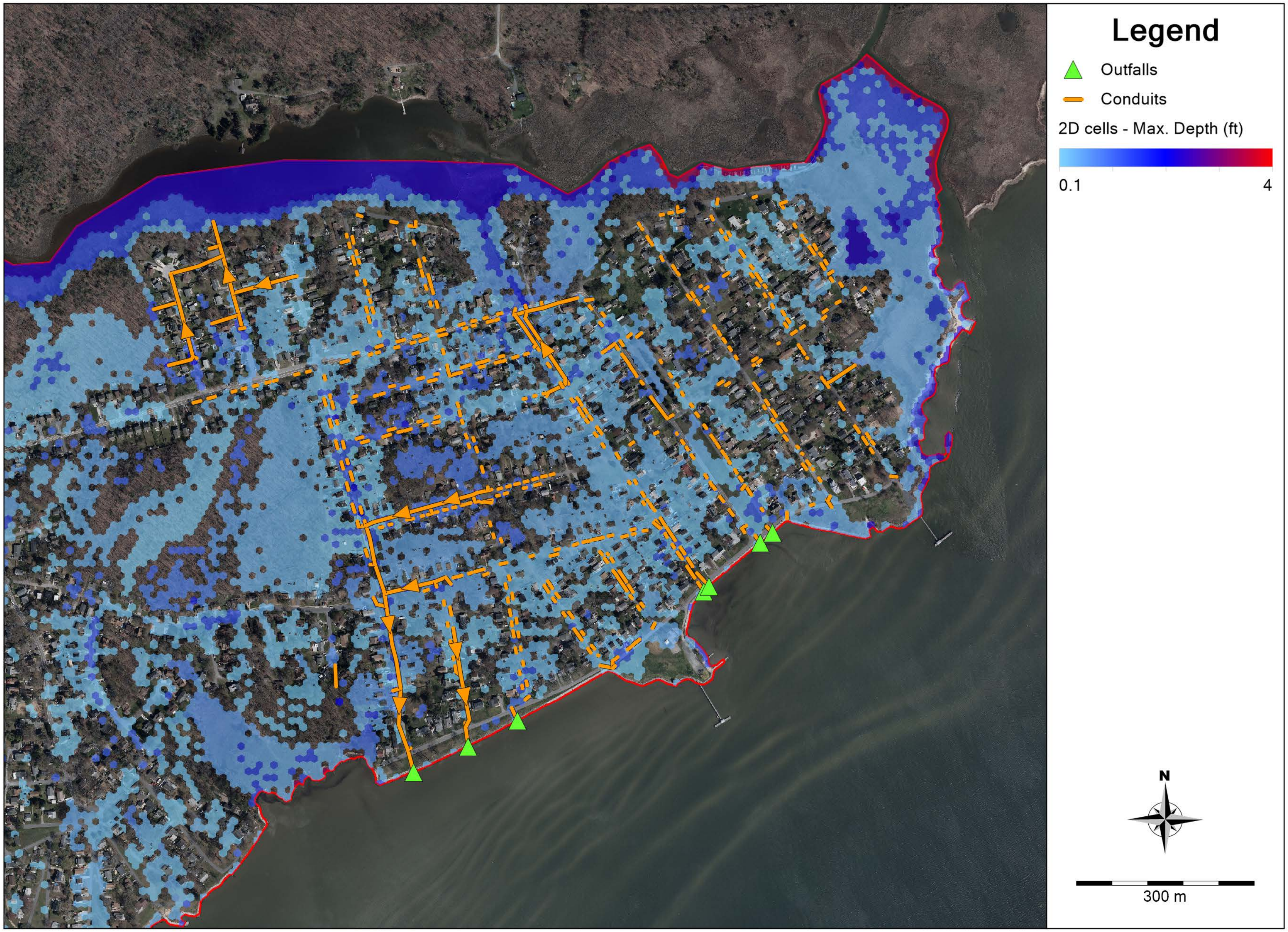
4
N
300 m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Outfalls
Conduits
2D cells - Max. Depth (ft)
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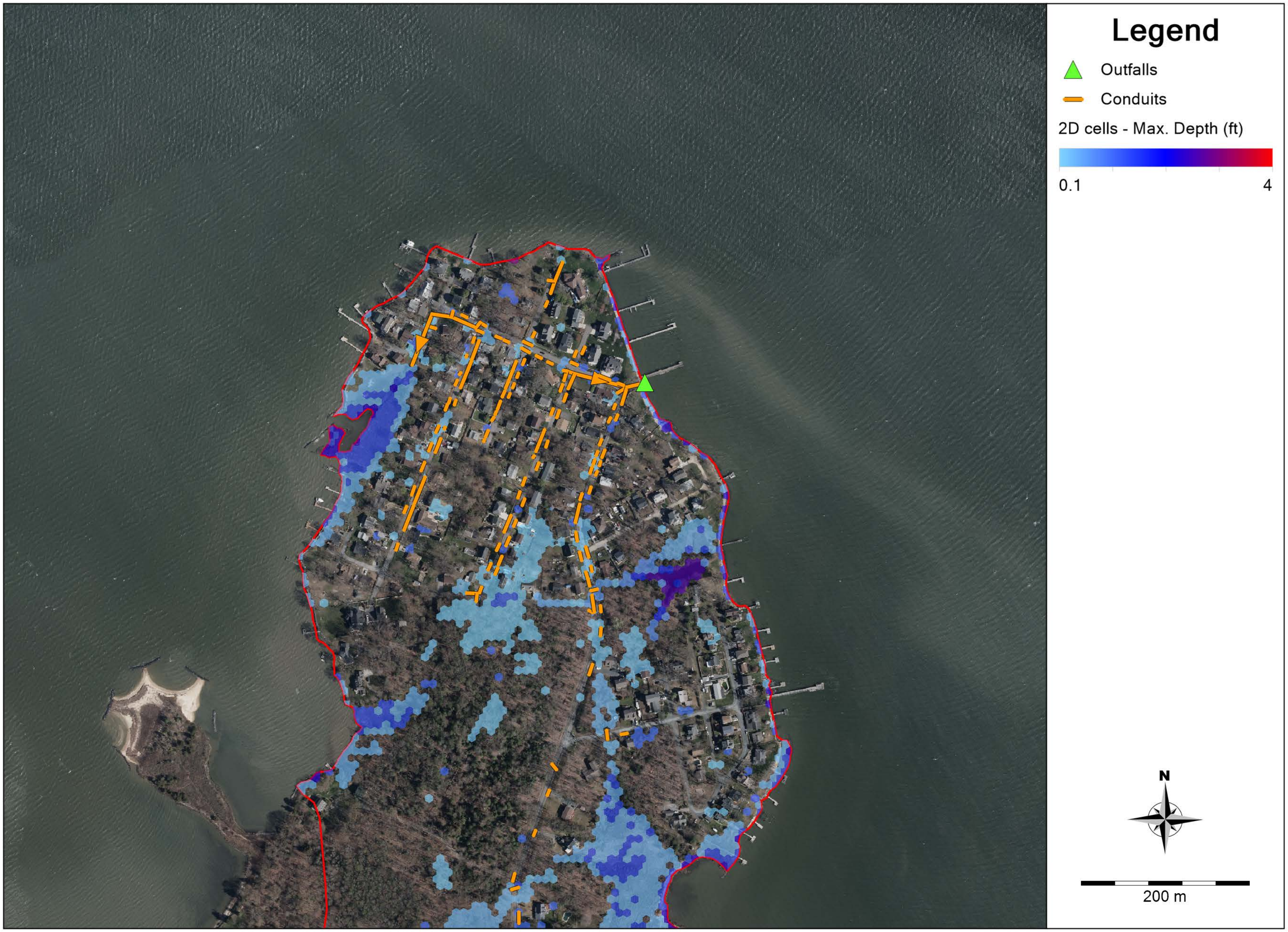
4
N
300 m


Legend
Outfalls
Conduits
IDLEWILDE_SHORES
_DA_OUTLINE
N
200 m



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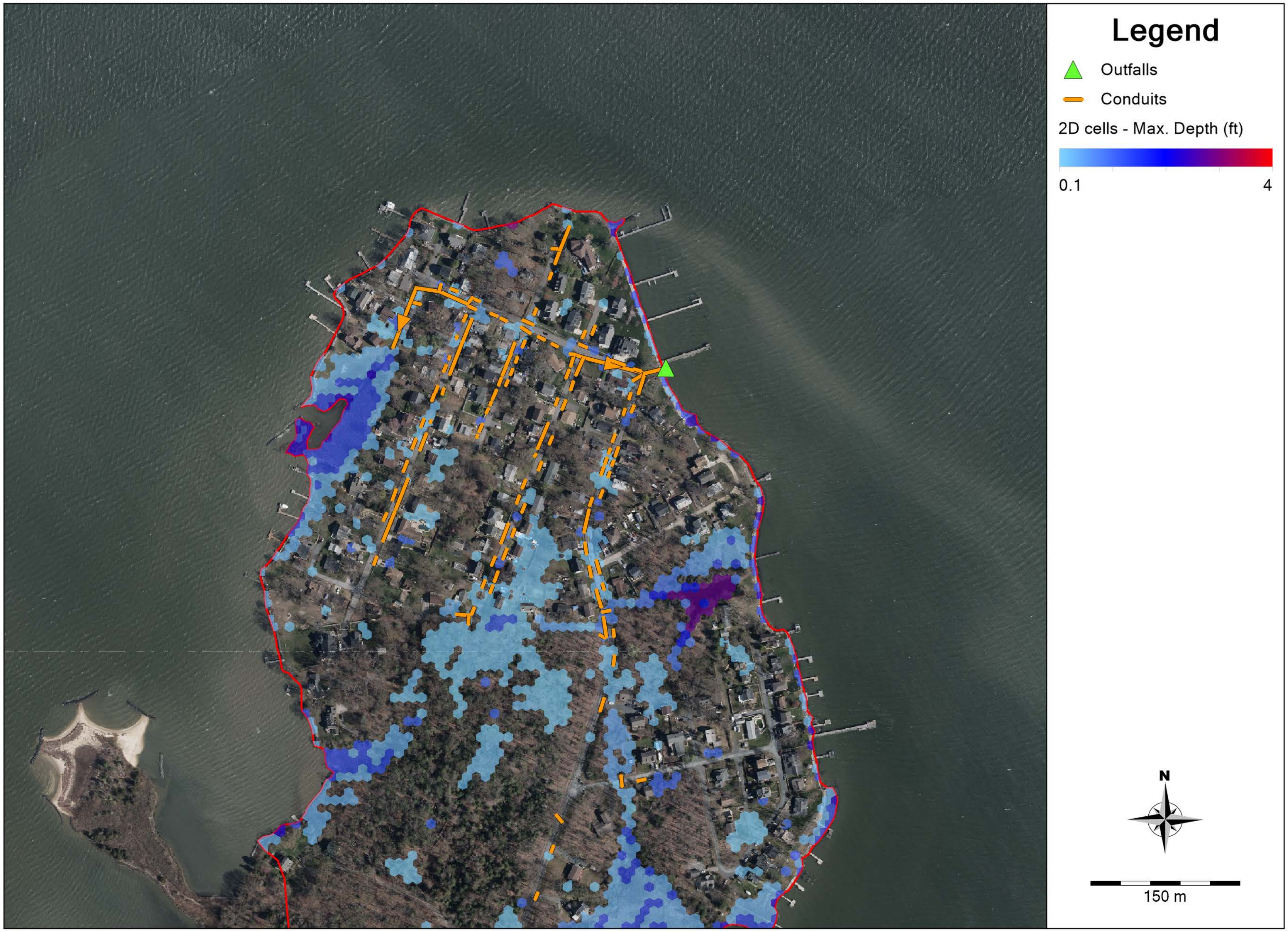
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
200 m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Outfalls
Conduits
2D cells - Max. Depth (ft)
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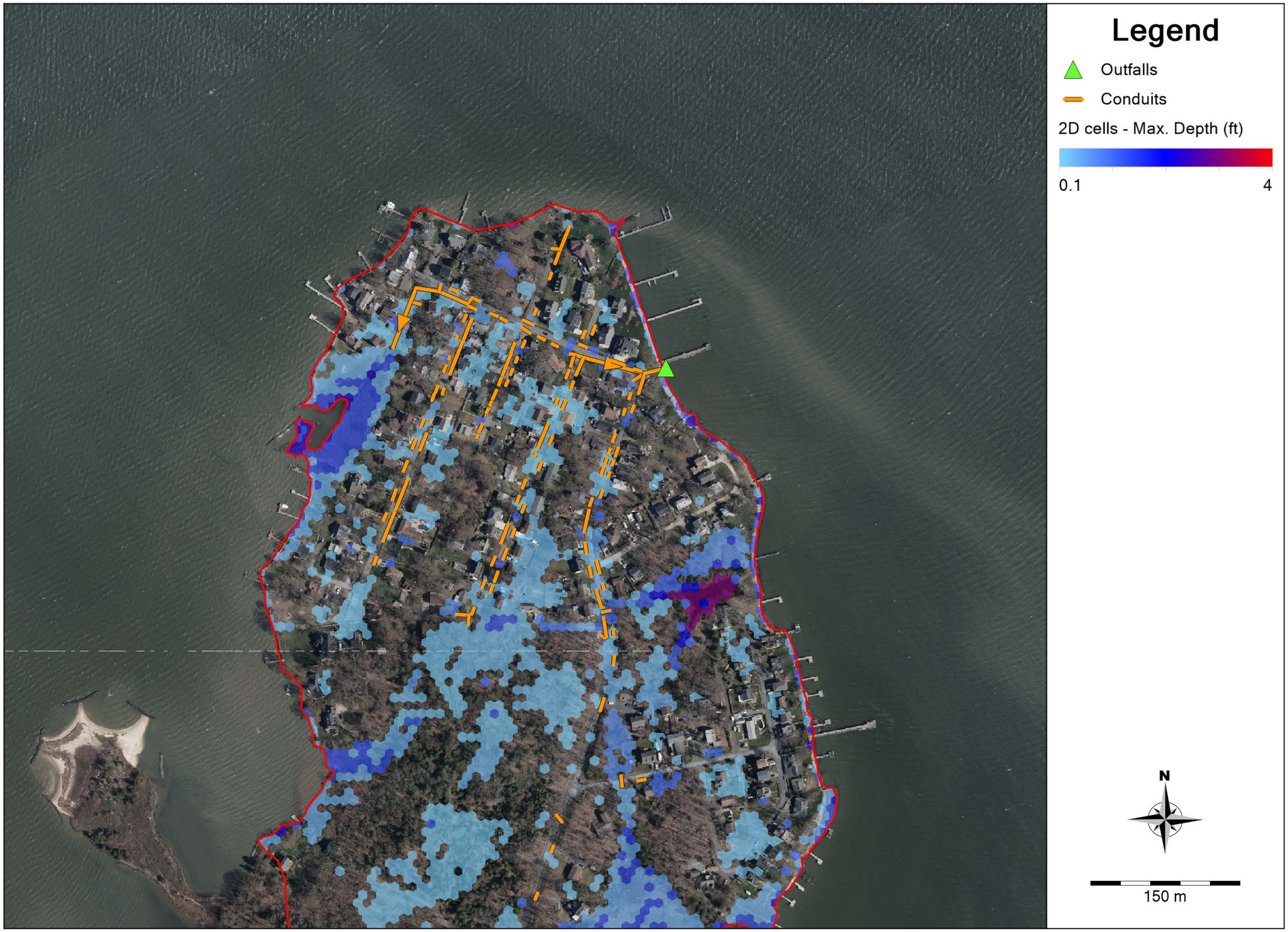
4
N
150 m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Outfalls
Conduits
2D cells - Max. Depth (ft)
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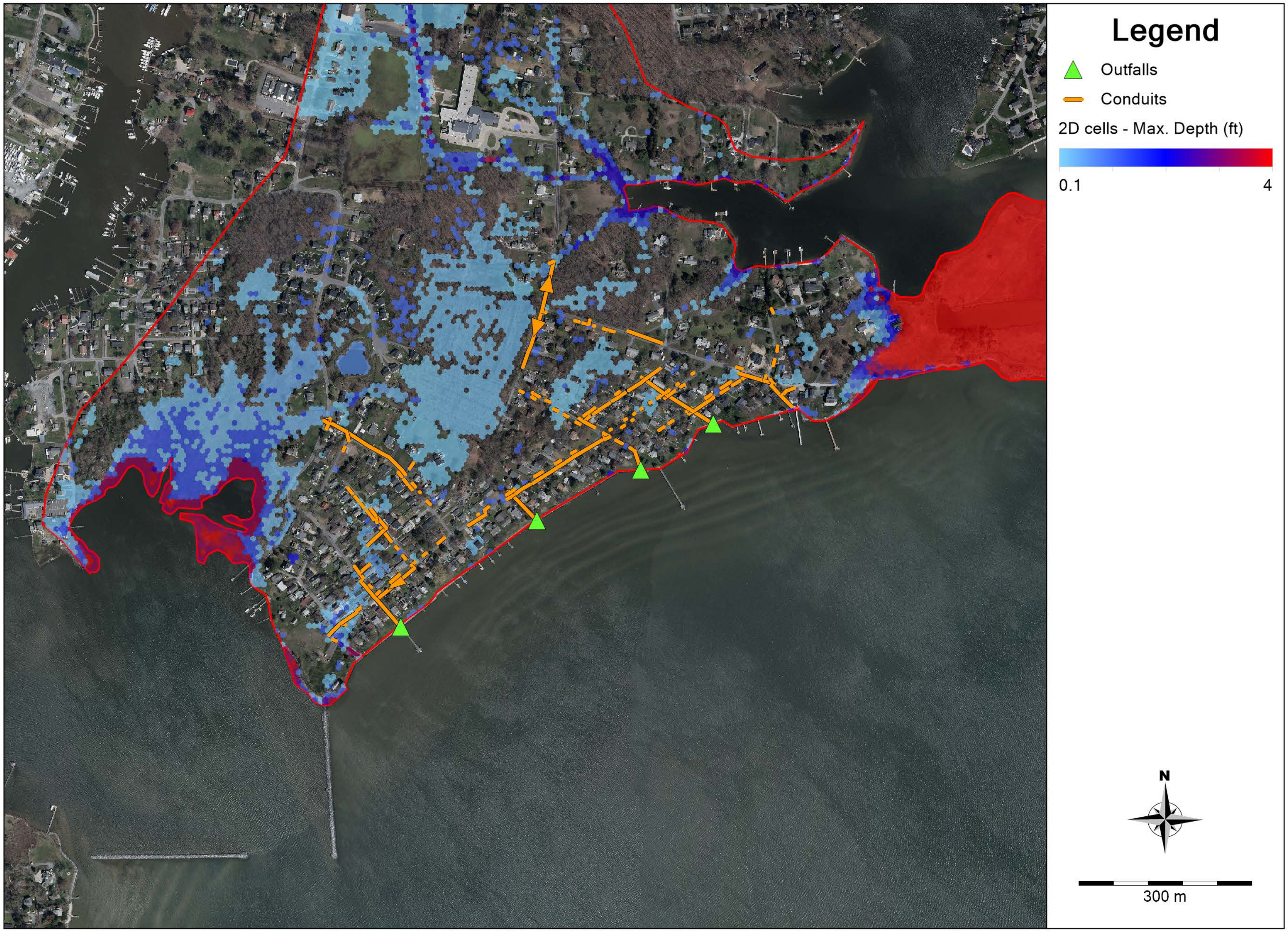
4
N
150 m

Legend
Outfalls
Conduits
Owings_Beach_DA_OUTLINE
N
200 m



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Conduits
2D cells - Max. Depth (ft)
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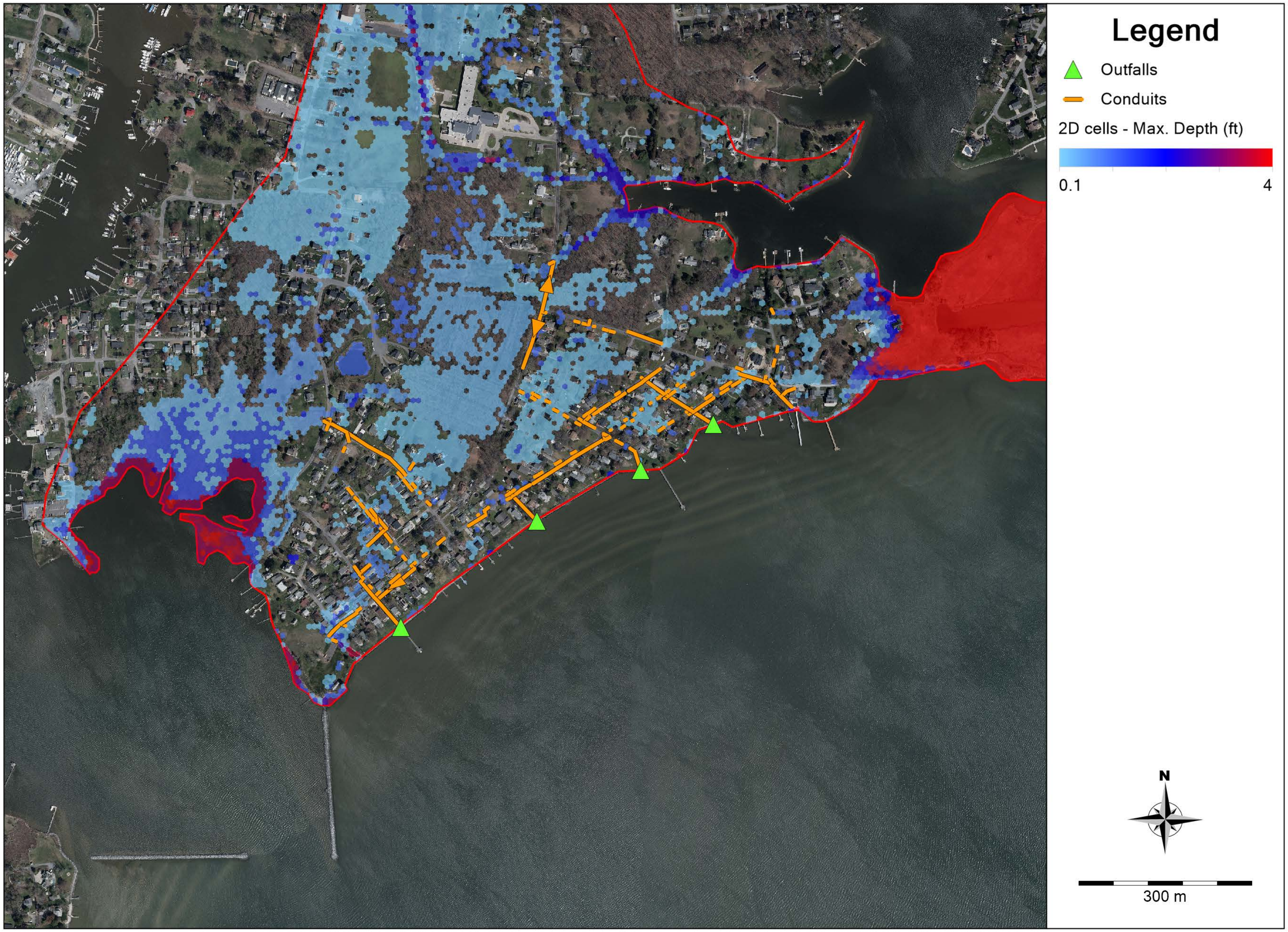
N
300 m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Conduits
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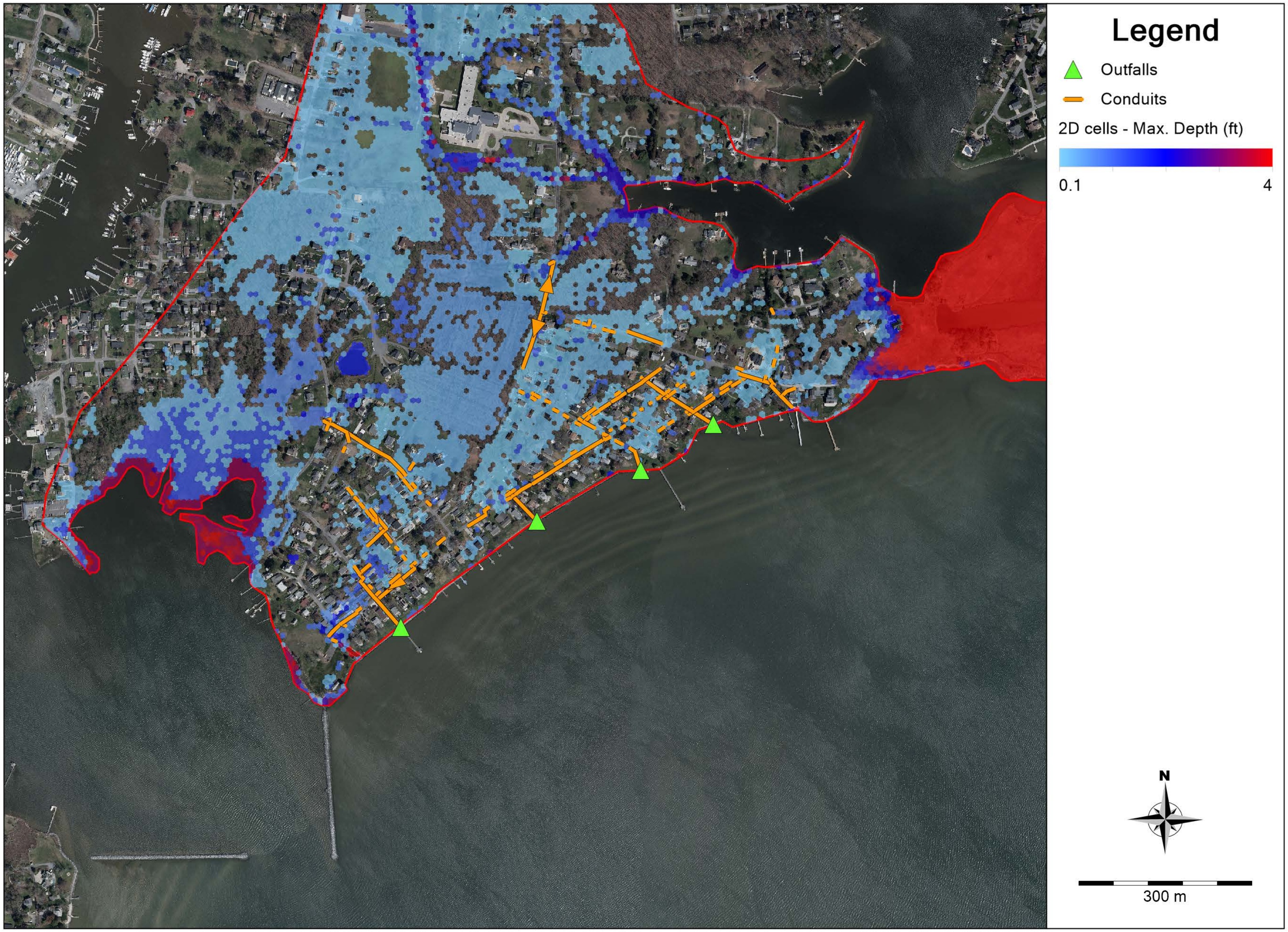
4
N
300 m



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Outfalls
Conduits
2D cells - Max. Depth (ft)
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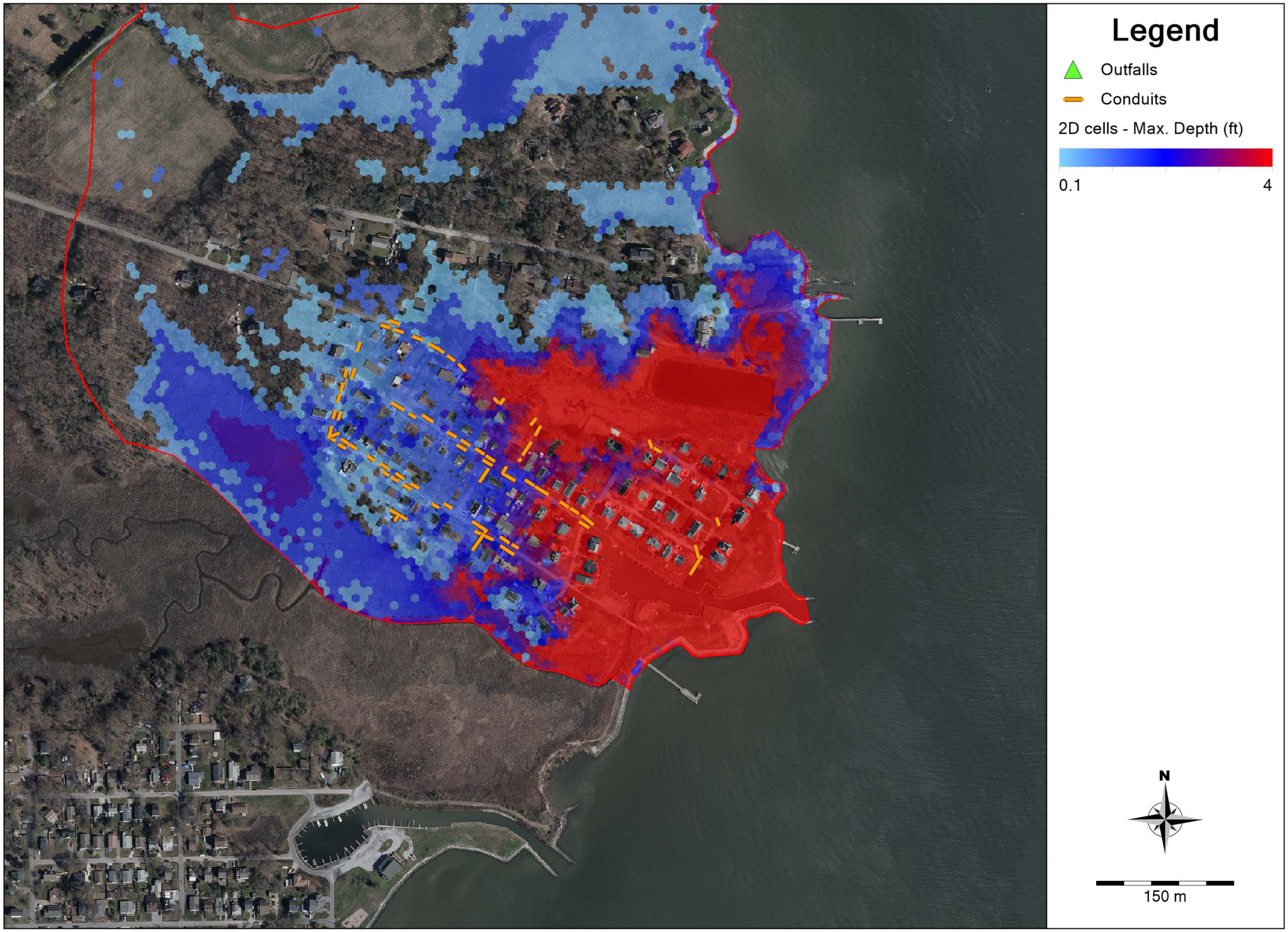
4
N
300 m

Legend
Outfalls
Conduits
SNUG_HARBOR_DA_OUTLINE
N
100 m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Conduits
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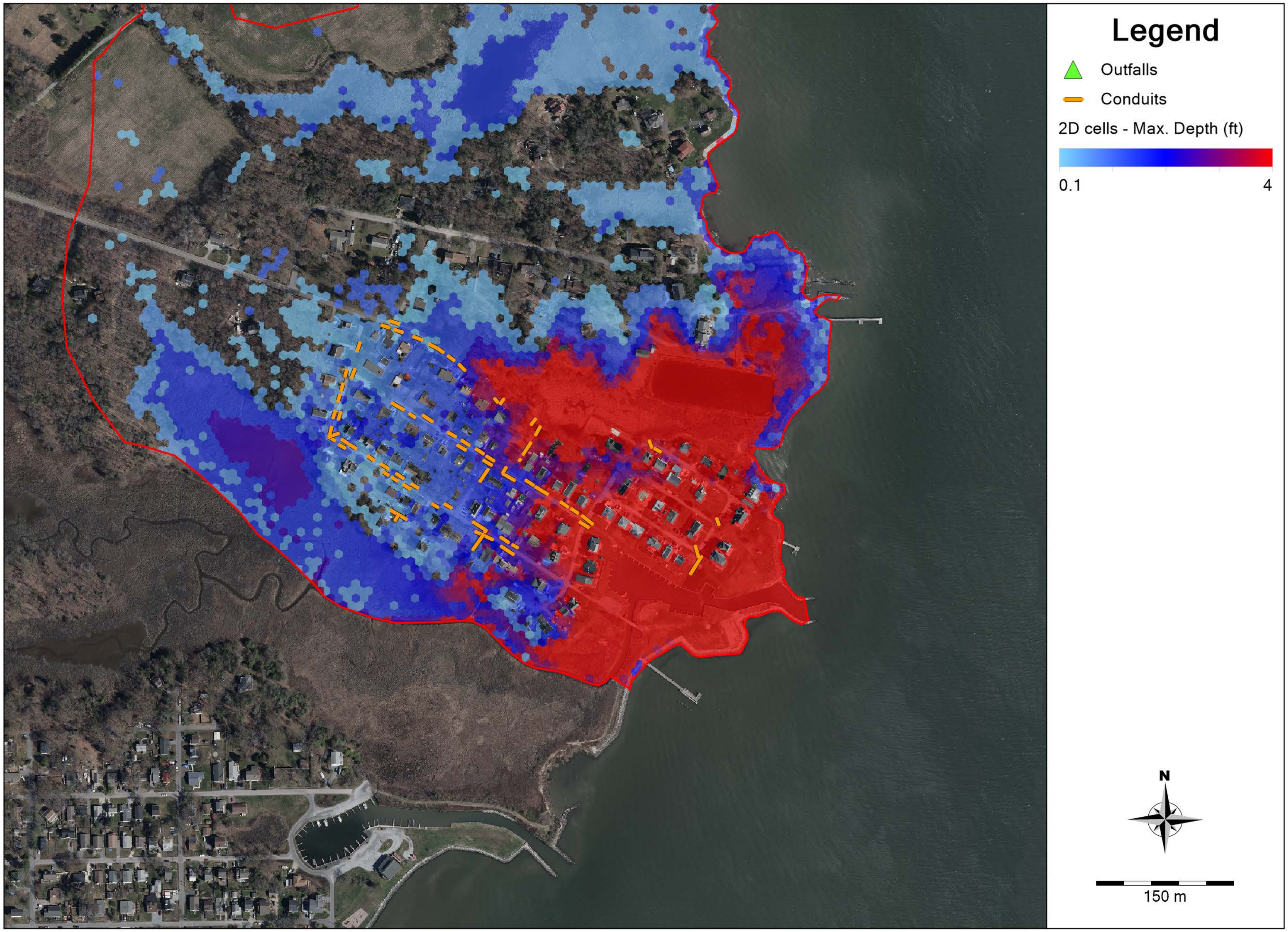
4
N
150 m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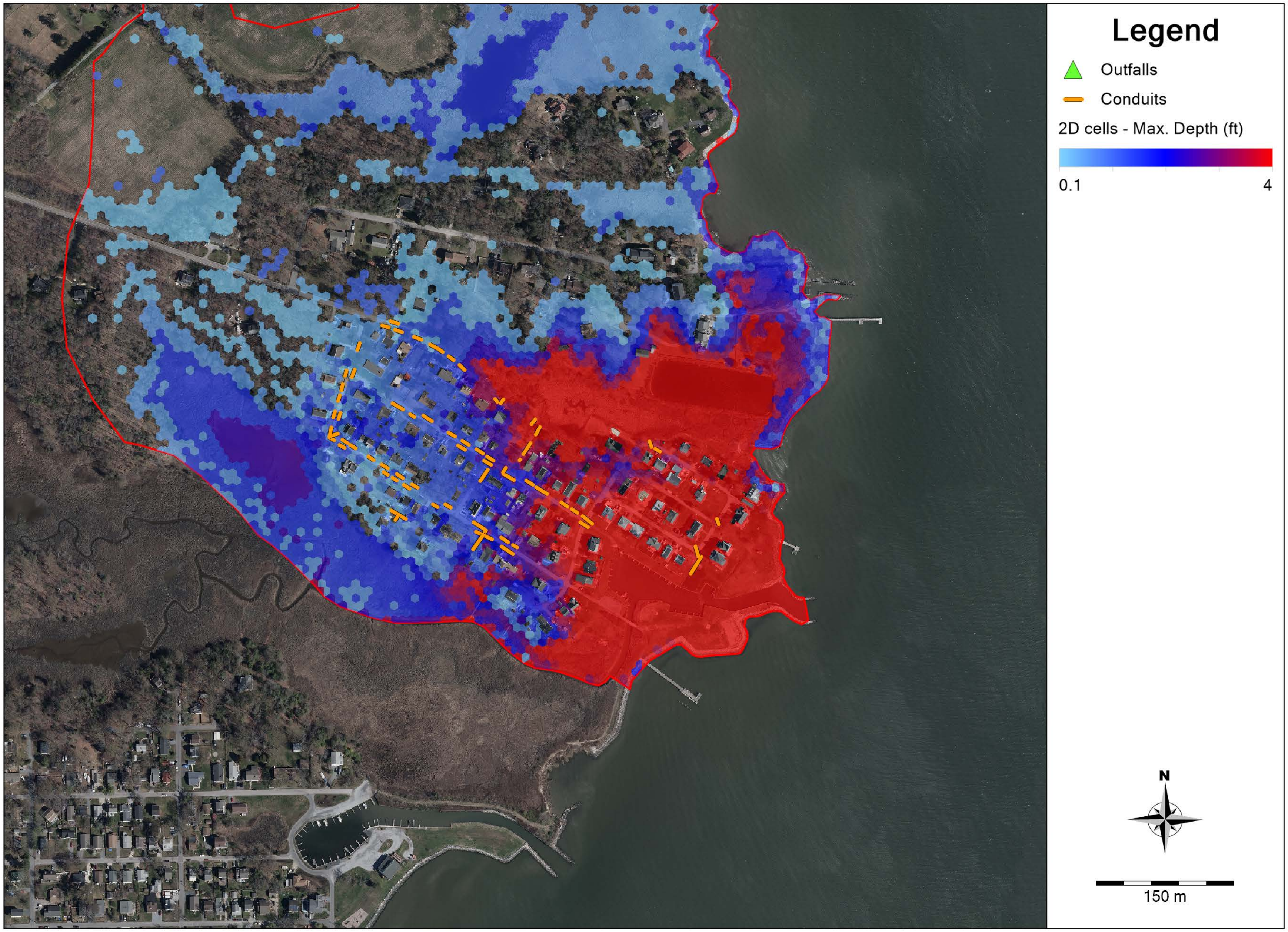
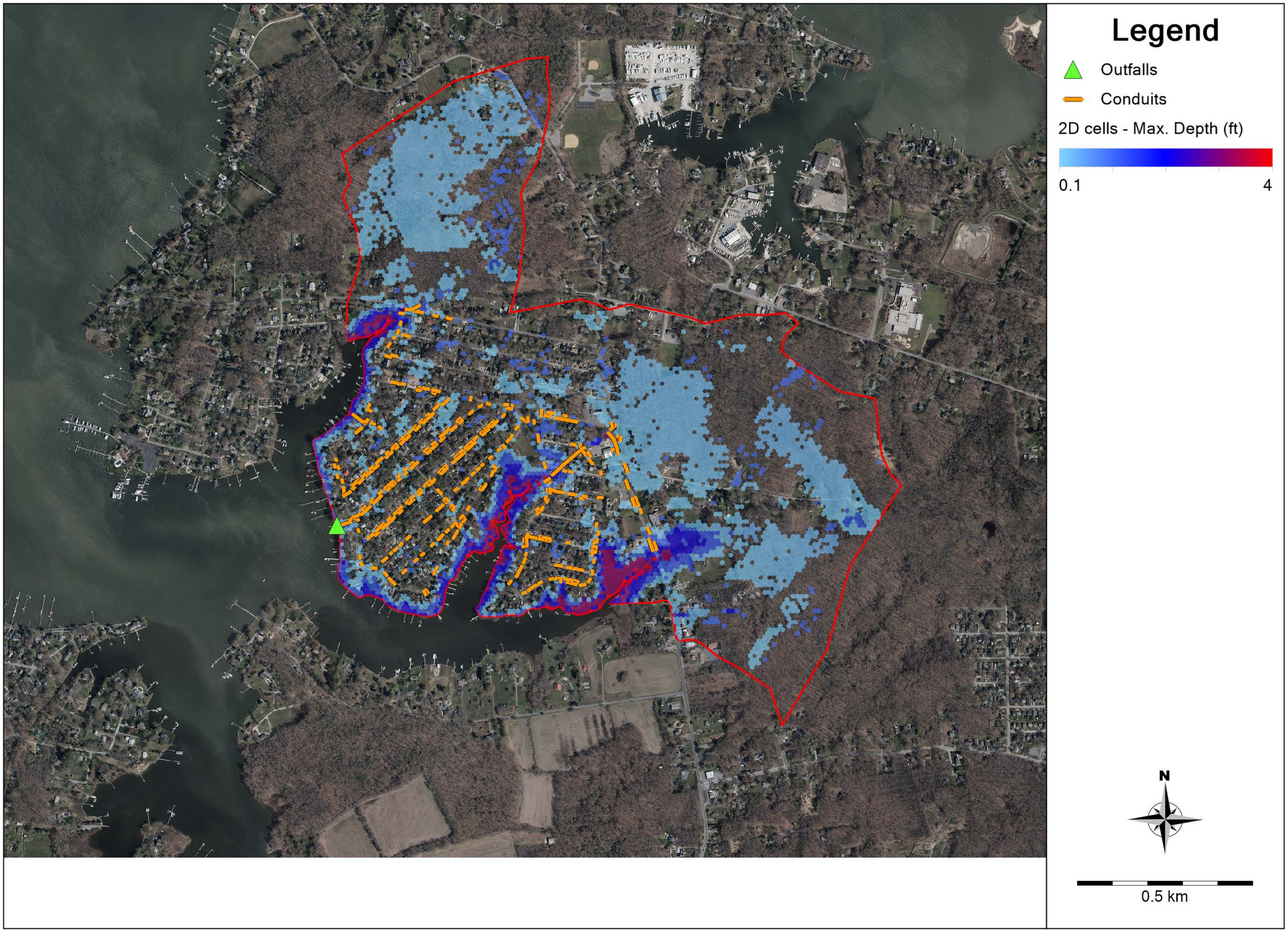
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
150 m



Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
150 m

2050 WITH STORM SURGE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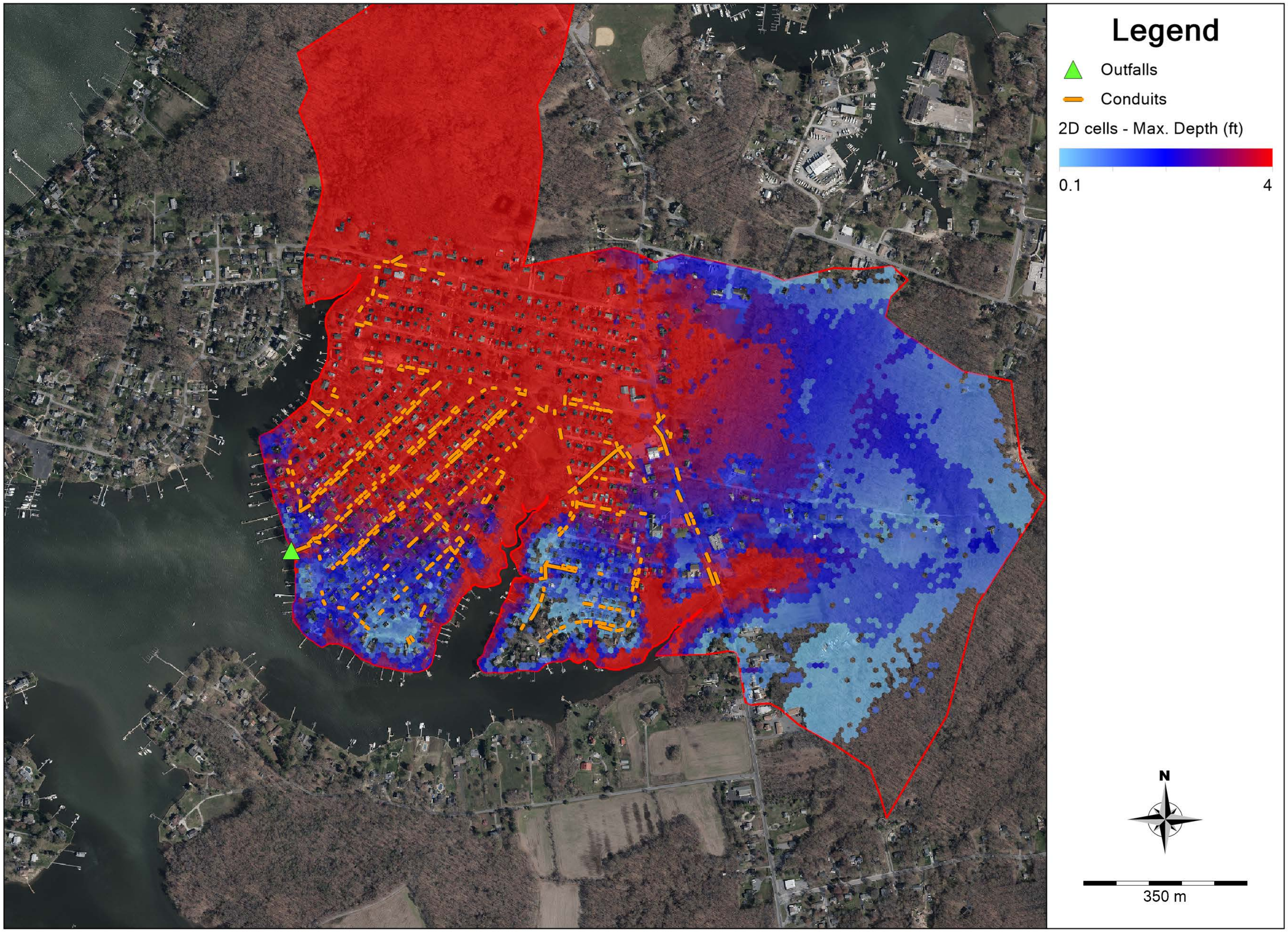
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
0.5 km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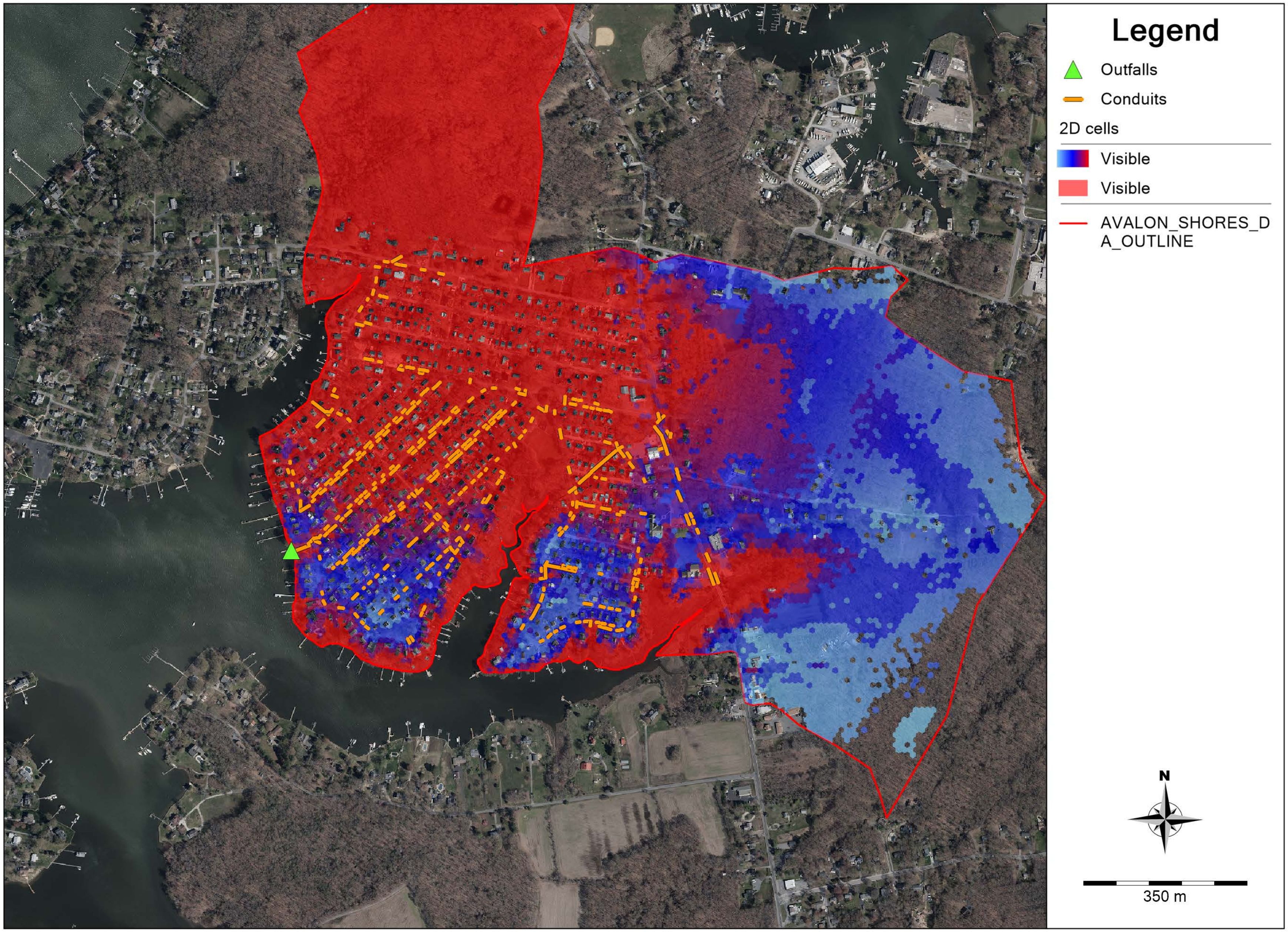
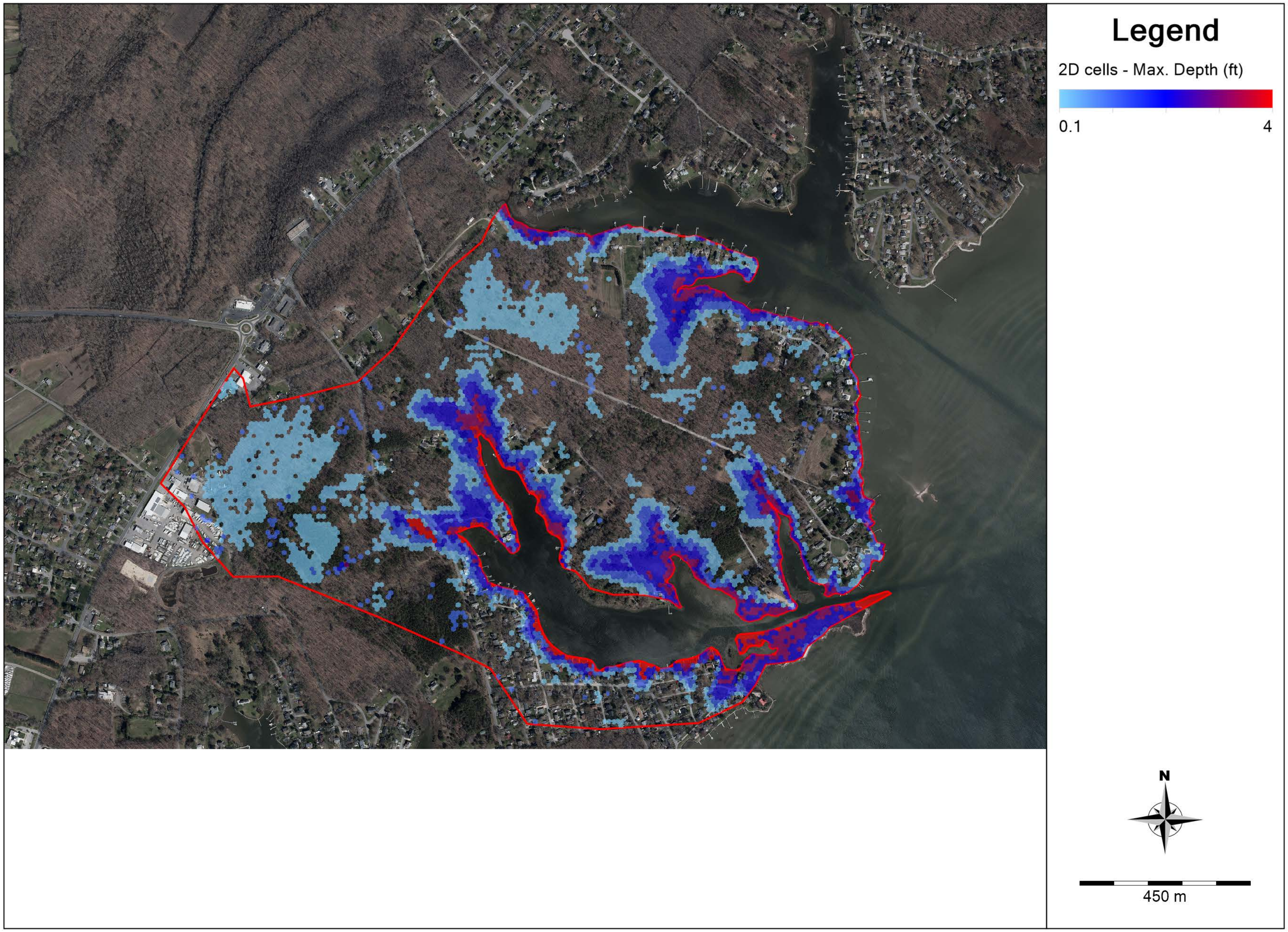
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
350 m



Legend
Outfalls
Conduits
2D cells
Visible
Visible
AVALON_SHORES_DA_OUTLINE
N
350 m



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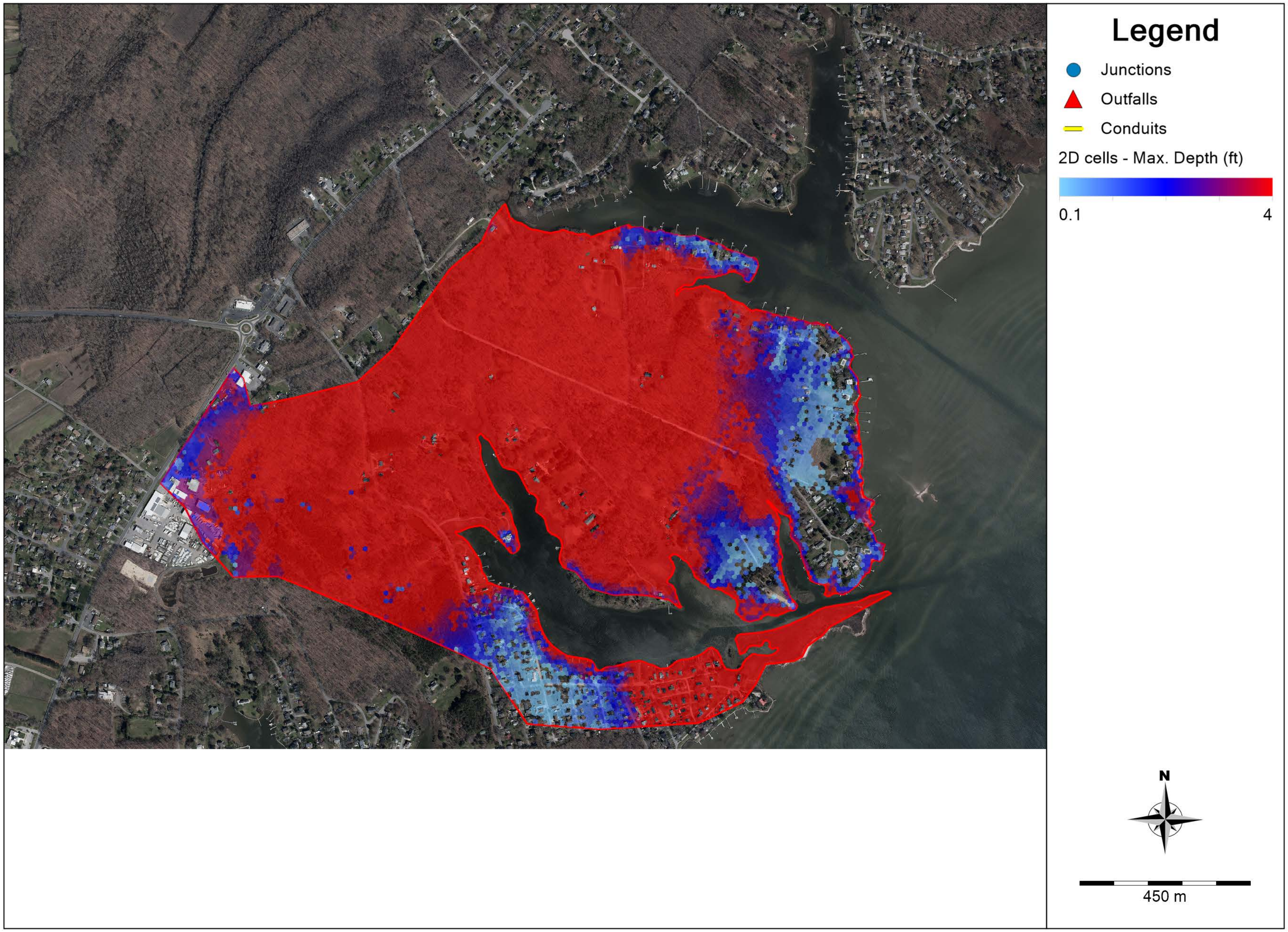
2D cells - Max. Depth (ft)
0.1
4
N
450 m



Legend
Junctions
Outfalls
Conduits
2D cells - Max. Depth (ft)
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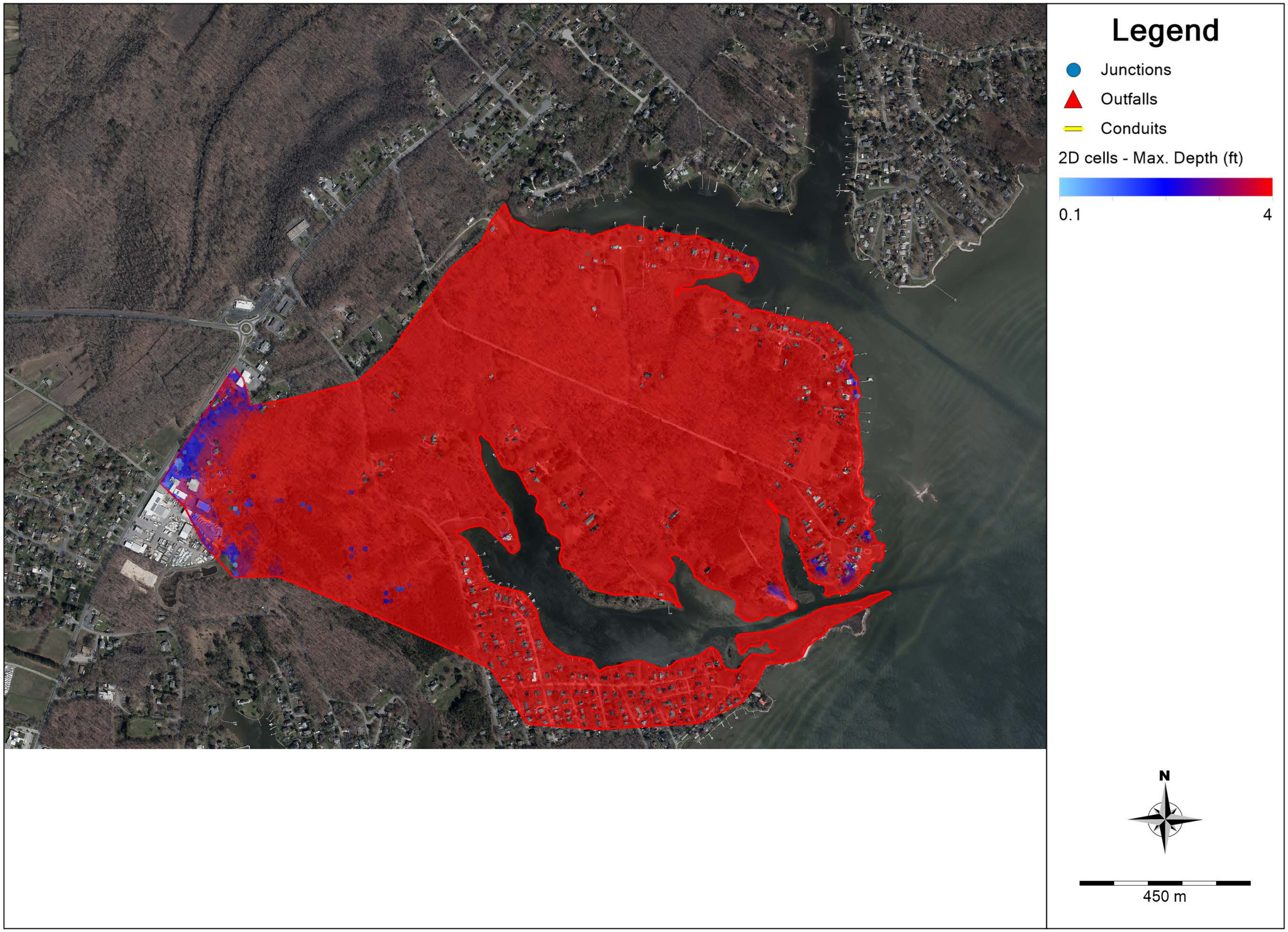
4
N
450 m



Legend
Junctions
Outfalls
Conduits
2D cells - Max. Depth (ft)
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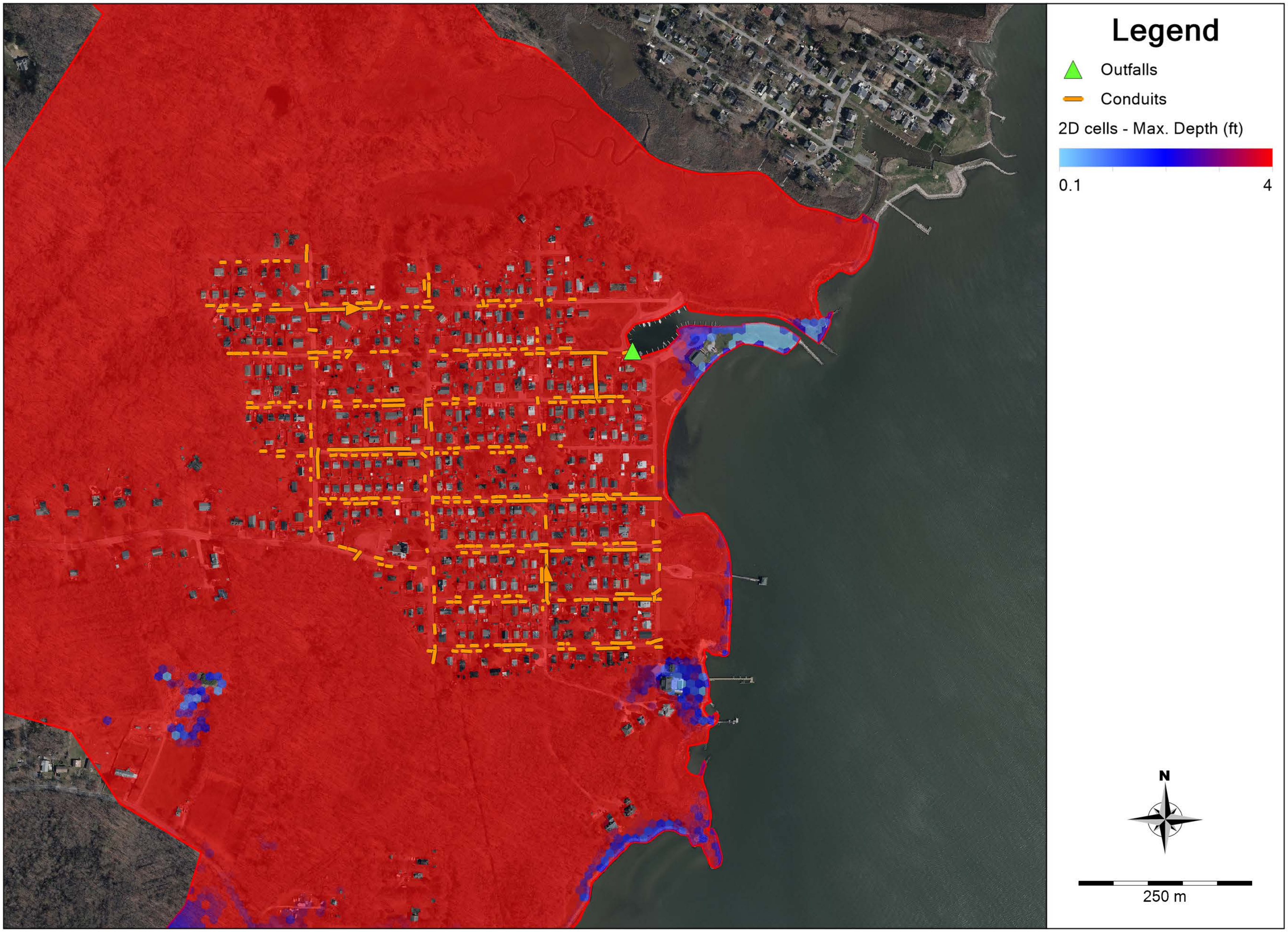
4
N
450 m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Outfalls
Conduits
2D cells - Max. Depth (ft)
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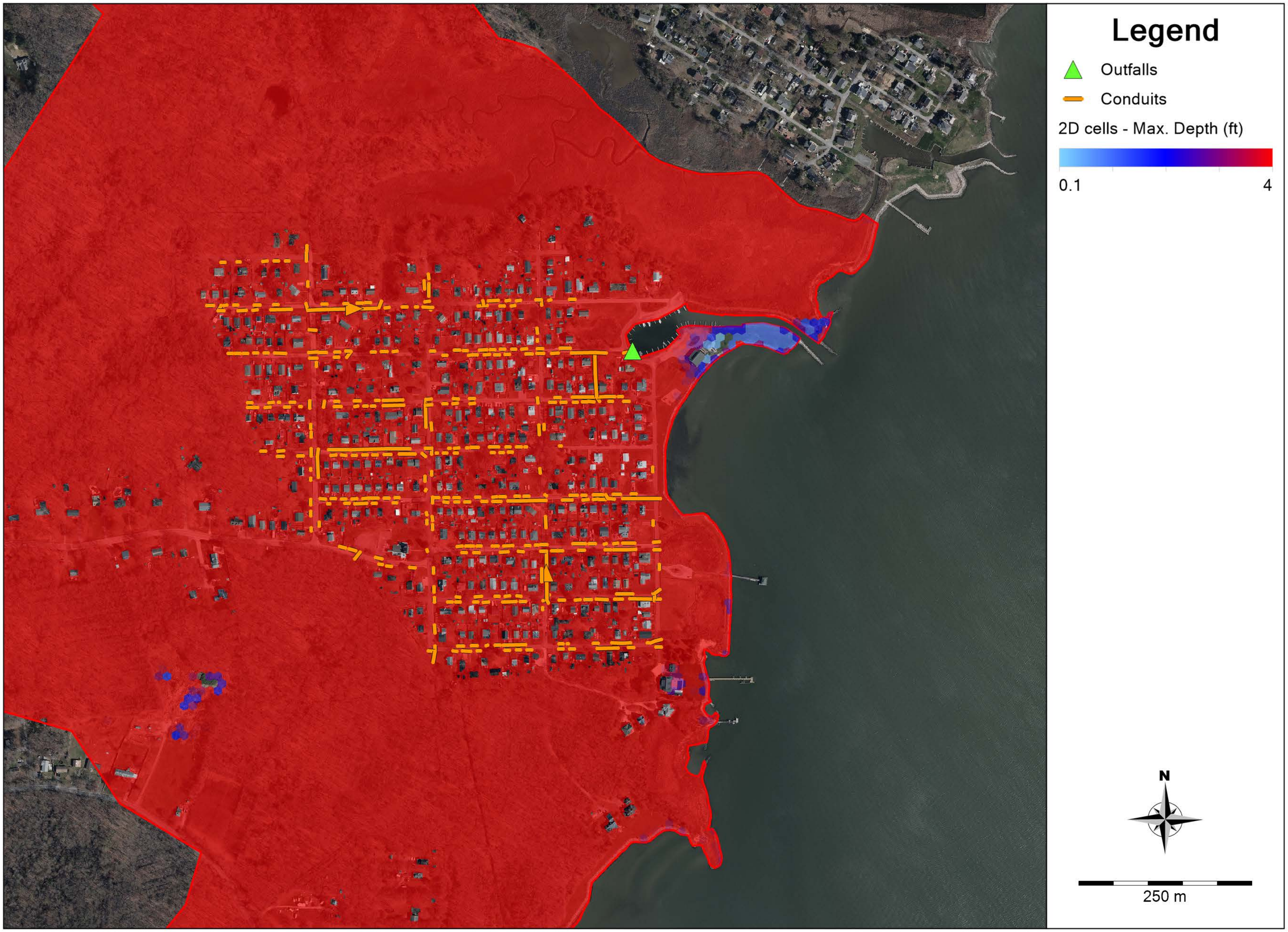
4
N
250 m



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Outfalls
Conduits
2D cells - Max. Depth (ft)
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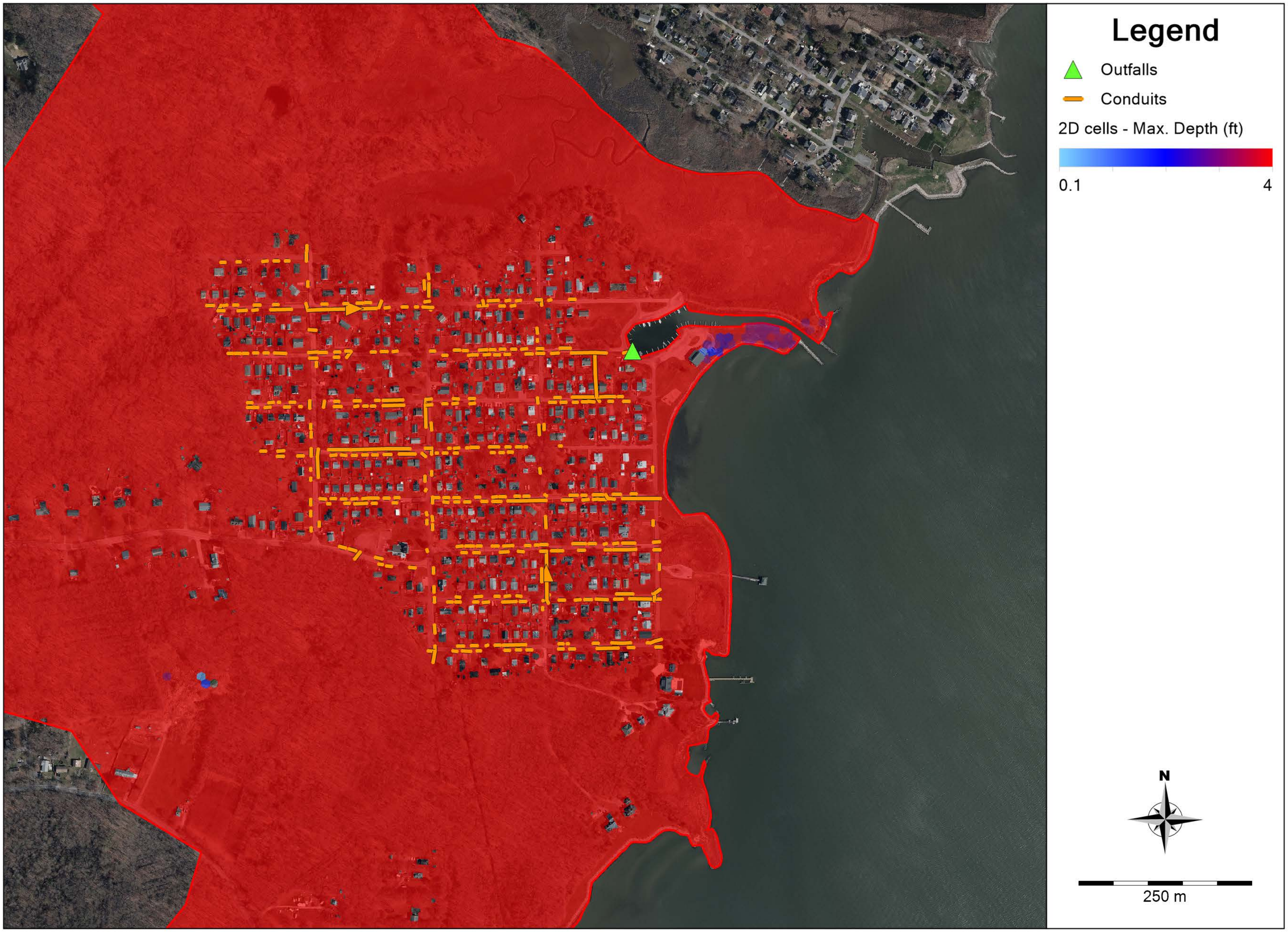
4
N
250 m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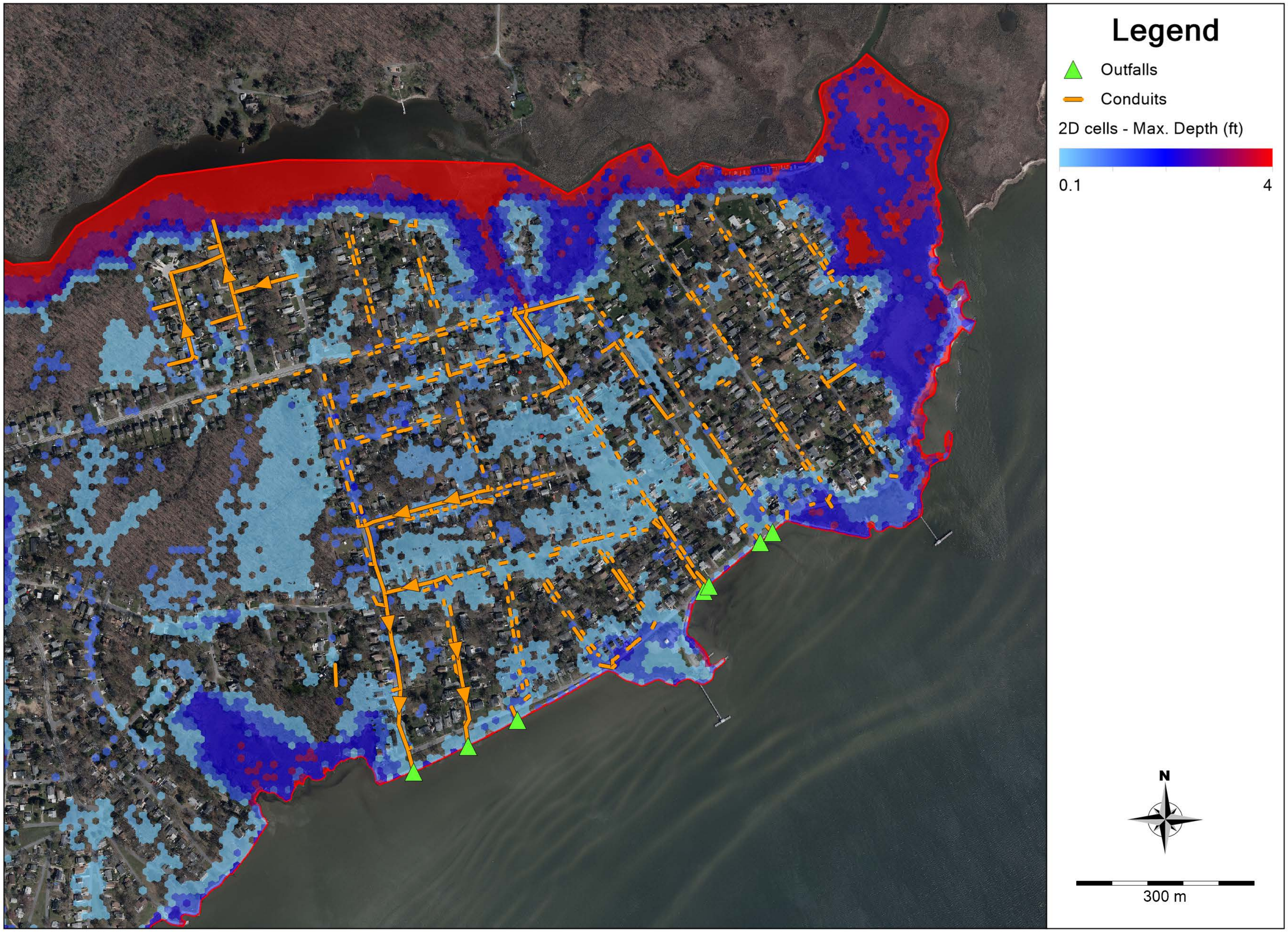
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
250 m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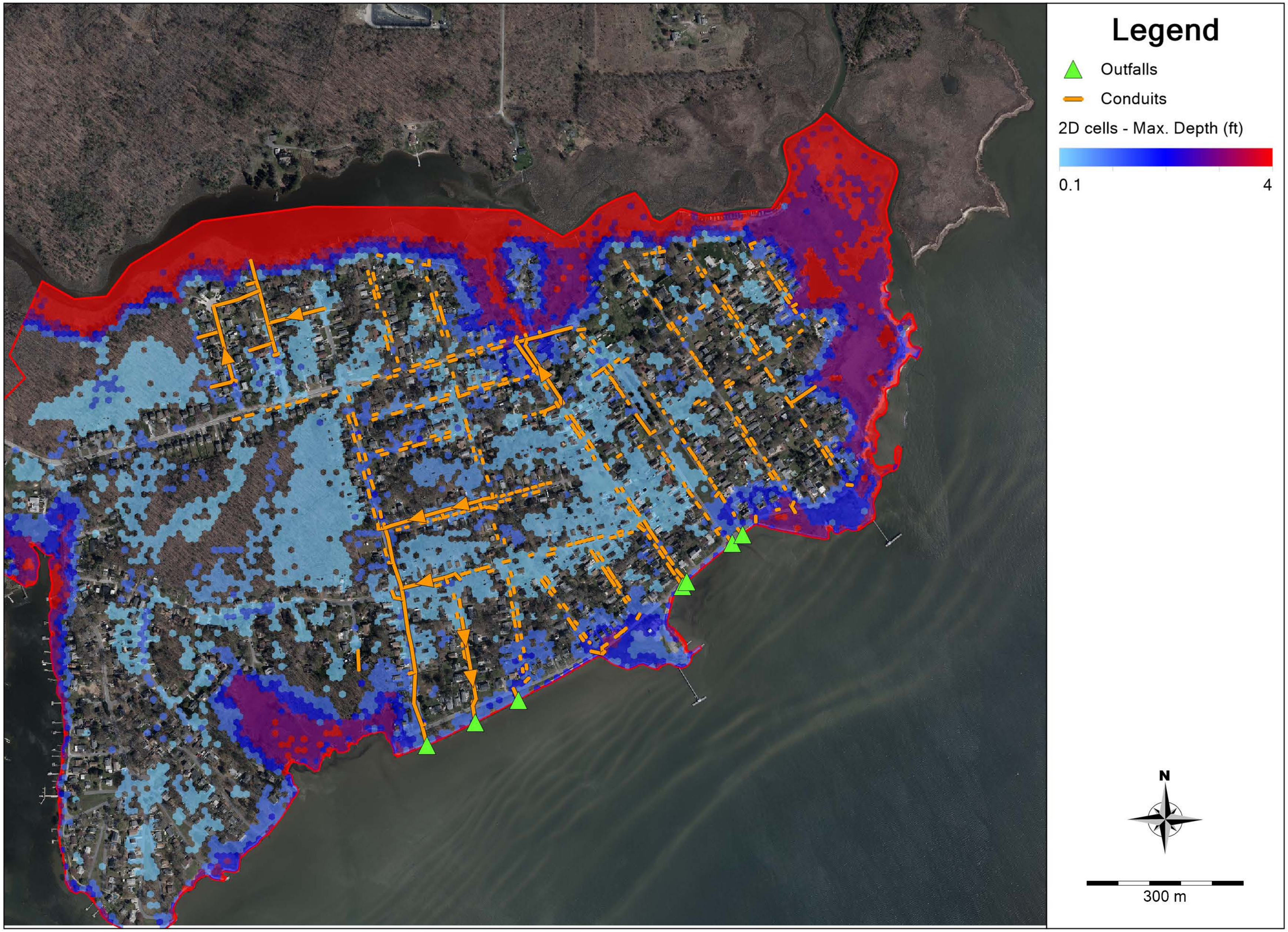

Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
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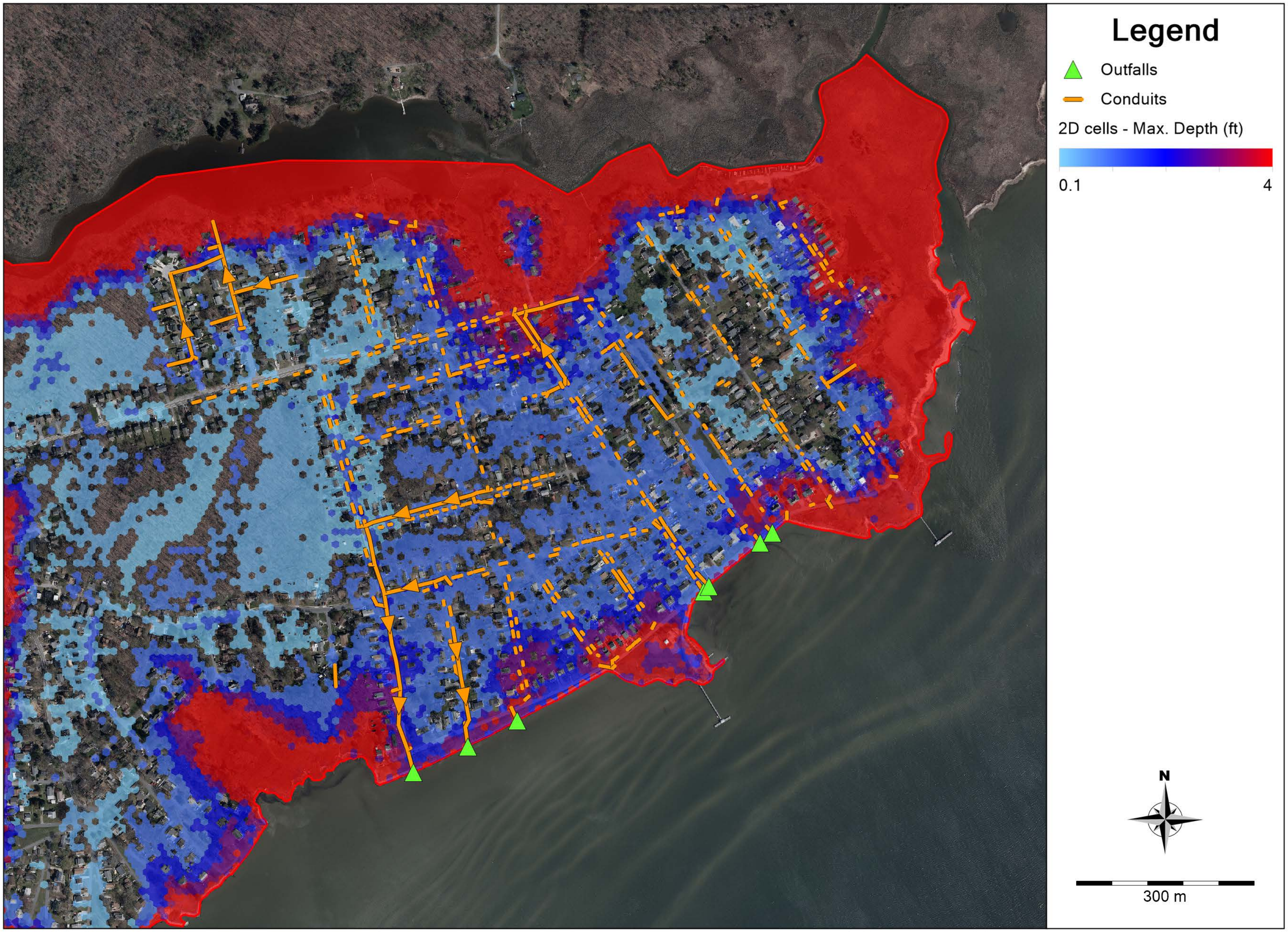
300 m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Outfalls
Conduits
2D cells - Max. Depth (ft)
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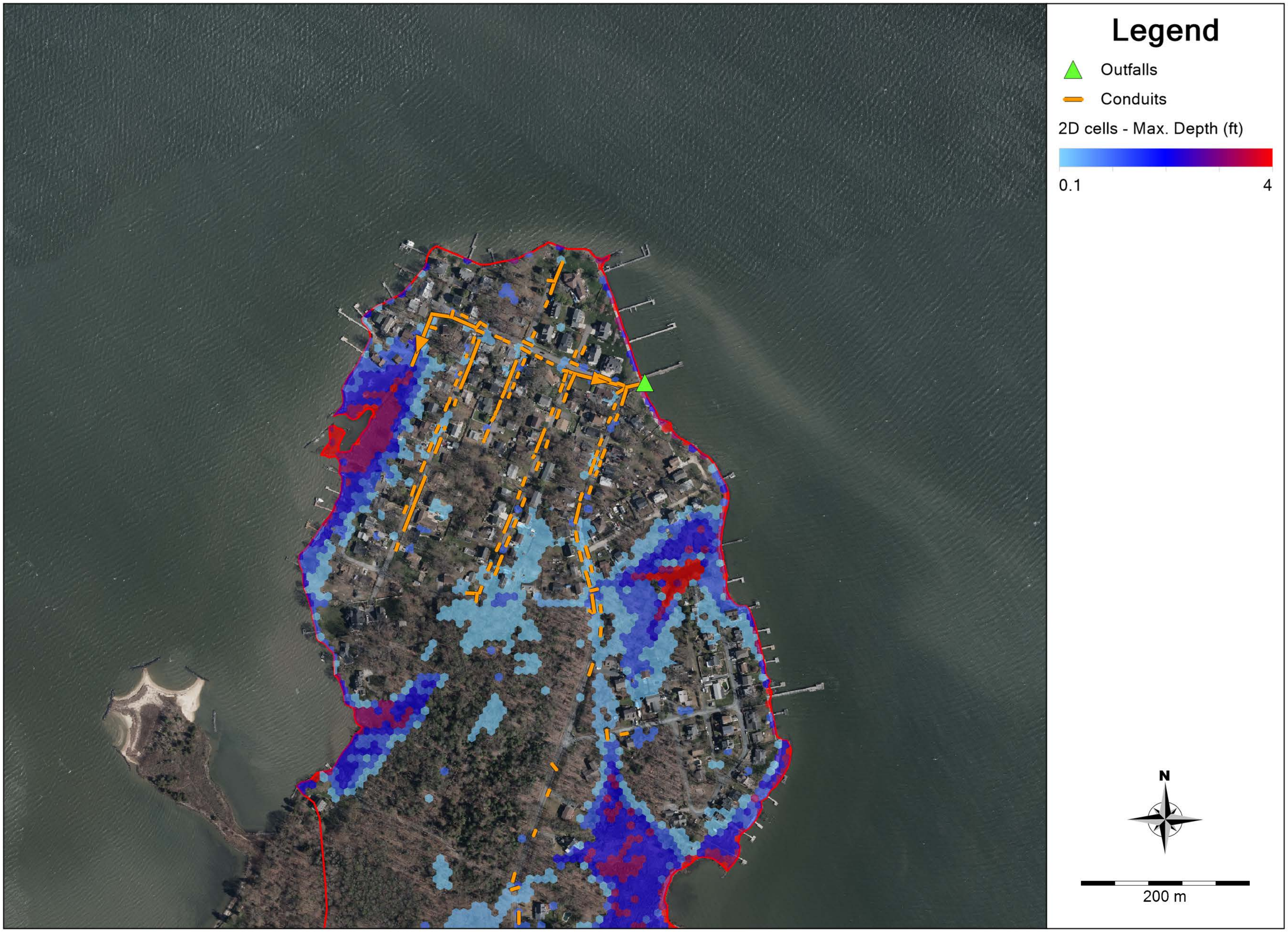
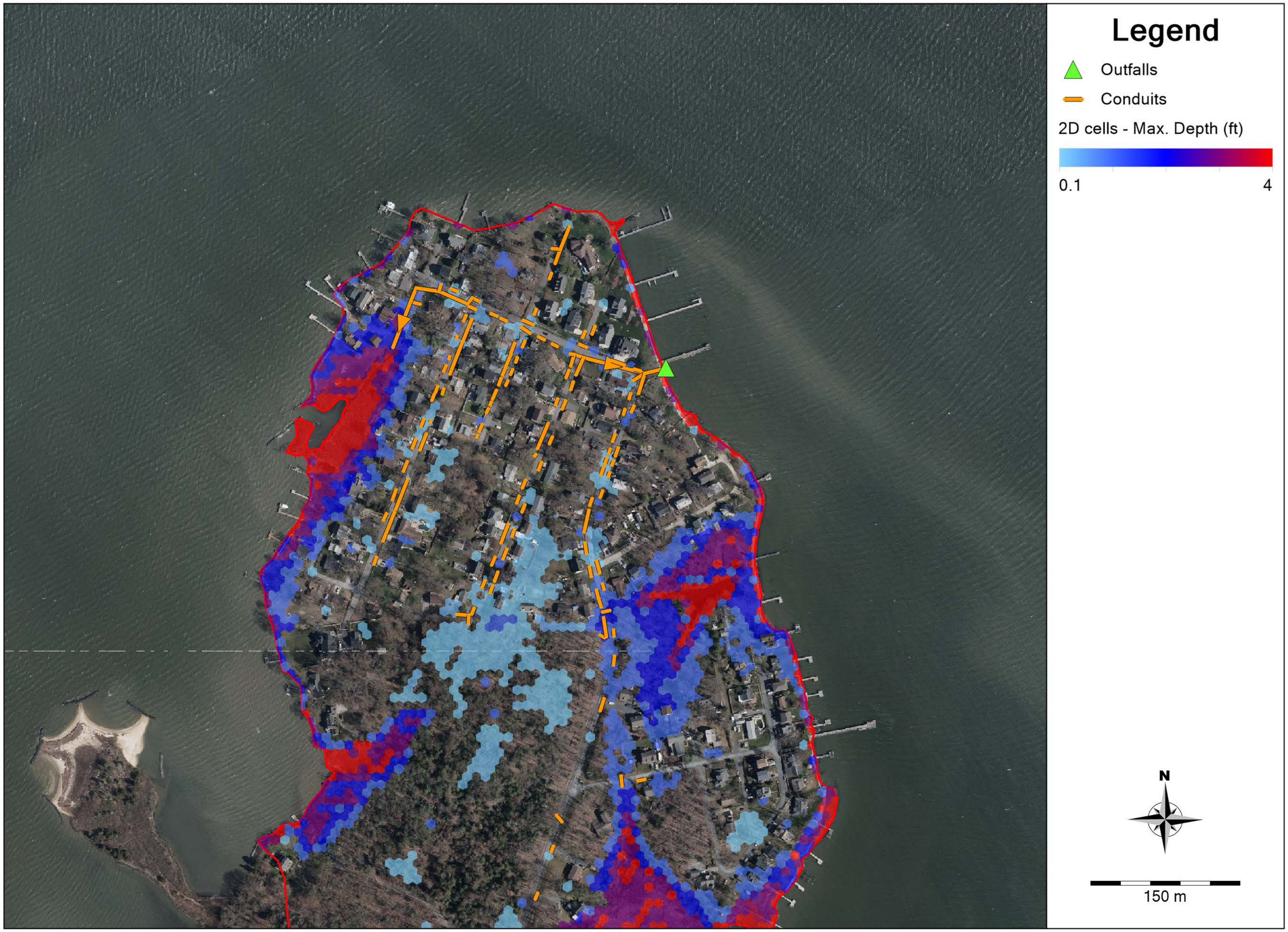
300 m



Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
200 m



Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
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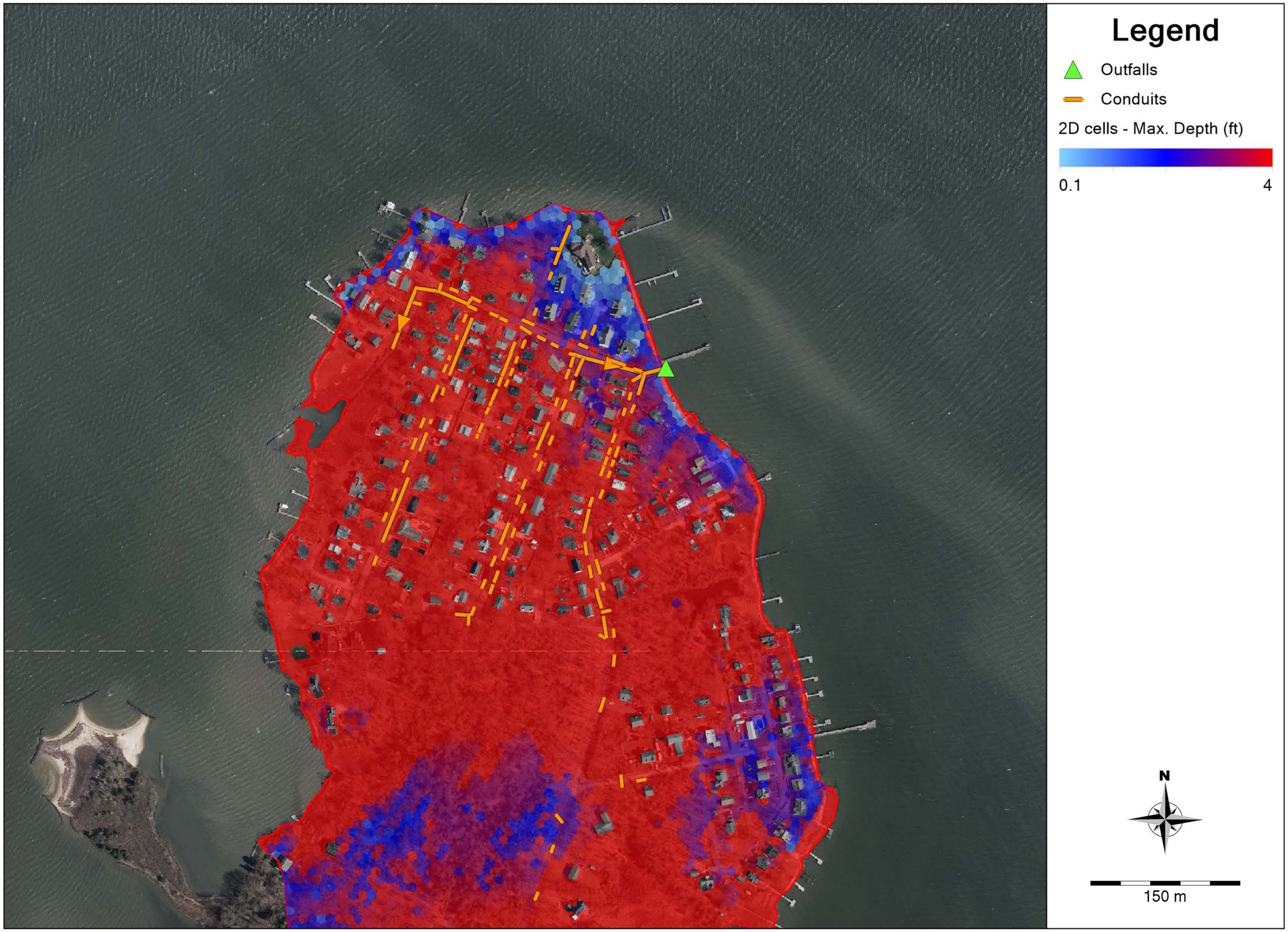
4
N
150 m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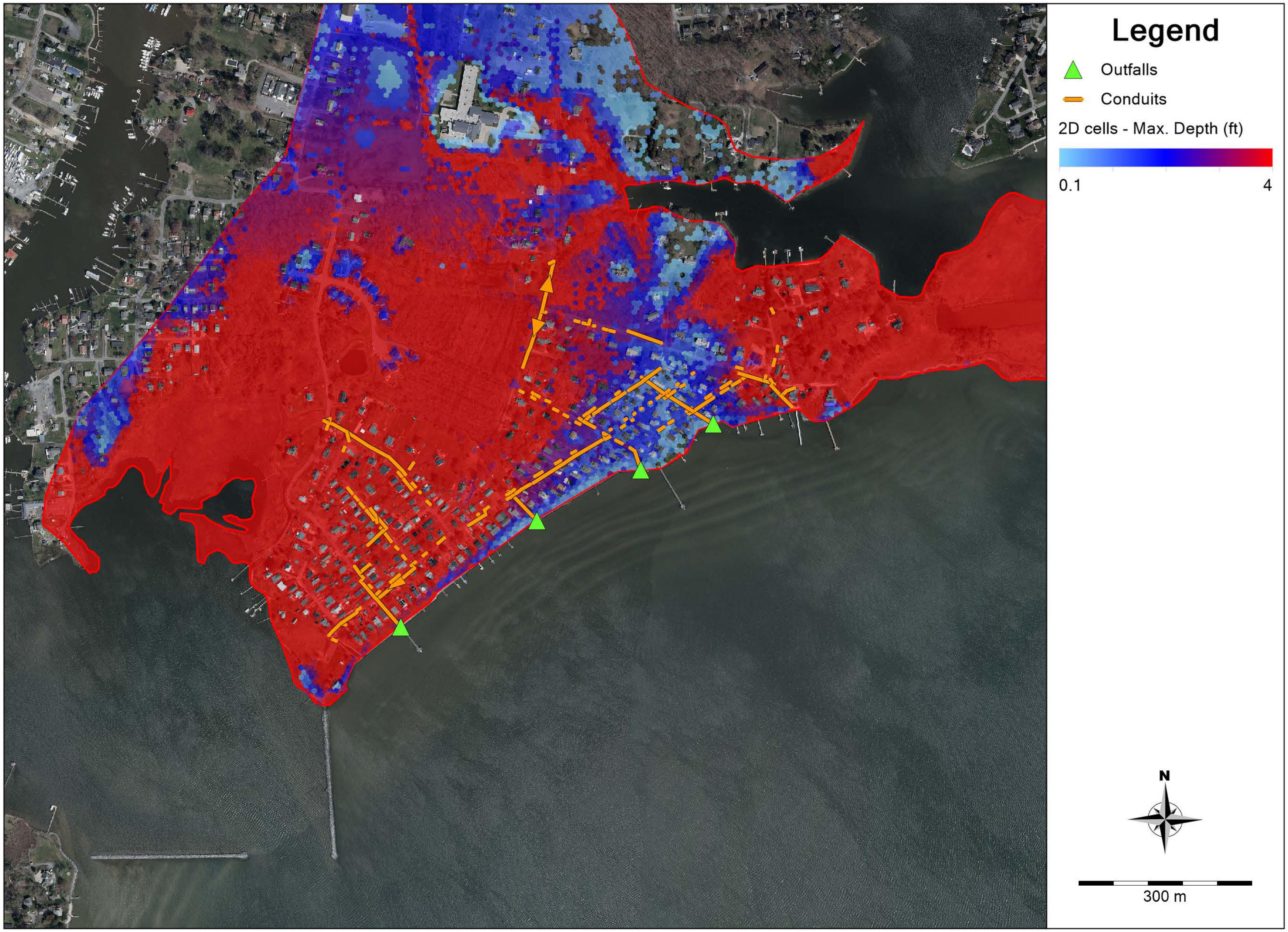
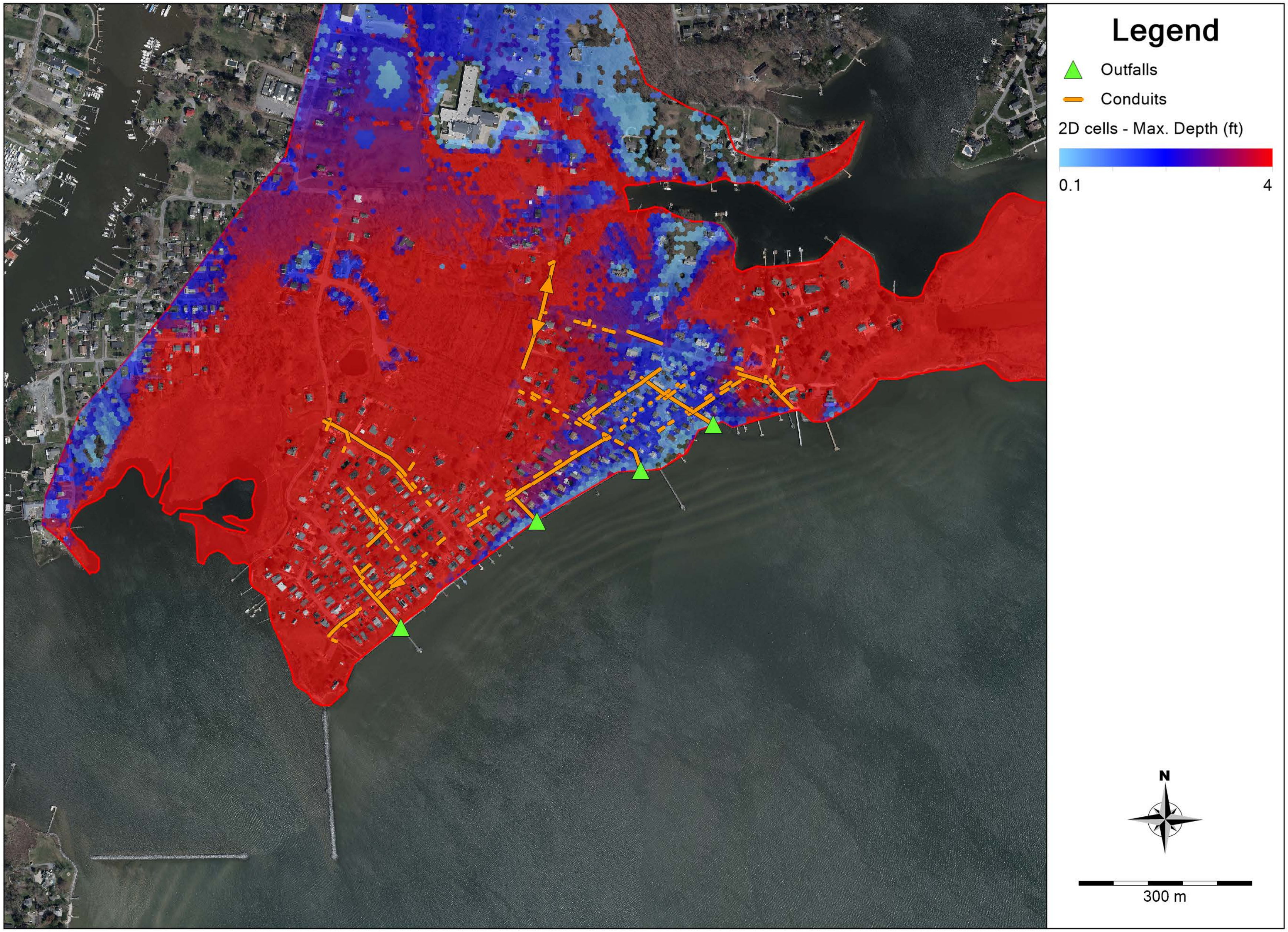
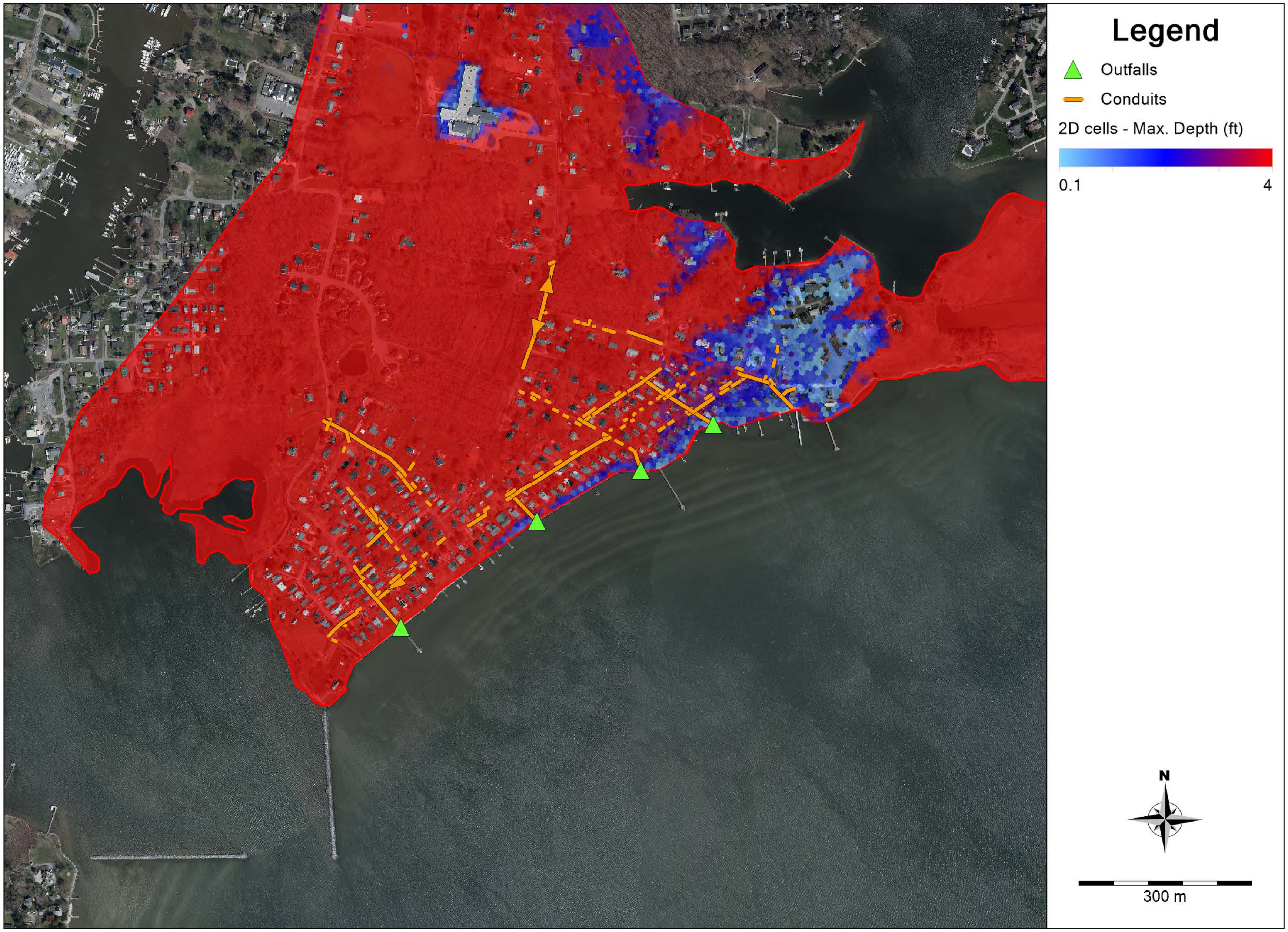
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
150 m


Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
300 m


Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
300 m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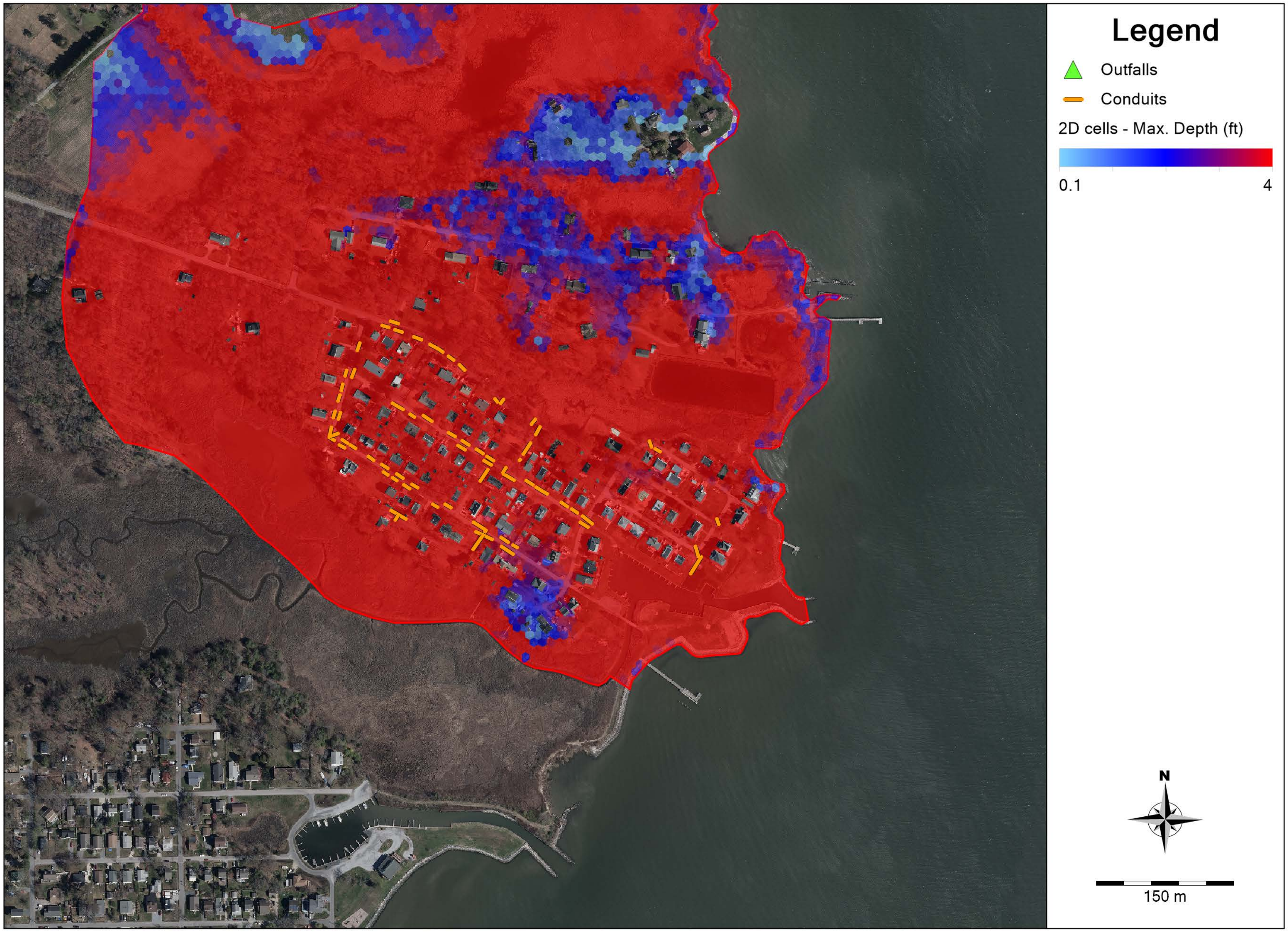
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
300 m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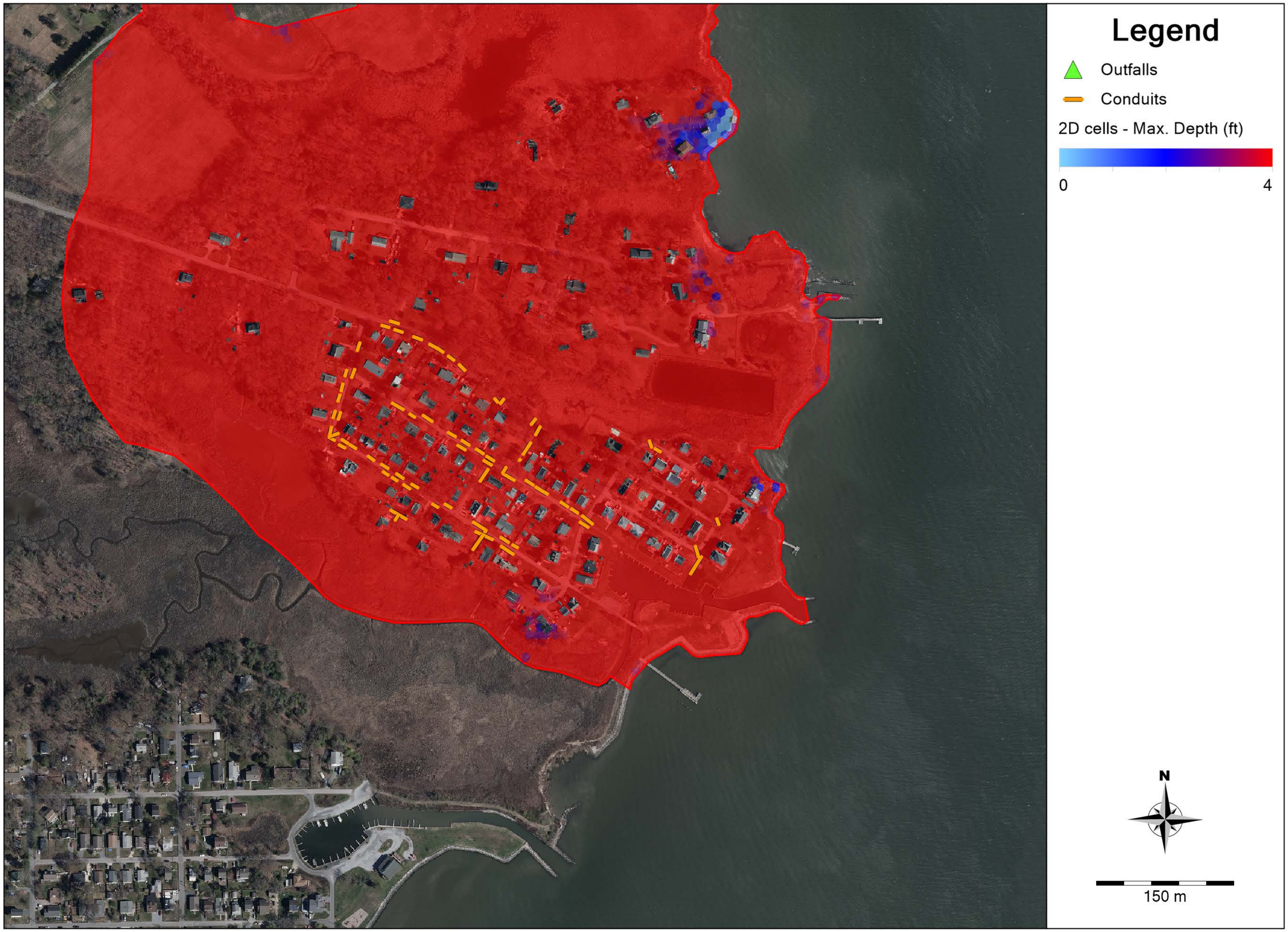
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
150 m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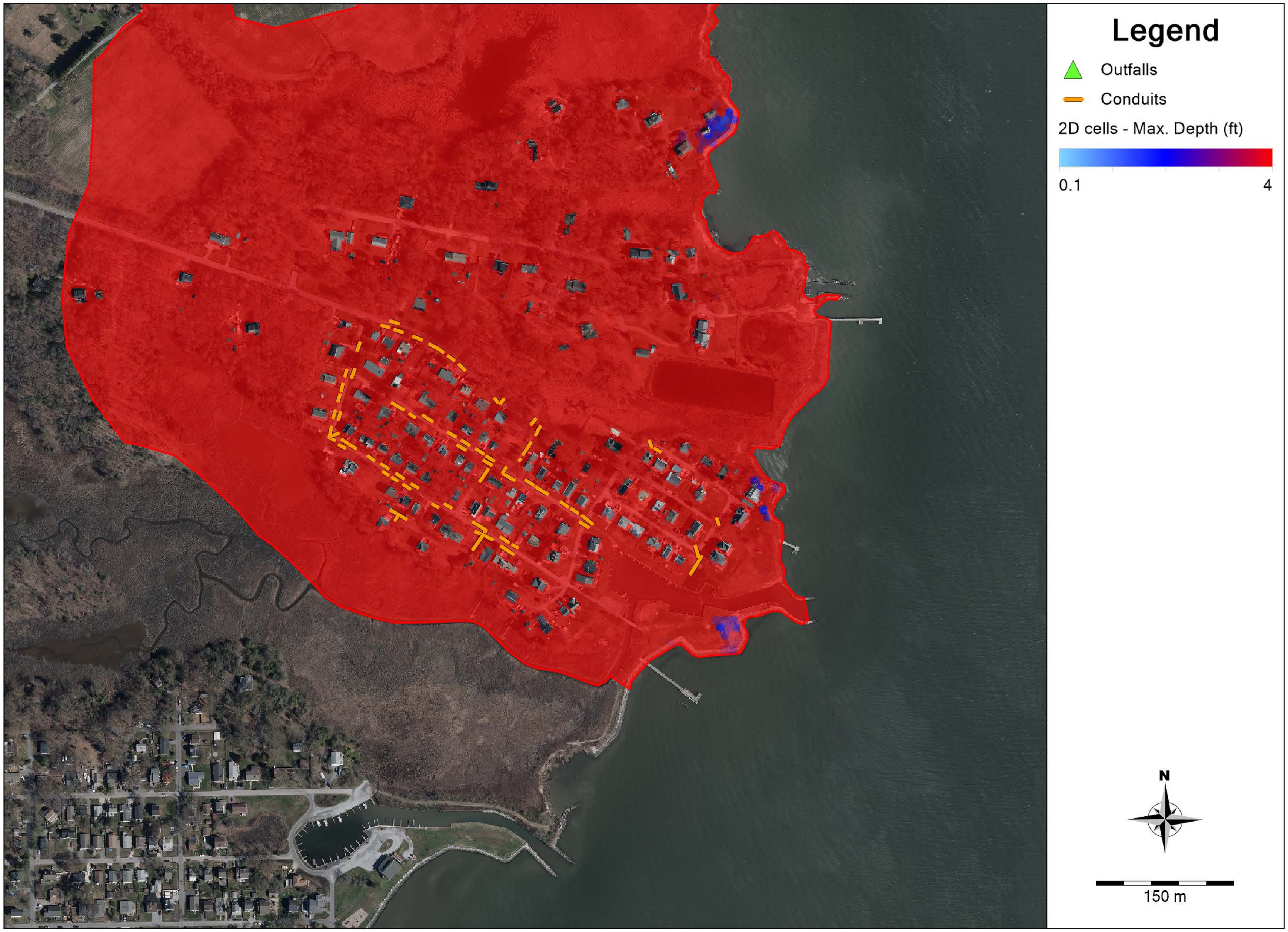
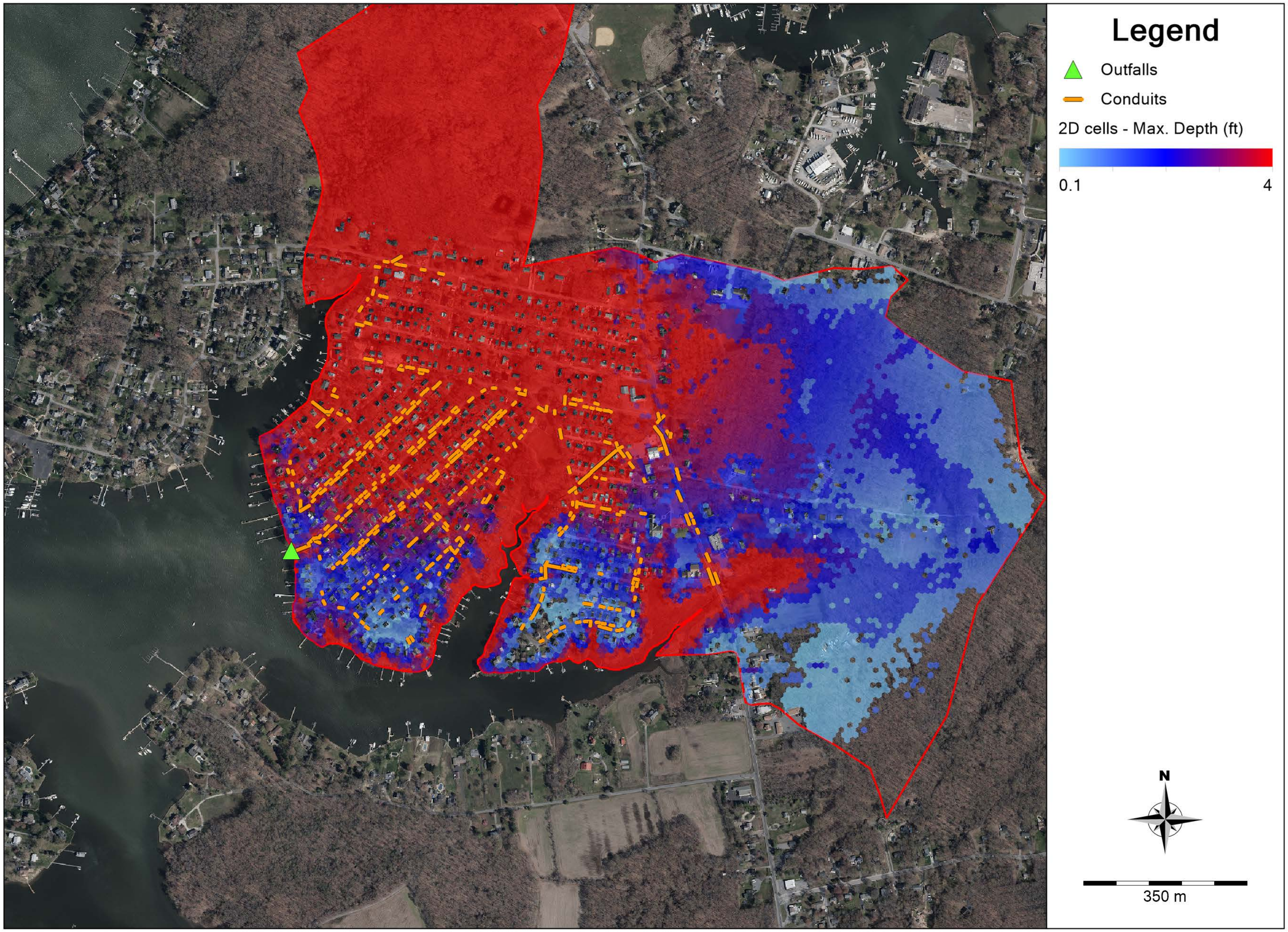
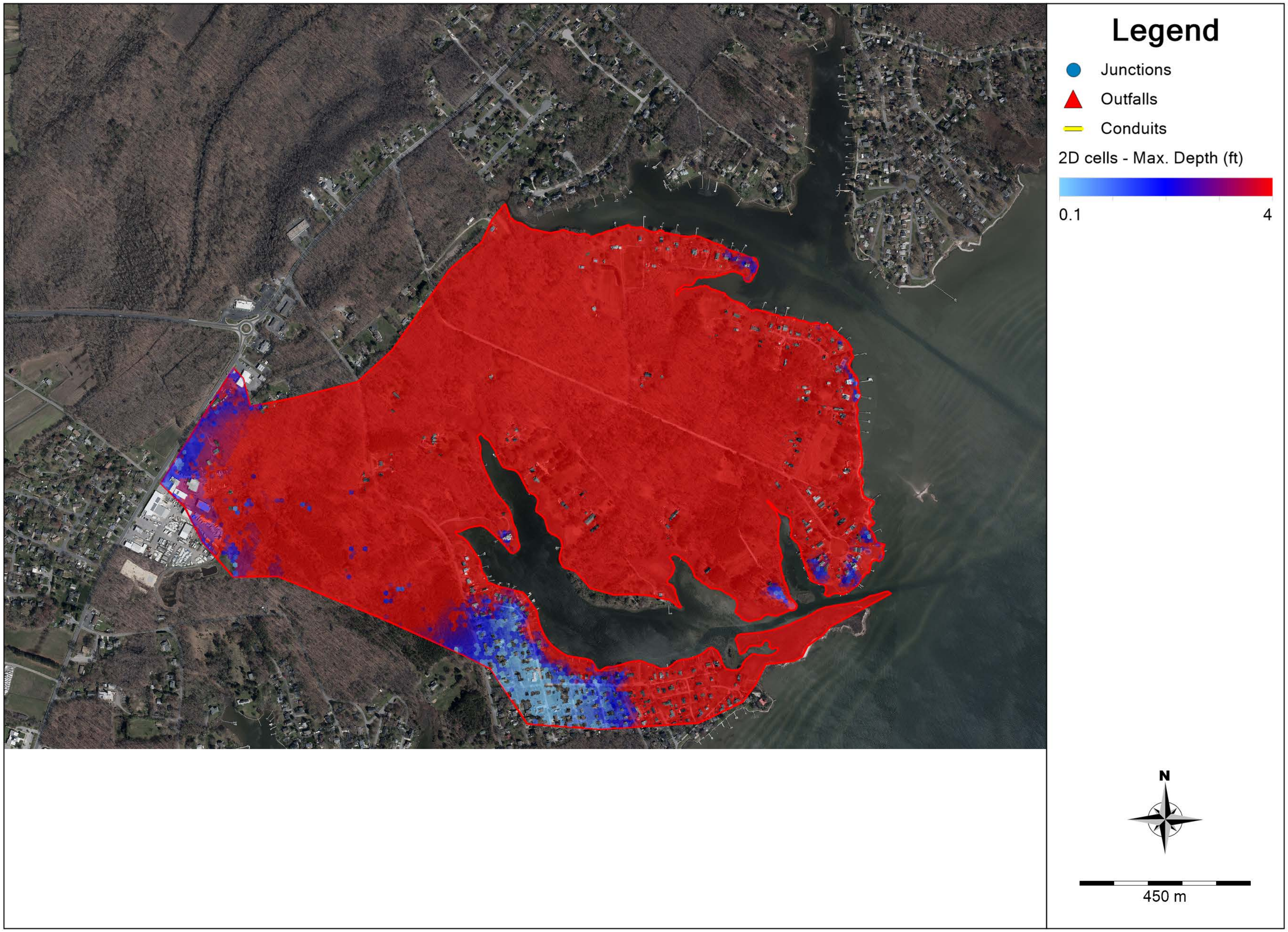
Outfalls
Conduits
2D cells - Max. Depth (ft)
0
4
N
150 m


Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
150 m

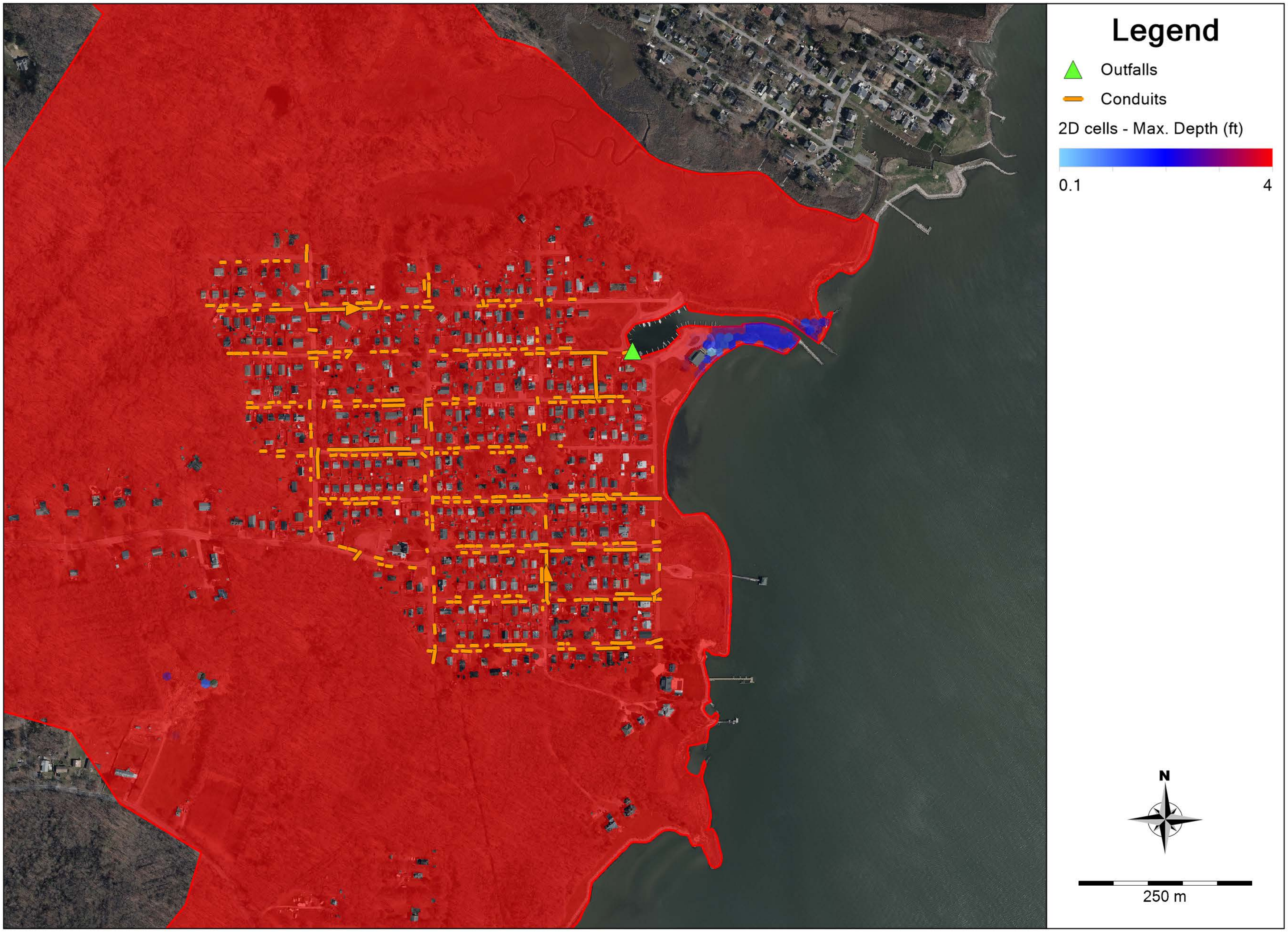
2065 WITH STORM SURGE



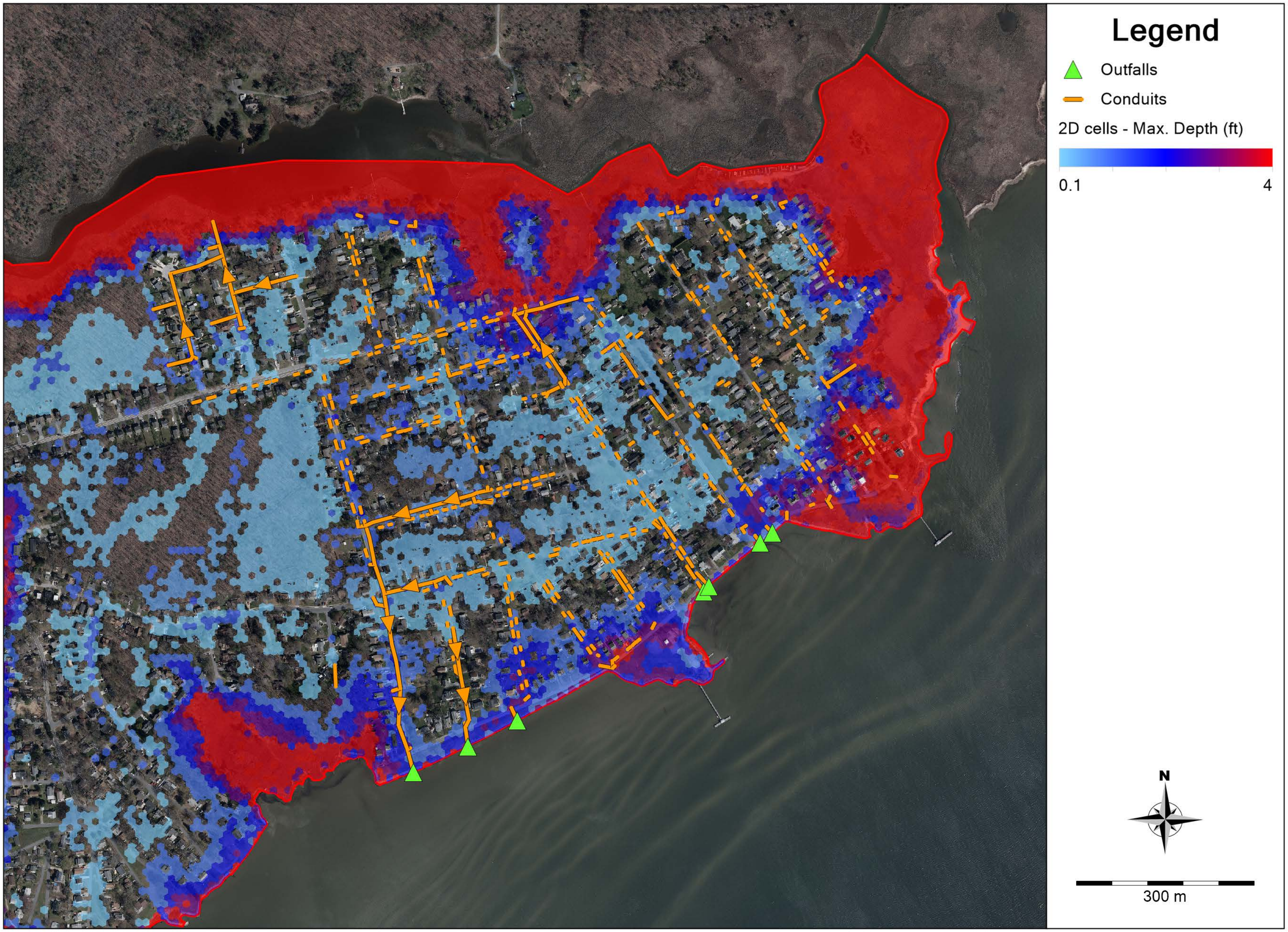
Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
350 m

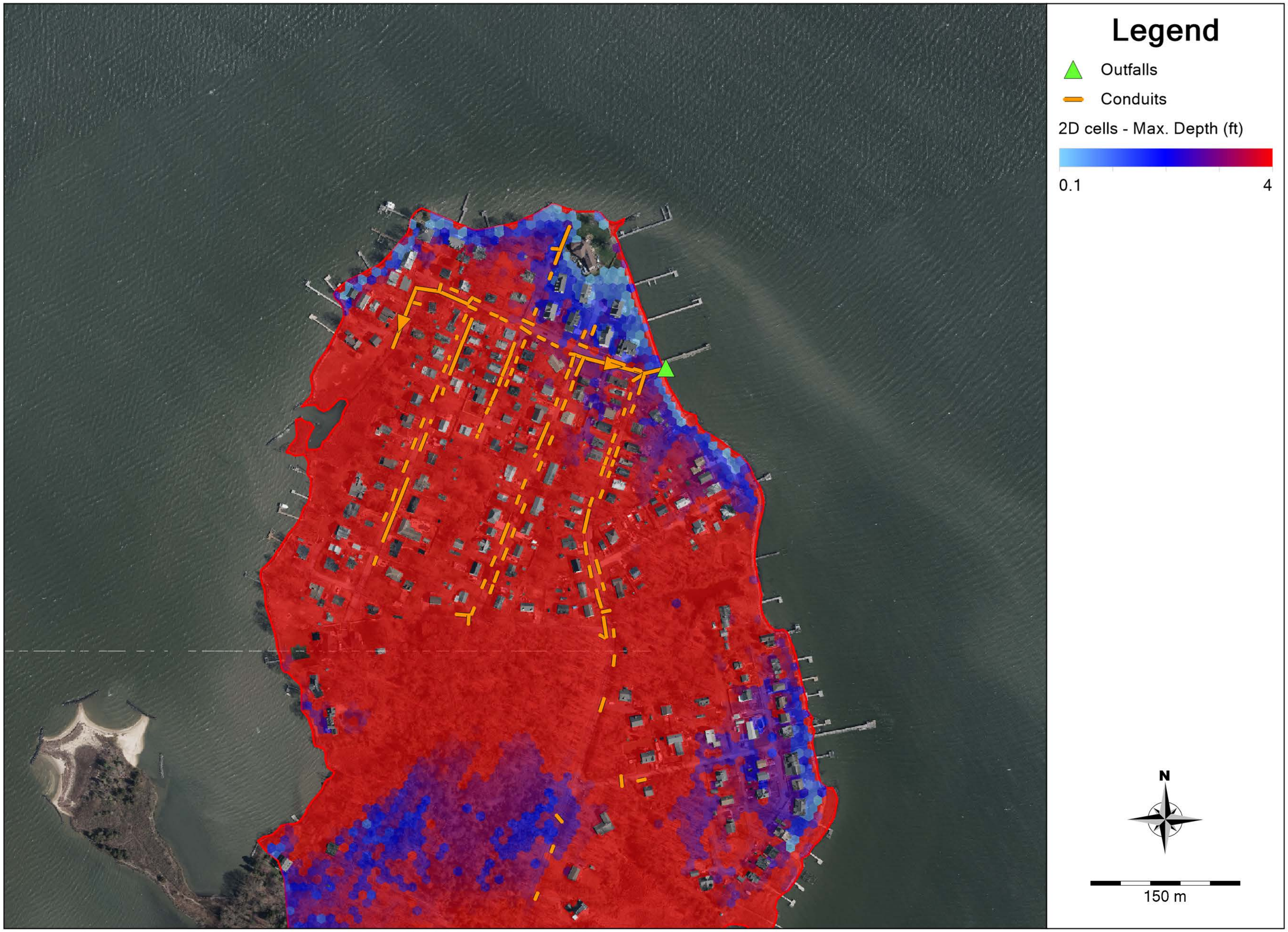


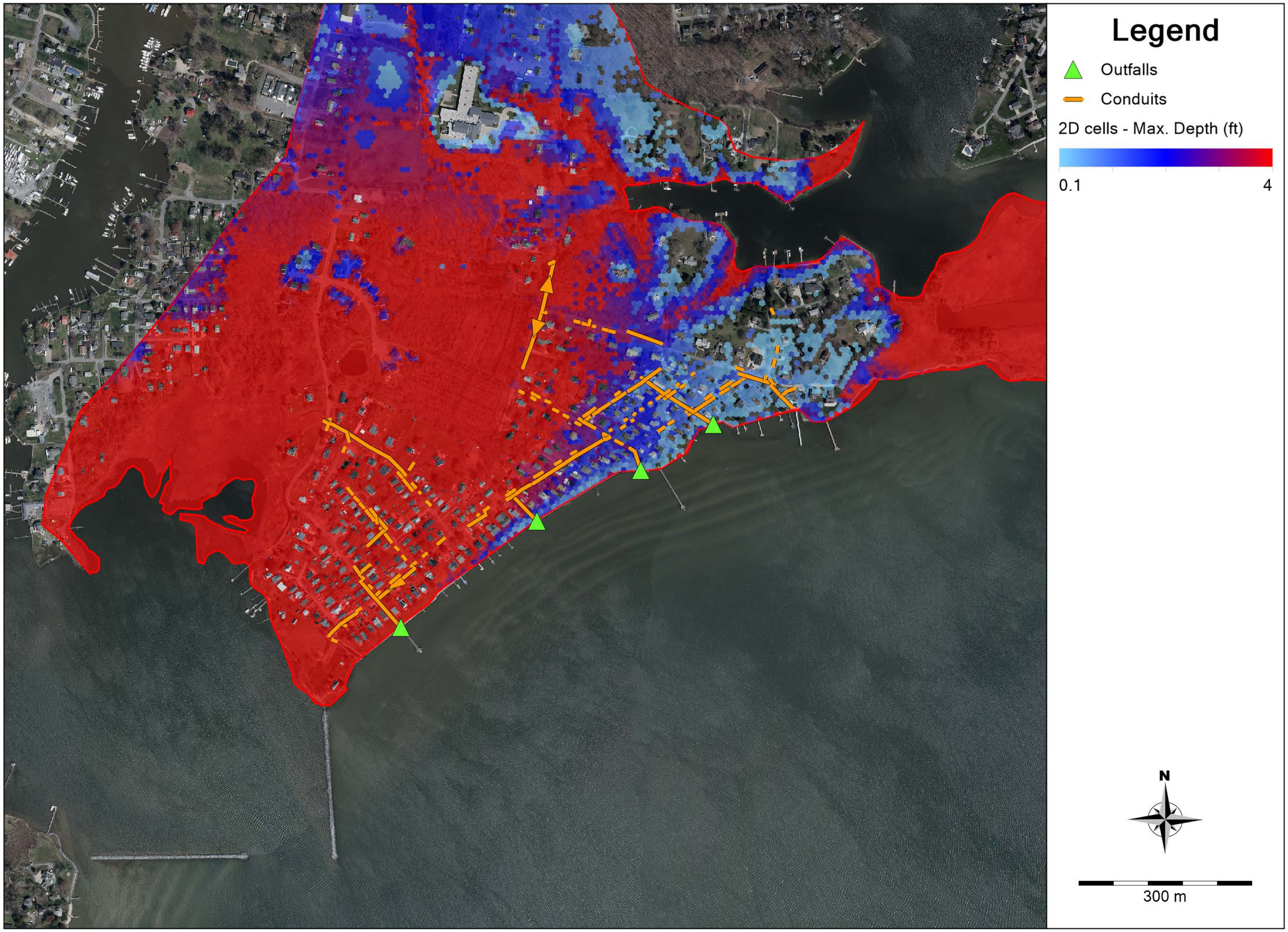
Legend
Junctions
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
450 m



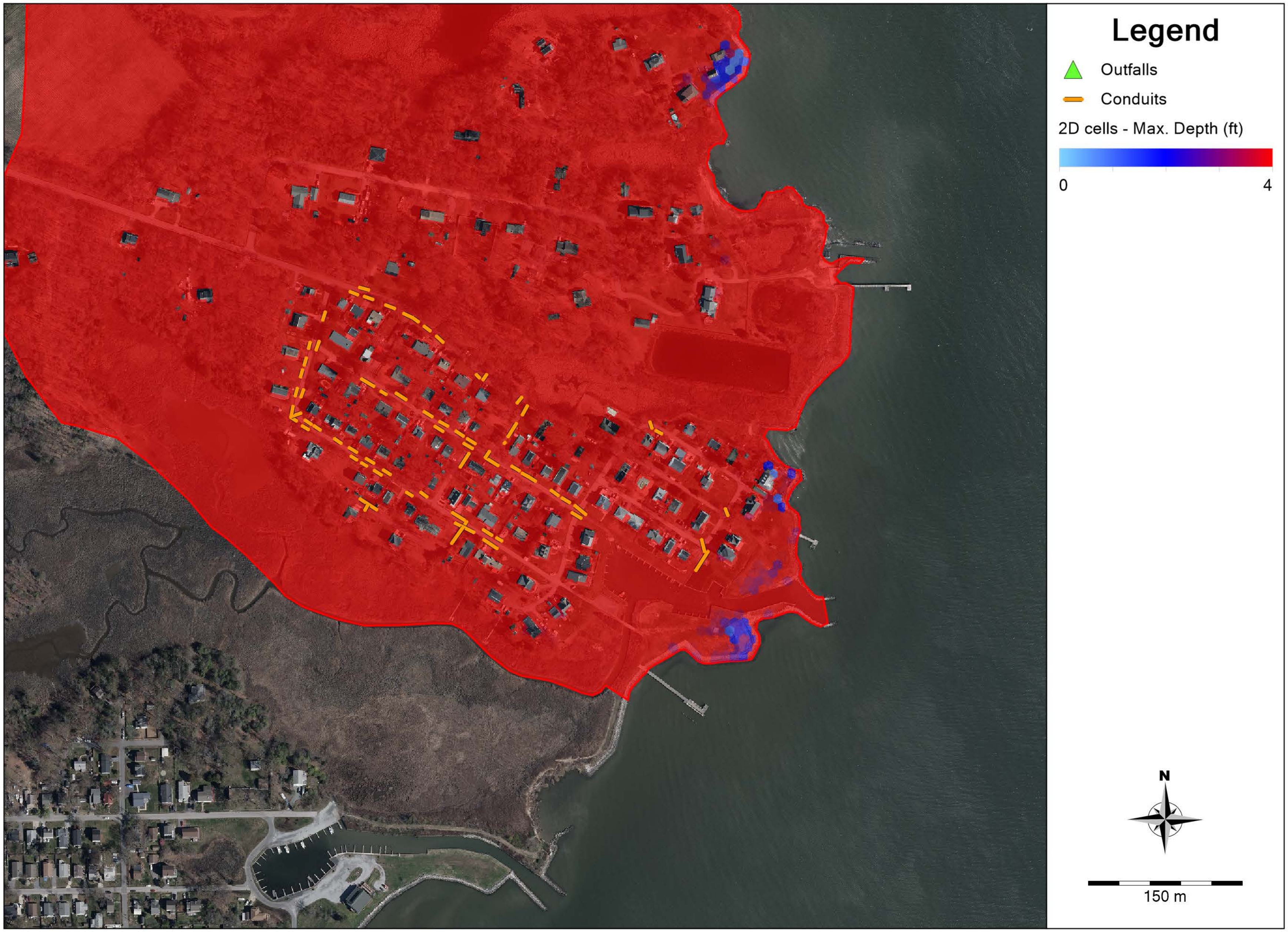
Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
250 m


Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
300 m


Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
150 m



Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0.1
4
N
300 m



Legend
Outfalls
Conduits
2D cells - Max. Depth (ft)
0
4
N
150 m

MODEL INPUTS

```
Avalon Shores Input
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         HORTON
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           08/07/2024
START_TIME           00:00:00
REPORT_START_DATE    08/07/2024
REPORT_START_TIME    00:00:00
END_DATE             08/07/2024
END_TIME             23:54:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         0.5
RULE_STEP            00:00:00

INERTIAL_DAMPING     FULL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         1
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              10

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
100YR-STORM      VOLUME    0:06     1.0      TIMESERIES 100YR-STORM
10YR-STORM       VOLUME    0:06     1.0      TIMESERIES 10YR-STORM
2YR-STORM        VOLUME    0:06     1.0      TIMESERIES 2YR-STORM

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
2000             Tidal      0          -0.721
2000                        0.17       -0.773
2000                        0.33       -0.782
2000                        0.5        -0.791
2000                        0.67       -0.8
2000                        0.83       -0.809
2000                        1          -0.773
2000                        1.17       -0.733
2000                        1.33       -0.693
2000                        1.5        -0.652
2000                        1.67       -0.612
```

Broadwater Point Input

;;Project Title/Notes

[OPTIONS]

;;Option Value

FLOW_UNITS CFS

INFILTRATION HORTON

FLOW_ROUTING DYNWAVE

LINK_OFFSETS DEPTH

MIN_SLOPE 0

ALLOW_PONDING NO

SKIP_STEADY_STATE NO

START_DATE 08/07/2024

START_TIME 00:00:00

REPORT_START_DATE 08/07/2024

REPORT_START_TIME 00:00:00

END_DATE 08/07/2024

END_TIME 23:54:00

SWEEP_START 01/01

SWEEP_END 12/31

DRY_DAYS 0

REPORT_STEP 00:01:00

WET_STEP 00:05:00

DRY_STEP 00:05:00

ROUTING_STEP 0.5

RULE_STEP 00:00:00

INERTIAL_DAMPING FULL

NORMAL_FLOW_LIMITED BOTH

FORCE_MAIN_EQUATION H-W

VARIABLE_STEP 0.75

LENGTHENING_STEP 0

MIN_SURFAREA 1

MAX_TRIALS 8

HEAD_TOLERANCE 0.005

SYS_FLOW_TOL 5

LAT_FLOW_TOL 5

MINIMUM_STEP 0.5

THREADS 10

[EVAPORATION]

;;Data Source Parameters

;;-------------- ----------------

CONSTANT 0.0

DRY_ONLY NO

[RAINGAGES]

;;Name Format Interval SCF Source

;;-------------- --------- -------- -------- ----------

100YR-STORM VOLUME 0:06 1.0 TIMESERIES 100YR-STORM

10YR-STORM VOLUME 0:06 1.0 TIMESERIES 10YR-STORM

2YR-STORM VOLUME 0:06 1.0 TIMESERIES 2YR-STORM

[CURVES]

;;Name Type X-Value Y-Value

;;-------------- ---------- ---------- ----------

2000 Tidal 0 -0.721

2000 0.17 -0.773

2000 0.33 -0.782

2000 0.5 -0.791

2000 0.67 -0.8

2000 0.83 -0.809

2000 1 -0.773

2000 1.17 -0.733

2000 1.33 -0.693

2000 1.5 -0.652

2000 1.67 -0.612

2000 1.83 -0.572

Cedarhurst Input

;;Project Title/Notes

[OPTIONS]

;;Option Value

FLOW_UNITS CFS

INFILTRATION HORTON

FLOW_ROUTING DYNWAVE

LINK_OFFSETS DEPTH

MIN_SLOPE 0

ALLOW_PONDING NO

SKIP_STEADY_STATE NO

START_DATE 08/07/2024

START_TIME 00:00:00

REPORT_START_DATE 08/07/2024

REPORT_START_TIME 00:00:00

END_DATE 08/07/2024

END_TIME 23:54:00

SWEEP_START 01/01

SWEEP_END 12/31

DRY_DAYS 0

REPORT_STEP 00:01:00

WET_STEP 00:05:00

DRY_STEP 00:05:00

ROUTING_STEP 0.5

RULE_STEP 00:00:00

INERTIAL_DAMPING FULL

NORMAL_FLOW_LIMITED BOTH

FORCE_MAIN_EQUATION H-W

VARIABLE_STEP 0.75

LENGTHENING_STEP 0

MIN_SURFAREA 1

MAX_TRIALS 8

HEAD_TOLERANCE 0.005

SYS_FLOW_TOL 5

LAT_FLOW_TOL 5

MINIMUM_STEP 0.5

THREADS 10

[EVAPORATION]

;;Data Source Parameters

;;-------------- ----------------

CONSTANT 0.0

DRY_ONLY NO

[RAINGAGES]

;;Name Format Interval SCF Source

;;-------------- --------- -------- -------- ----------

100YR-STORM VOLUME 0:06 1.0 TIMESERIES 100YR-STORM

10YR-STORM VOLUME 0:06 1.0 TIMESERIES 10YR-STORM

2YR-STORM VOLUME 0:06 1.0 TIMESERIES 2YR-STORM

[CURVES]

;;Name Type X-Value Y-Value

;;-------------- ---------- ---------- ----------

2000 Tidal 0 -0.721

2000 0.17 -0.773

2000 0.33 -0.782

2000 0.5 -0.791

2000 0.67 -0.8

2000 0.83 -0.809

2000 1 -0.773

2000 1.17 -0.733

2000 1.33 -0.693

2000 1.5 -0.652

2000 1.67 -0.612

Franklin Manor Input

;;Project Title/Notes

[OPTIONS]

;;Option Value

FLOW_UNITS CFS

INFILTRATION HORTON

FLOW_ROUTING DYNWAVE

LINK_OFFSETS DEPTH

MIN_SLOPE 0

ALLOW_PONDING NO

SKIP_STEADY_STATE NO

START_DATE 08/07/2024

START_TIME 00:00:00

REPORT_START_DATE 08/07/2024

REPORT_START_TIME 00:00:00

END_DATE 08/07/2024

END_TIME 23:54:00

SWEEP_START 01/01

SWEEP_END 12/31

DRY_DAYS 0

REPORT_STEP 00:01:00

WET_STEP 00:05:00

DRY_STEP 00:05:00

ROUTING_STEP 0.5

RULE_STEP 00:00:00

INERTIAL_DAMPING FULL

NORMAL_FLOW_LIMITED BOTH

FORCE_MAIN_EQUATION H-W

VARIABLE_STEP 0.75

LENGTHENING_STEP 0

MIN_SURFAREA 1

MAX_TRIALS 8

HEAD_TOLERANCE 0.005

SYS_FLOW_TOL 5

LAT_FLOW_TOL 5

MINIMUM_STEP 0.5

THREADS 10

[EVAPORATION]

;;Data Source Parameters

;;-------------- ----------------

CONSTANT 0.0

DRY_ONLY NO

[RAINGAGES]

;;Name Format Interval SCF Source

;;-------------- --------- -------- -------- ----------

100YR-STORM VOLUME 0:06 1.0 TIMESERIES 100YR-STORM

10YR-STORM VOLUME 0:06 1.0 TIMESERIES 10YR-STORM

2YR-STORM VOLUME 0:06 1.0 TIMESERIES 2YR-STORM

[CURVES]

;;Name Type X-Value Y-Value

;;-------------- ---------- ---------- ----------

2000	Tidal	0	-0.721
2000		0.17	-0.773
2000		0.33	-0.782
2000		0.5	-0.791
2000		0.67	-0.8
2000		0.83	-0.809
2000		1	-0.773
2000		1.17	-0.733
2000		1.33	-0.693
2000		1.5	-0.652
2000		1.67	-0.612

Idlewilde Shores Input

;;Project Title/Notes

Idlewilde Shores Existing Conditions

[OPTIONS]

;;Option Value

FLOW_UNITS CFS

INFILTRATION HORTON

FLOW_ROUTING DYNWAVE

LINK_OFFSETS DEPTH

MIN_SLOPE 0

ALLOW_PONDING NO

SKIP_STEADY_STATE NO

START_DATE 08/07/2024

START_TIME 00:00:00

REPORT_START_DATE 08/07/2024

REPORT_START_TIME 00:00:00

END_DATE 08/07/2024

END_TIME 23:54:00

SWEEP_START 01/01

SWEEP_END 12/31

DRY_DAYS 0

REPORT_STEP 00:01:00

WET_STEP 00:05:00

DRY_STEP 00:05:00

ROUTING_STEP 0.5

RULE_STEP 00:00:00

INERTIAL_DAMPING FULL

NORMAL_FLOW_LIMITED BOTH

FORCE_MAIN_EQUATION H-W

VARIABLE_STEP 0.75

LENGTHENING_STEP 0

MIN_SURFAREA 1

MAX_TRIALS 8

HEAD_TOLERANCE 0.005

SYS_FLOW_TOL 5

LAT_FLOW_TOL 5

MINIMUM_STEP 0.5

THREADS 10

[EVAPORATION]

;;Data Source Parameters

;;-------------- ----------------

CONSTANT 0.0

DRY_ONLY NO

[RAINGAGES]

;;Name Format Interval SCF Source

;;-------------- --------- -------- -------- ----------

100YR-STORM VOLUME 0:06 1.0 TIMESERIES 100YR-STORM

10YR-STORM VOLUME 0:06 1.0 TIMESERIES 10YR-STORM

2YR-STORM VOLUME 0:06 1.0 TIMESERIES 2YR-STORM

[CURVES]

;;Name Type X-Value Y-Value

;;-------------- ---------- ---------- ----------

;Year 2000 No Storm Surge

2000 Tidal 0 -0.721

2000 0.17 -0.773

2000 0.33 -0.782

2000 0.5 -0.791

2000 0.67 -0.8

2000 0.83 -0.809

2000 1 -0.773

2000 1.17 -0.733

2000 1.33 -0.693

Owings Beach Input

;;Project Title/Notes

[OPTIONS]

;;Option Value

FLOW_UNITS CFS

INFILTRATION HORTON

FLOW_ROUTING DYNWAVE

LINK_OFFSETS DEPTH

MIN_SLOPE 0

ALLOW_PONDING NO

SKIP_STEADY_STATE NO

START_DATE 08/07/2024

START_TIME 00:00:00

REPORT_START_DATE 08/07/2024

REPORT_START_TIME 00:00:00

END_DATE 08/07/2024

END_TIME 23:54:00

SWEEP_START 1/1

SWEEP_END 12/31

DRY_DAYS 0

REPORT_STEP 00:01:00

WET_STEP 00:05:00

DRY_STEP 00:05:00

ROUTING_STEP 5

RULE_STEP 00:00:00

INERTIAL_DAMPING PARTIAL

NORMAL_FLOW_LIMITED BOTH

FORCE_MAIN_EQUATION H-W

VARIABLE_STEP 0.75

LENGTHENING_STEP 0

MIN_SURFAREA 0

MAX_TRIALS 8

HEAD_TOLERANCE 0

SYS_FLOW_TOL 5

LAT_FLOW_TOL 5

MINIMUM_STEP 0.5

THREADS 10

[EVAPORATION]

;;Data Source Parameters

;;-------------- ----------------

CONSTANT 0.0

DRY_ONLY NO

[RAINGAGES]

;;Name Format Interval SCF Source

;;-------------- --------- -------- -------- ----------

100YR-STORM VOLUME 0.06 1.0 TIMESERIES 100YR-STORM

10YR-STORM VOLUME 0.06 1.0 TIMESERIES 10YR-STORM

2YR-STORM VOLUME 0:06 1.0 TIMESERIES 2YR-STORM

[CURVES]

;;Name Type X-Value Y-Value

;;-------------- ---------- ---------- ----------

2000 Tidal 0 -0.721

2000 0.17 -0.773

2000 0.33 -0.782

2000 0.5 -0.791

2000 0.67 -0.8

2000 0.83 -0.809

2000 1 -0.773

2000 1.17 -0.733

2000 1.33 -0.693

2000 1.5 -0.652

2000 1.67 -0.612

Snug Harbor Input

;;Project Title/Notes

[OPTIONS]

;;Option Value

FLOW_UNITS CFS

INFILTRATION HORTON

FLOW_ROUTING DYNWAVE

LINK_OFFSETS DEPTH

MIN_SLOPE 0

ALLOW_PONDING NO

SKIP_STEADY_STATE NO

START_DATE 08/07/2024

START_TIME 00:00:00

REPORT_START_DATE 08/07/2024

REPORT_START_TIME 00:00:00

END_DATE 08/07/2024

END_TIME 23:54:00

SWEEP_START 01/01

SWEEP_END 12/31

DRY_DAYS 0

REPORT_STEP 00:01:00

WET_STEP 00:05:00

DRY_STEP 00:05:00

ROUTING_STEP 0.5

RULE_STEP 00:00:00

INERTIAL_DAMPING FULL

NORMAL_FLOW_LIMITED BOTH

FORCE_MAIN_EQUATION H-W

VARIABLE_STEP 0.75

LENGTHENING_STEP 0

MIN_SURFAREA 1

MAX_TRIALS 8

HEAD_TOLERANCE 0.005

SYS_FLOW_TOL 5

LAT_FLOW_TOL 5

MINIMUM_STEP 0.5

THREADS 10

[EVAPORATION]

;;Data Source Parameters

;;-------------- ----------------

CONSTANT 0.0

DRY_ONLY NO

[RAINGAGES]

;;Name Format Interval SCF Source

;;-------------- --------- -------- -------- ----------

100YR-STORM VOLUME 0:06 1.0 TIMESERIES 100YR-STORM

10YR-STORM VOLUME 0:06 1.0 TIMESERIES 10YR-STORM

2YR-STORM VOLUME 0:06 1.0 TIMESERIES 2YR-STORM

[CURVES]

;;Name Type X-Value Y-Value

;;-------------- ---------- ---------- ----------

2000 Tidal 0 -0.721

2000 0.17 -0.773

2000 0.33 -0.782

2000 0.5 -0.791

2000 0.67 -0.8

2000 0.83 -0.809

2000 1 -0.773

2000 1.17 -0.733

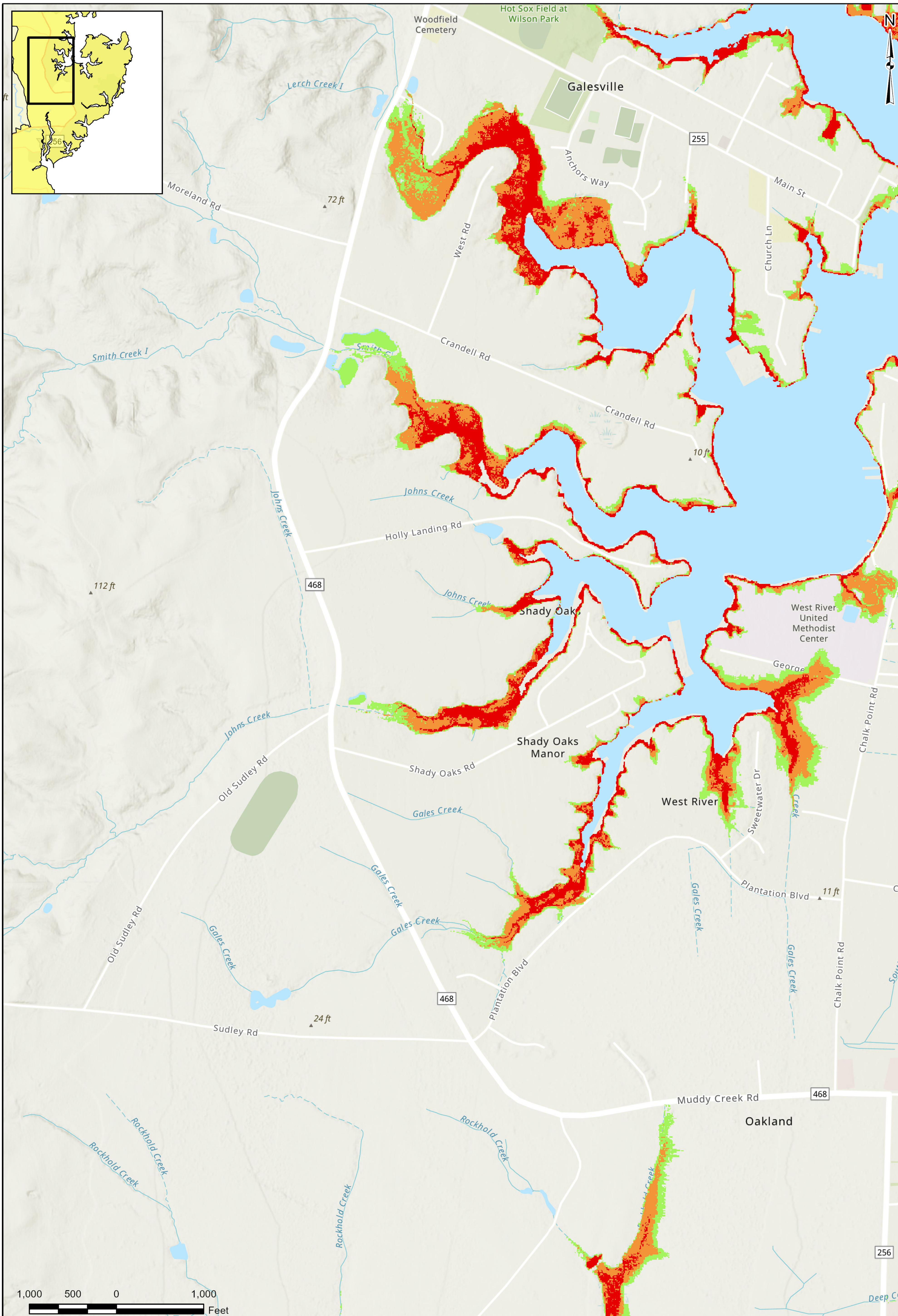
2000 1.33 -0.693

2000 1.5 -0.652

2000 1.67 -0.612

APPENDIX D

VULNERABILITY ANALYSIS MAPS



Notes: Flood Depth vulnerability classifications are based on a generalized vulnerability scale, derived from grouped vulnerability score ranges of 1–3, 4–7, and 8-10 for low, medium, and high-risk groups, respectively.

County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

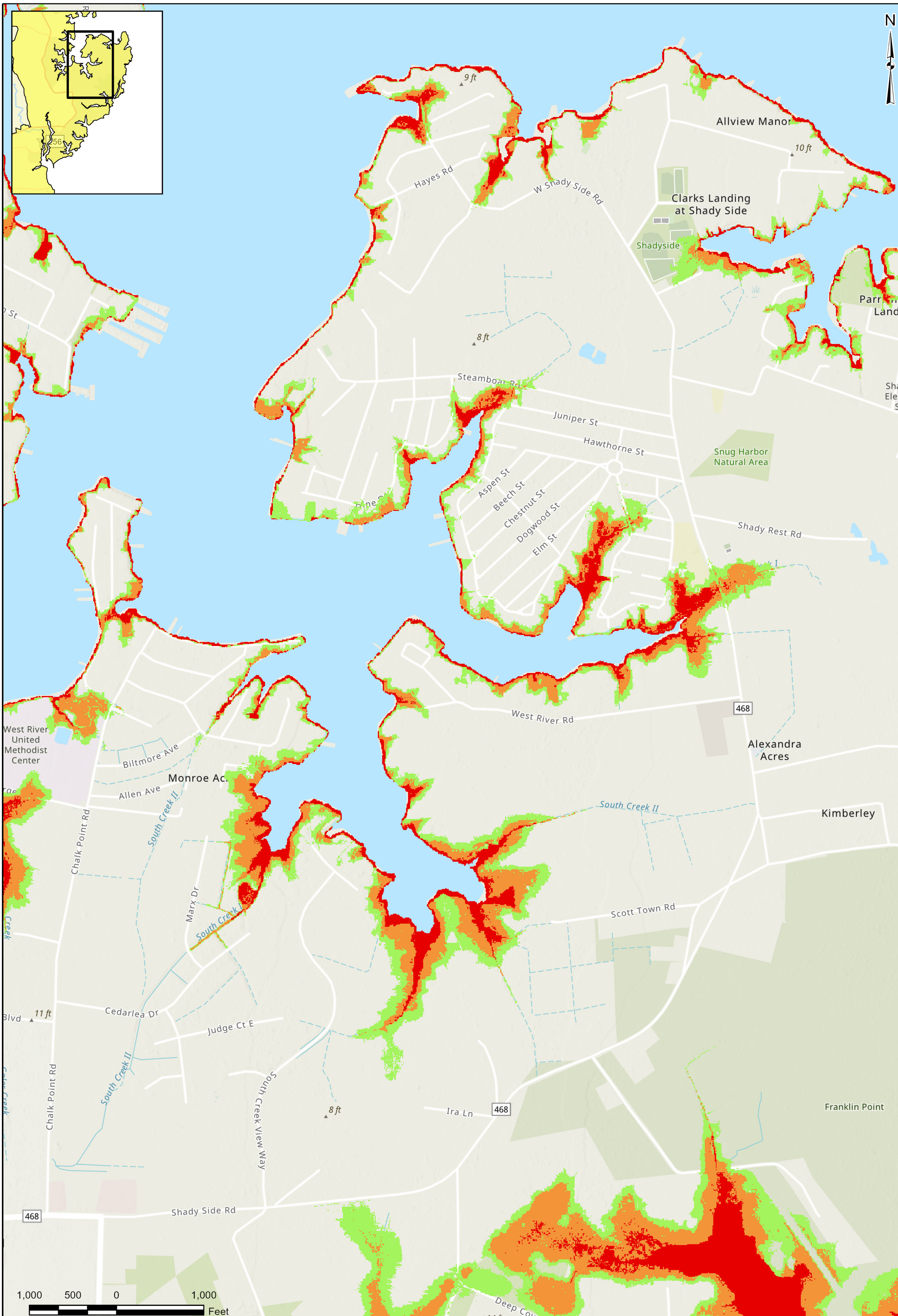
- Low
- Medium
- High

BayLand Consultants & Designers, Inc.
"Integrating Engineering and Environment"
7455 New Ridge Road, Suite T
Hanover, Maryland 21076
Phone: (410) 694-9401
Fax: (410) 694-9405
Website: www.baylandinc.com

FLOOD DEPTH VULNERABILITY CATEGORY

SHEET 1

S:\Maryland\Anne_Arundel_County\Project_Data\5_21301_SLR_on_the_Shady_Side_Peninsula\Figures\SLR_on_the_Shady_Side_Peninsula_FIGURES_EM.aprx



Notes: Flood Depth vulnerability classifications are based on a generalized vulnerability scale, derived from grouped vulnerability score ranges of 1–3, 4–7, and 8-10 for low, medium, and high-risk groups, respectively.

County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

Low
Medium
High

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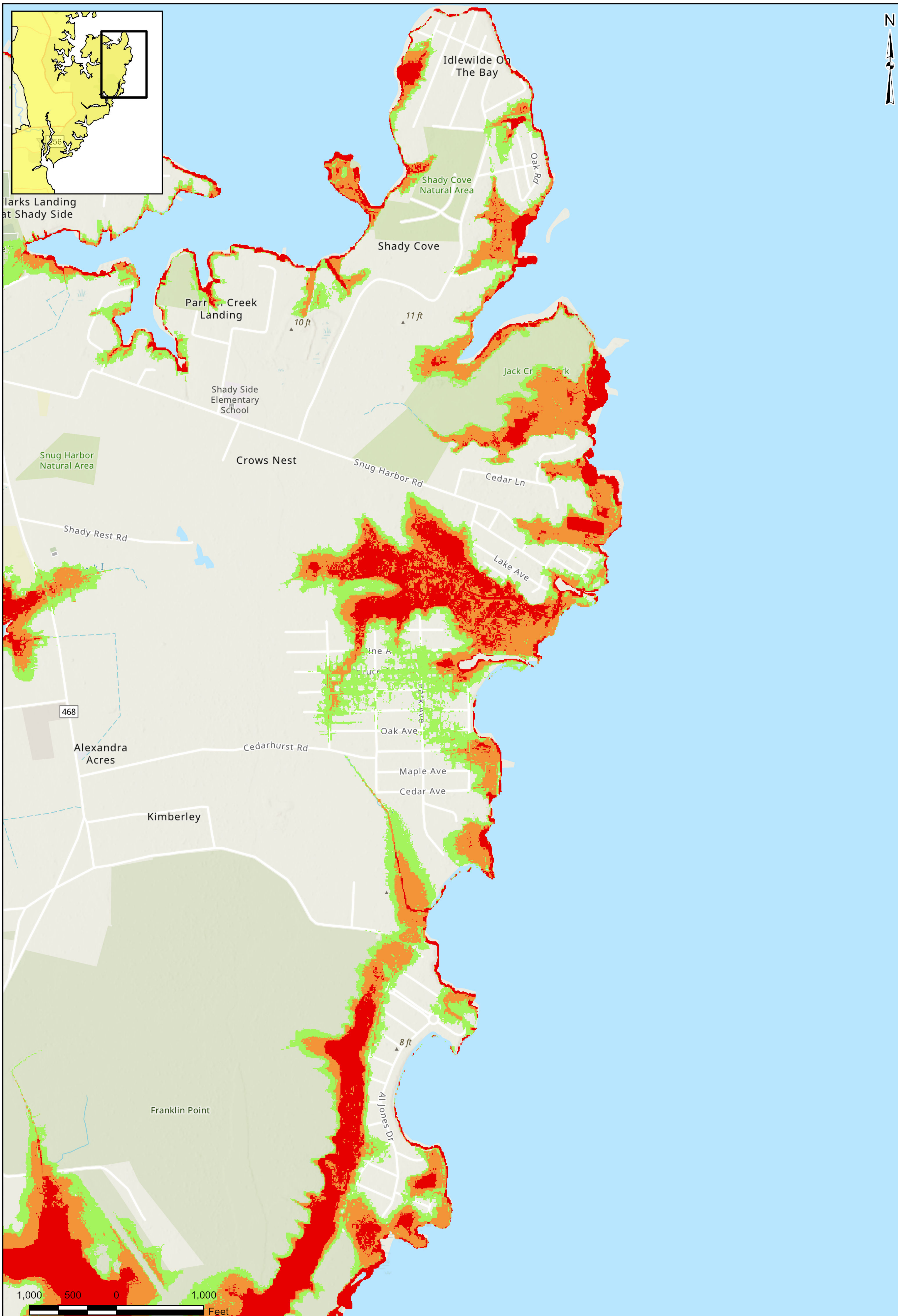
FLOOD DEPTH VULNERABILITY CATEGORY

SHEET 2

S:\Maryland\Anne_Arundel_County\Project_Data\5_21301_SLR_on_the_Shady_Side_Peninsula\Figures\SLR_on_the_Shady_Side_Peninsula_FIGURES_EM.aprx



Notes: Flood Depth vulnerability classifications are based on a generalized vulnerability scale, derived from grouped vulnerability score ranges of 1–3, 4–7, and 8-10 for low, medium, and high-risk groups, respectively.

County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

- Low
- Medium
- High

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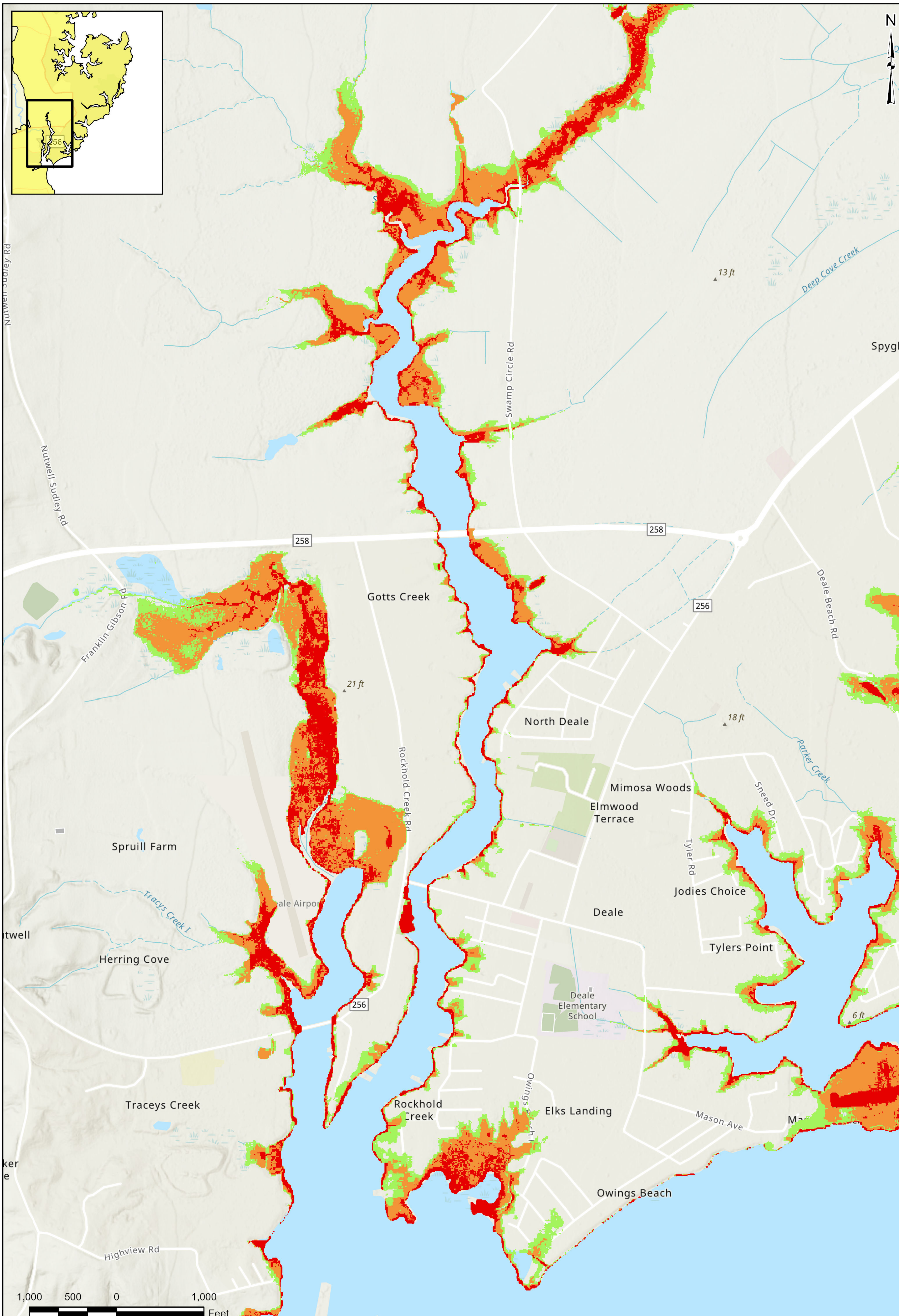
FLOOD DEPTH VULNERABILITY CATEGORY

SHEET 3

S:\Maryland\Anne_Arundel_County\Project_Data\5_21301_SLR_on_the_Shady_Side_Peninsula\Figures\SLR_on_the_Shady_Side_Peninsula_FIGURES_EM.aprx



Notes: Flood Depth vulnerability classifications are based on a generalized vulnerability scale, derived from grouped vulnerability score ranges of 1–3, 4–7, and 8-10 for low, medium, and high-risk groups, respectively.

Low
Medium
High

County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

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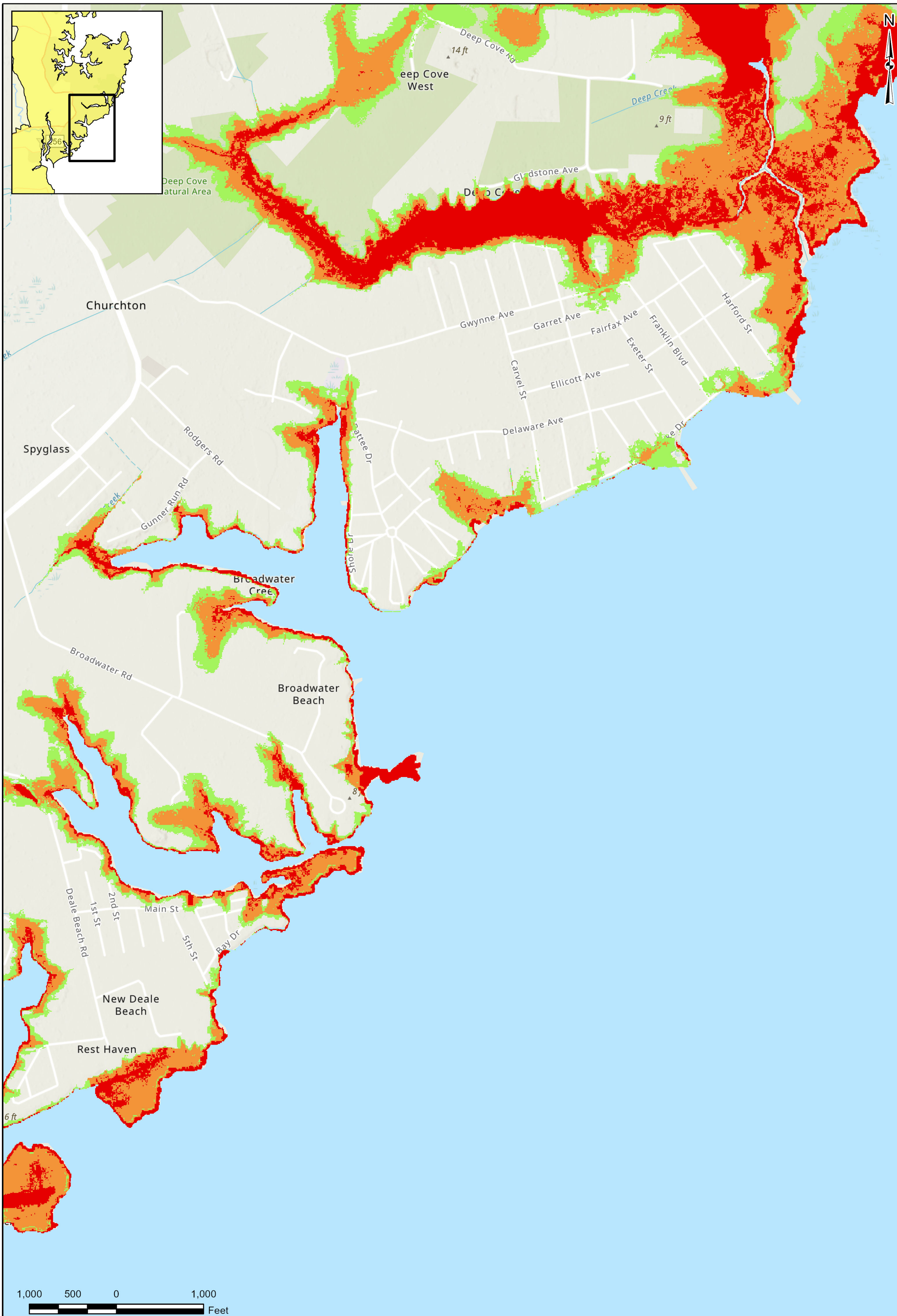
FLOOD DEPTH VULNERABILITY CATEGORY

SHEET 4

S:\Maryland\Anne_Arundel_County\Project_Data\5_21301_SLR_on_the_Shady_Side_Peninsula\Figures\SLR_on_the_Shady_Side_Peninsula_FIGURES_EM.aprx



Notes: Flood Depth vulnerability classifications are based on a generalized vulnerability scale, derived from grouped vulnerability score ranges of 1–3, 4–7, and 8-10 for low, medium, and high-risk groups, respectively.

County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

Low

Medium

High

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"Integrating Engineering and Environment"
7455 New Ridge Road, Suite T
Hanover, Maryland 21076
Phone: (410) 694-9401
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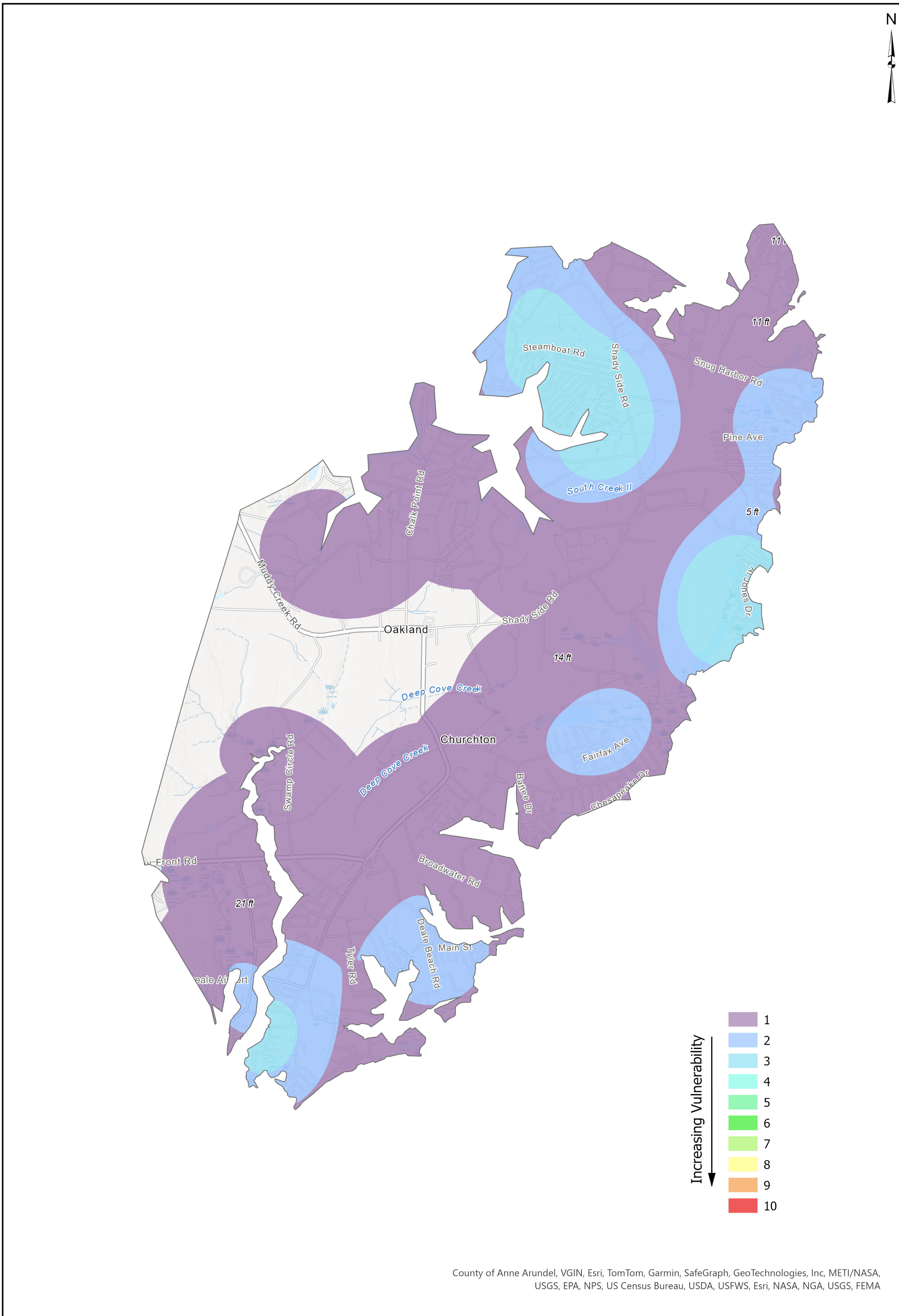
FLOOD DEPTH VULNERABILITY CATEGORY

SHEET 5



Notes: A density analysis was used to identify clusters of structures that would be inundated by the years 2050, 2065, and 2100. Neighborhoods with a high density of flood-exposed buildings were assigned higher vulnerability scores.

3,000 1,500 0 3,000 Feet

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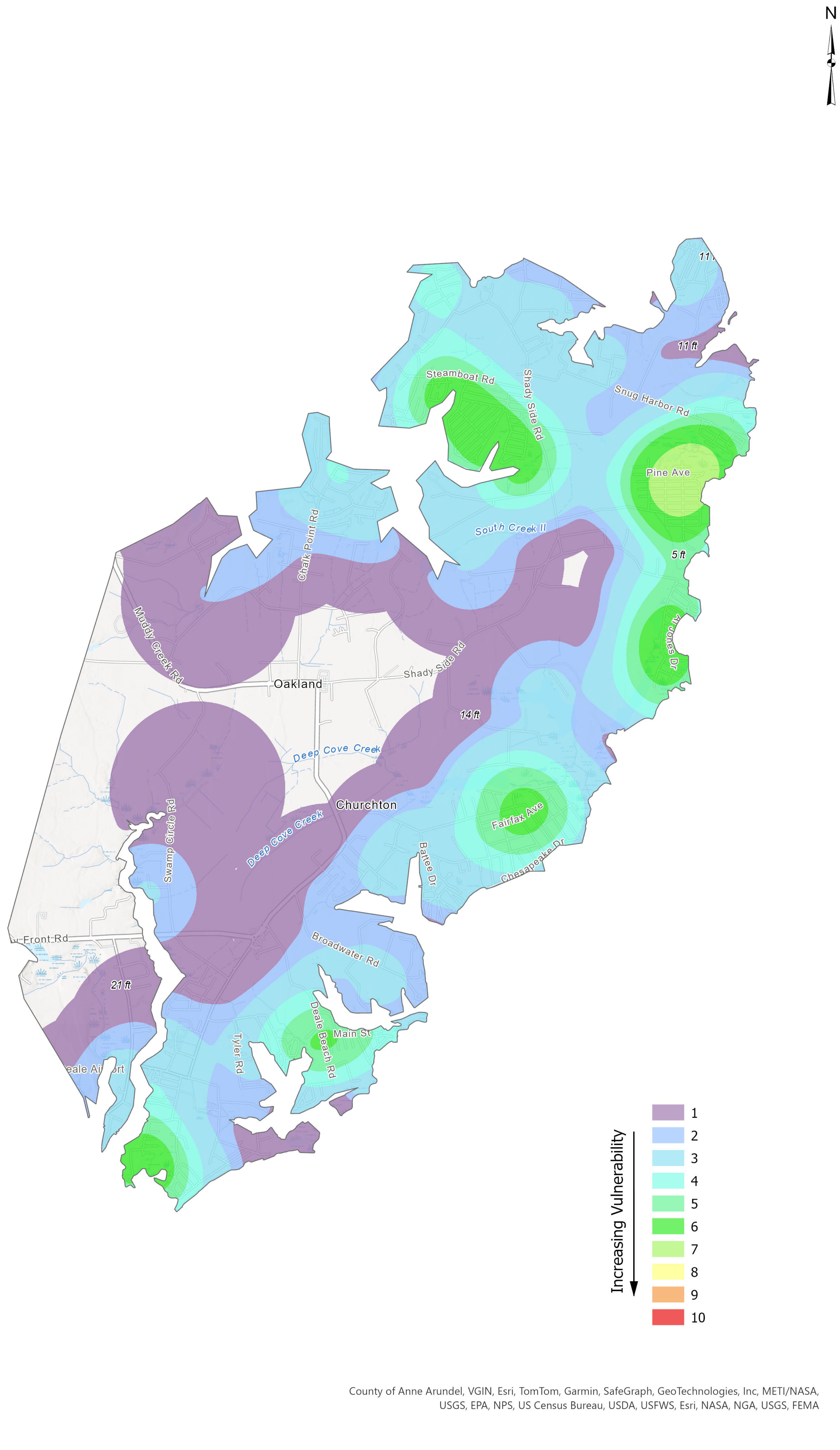
DENSITY OF BUILDINGS INUNDATED

2050



Notes: A density analysis was used to identify clusters of structures that would be inundated by the years 2050, 2065, and 2100. Neighborhoods with a high density of flood-exposed buildings were assigned higher vulnerability scores.

3,000 1,500 0 3,000 Feet

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DENSITY OF BUILDINGS INUNDATED

2065

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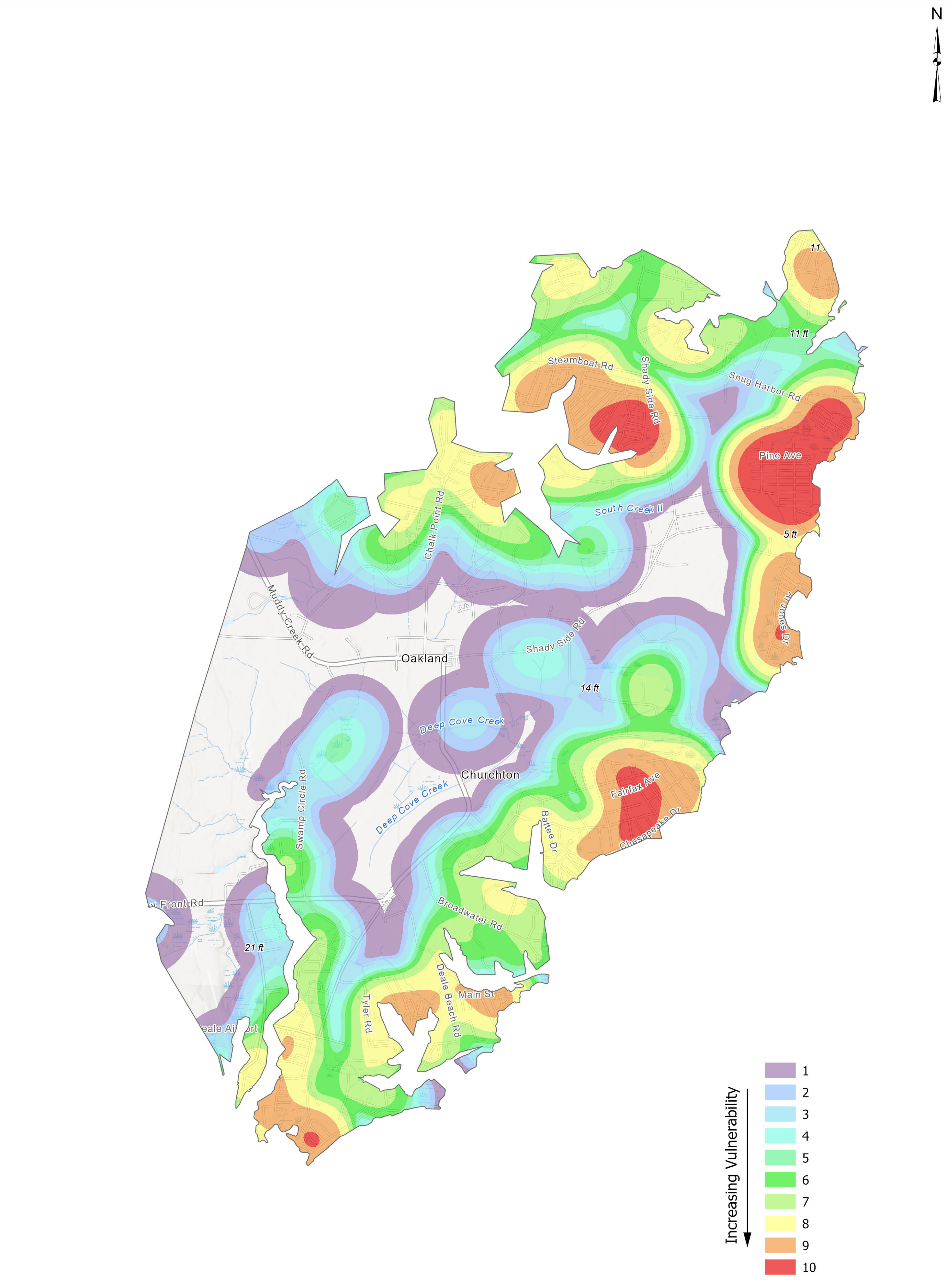

County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA

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Notes: A density analysis was used to identify clusters of structures that would be inundated by the years 2050, 2065, and 2100. Neighborhoods with a high density of flood-exposed buildings were assigned higher vulnerability scores.

3,000 1,500 0 3,000 Feet

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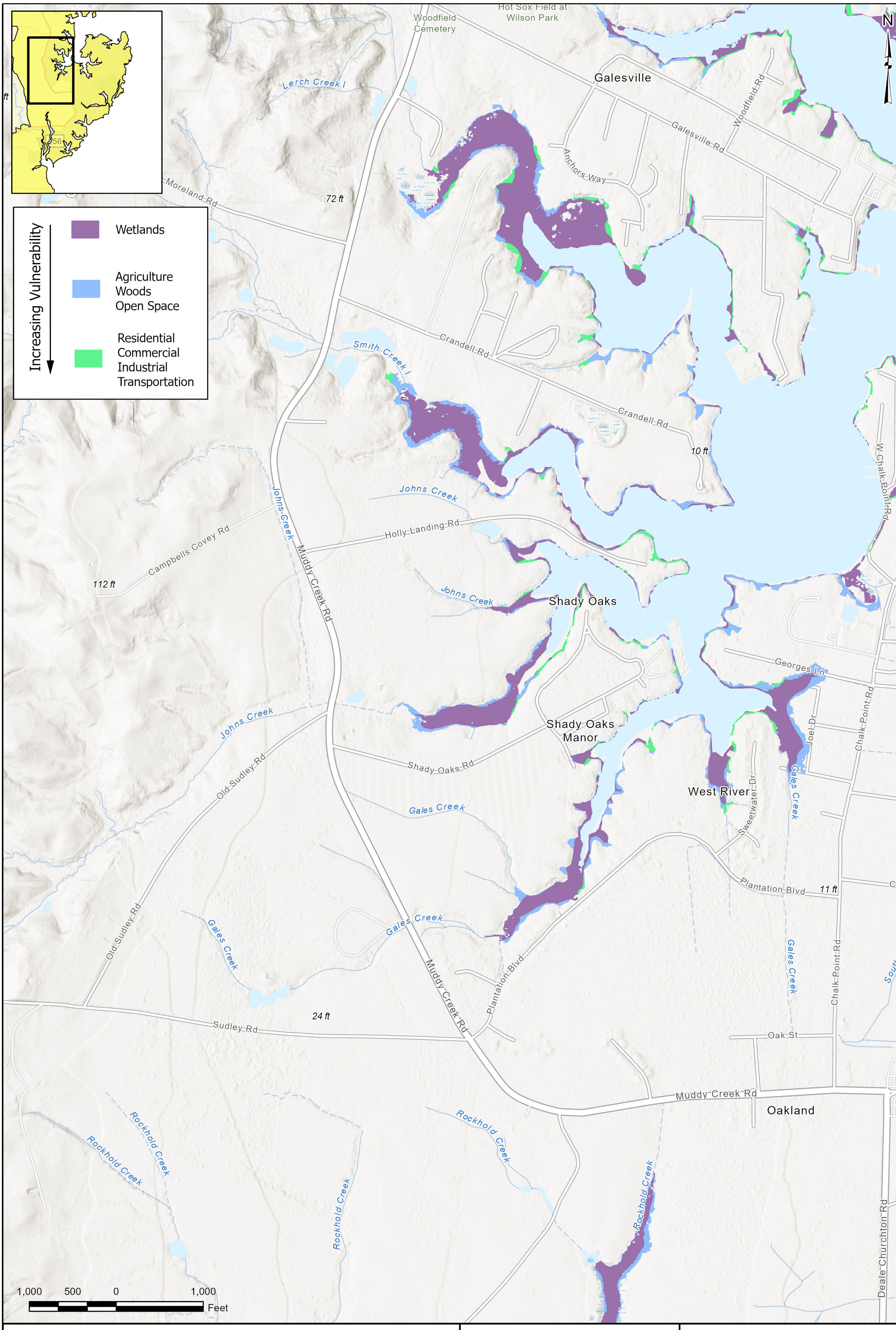
DENSITY OF BUILDINGS INUNDATED

2100



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INUNDATED LAND COVER - 2050

SHEET 1

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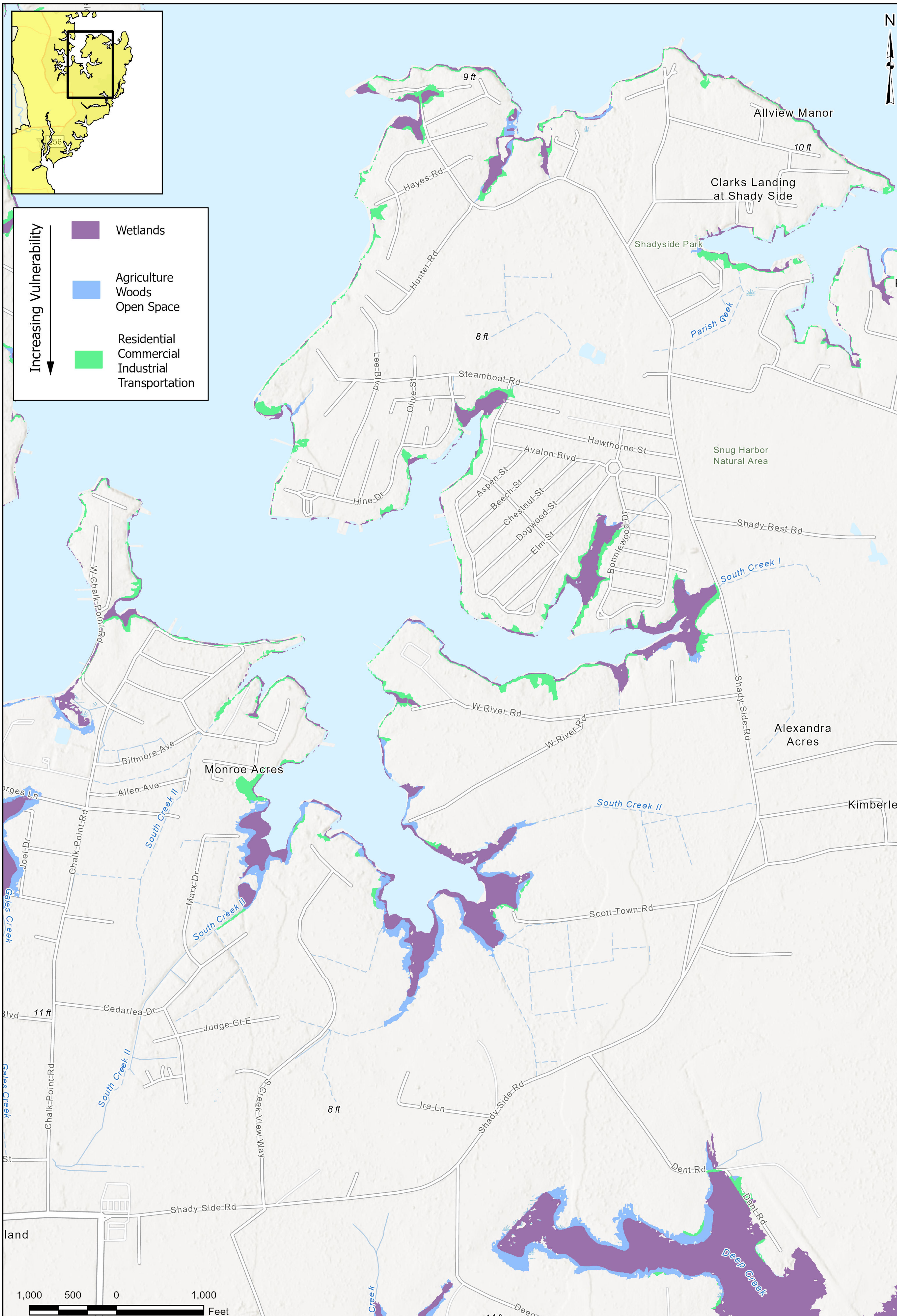

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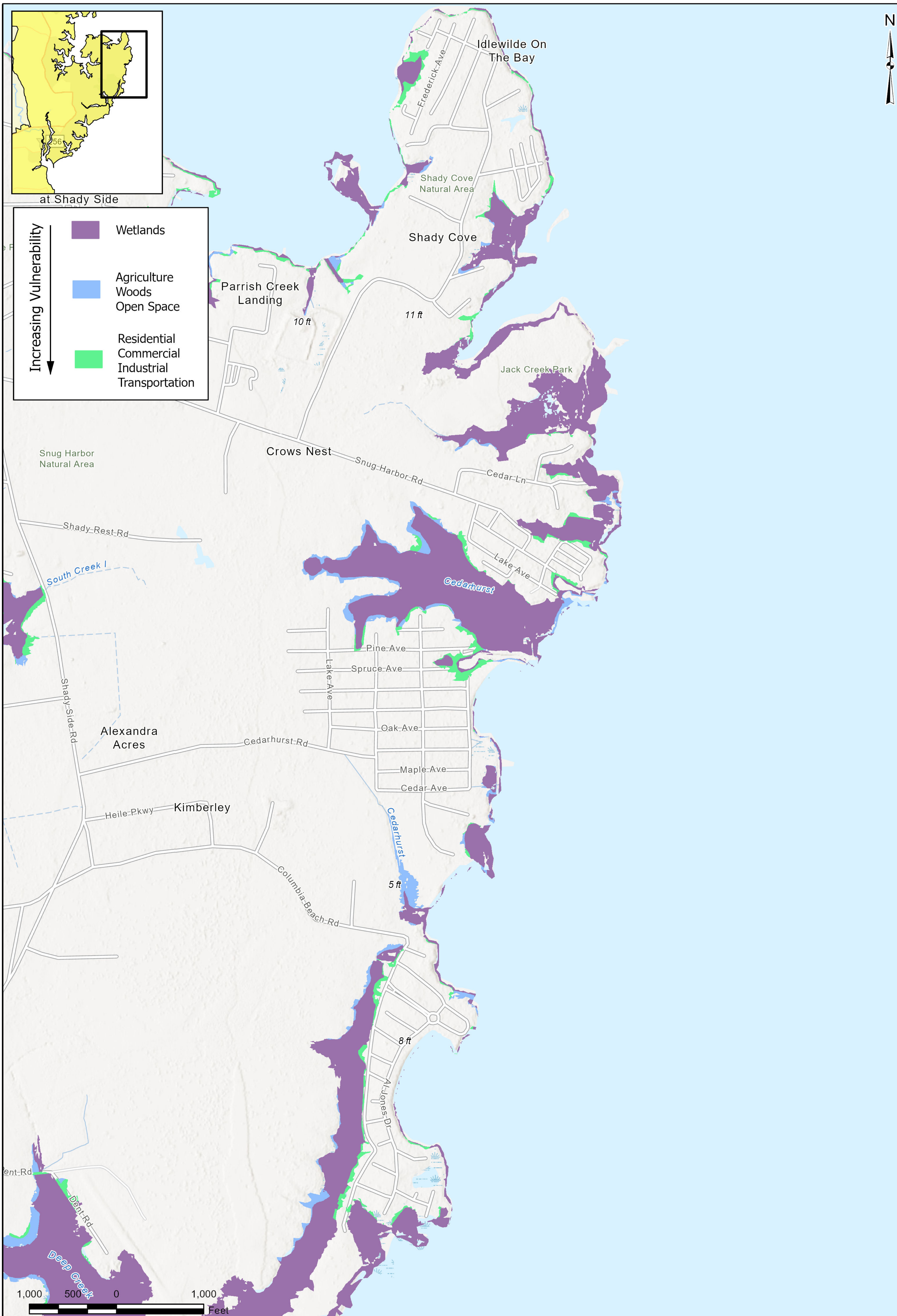
INUNDATED LAND COVER - 2050

SHEET 2



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INUNDATED LAND COVER - 2050

SHEET 3

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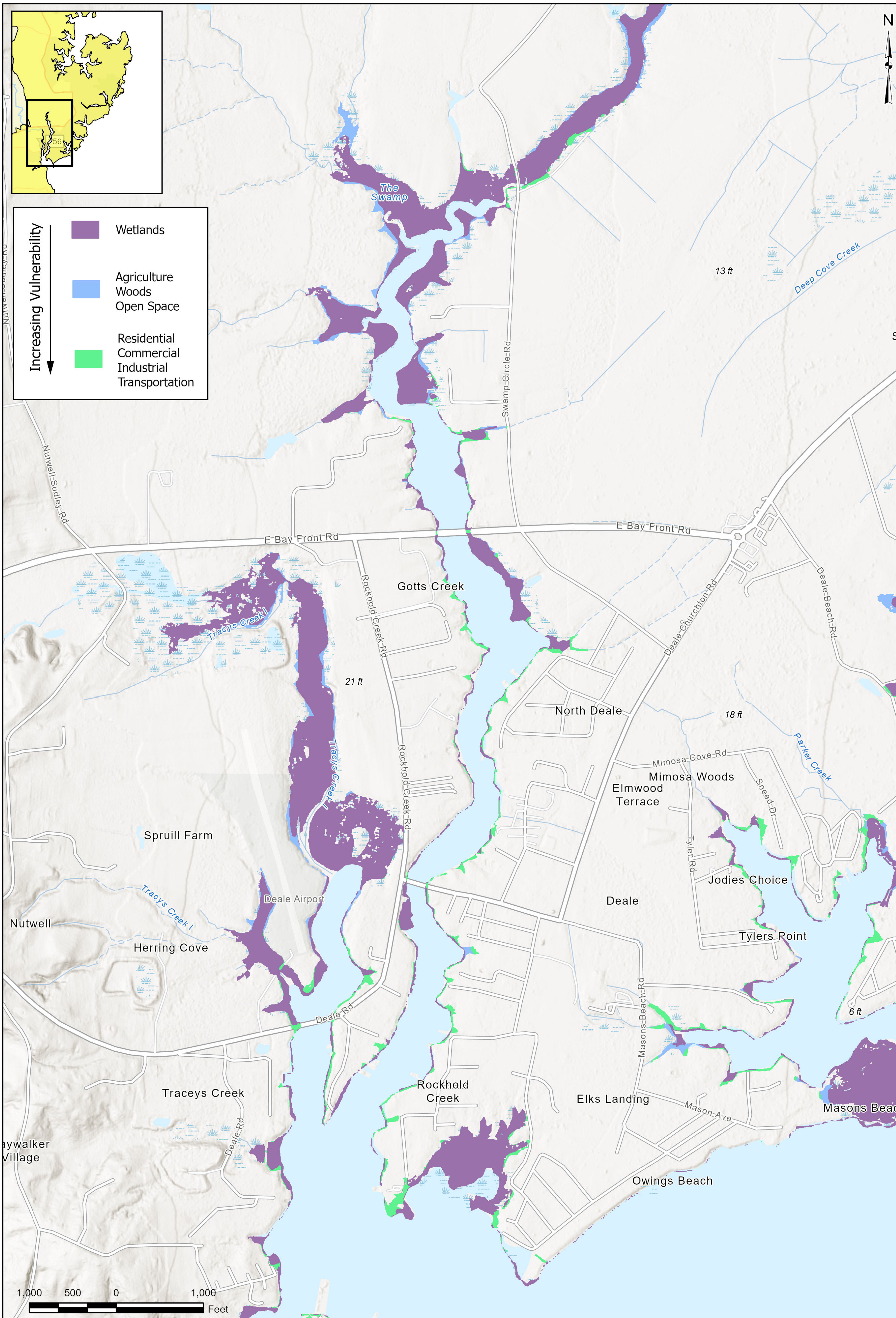

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INUNDATED LAND COVER - 2050

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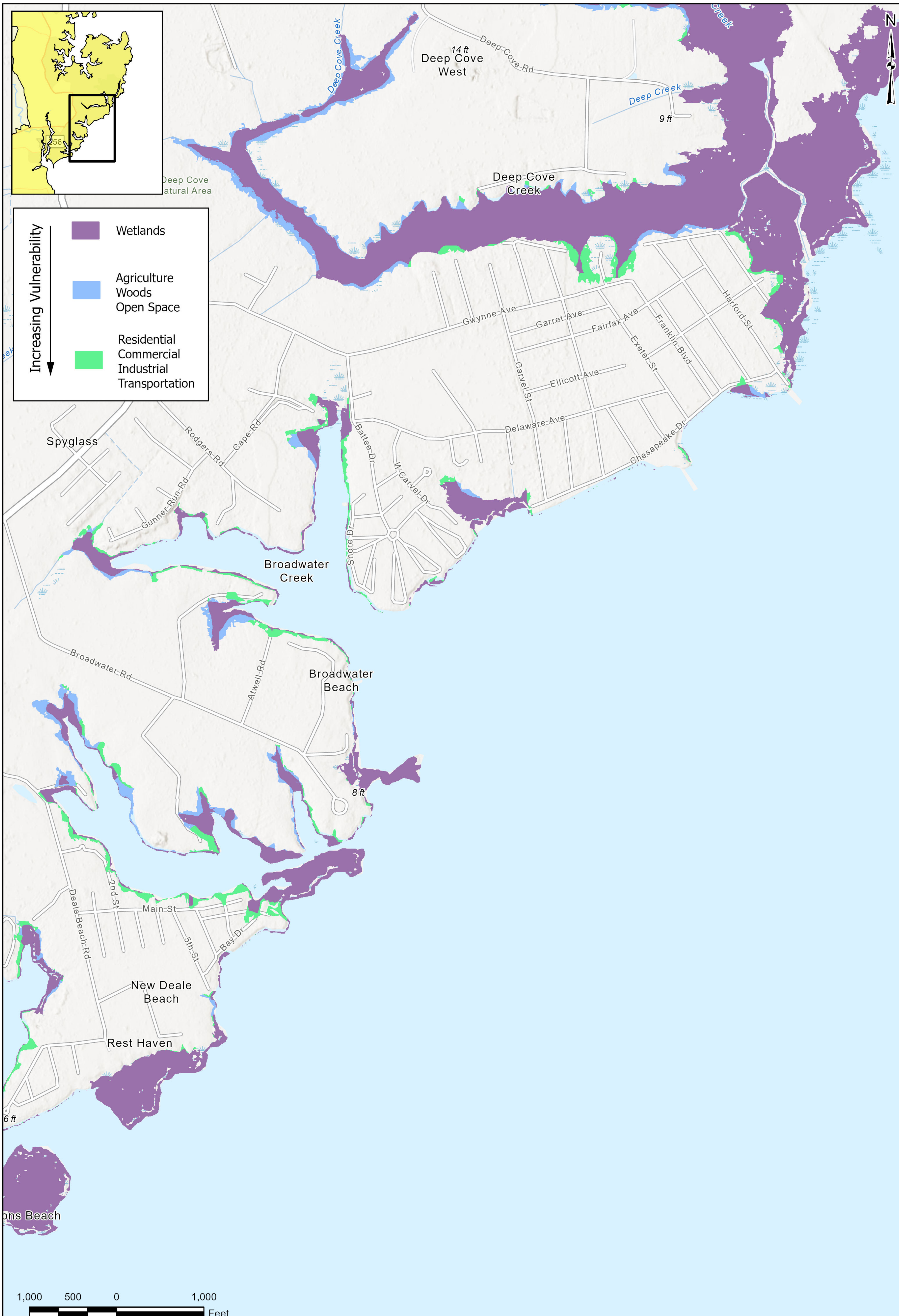

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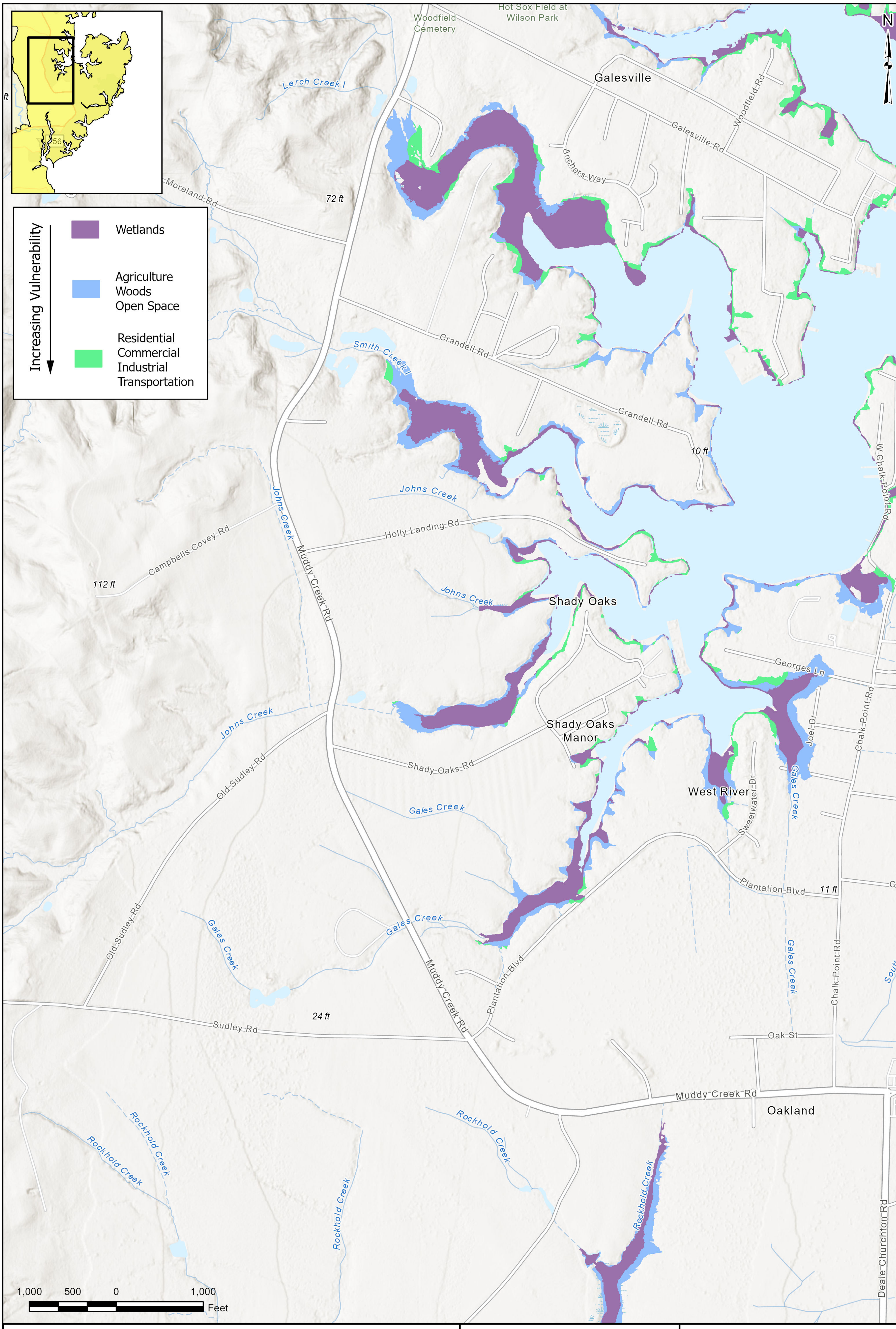
INUNDATED LAND COVER - 2050

SHEET 5



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INUNDATED LAND COVER - 2065

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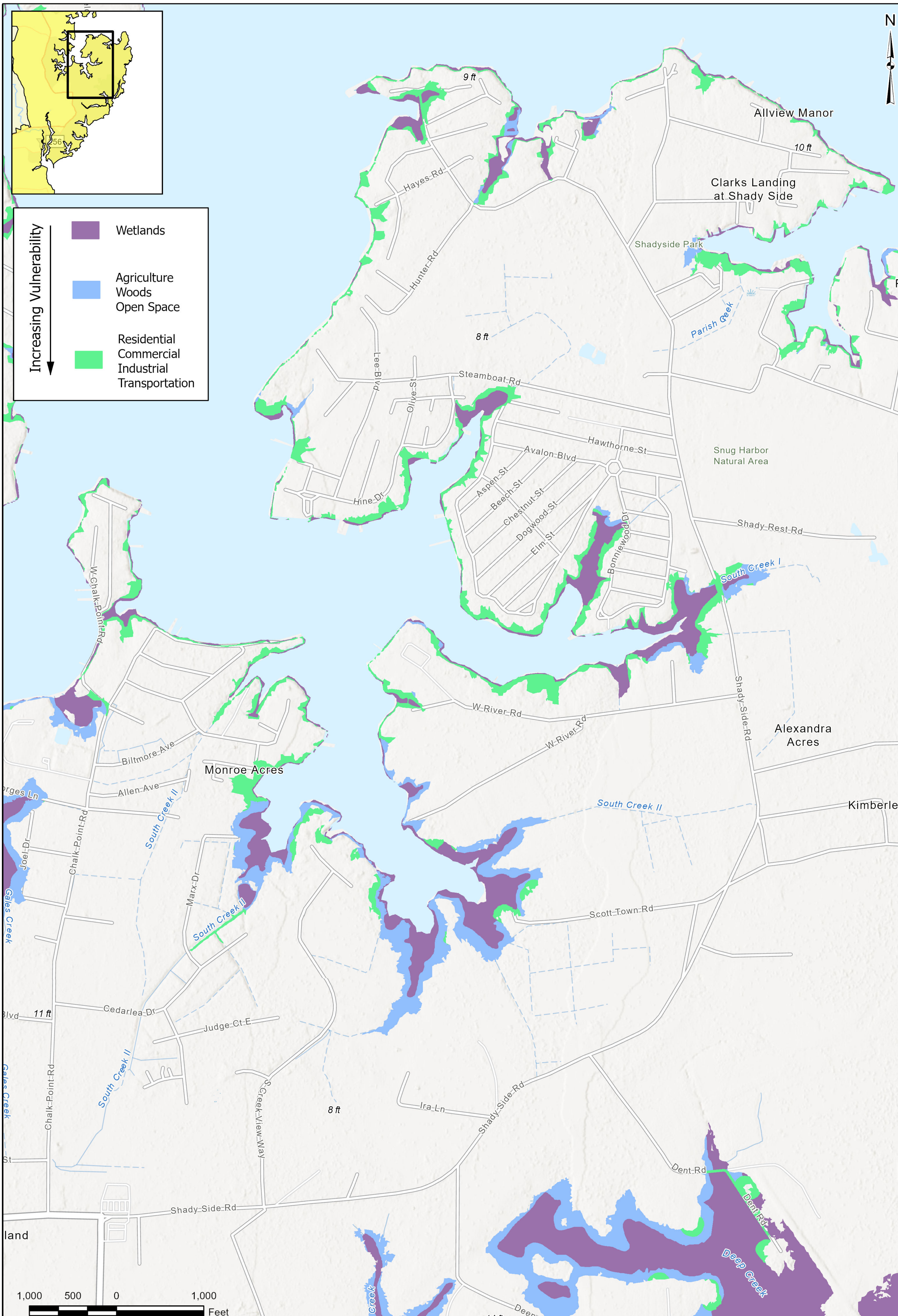

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INUNDATED LAND COVER - 2065

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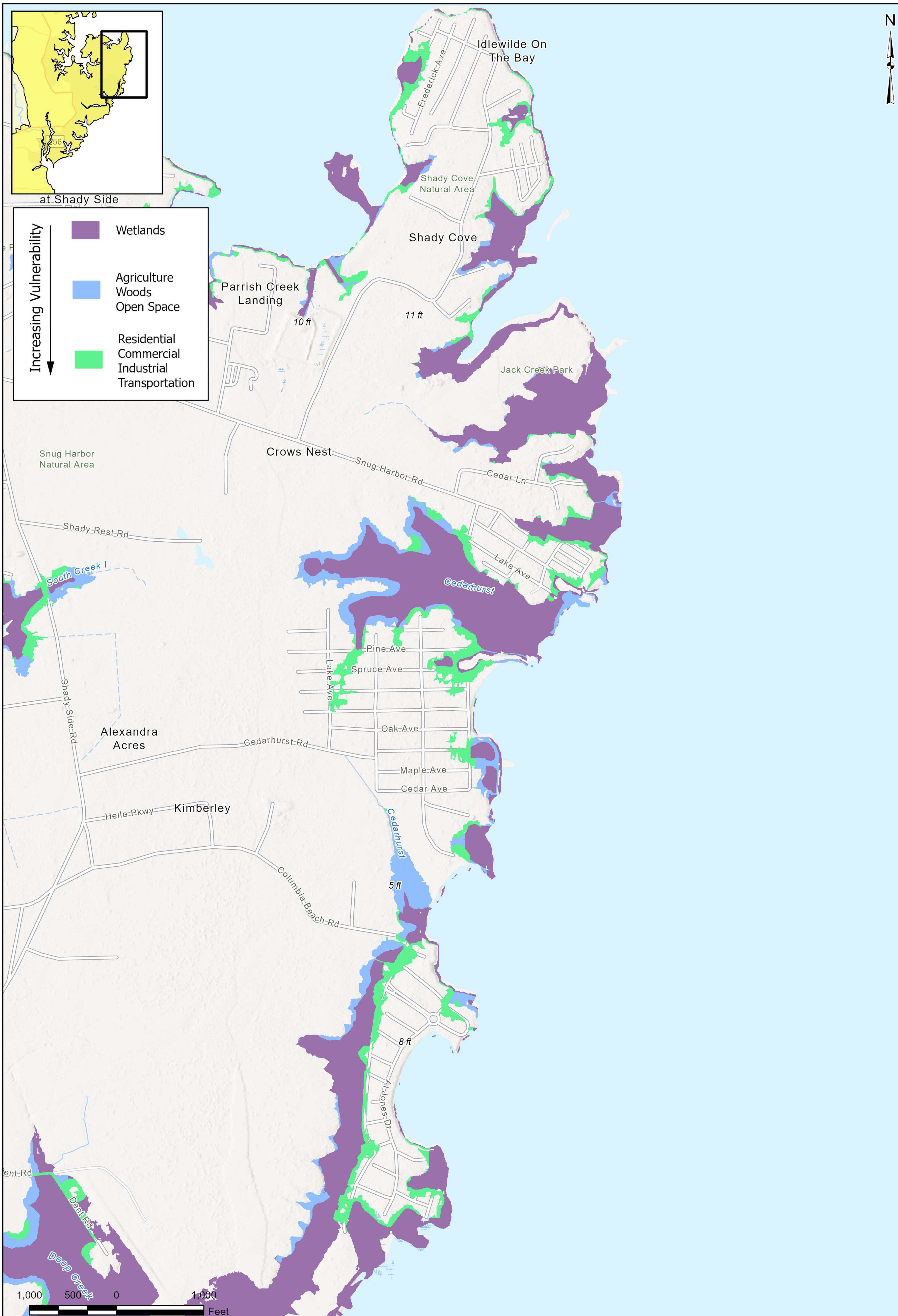

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INUNDATED LAND COVER - 2065

SHEET 3

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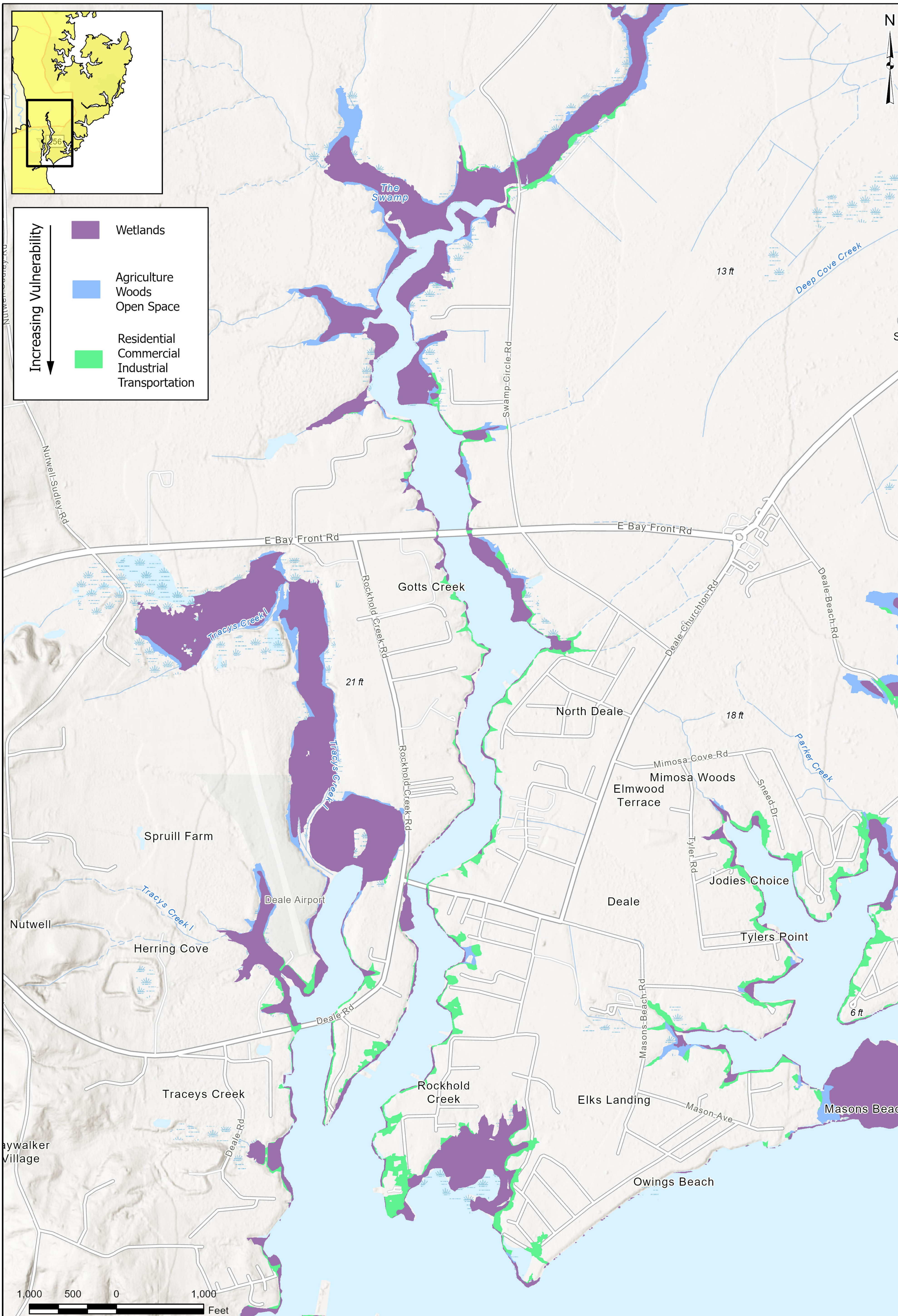

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INUNDATED LAND COVER - 2065

SHEET 4

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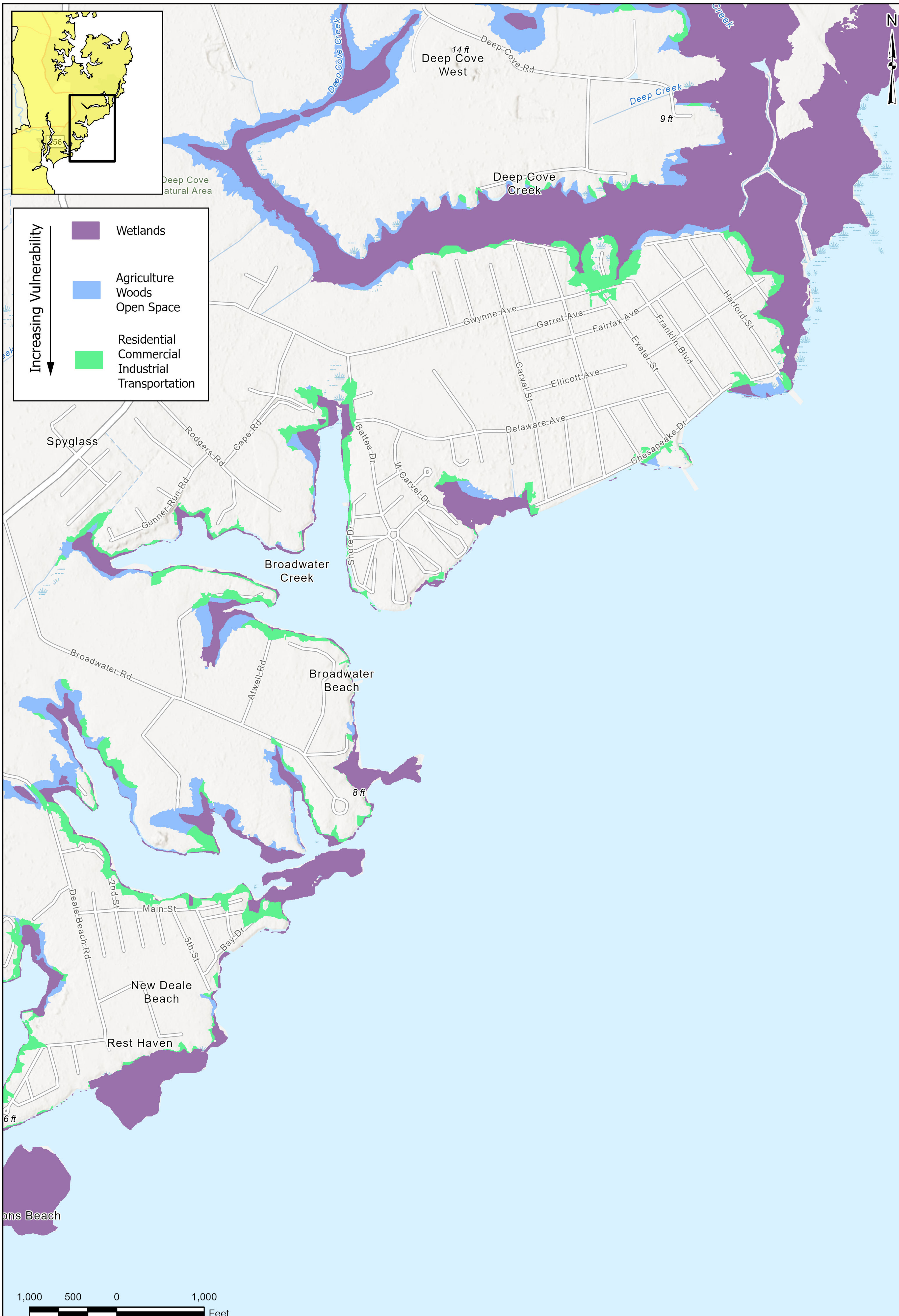

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INUNDATED LAND COVER - 2065

SHEET 5

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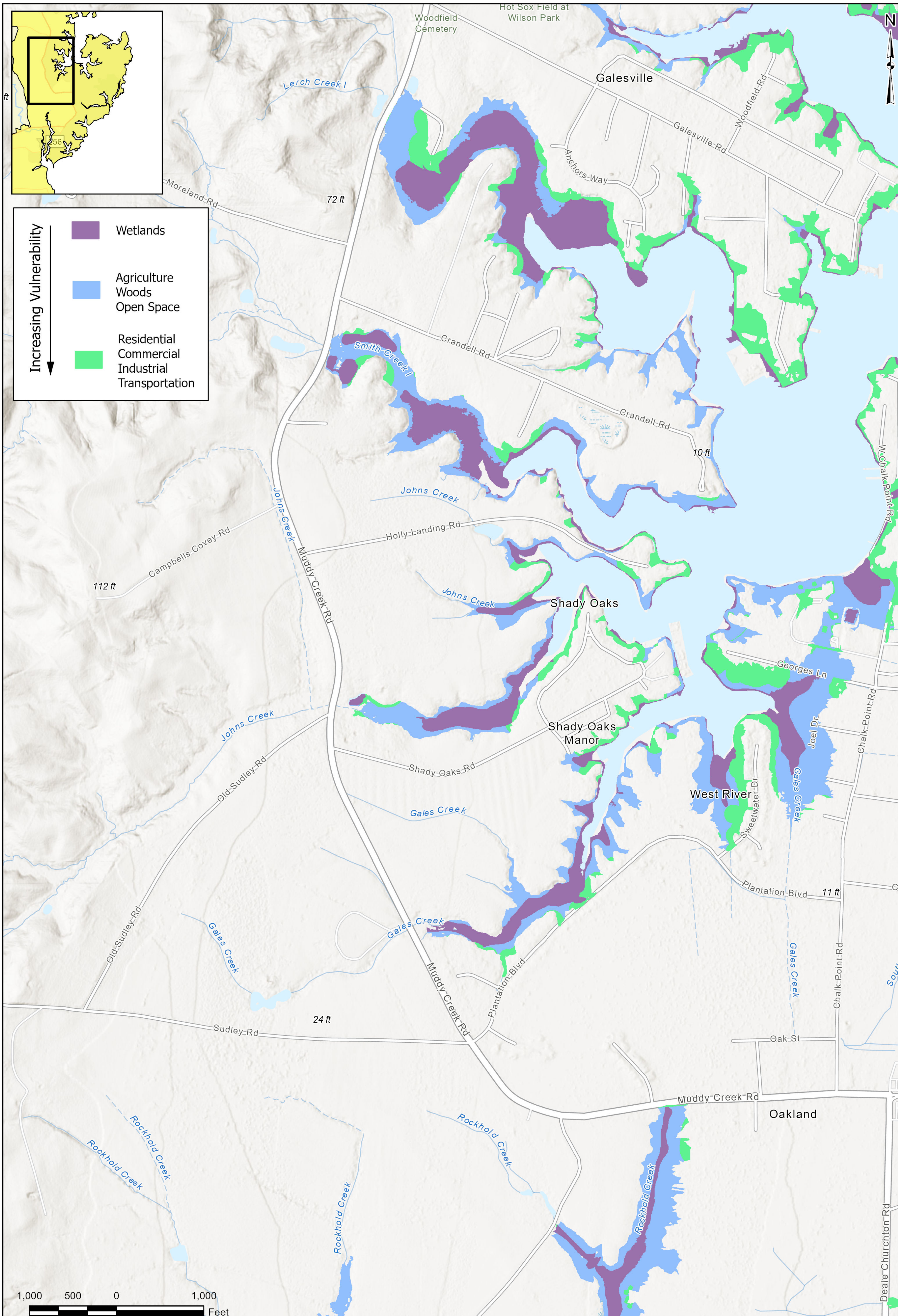

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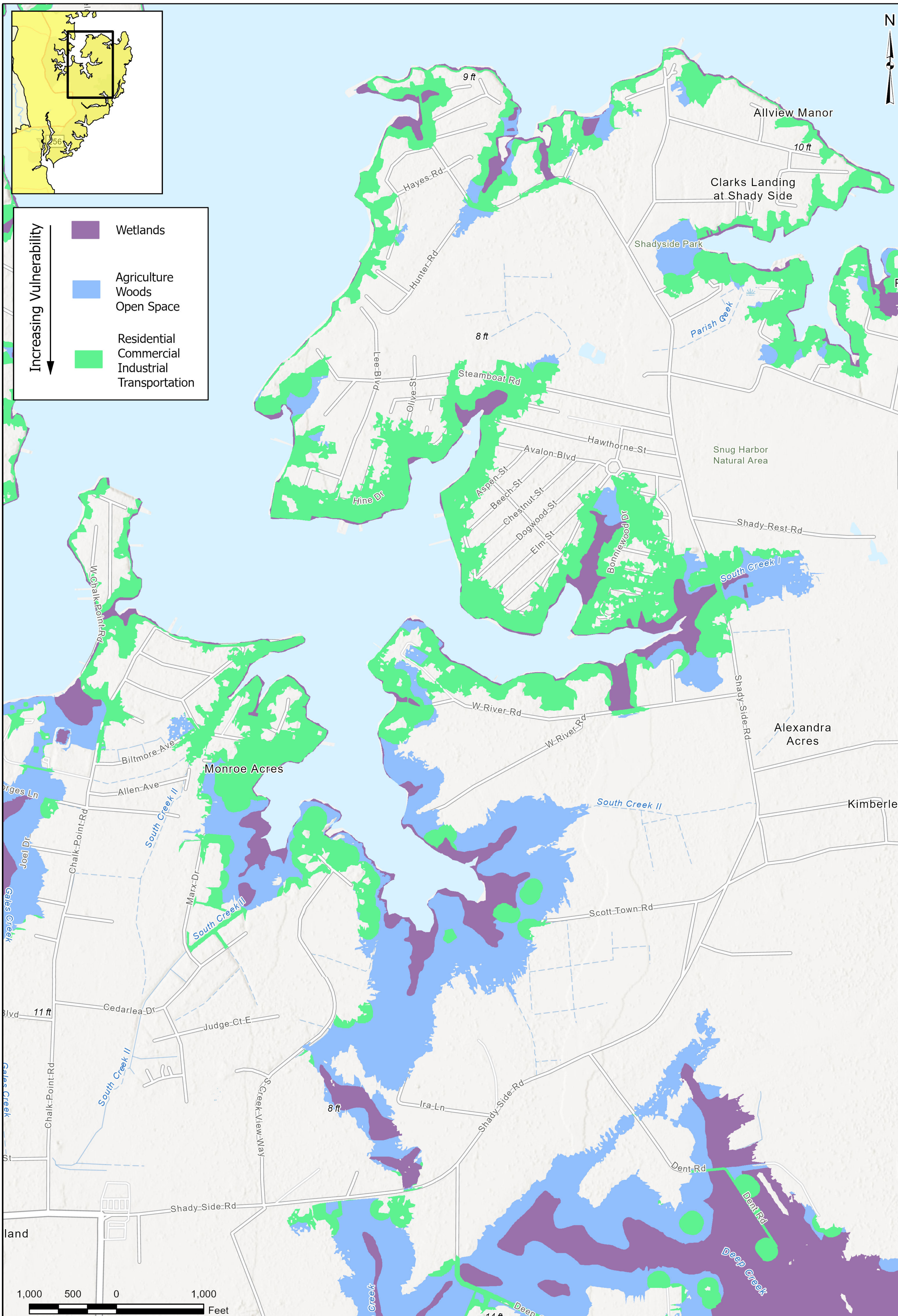
INUNDATED LAND COVER - 2100

SHEET 1



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INUNDATED LAND COVER - 2100

SHEET 2

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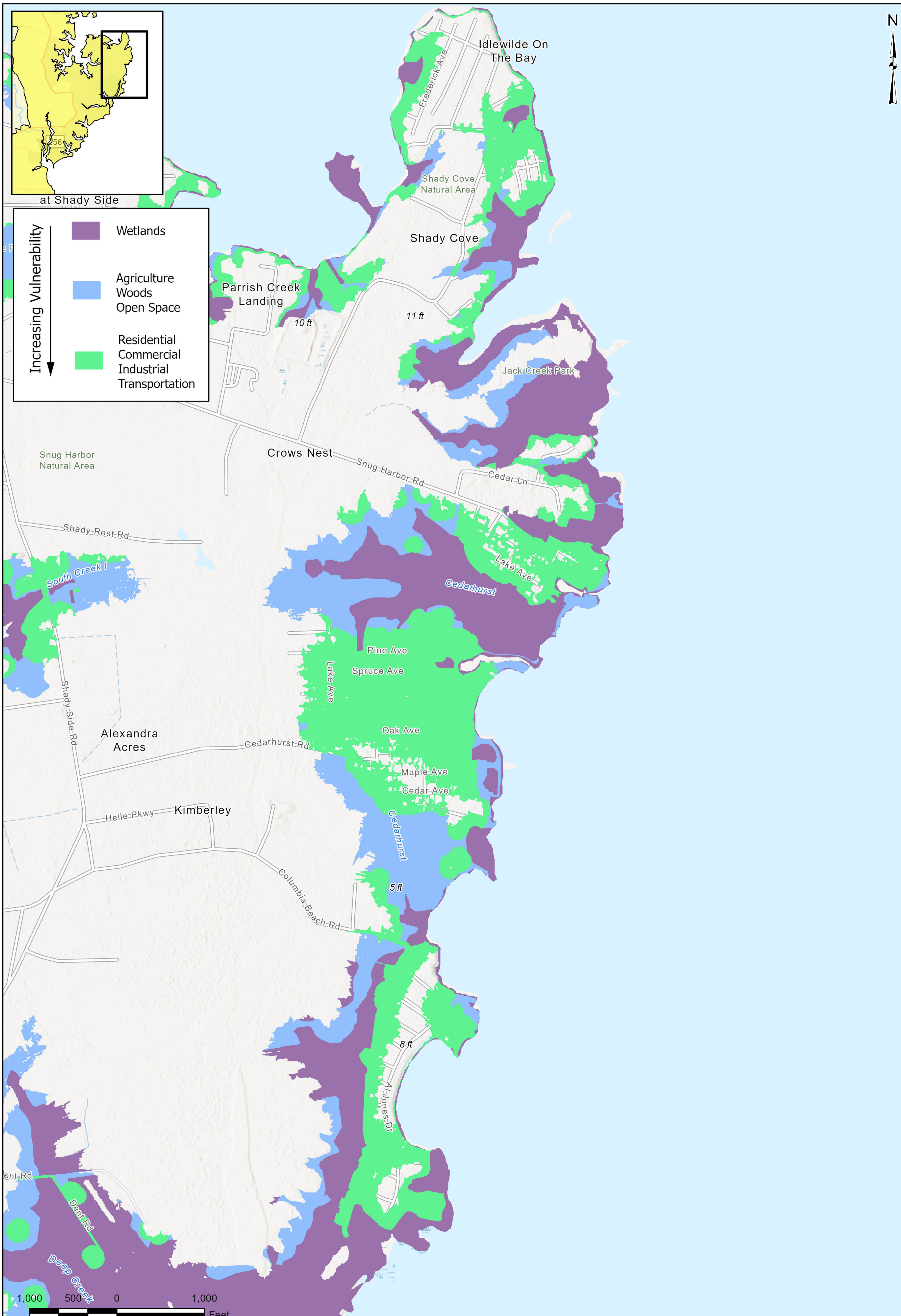

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INUNDATED LAND COVER - 2100

SHEET 3

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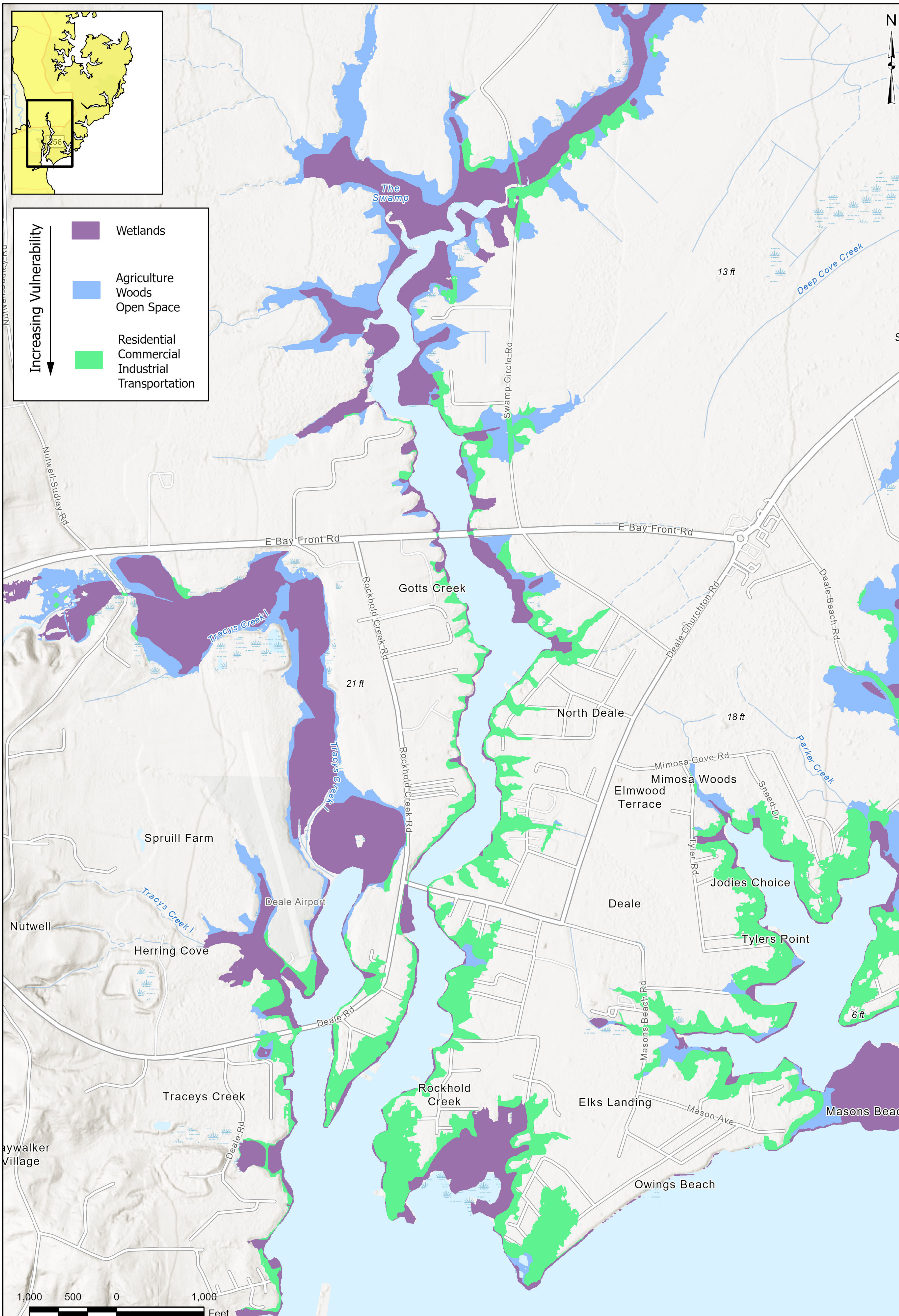

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INUNDATED LAND COVER - 2100

SHEET 4

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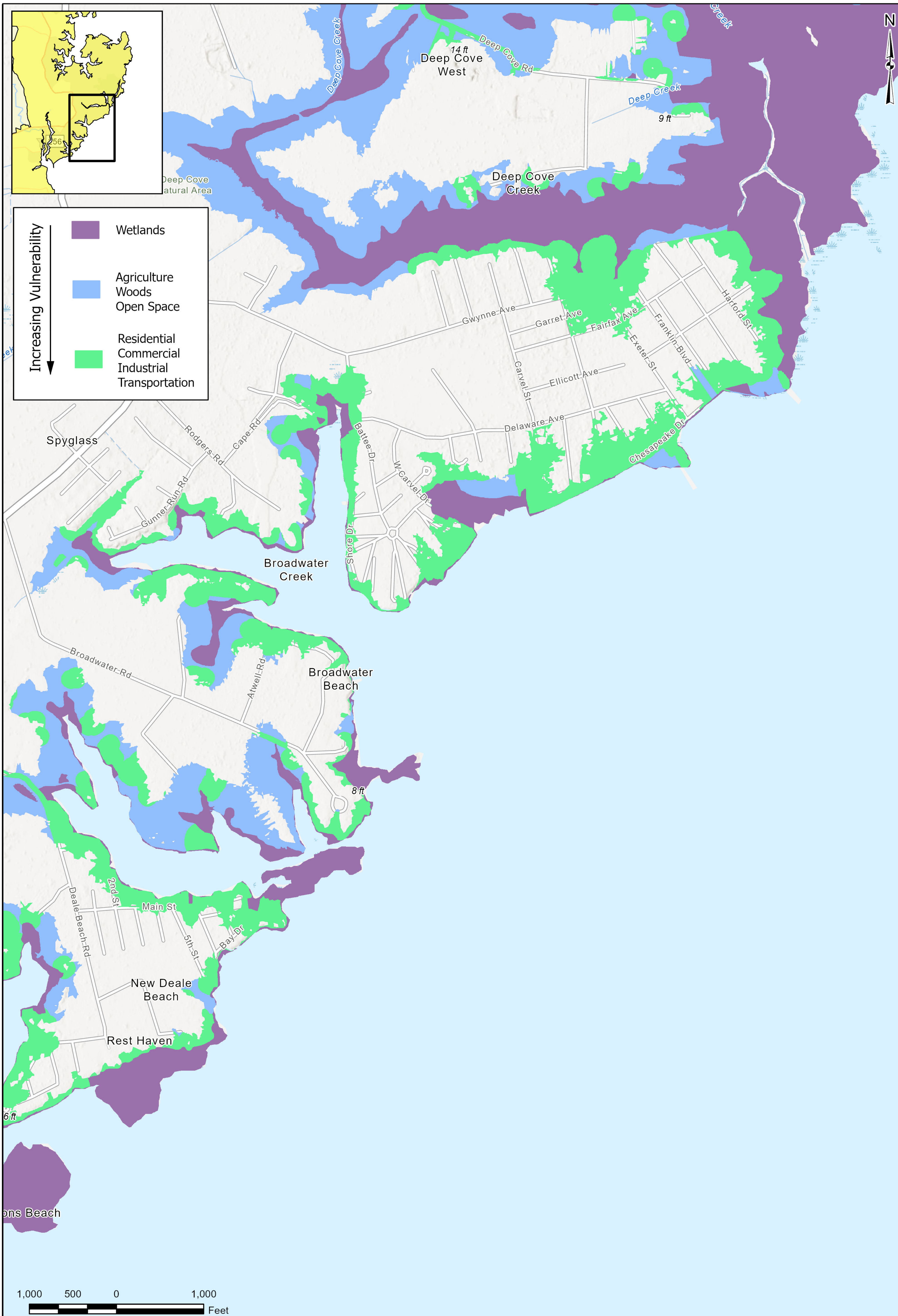

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INUNDATED LAND COVER - 2100

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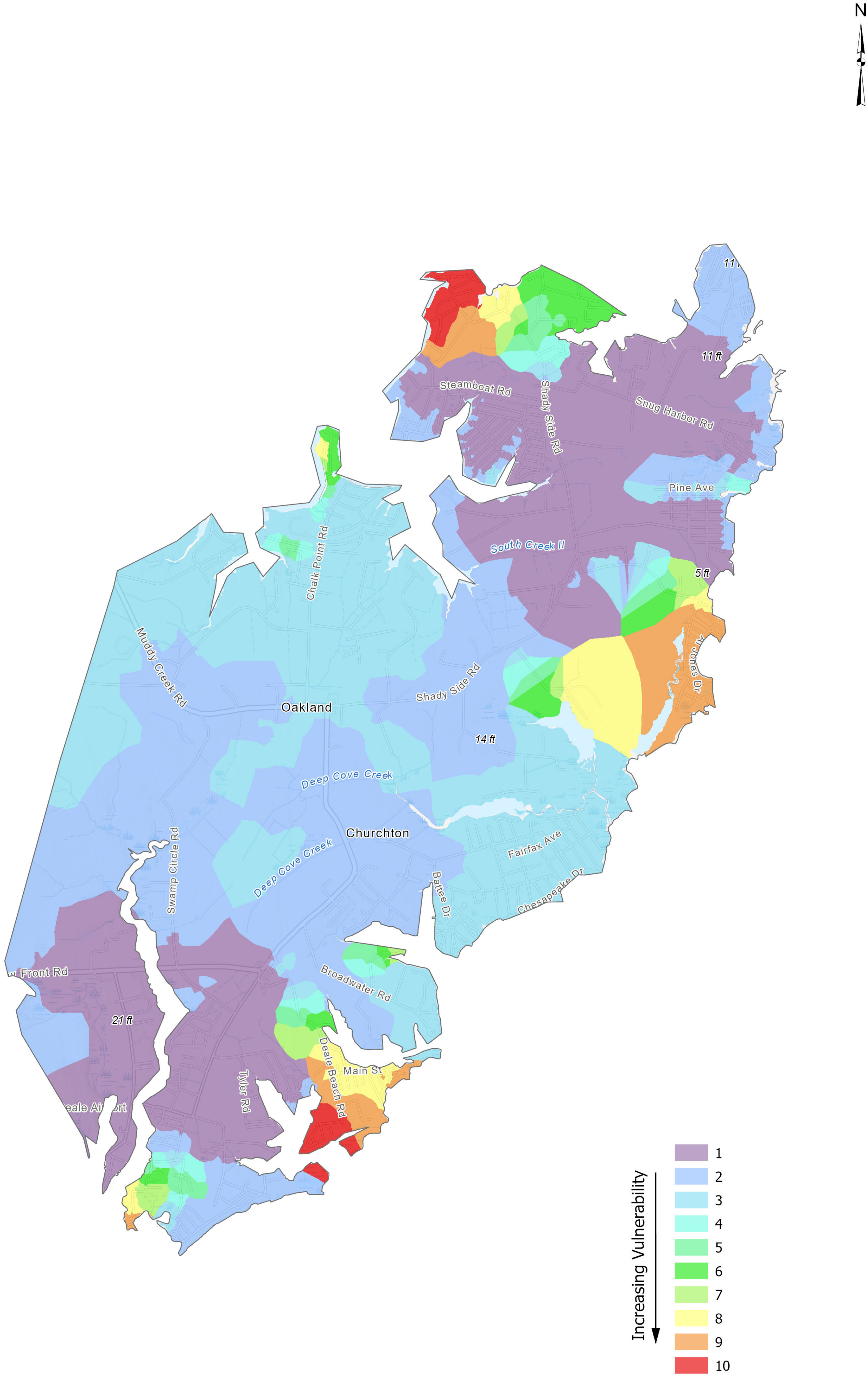

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Notes: To evaluate accessibility constraints, a cost-distance analysis was performed using the spatial proximity to hospitals, fire stations, and designated evacuation routes.

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ACCESSIBILITY TO EMERGENCY SERVICES

2050

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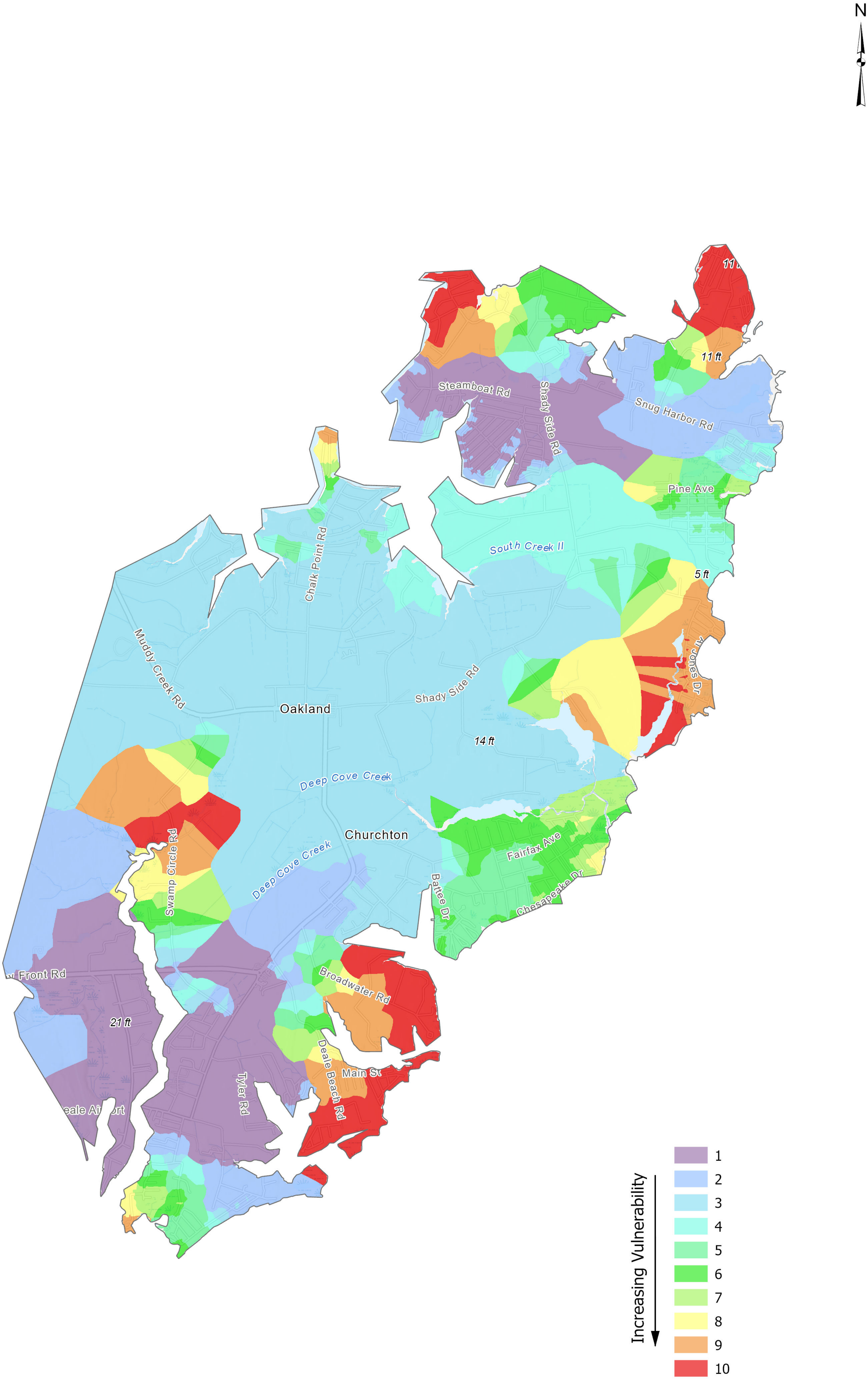

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ACCESSIBILITY TO EMERGENCY SERVICES

2065

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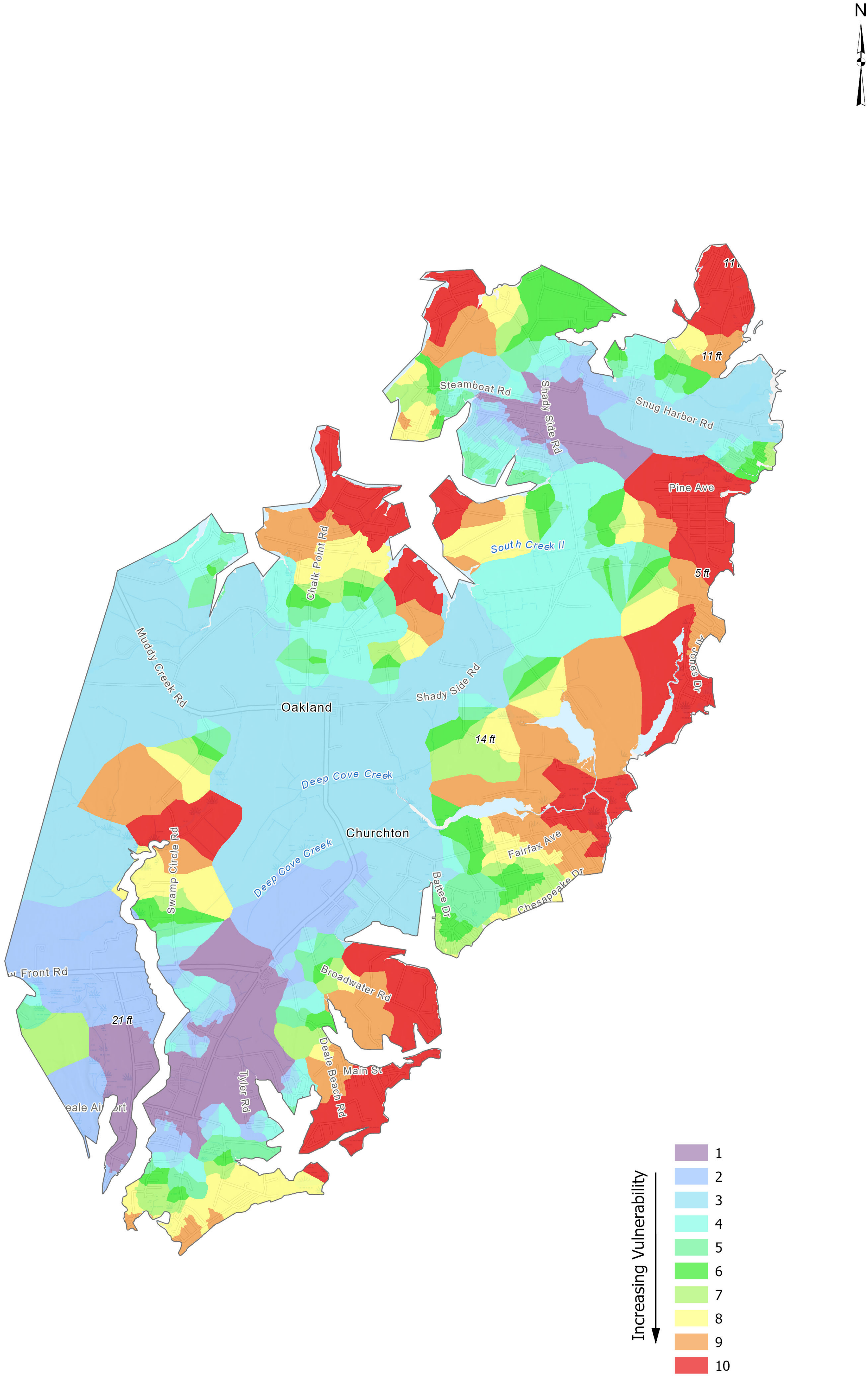

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ACCESSIBILITY TO EMERGENCY SERVICES

2100

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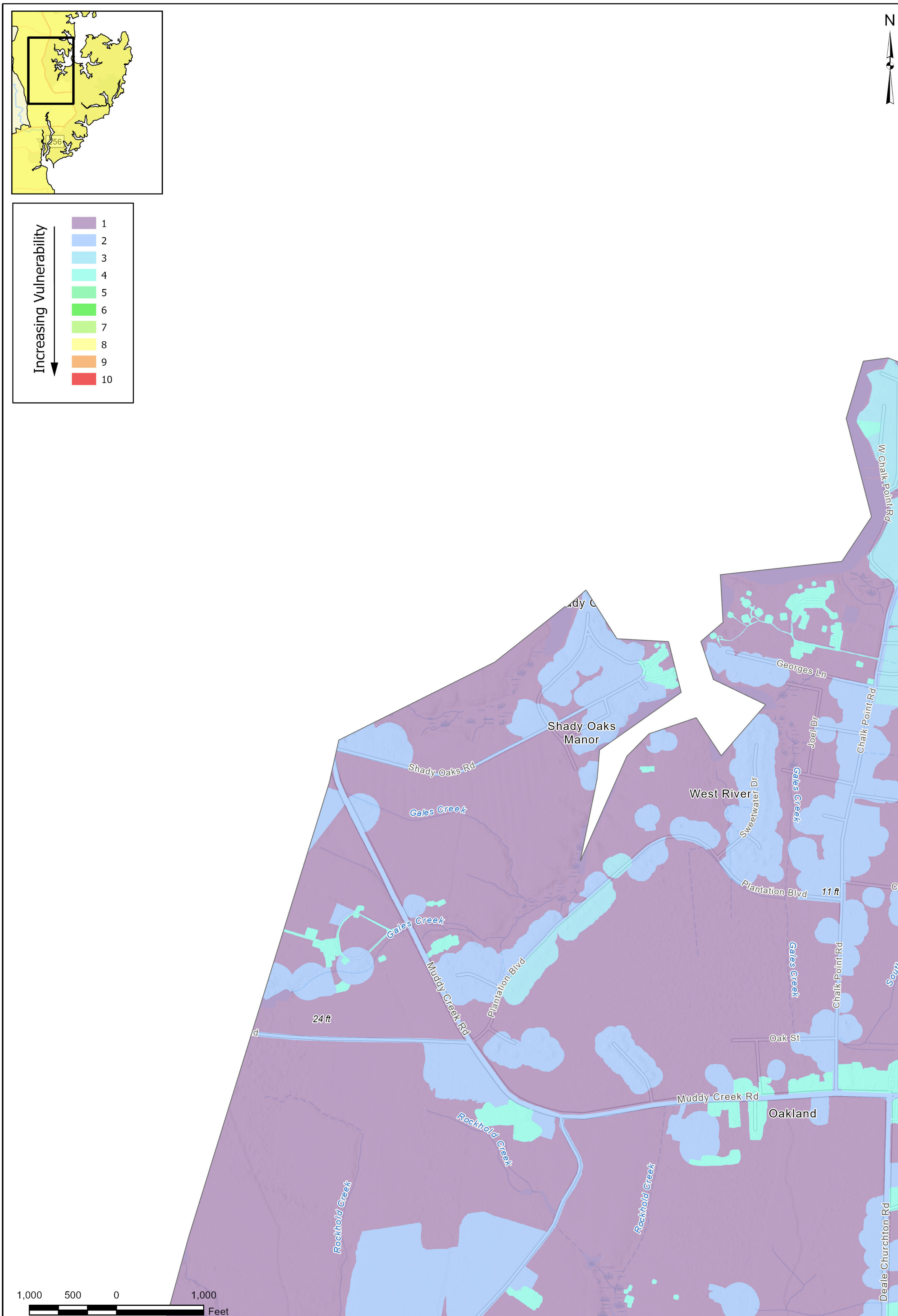

Notes: The final stormwater vulnerability map combines modeled flood response with land-use characteristics to provide a comprehensive assessment of stormwater-driven flood risk across the peninsula.

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STORMWATER FLOOD VULNERABILITY

SHEET 1

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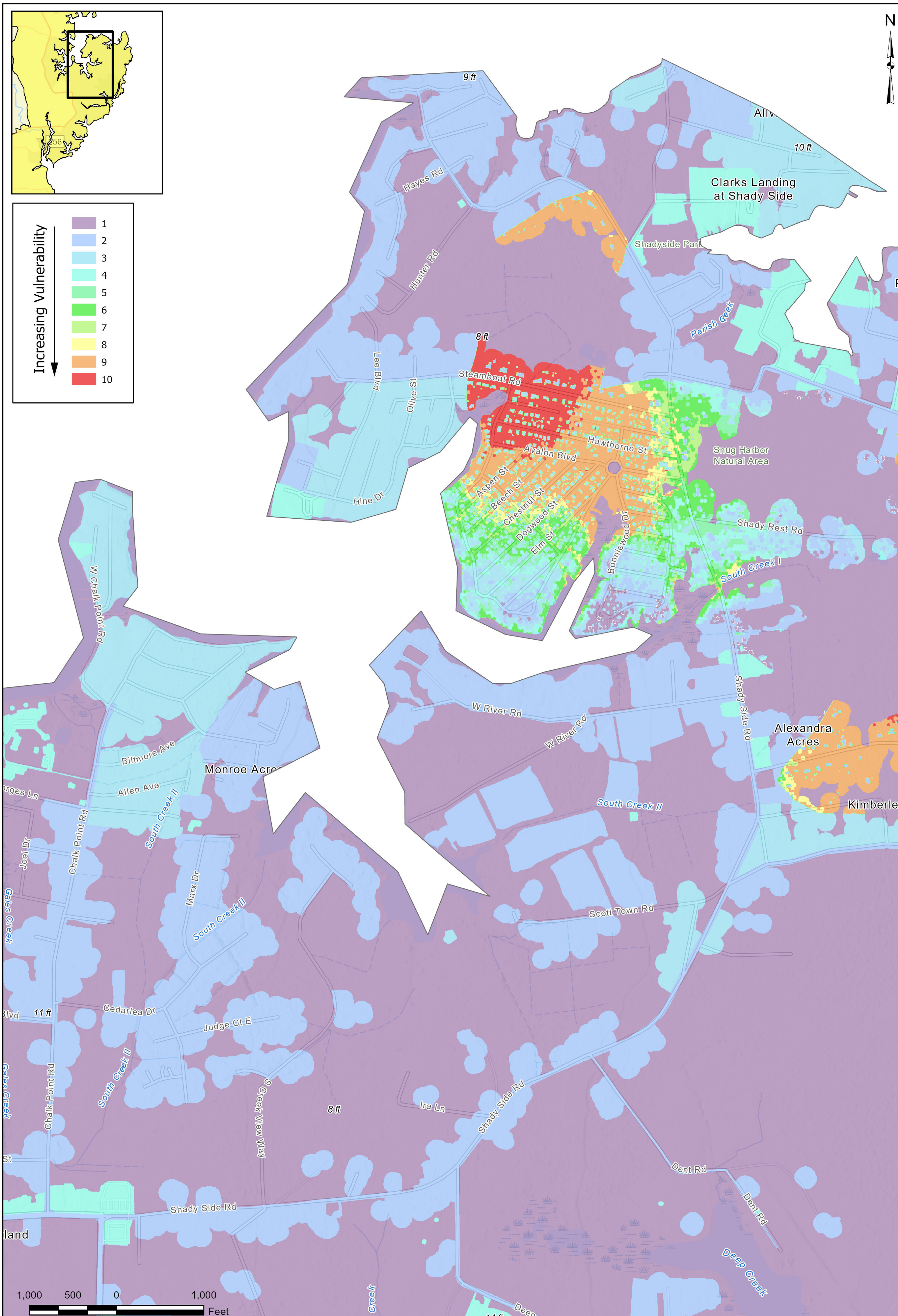

Notes: The final stormwater vulnerability map combines modeled flood response with land-use characteristics to provide a comprehensive assessment of stormwater-driven flood risk across the peninsula.

County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA, Esri Community Maps Contributors, County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

BayLand Consultants & Designers, Inc.
"Integrating Engineering and Environment"
7455 New Ridge Road, Suite T
Hanover, Maryland 21076
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STORMWATER FLOOD VULNERABILITY

SHEET 2

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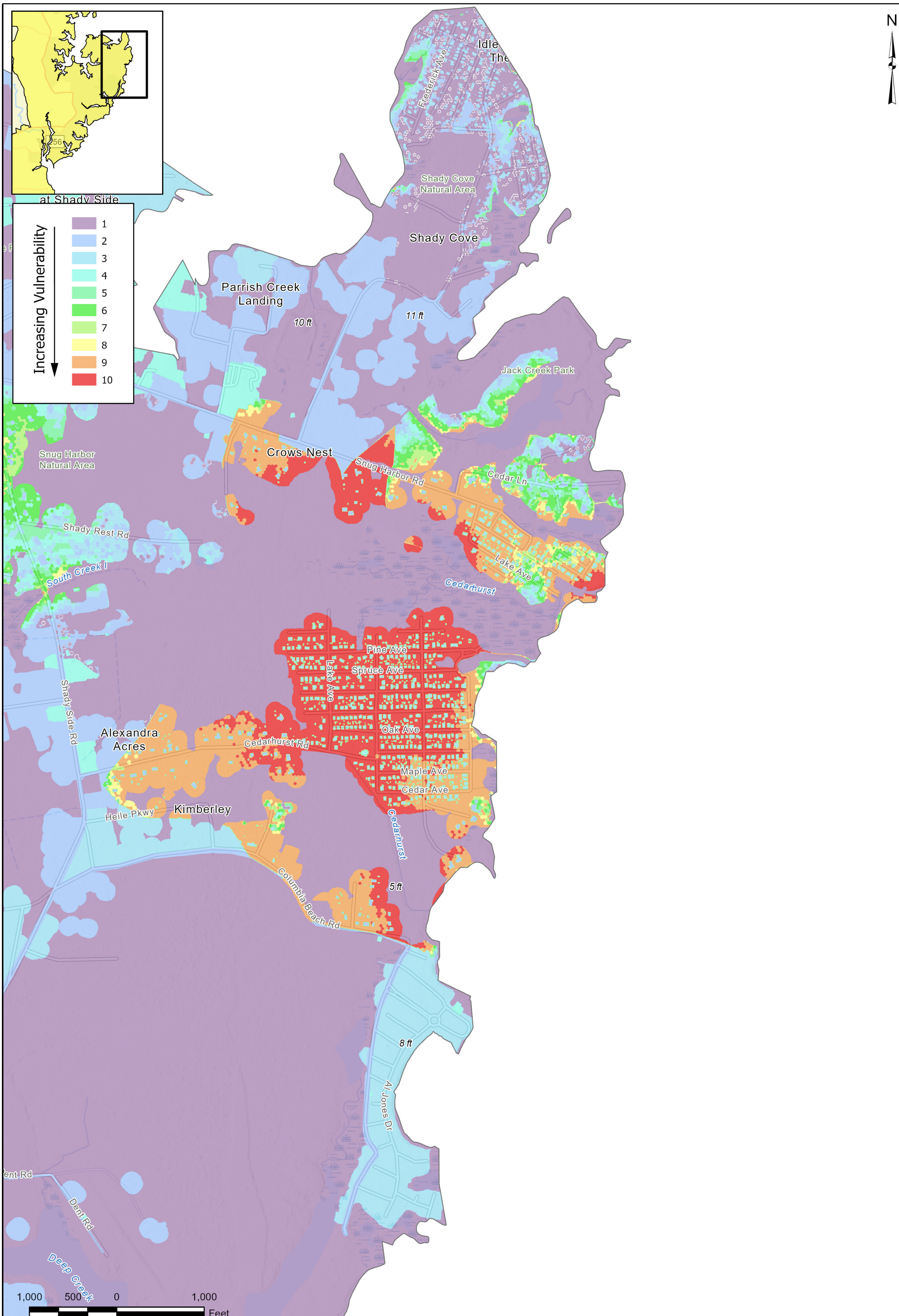

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STORMWATER FLOOD VULNERABILITY

SHEET 3

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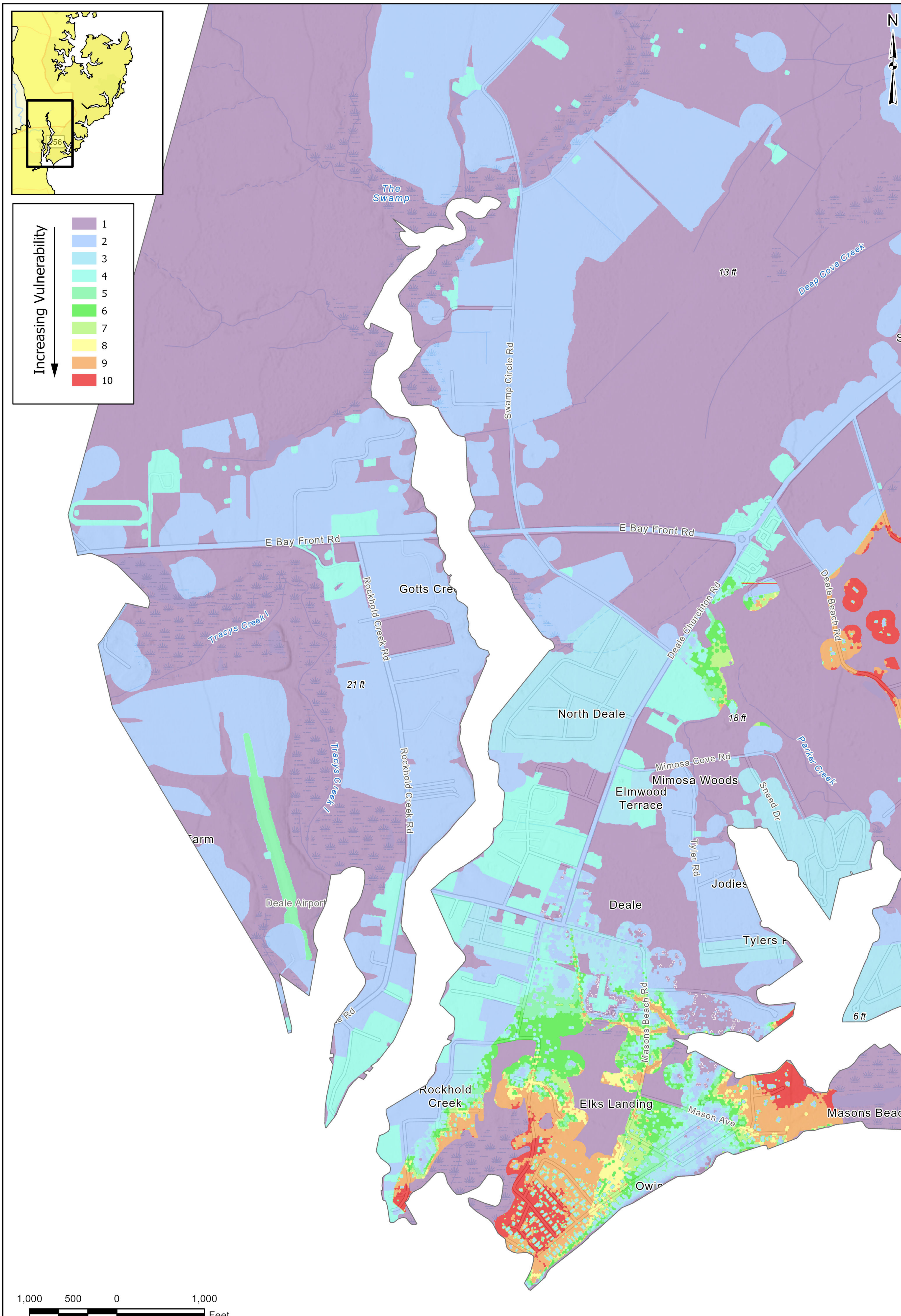

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STORMWATER FLOOD VULNERABILITY

SHEET 4

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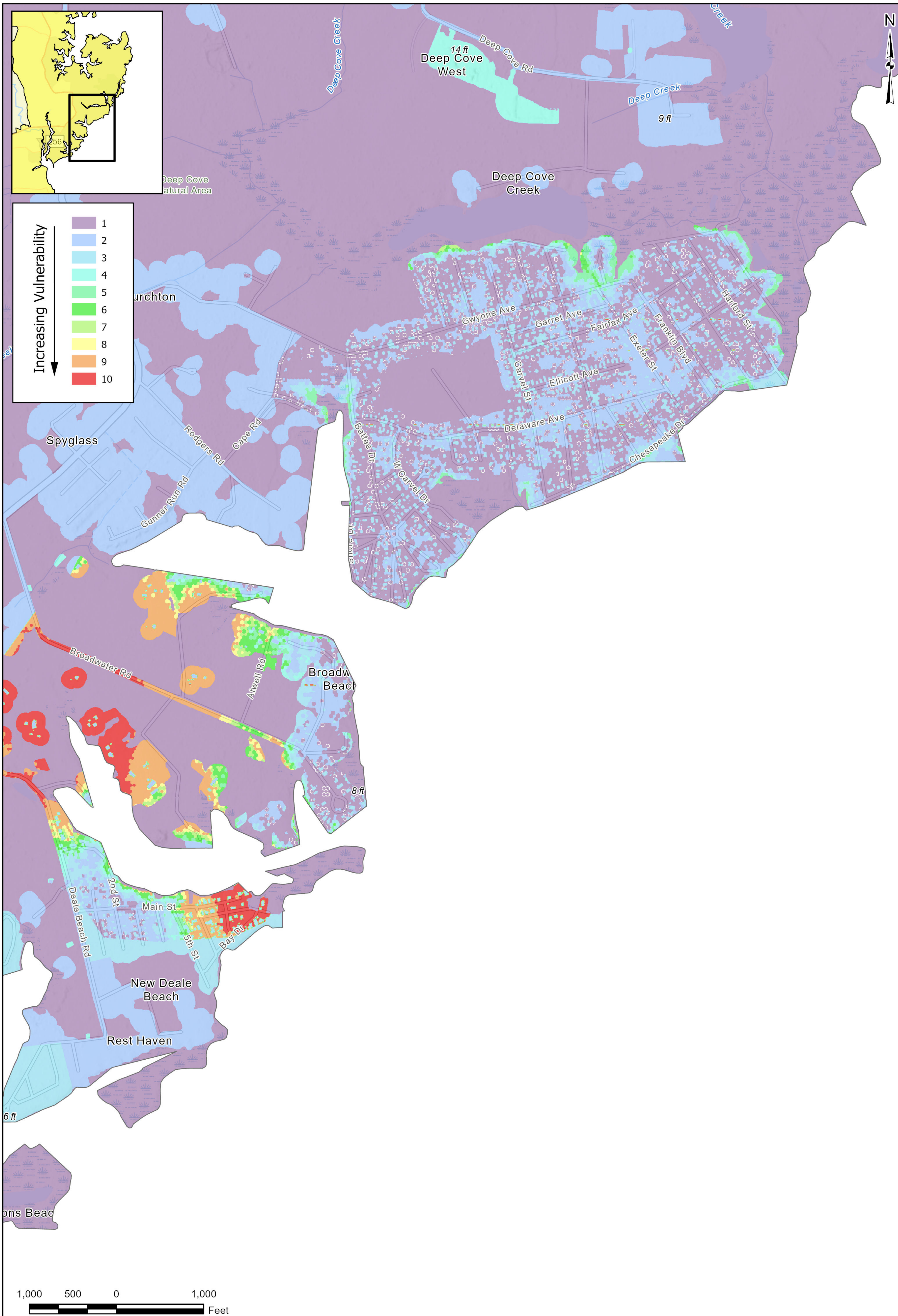

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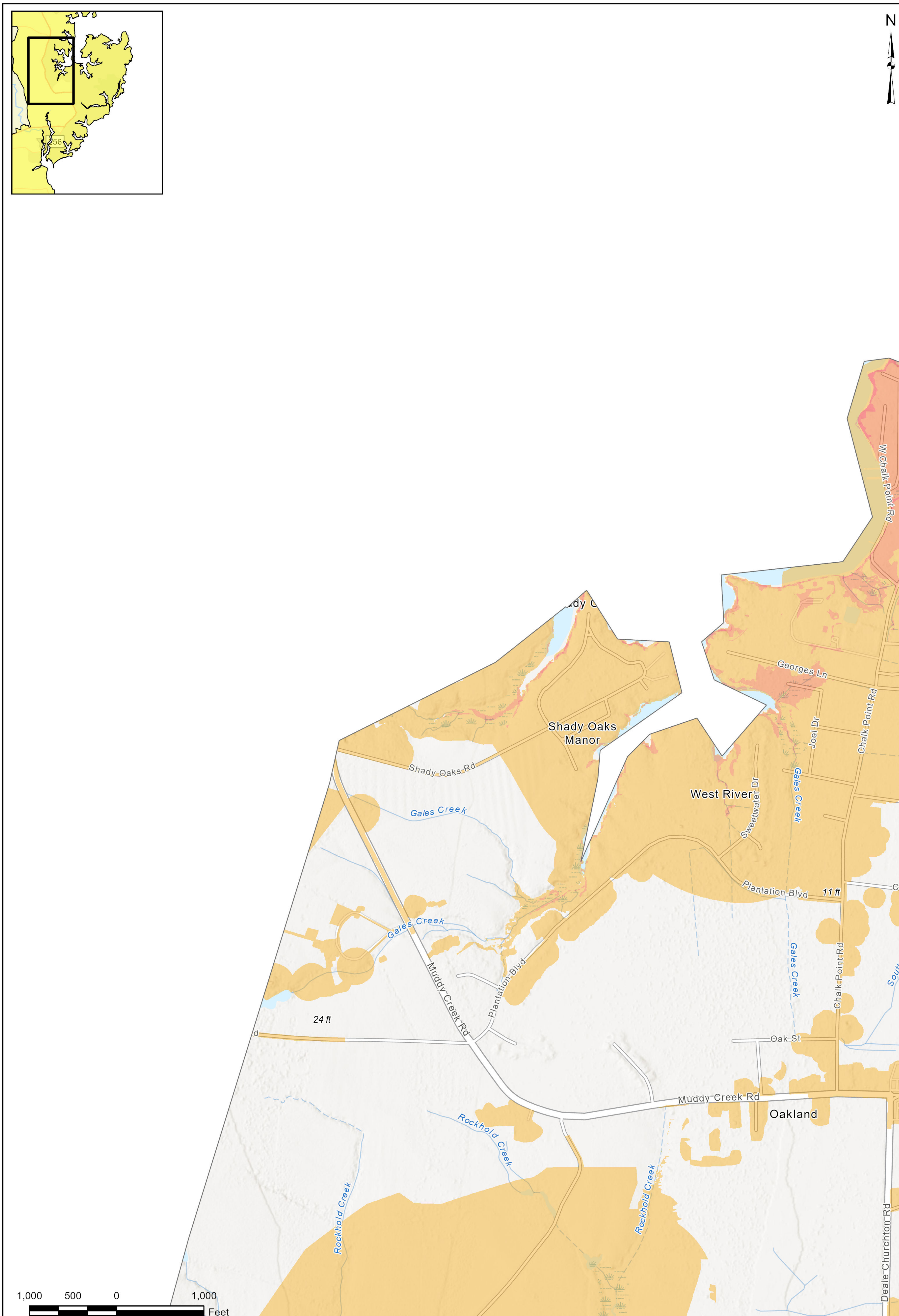
STORMWATER FLOOD VULNERABILITY

SHEET 5



Notes: The final composite vulnerability map was generated using a weighted overlay analysis, which assigns numerical weights to each contributing factor based on its relative influence on flood vulnerability.

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More Vulnerable

Less Vulnerable

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VULNERABILITY RATING

SHEET 1

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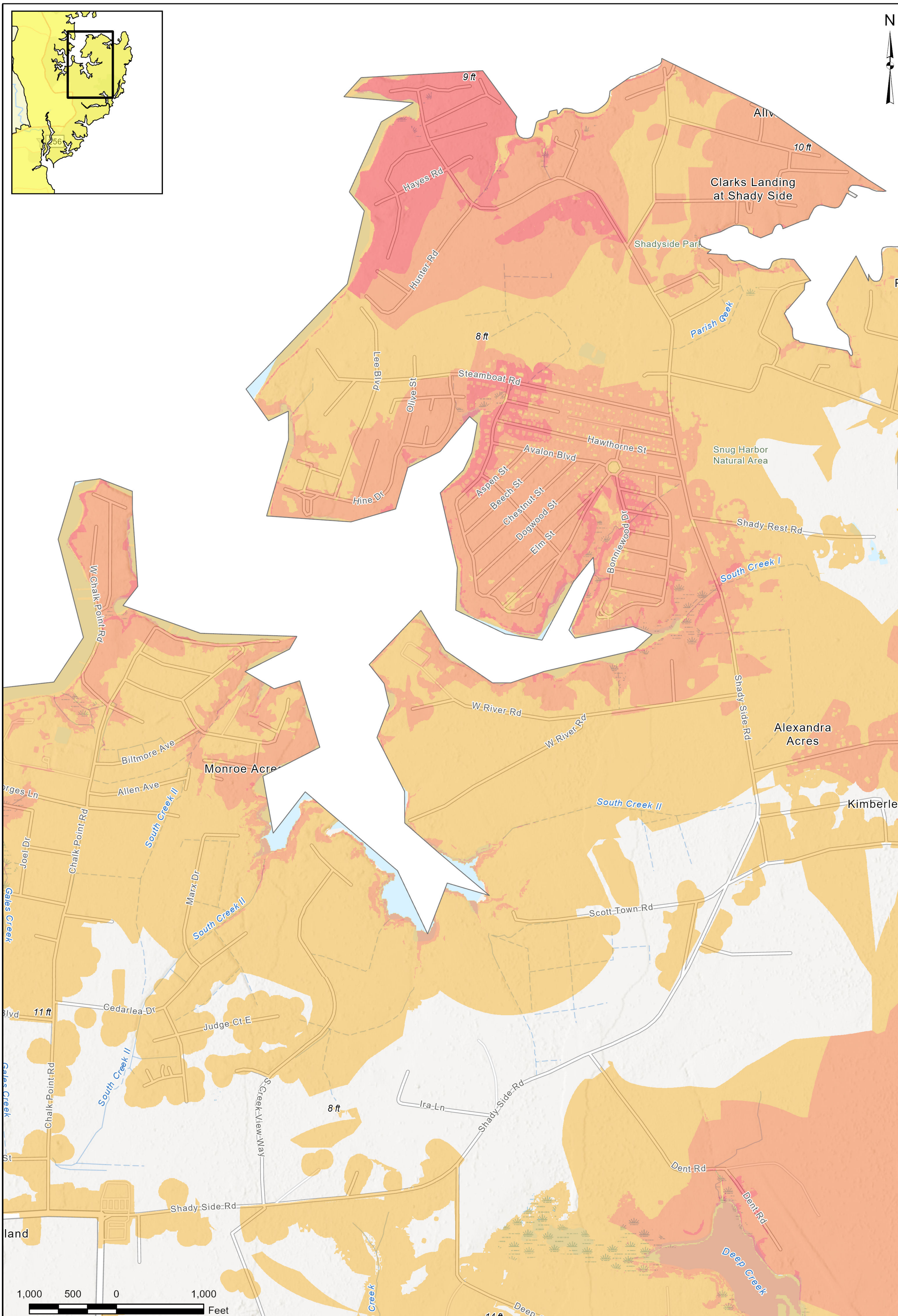

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More Vulnerable

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VULNERABILITY RATING

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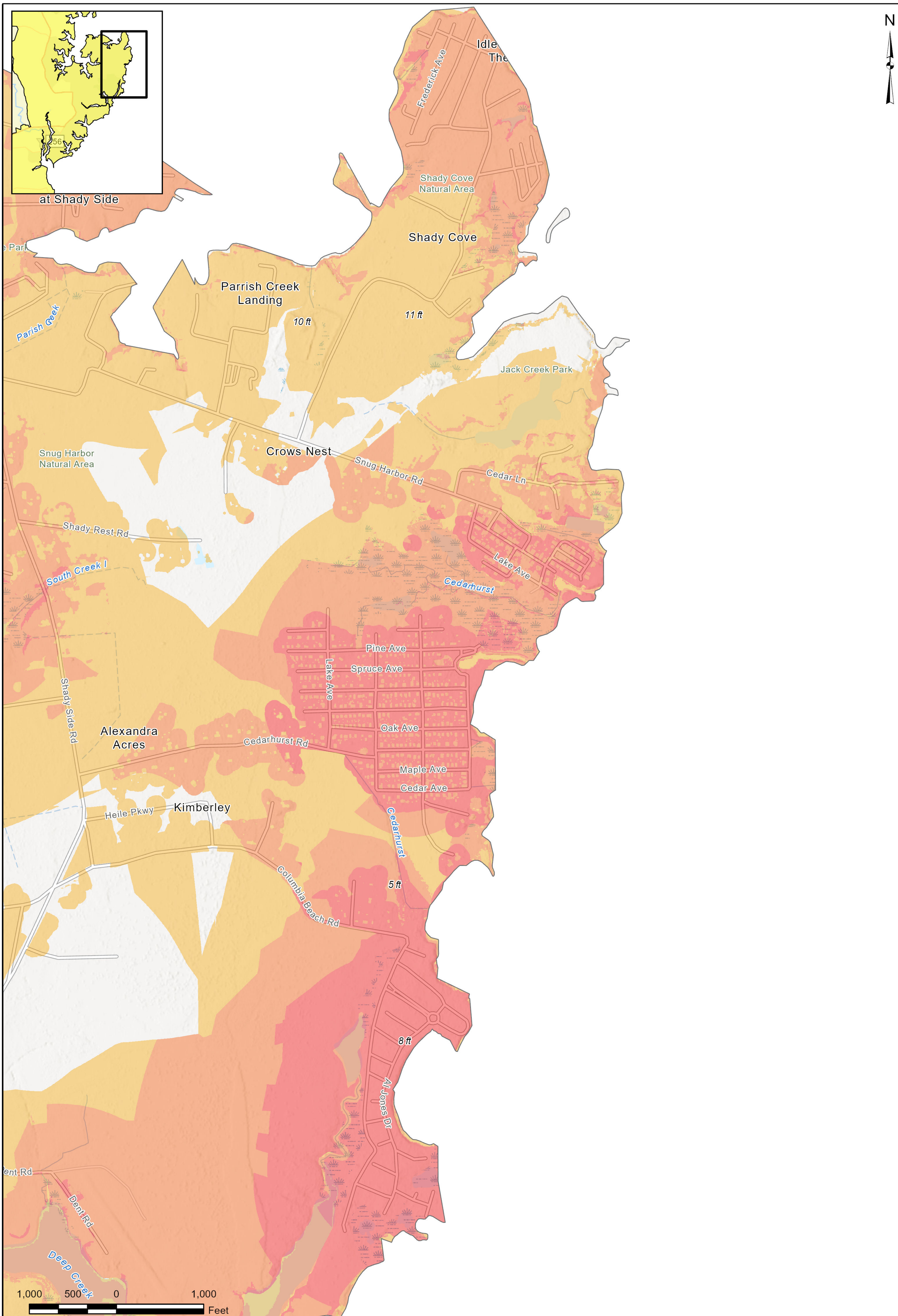

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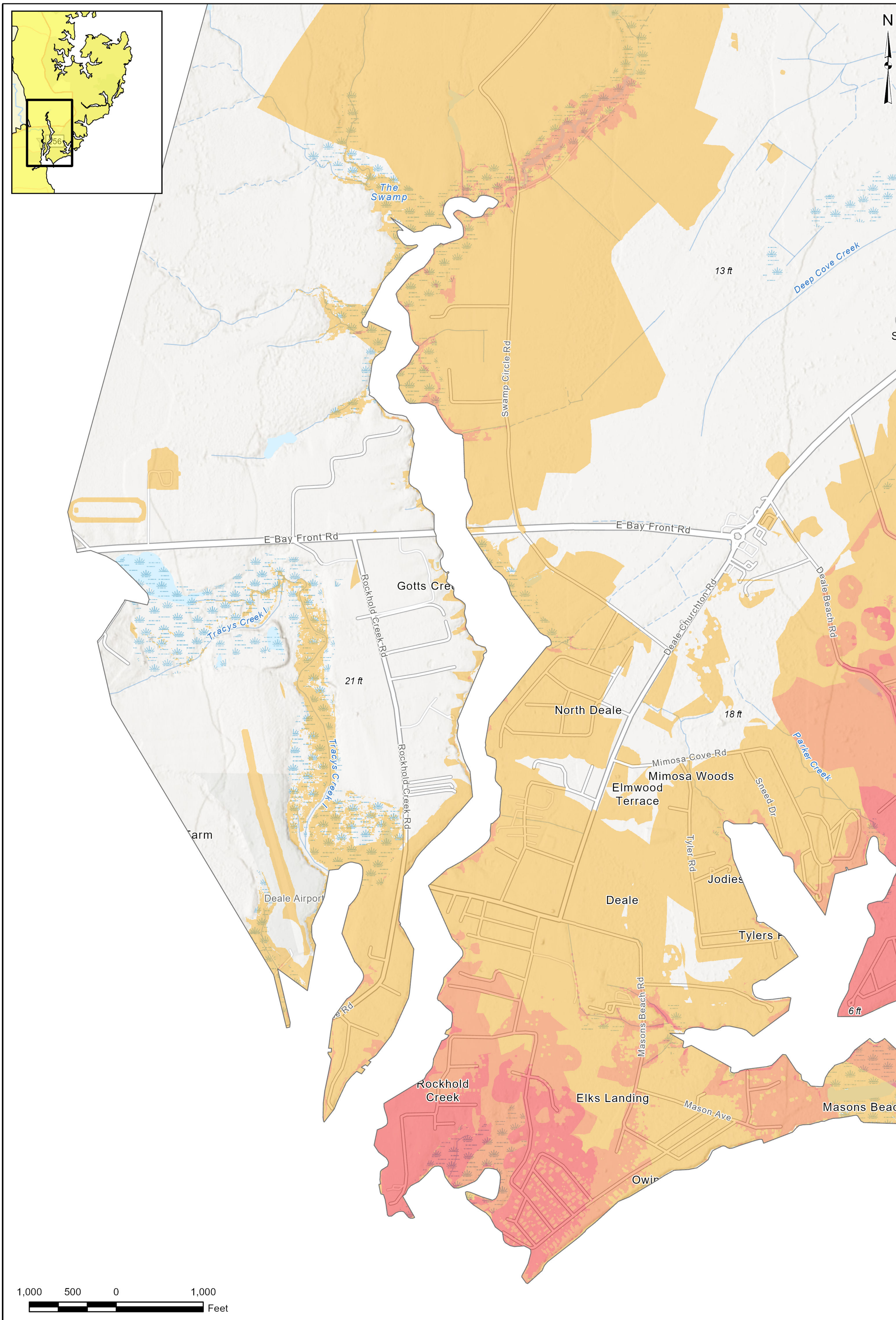

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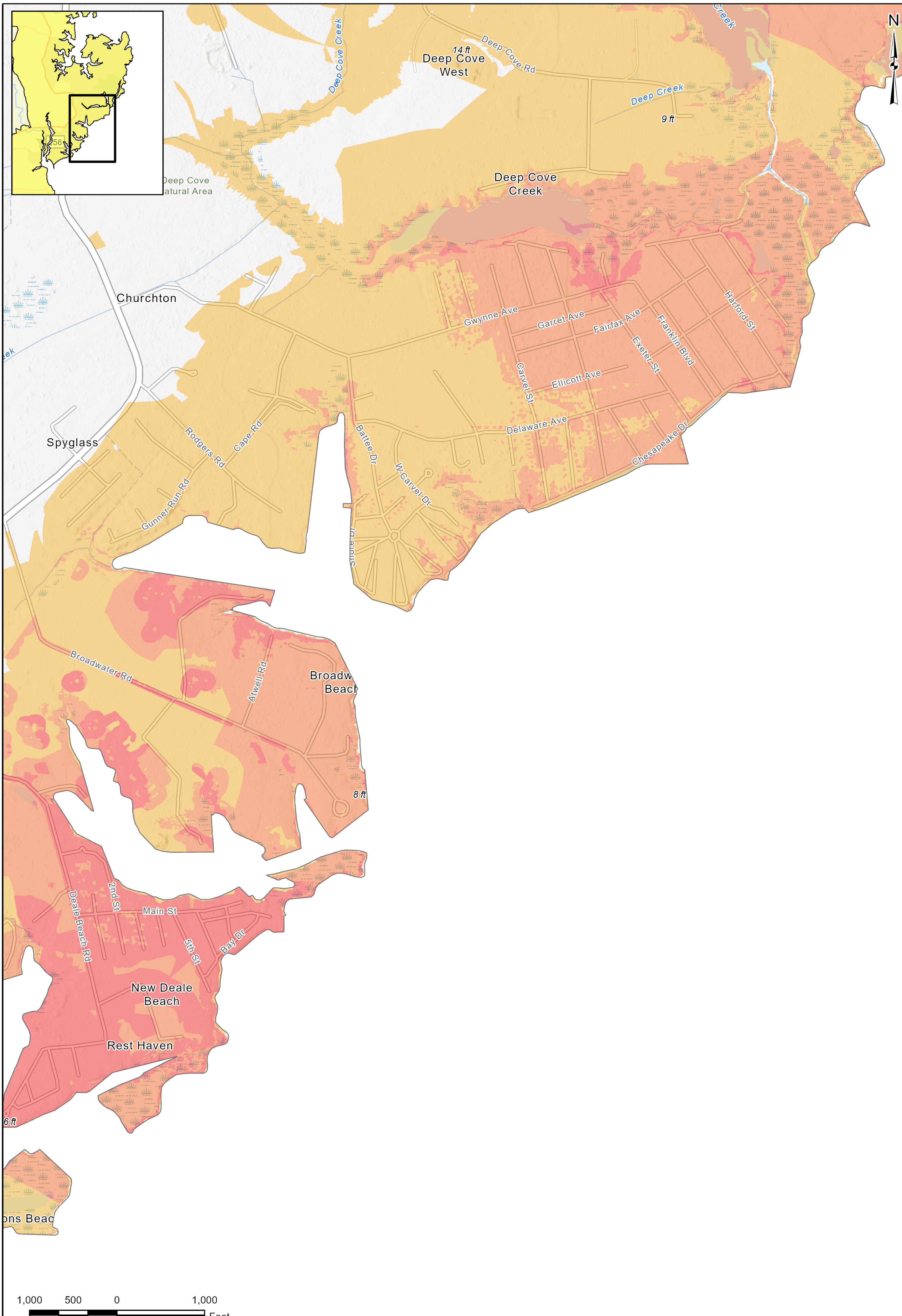

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VULNERABILITY RATING

SHEET 5

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