Memorandum

October 07, 2025

To	Jarrod Cabral, Town of Truro		
Copy to	Emily Beebe, Town of Truro		
From	Julia Khrakovsky	**Tel**	781-750-1928
Subject	Truro Walsh Property Memorandum – Draft Rev0	**Project no.**	12603461

1. Introduction

The proposed Walsh Property development on Walsh Way in Truro, MA is anticipated to include approximately 160 new housing units. The purpose of the Walsh Project is to evaluate a cluster wastewater treatment system for the new proposed development. The cluster system will be designed to treat wastewater for nitrogen. The intention of the nitrogen treatment aspect of this system is to limit-site wide nitrogen loading to a maximum concentration of 5 parts per million (ppm), in accordance with the Cape Cod Commission (CCC) Regional Policy Plan (**capecodcommission.org/resource-library/file/?url=/dept/commission/team/Website_Resources/RPP/2018_Cape_Cod_Regional_Policy_Plan_for_web.pdf**) guideline for nitrogen concentrations within groundwater. Nitrogen pollution can cause eutrophication and have degrading effects on water quality, environmental health, and human health.

The purpose of this memorandum is to summarize the evaluations that have been conducted to determine the impacts of recharging treated wastewater from the proposed Walsh development on Truro's groundwater resources, with particular attention to potential impacts on nearby wells.

1.1 Progress to Date

To date, GHD has modelled the following:

- Walsh Property groundwater mounding
- Walsh Property particle pathways
- North Union Field Wells Primary Capture Zone
- Proposed Quail Ridge Wells Primary Capture Zone

Additionally, GHD has performed the following analyses:

- Recharge sites analysis
- Recharge methods analysis

The model simulations are summarized in Section 2 of this memorandum. The recharge analysis is summarized in Section 3.

2. Model Summaries

2.1 Walsh Property Groundwater Mounding Model

An initial groundwater model for the Walsh property was conducted to identify potential groundwater mounding impacts of the discharged flows from a proposed new cluster system. A groundwater mounding simulation is performed to evaluate the following:

– Potential localized rise in the water table that may occur as a result of the treated wastewater flows being discharged at a proposed site.
– The mound's impact on sensitive receptors

The groundwater mounding model was simulated using the parameters summarized in Table 1.

Table 1 Groundwater Mounding Model Input Parameters

Parameter	Value
Walsh Property Flow (Title 5 maximum day flows)[1]	60,000 gpd
Hydraulic Loading Rate (HLR)	3 gpd / SF
Average Day Flow[2]	32,600 gpd
Maximum Month Flow[2]	42,400 gpd

Notes:
1. Source: 'Walsh Wastewater and Stormwater Management Options – Truro School' Memorandum, Prepared by Scott Horsley and Dated April 14, 2025
2. Average day and maximum month flows were calculated by applying peaking factors based on sample data from nearby similarly sized facilities.

For this simulation, discharge was modelled at the Truro School property, under the ball fields, as shown in Figure 1, attached. The groundwater flow model was simulated using 80% of the maximum daily discharge flow conditions. The leaching fields were sized to accommodate Title 5 flows, with one bed out of service. The results of the groundwater mounding model are included in Figure 2. MassMapper GIS layers were used to evaluate proximity of the groundwater mound to mapped sensitive receptors. The model indicated that the groundwater mound from the Walsh recharge intersects with interim wellhead protection area (IWPA), but does not impact sensitive resources including MassDEP mapped priority and estimated habitats, wetlands, vernal pools, and areas of cricital environmental concern.

2.2 Walsh Property Particle Pathways

The particle tracking simulation was performed to determine the potential pathways and movement of discharged water from the Walsh Property, particularly in relation to the North Union Wellfields during active pumping. By modelling the transport of particles, the study aimed to assess the following:

– Whether discharged water could reach the wellfields, which is critical for understanding possible impacts on groundwater quality and ensuring the protection of drinking water resources

A model previously developed by McLane Environmental, Inc and dated March 2024 was used for the basis of the particle pathway tracking simulation[1]. The McLane NUF Model was developed from the 2004 USGS regional model.[2]

[1] McLane Environmental, Inc., March 2024. SEAWAT Modeling of the Pamet Lens Aquifer, 2023 Model Update Report, North Union Field Well Site. Cape Cod, MA. Prepared for Environmental Partners (an Apex Company).
[2] Masterson, J.D. (2004), Simulated interaction between freshwater and saltwater and effects on ground-water pumping and sea-level change, lower Cape Cod aquifer system, Massachusetts, U.S. Geological Survey SRI 2004-5014.

The parameters in Table 1 above were used for the Walsh Property discharge modelling. The groundwater flow model was simulated using average flow conditions. The North Union Field (NUF) well pumping rates used in the simulation are summarized in Table 2.

Table 2 Particle Pathways Simulation Input Parameters

Parameter	Value
North Union Field Well 1 (Northern Well) Pumping Rate[1]	91.1 gpm
North Union Field Well 2 (Southern Well) Pumping Rate[1]	165.4 gpm
South Hollow Wells (4 wells)[1]	60.8 gpm each well
Notes: 1. Source: Well pumping rates from the McLane Environmental, Inc. NUF Model.	

The model indicates that particles from the Walsh discharge move west, away from the North Union Field wells. This means that treated effluent discharged from the Walsh property is not anticipated to be captured by the two NUF wells under the above pumping conditions. See Figure 3 for the particle pathway results.

To understand if the new discharge associate with the Walsh property has an affect on the groundwater being pulled into the North Union wells, a primary capture zone analysis was performed and is described in Section 3.3. See Figure 3 for the particle pathway results.

2.3 North Union Field Wells Primary Capture Zone

A primary capture zone analysis was established in the *'Groundwater Protection Priorities for the Walsh Property Master Plan to Sustain Long Term Drinking Water Availability and Quality'* report, prepared by Thomas Cambareri, Sole Source Consulting and dated June 1, 2023. The primary capture zone is critical for understanding which portions of the aquifer contribute water to the well, helping to assess potential sources of contamination and guide management strategies

The primary capture zone parameters for the North Union Field wells were replicated in order to assess potential impacts of treated effluent recharge under these conditions. The main purpose of this analysis is to:

– Evaluate whether treated effluent from the proposed wastewater treatment recharge at the Truro School is anticipated to be captured by the NUF wells under the pumping conditions outlined in Table 3.

The model inputs for the NUF wells primary capture zone simulation are summarized in Table 3.

Table 3 North Union Field Wells Primary Capture Zone Simulation Input Parameters

Parameter	Value
North Union Field Wells Total Pumping Rate[1]	509.7 gpm
North Union Field Well 1 (Northern Well) Pumping Rate[2]	181.0 gpm
North Union Field Well 2 (Southern Well) Pumping Rate[2]	328.7 gpm
South Hollow Wells Total Pumping Rate[3]	243.2 gpm
South Hollow Wells Pumping Rate Each (4 total wells)[3]	60.8 gpm
Notes: 1. NUF total well flow is the permitted pumping rate (734,000 gpd) per the 'Groundwater Protection Priorities for the Walsh Property Master Plan to Sustain Long Term Drinking Water Availability and Quality' Prepared by Thomas Cambareri, Sole Source Consulting and dated June 1, 2023. 2. Well pumping rates were estimated by applying the ratio of pumping rates in the McLane NUF model (Table 2 above) to the permitted pumping rate. The Well 1 and Well 2 pumping rates add up to the total permitted pumping rate. 3. Source: Well pumping rates from the McLane Environmental, Inc. NUF Model.	

The results of the primary capture zone simulation are included in Figure 4. Figure 5 shows the primary capture zone of the NUF wells and the particle pathways from the leaching fields. As shown in Figure 5, the leaching fields for the effluent discharge appear to be outside the primary capture zone of NUF wells under this condition.

2.4 Quail Ridge Wells Primary Capture Zone

Similar to the model described in Section 2.3, a primary capture zone model was conducted for the newly proposed pumping wells at the Quail Ridge site. The purpose of this model is to:

– Evaluate whether treated effluent from the proposed wastewater treatment recharge at the Truro School is anticipated to be captured by the Quail Ridge wells under the pumping conditions outlined in Table 4.

The model inputs for the proposed Quail Ridge Wells capture zone simulation are summarized in Table 4 below.

Table 4 Quail Ridge Wells Primary Capture Zone Simulation Inputs

Parameter	Value
Quail Ridge Site A Pumping Rate[1]	500 gpm
Quail Ridge Site B Pumping Rate[1]	69.4 gpm
North Union Field Wells Total Pumping Rate[2]	509.7 gpm
North Union Field Well 1 (Northern Well) Pumping Rate[3]	181.0 gpm
North Union Field Well 2 (Southern Well) Pumping Rate[3]	328.7 gpm
South Hollow Wells Total Pumping Rate[4]	243.2 gpm
South Hollow Wells Pumping Rate Each (4 total wells)[4]	60.8 gpm

Notes:

1. Source: Provided by Jarrod Cabral at progress meeting on September 24th, 2025.
2. NUF total well flow is the permitted pumping rate (734,000 gpd) per the 'Groundwater Protection Priorities for the Walsh Property Master Plan to Sustain Long Term Drinking Water Availability and Quality' Prepared by Thomas Cambareri, Sole Source Consulting and dated June 1, 2023.
3. Well pumping rates were estimated by applying the ratio of pumping rates in the McLane NUF model (Table 2 above) to the permitted pumping rate. The Well 1 and Well 2 pumping rates add up to the total permitted pumping rate.
4. Source: Well pumping rates from the McLane Environmental, Inc. NUF Model.

The modeled well locations were based on the '*Regional Water Supply and Watershed Management Study'* Presentation by APEX, dated September 28th, 2025. The Quail Ridge wells were modeled with one well active at a time. As shown in Figure 6, under the Quail Ridge Site A pumping conditions (69.4 gpm), the effluent migration pathways from the treatment recharge at the Truro School appear to be outside the NUF wells primary capture area. As shown in Figure 7, under the Quail Ridge Site B pumping conditions (500 gpm), the effluent migration pathways from the treatment recharge at the Truro School appear to be within the NUF wells primary capture area.

3. Treated Effluent Recharge Alternatives

The 2018 MassDEP Small WWTF Design Guidelines list the following technologies as approved methods of effluent land disposal:

- Open Sand Beds
- Leaching facilities (leaching pits, leaching trenches, leaching chambers)
- Drip dispersal or other approved subsurface methods

- Reclaimed water uses consistent with MassDEP policies (including spray irrigation)

Alternative methods of effluent disposal through land application, including well injection and wick wells, are allowable on a case-by-case basis provided that adequate pilot test results at the proposed discharge site (performed with MassDEP approval) are provided or adequate experience at similar locations exists. Discharge sites within a Zone II need to meet a higher effluent standard than sites outside of a Zone II.

3.1 Recharge Methods

3.1.1 Open Sand Beds

Open sand beds – also known as infiltration beds, surface infiltration beds, recharge beds, or rapid infiltration beds, are open basins designed to allow treated effluent to flow across the bottom of the basin and infiltrate through the open sand bed and the unsaturated zone to the groundwater. Open sand beds are typically operated year-round. Bed operation and maintenance (O&M) is relatively simple because the bed is exposed at the surface and the sand surface can be raked or replaced if the sand becomes plugged with effluent, debris, or vegetative growth.

A hydraulic loading rate of 5 gallons per day per square foot (gpd/SF) of bed area is typically allowed by MassDEP unless hydrogeologic tests demonstrate a greater infiltration loading capacity at the specific site. Advantages and challenges of open sand beds are summarized below in Table 5.

Table 5 Open Sand Beds Summary

Advantages	Challenges
Relatively high hydraulic loading rates on sites with good permeability and sufficient depth to groundwater Widely used on Cape Cod	Large surface footprint requirements, which may have a visual and environmental impact No secondary uses of land Effluent disinfection required If the discharge site is located in a nitrogen-sensitive watershed, effluent will likely need to be treated to a very low effluent nitrogen limit If discharge site is located in a Zone II protection area, effluent filtration is required per 314 CMR 5.00. An effluent Total Organic Carbon (TOC) limit will also need to be met

3.1.2 Leaching Facilities

Leaching facilities – also known as subsurface infiltration – typically utilize pump and piping systems to pressure dose sub-surface infiltration areas (trenches, chambers, or pits) which percolate to groundwater. Maintenance and cleaning of these systems is more difficult the surface systems because the infiltration area is below-grade and effluent solids cannot be easily removed. Leaching facilities can have secondary uses, such as parking lots, lawns, playing fields, and recreational areas.

Hydraulic loading rates of 2 ½ to 3 gallons per day per square food (gpd/sf) of bed area are typically allowed by MassDEP (depending on the configuration of the system), unless hydrogeologic tests demonstrate a greater infiltration loading rate at the specific site.

Advantages and challenges of leaching facilities are summarized in Table 6 below.

Table 6 Leaching Facilities Summary

Advantages	Challenges
Located below-grade – allowing for secondary uses, such as parking lots or municipal recreational areas Disinfection is typically not required prior to discharge unless the discharge site is within a water supply area	Larger land areas are required due to lower hydraulic loading rates than open sand beds Effluent filtration is typically required to minimize bed clogging over time If discharge site is located in a nutrient sensitive watershed, effluent will likely need to be treated to a very low effluent nitrogen limit If discharge site is located in a Zone II protection area, effluent filtration and disinfection are required per 314 CMR 05. An effluent TOC limit will also need to be met Pressurized systems often require more complex system balancing, and equalization/storage may be necessary to provide equal distribution throughout the system

3.1.3 Drip Dispersal

Drip dispersal systems – also known as subsurface dispersal systems or drip irrigation systems- consist of shallow subsurface perforated tubing. These types of systems were developed based on drip irrigation systems typically utilized to irrigate agricultural areas or plants. The systems can also be potentially used in lawns and wooded areas, if sited properly, or installed below the root zone (similar to a leaching facility). Treated effluent is pumped through the tubes under pressure and discharged slowly through the emitters into the ground (either within the root zone or below the root zone). Tubing is typically installed with a vibratory plow or trencher, and requires minimal disturbance to the surface.

A hydraulic loading rate of 1.5 gallons per day per square foot (gpd/sf) of drip dispersal area is typically allowed my MassDEP unless hydrogeologic tests demonstrate a greater infiltration loading capacity at the specific site. The hydraulic loading rate assumes that the system is installed in a rectangular configuration with emitters evenly spaced at 2 feet on center and tubing 4 feet on center with the area between the tubing used as reserve area. Effluent typically needs to be filtered to avoid clogging the drip emitters. MassDEP does not require disinfection for drip dispersal systems outside of a Zone II or Interim Wellhead Protection Area.

Advantages and challenges of drop dispersal are summarized in Table 7 below.

Table 7 Drip Dispersal Summary

Advantages	Challenges
• Can be utilized in various terrain conditions and land uses • Tubing is typically installed at a shallow depth using relatively simple construction techniques • Low delivery rate minimizes water table impacts • Located below-grade allowing for secondary uses such as municipal recreational areas, or below parking areas (although not as common)	• Large area required due to low hydraulic loading rate. • Effluent filtration is typically required to minimize clogging. • Periodic back-flushing required. • Limited cold weather use due to potential freezing (if located within the root zone). • Tubing is typically installed at a shallow depth and the above-grade surface needs to be protected from heavy loading. • If discharge site is located in a nutrient-sensitive watershed, effluent will likely need to be treated to a very low effluent nitrogen limit. • If discharge site is located in a Zone II protection area, effluent filtration and disinfection are required per 314 CMR 05. An effluent TOC limit will also need to be met

Advantages	Challenges
	• Pressurized systems often require more complex system balancing, and equalization/storage may be necessary to provide equal distribution throughout the system.

3.1.4 Spray Irrigation

A spray irrigation system is comprised of effluent pumps, distribution piping, and a spray system consisting of risers and spray nozzles. Treated effluent is pumped through distribution lines and discharged via spray nozzles to the surrounding surface area. Spray irrigation systems may be suitable for golf courses and in large remote fields during the growing season. During the winter (non-growing season) effluent would need to be stored or discharge at a different location through an alternate technology.

314 CMR 20.00 – Reclaimed Water Program and Standards, which was most recently updated in 2009, classifies irrigation uses into three categories:

- Class A – Locations where individual members of the public are likely to come into contact with the reclaimed water.
- Class B – Locations where individual members of the public are not likely to come into contact with the reclaimed water.
- Class C – Agricultural irrigation with restriction and silviculture (growing and cultivation of trees).

The application rate for non-golf course areas is typically 2 inches per acre per week. Application rates for golf courses are typically based on turf management needs. Effluent disposal through spray irrigation is limited to the growing season.

Advantages and challenges of spray irrigation systems are summarized in Table 8 below.

Table 8 Spray Irrigation Summary

Advantages	Challenges
• Land can be utilized for secondary uses such as golf courses • Reduces potable water demands • Provides nitrogen update by plant life and reduces need for fertilizers at golf courses	• Difficult to secure suitable and authorized locations for spray irrigation • Limited cold weather use due to potential freezing • Limited use during site's secondary use (for example, spray irrigation on a gold course fairway likely cannot be operating when people are golfing) • Spray nozzles are subject to clogging • Requires secondary method of discharge during winter months or during the sites secondary use • If discharge site is located within a nutrient-sensitive watershed, effluent will likely need to be treated to a very low effluent nitrogen limit • If discharge site is located in a Zone II protection area, effluent filtration and disinfection are required per 314 CMR 05. An effluent TOC limit will also need to be met • Discharge needs to meet reclaimed water effluent limits • Pressurized systems often require more complex system balancing, and equalization/storage may be necessary to provide equal distribution throughout the system

3.1.5 Well Injection

A well injection system pumps treated effluent through wells that extend into permeable and saturated geologic strata. When discharged into saturated strata, the discharge process is the reverse of extracting water from a well. Well injection systems are regulated under the Underground Injection Control (UIC) Program, which is administered by MassDEP.

The well injection rate depends on site conditions such as the groundwater depth, geologic conditions, and effluent characteristics. Potential concerns of well injection include the mounding of groundwater at low elevations. Extensive hydrogeologic testing is necessary to confirm the suitability of this technology for an application.

Well injection of treated municipal wastewater effluent has been implemented on a limited basis throughout the United States; and limited information exists on property siting, design, construction, and operation of the wells. Pilot tests at the Hyannis Water Pollution Facility (WPCF) in 2003 indicated that injection wells can become plugged with biological growth if the effluent is not properly chlorinated. Discussions with MassDEP during the pilot testing identified minimal support for the development of this technology because it utilizes chlorination. Chlorination can create secondary impacts to the groundwater through the formation of disinfection byproducts – such as total organic halide (TOX) and trihalomethanes (THMs) – that can pose potential risks. If the effluent is discharged directly to the groundwater, 314 CMR 4.10.4c requires that the effluent meet the same requirements as a discharge to a Zone II or Interim Wellhead Protection Area with a two-year groundwater travel time to the source.

Advantages and challenges of well injection systems are summarized in Table 9 below.

Table 9 Well Injection Summary

Advantages	Challenges
• Small surface footprint with minimal surface disturbance • Wells count be installed in several discrete locations to minimize groundwater mounding	• Effluent filtration and chlorination is typically required to minimize clogging/biofouling • Formation of disinfection byproducts after chlorination can pose potential health risks • Effluent needs to meet very stringent discharge requirements for deep well systems (equivalent to a Zone II with a two-year ground water travel time) • Limited successful installations in the United States and limited performance data available • Extensive hydrogeologic testing required • Pressurized systems often require more complex system balancing and equalization/storage may be necessary

3.1.6 Wick Wells

Wick wells typically utilize large diameter (3 to 6 feet) well casings filled with stone. Treated effluent is discharged into the unsaturated zone and infiltrates into the underlying aquifer. Wick wells have been implemented on a limited basis in the United States, with three permitted locations in Massachusetts. Extensive hydrogeologic testing is necessary to confirm the suitability of this technology for an application.

Advantages and challenges of wick wells are summarized in Table 10 below.

Table 10 Wick Wells Summary

Advantages	Challenges
• Small surface footprint with minimal surface disturbance	• Effluent filtration is typically required to minimize clogging

Advantages	Challenges
• Wells could be installed in several discrete locations to minimize groundwater mounding	• Limited successful installations in the United States and limited performance data available • Extensive hydrogeologic testing required • Depending on well spacing, may require a more complex system for flow distribution and system balancing

3.2 Recharge Layouts

Based on the above outlined advantages and challenges with the various recharge methods, two alternate layouts for leaching fields were identified on the Truro School property. As stated above, leaching fields allow for secondary uses, making them a suitable option for the already developed recharge site. The first layout sites the leaching fields under the school's ball fields – this is the layout that was modelled under the various scenarios described in Section 3. The alternate leaching field layout is under the parking lot. Both layouts are shown in Figure 8, with the layout under the ball fields in yellow and the layout under the parking lot in pink.

The Truro School site cannot accommodate open sand beds due to space and site constraints. However, a preliminary open sand bed layout was developed and sized for the 9 Great Hollow property. This property was identified as a potential recharge site during discussion with the Town of Truro. This alternative is less favorable because the 9 Great Hollow location is situated further from Walsh, and would require crossing Route 6 to send flows there. A potential sand bed layout at 9 Great Hollow is included in Figure 9.

To date, recharge layouts have not been developed for the other methods beyond the leaching field alternatives described above. As noted previously, deep well injection would require comprehensive geotechnical investigations and site-specific hydrogeologic testing to ensure feasibility and address potential challenges associated with groundwater conditions and system design.

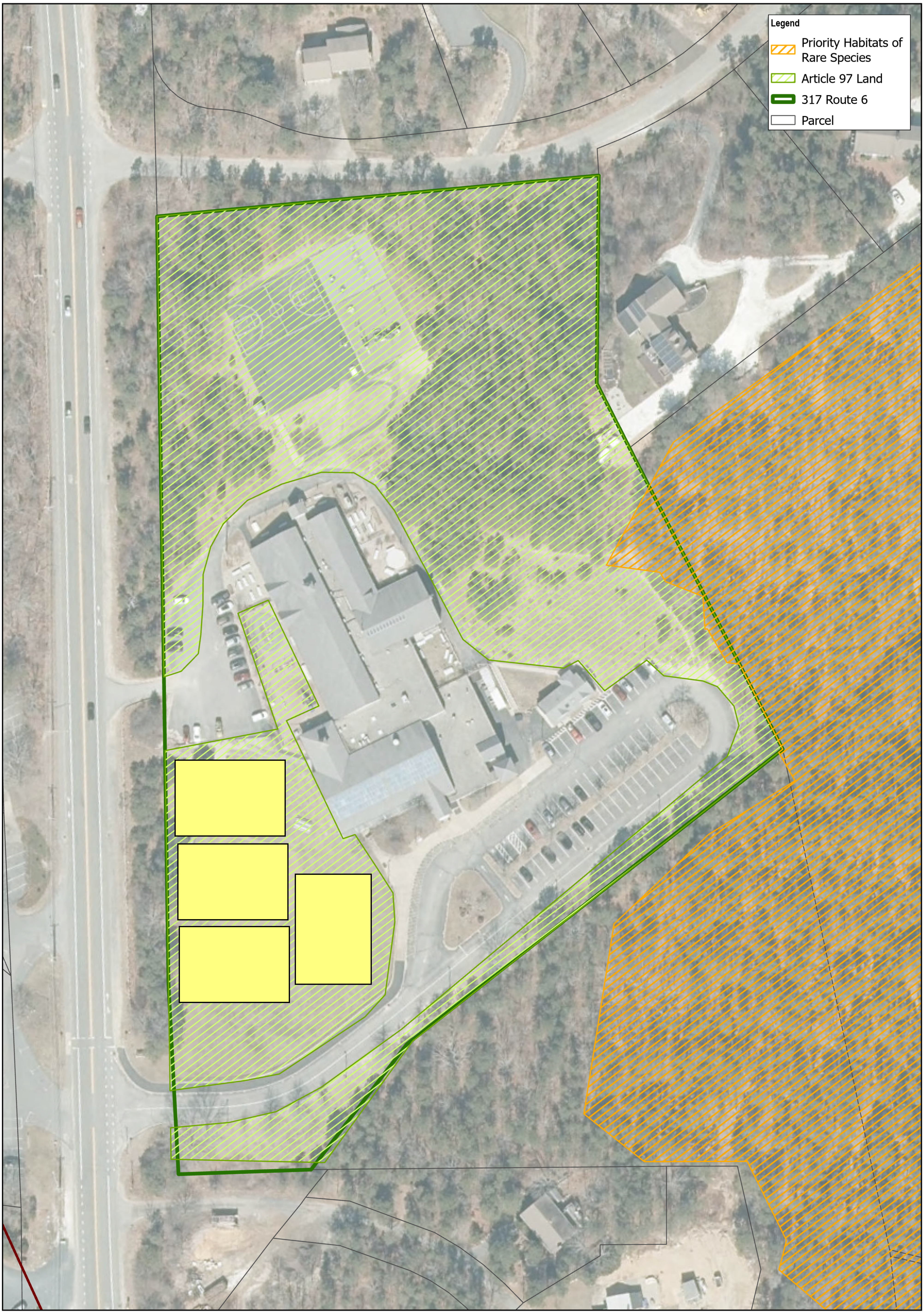
4. Next Steps

The next steps involve reviewing the model results with the Town of Truro to determine any further actions or adjustments required.

Regards

Julia Khrakovsky

Julia Khrakovsky
Engineer



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Paper Size ANSI B

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US Feet

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Map Projection: Lambert Conformal Conic
Horizontal Datum: NAD 1983 2011
Grid: NAD 1983 2011 StatePlane Massachusetts Mnld FIPS 2001 FtUS

TOWN OF TRURO
TRURO, MA

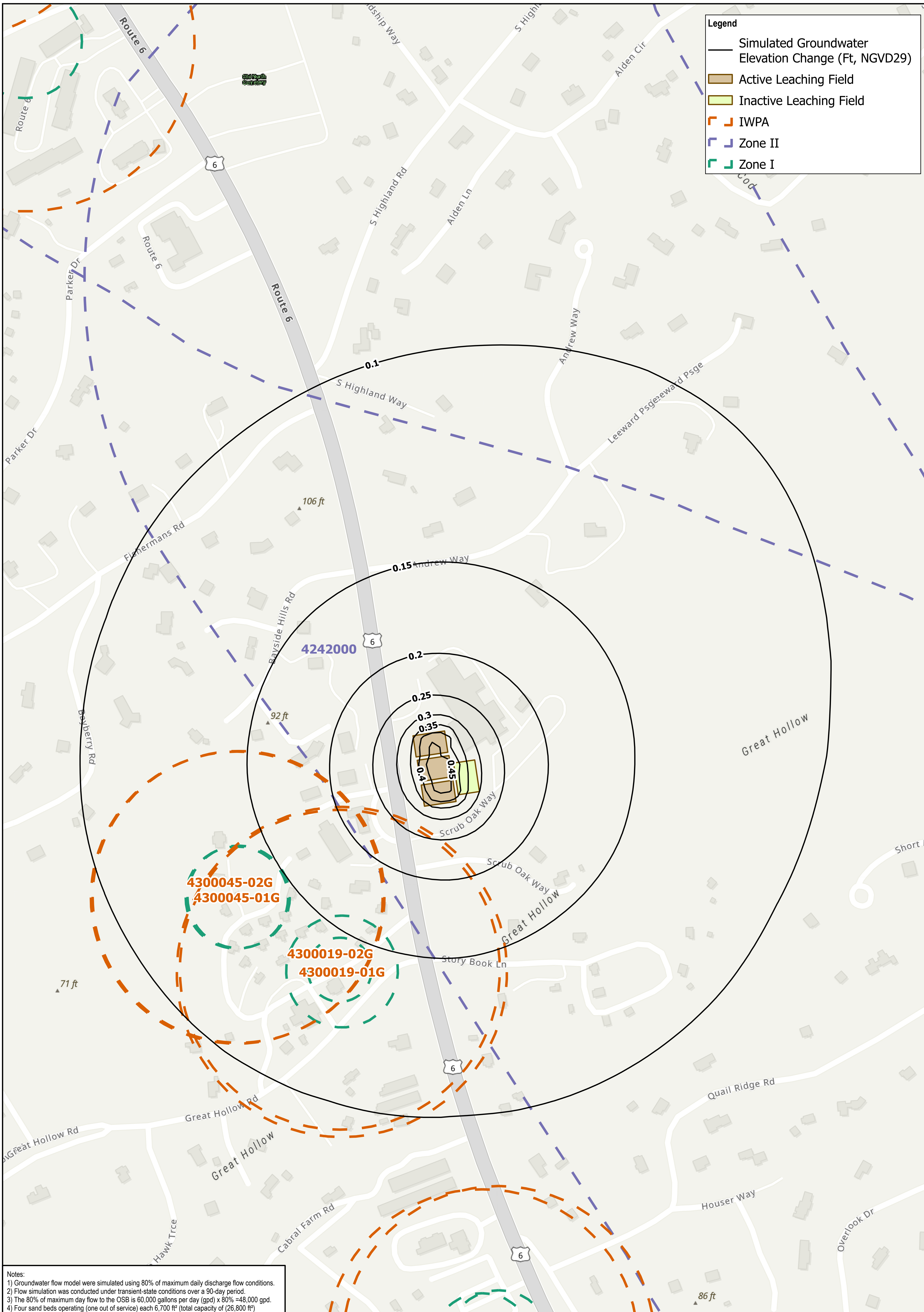
POTENTIAL EFFLUENT RECHARGE SITE 317 ROUTE 6

Project No. 12603461
Revision No. -
Date 4/21/2025

FIGURE 1

\\ghdnet\ghd\US\Hyannis\Projects\564\12603461\GIS\Maps\Working\12603461 Truro CCWP.aprx - 12603461 Truro Potential Effleunt Recharge Site 317 Route 6
Print date: 21 Apr 2025 - 12:44

Data source: orthos2023: MassGIS. Created by: amarriott



Notes:
1) Groundwater flow model were simulated using 80% of maximum daily discharge flow conditions.
2) Flow simulation was conducted under transient-state conditions over a 90-day period.
3) The 80% of maximum day flow to the OSB is 60,000 gallons per day (gpd) x 80% =48,000 gpd.
4) Four sand beds operating (one out of service) each 6,700 ft² (total capacity of (26,800 ft²)
5) The model was run on September 16, 2025.

Paper Size ANSI B

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US Feet

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Map Projection: Lambert Conformal Conic
Horizontal Datum: NAD 1983 2011
Grid: NAD 1983 2011 StatePlane Massachusetts Mnld FIPS 2001 FtUS

GHD

TOWN OF TRURO, MA
TRURO EFFLUENT DISCHARGE EVALUATION

SIMULATED GROUNDWATER ELEVATION INCREASE, 80% OF MAX DAY FLOW

Project No. 11216492
Revision No. -
Date 10/6/2025

FIGURE 2

\\ghdnet\ghd\US\Hyannis\Projects\564\12603461\GIS\Maps\Working\12603461 Truro GW Model.aprx - 002_12603461_Truro GW Mound and Sensitive Receptors with Labels
Print date: 06 Oct 2025 - 15:19

Data source: Reference/World_Boundaries_and_Places: Esri, HERE, Garmin, iPC
World Topographic Map: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community. Created by: amarriott

LEGEND

(red)	ACTIVE LEACHING FIELDS	(pink line)	SIMULATED GROUNDWATER PARTICLE PATHWAYS
(grey)	IN-ACTIVE LEACHING FIELD	⊕ 91.0	PUMPING WELL LOCATION IN APEX NUF MODEL PUMPING RATE (GPM)

0 500 1000ft

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GHD

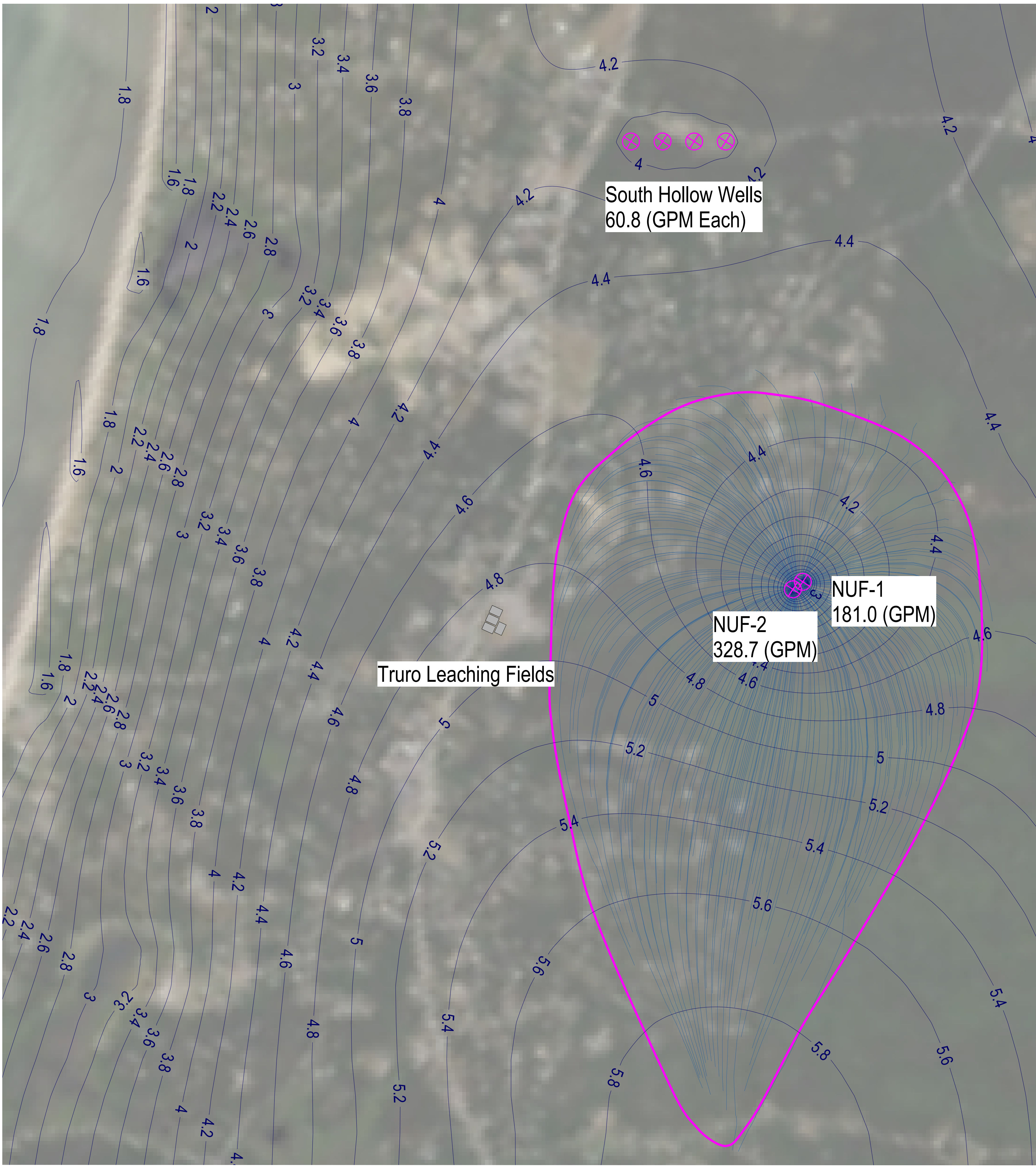
TOWN OF TRURO
TRURO EFFLUENT DISCHRGE EVALUATION
CAPE COD, MASSACHUSETTS

SIMULATED GROUNDWATER FLOW
PATHWAYS FOR AVERAGE DAY FLOW

Project No. 12603461
Date October 2025

FIGURE 3

Data Source



LEGEND

PROPOSED LEACHING FIELDS

ESTIMATED NUF WELL ZONE OF CONTRIBUTION IN SOLE SOURCE NUF MODEL

SIMULATED WELL ZONE OF CONTRIBUTION (GHD REFINED MODEL)

PUMPING WELL LOCATION IN APEX NUF MODEL
181.0
PUMPING RATE (GPM)

0 500 1000ft

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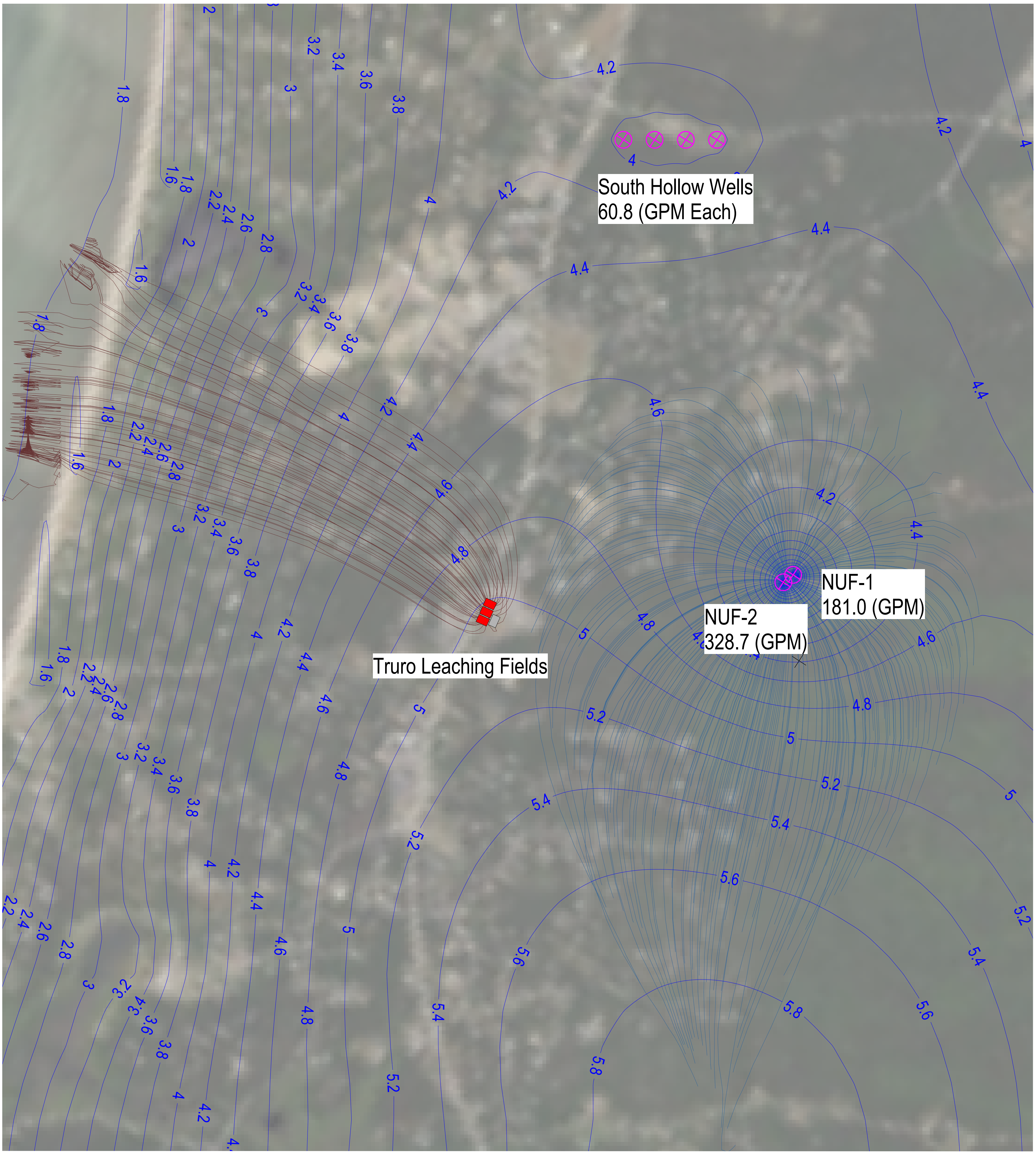
TOWN OF TRURO
TRURO EFFLUENT DISCHRGE EVALUATION
CAPE COD, MASSACHUSETTS

COMPARISON OF SIMULATED
WELL ZONE OF CONTRIBUTION
GHD REFINED VS. SOLE SOURCE MODEL

Project No. 12603461
Date October 2025

FIGURE 4

Data Source



LEGEND

ACTIVE LEACHING FIELDS

INACTIVE LEACHING FIELD

SIMULATED EFFLUENT PARTICLE PATHWAYS

SIMULATED ZONE OF CONTRIBUTION (TO NUF WELLS)

181.0 PUMPING WELL LOCATION IN APEX NUF MODEL
PUMPING RATE (GPM)

0 475 950ft

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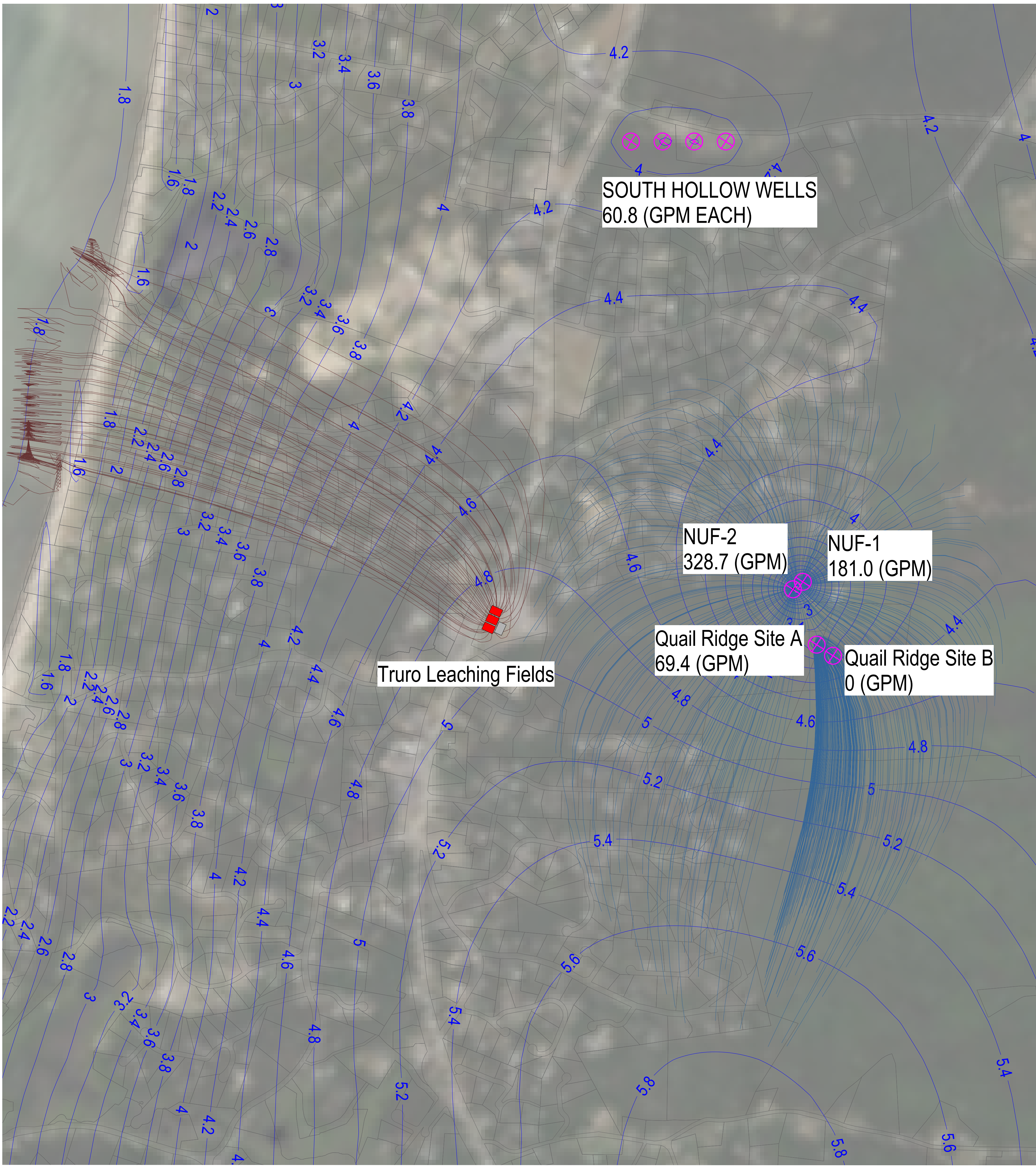
TOWN OF TRURO
TRURO EFFLUENT DISCHRGE EVALUATION
CAPE COD, MASSACHUSETTS

SIMULATED WELL ZONE OF CONTRIBUTION
AND EFFLUENT PATHWAYS
UNDER AVERAGE DAY FLOW CONDITIONS

Project No. 12603461
Date October 2025

FIGURE 5



LEGEND

ACTIVE LEACHING FIELDS	SIMULATED ZONE OF CONTRIBUTION (TO PUMPING WELLS)
INACTIVE LEACHING FIELD	PUMPING WELL LOCATION 181.0 PUMPING RATE (GPM)
SIMULATED EFFLUENT MIGRATION PATHWAYS	

0 475 950ft

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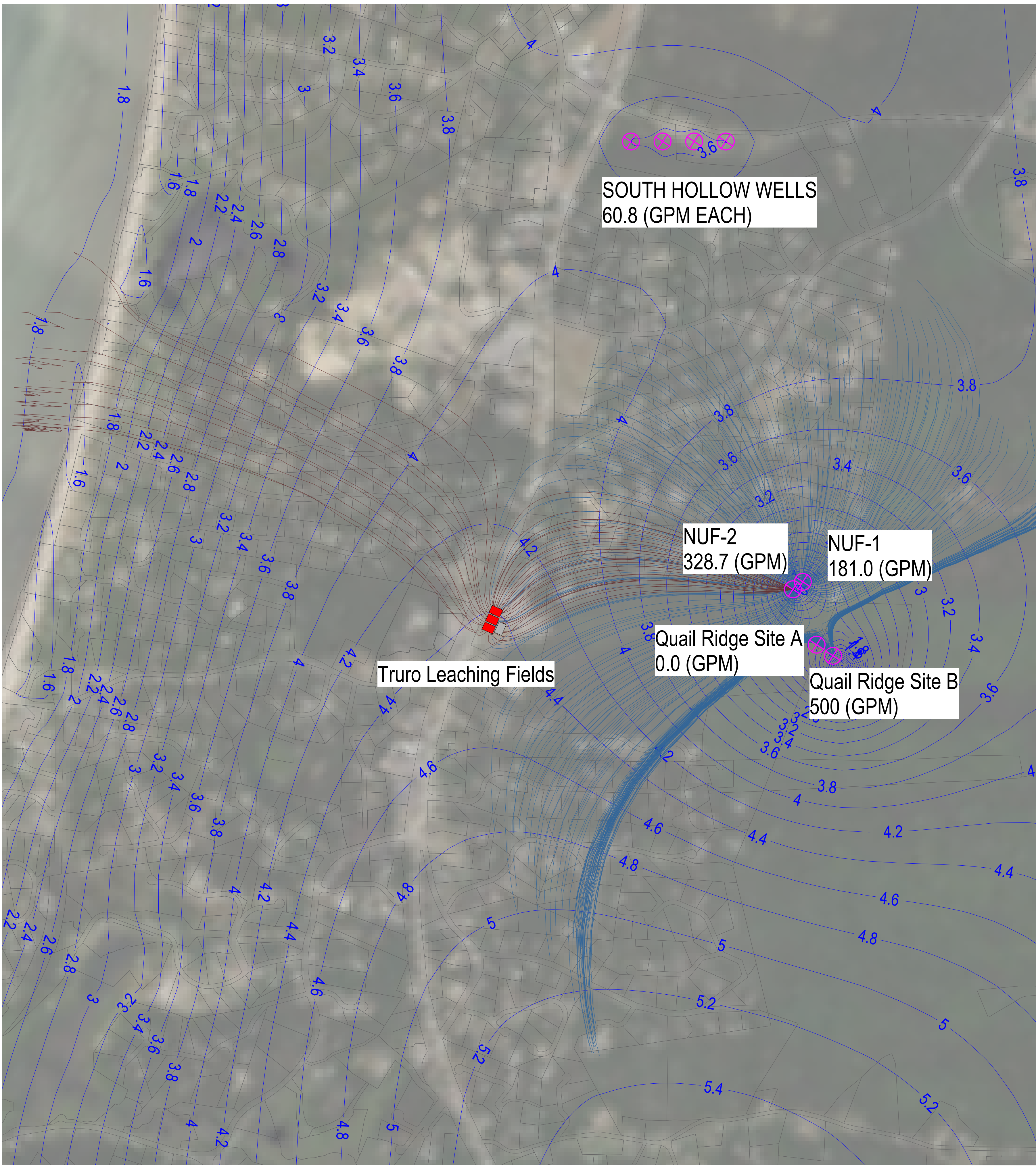
TOWN OF TRURO
TRURO EFFLUENT DISCHRGE EVALUATION
CAPE COD, MASSACHUSETTS

SIMULATED WELL ZONE OF CONTRIBUTION
AND EFFLUENT MIGRATION PATHWAYS
QUAIL RIDGE SITE A WELL PUMPING (100,000 GPD)

Project No. 12603461
Date October 2025

FIGURE 6



LEGEND

- ACTIVE LEACHING FIELDS
- INACTIVE LEACHING FIELD
- SIMULATED EFFLUENT MIGRATION PATHWAYS
- SIMULATED ZONE OF CONTRIBUTION (TO PUMPING WELLS)
- PUMPING WELL LOCATION; 181.0 PUMPING RATE (GPM)

0 475 950ft

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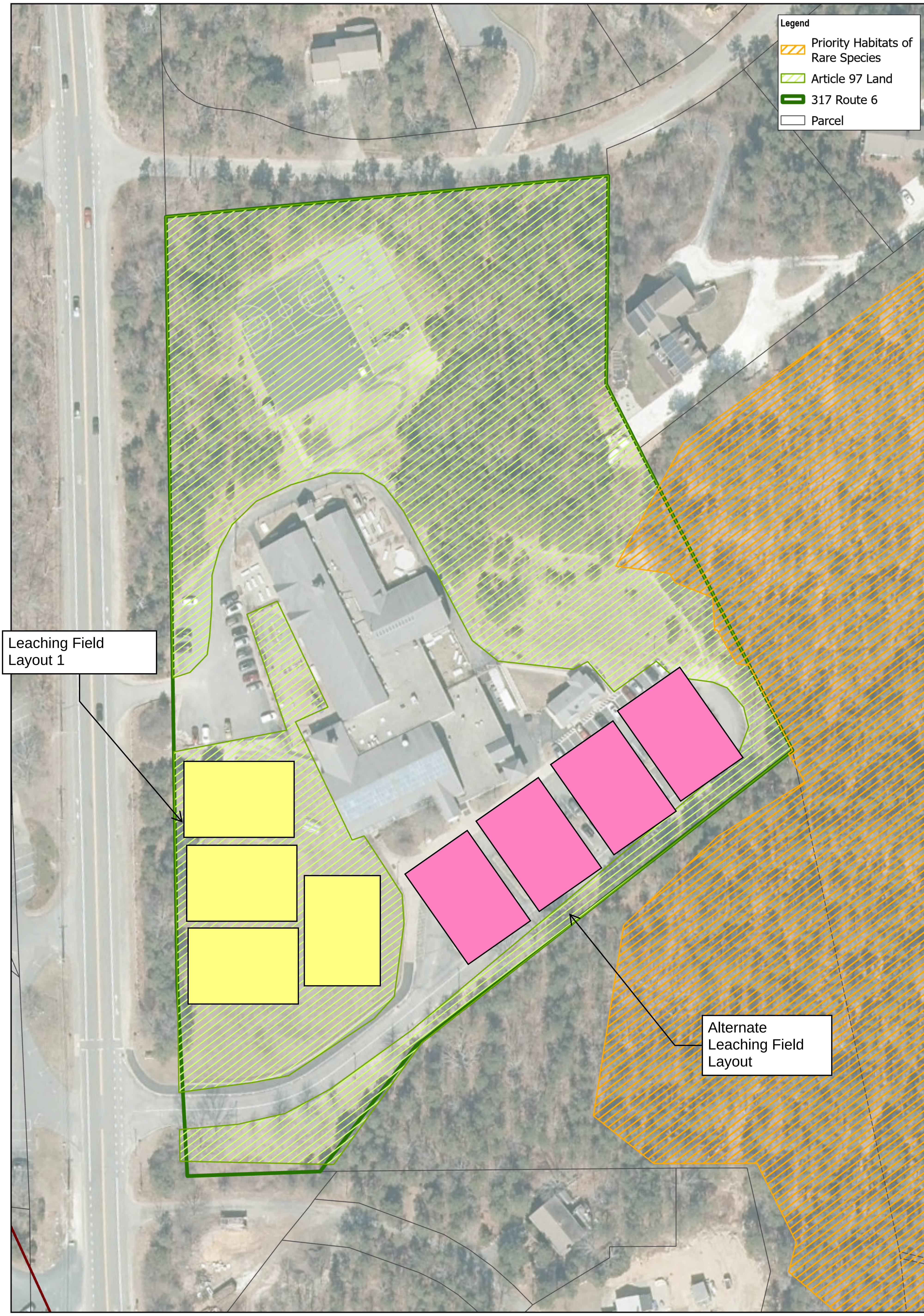
TOWN OF TRURO
TRURO EFFLUENT DISCHRGE EVALUATION
CAPE COD, MASSACHUSETTS

SIMULATED WELL ZONE OF CONTRIBUTION
AND EFFLUENT MIGRATION PATHWAYS
QUAIL RIDGE SITE B WELL PUMPING (500 GPM)

Project No. 12603461
Date October 2025

FIGURE 7



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Map Projection: Lambert Conformal Conic
Horizontal Datum: NAD 1983 2011
Grid: NAD 1983 2011 StatePlane Massachusetts Mnld FIPS 2001 FtUS

GHD

TOWN OF TRURO
TRURO, MA

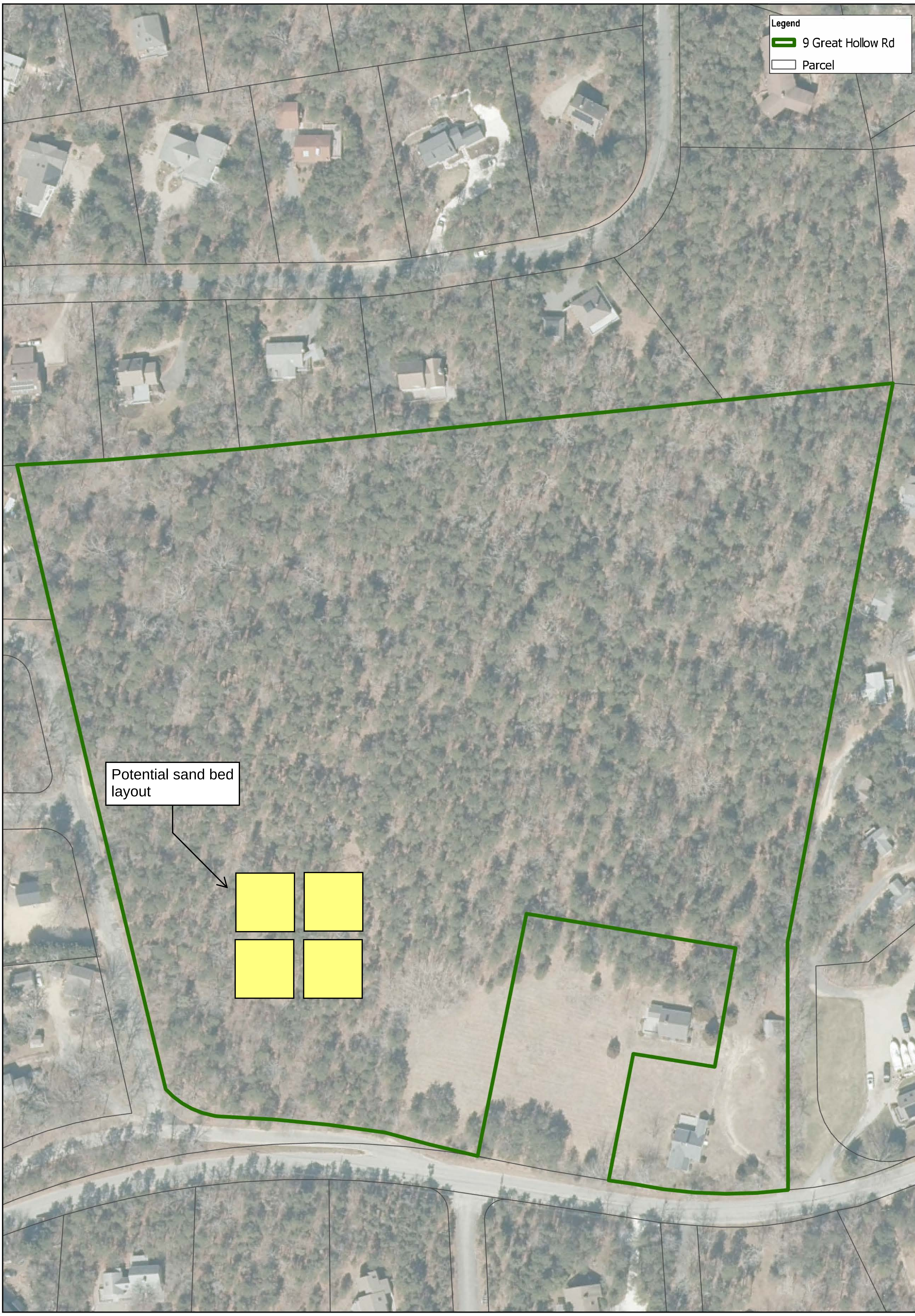
POTENTIAL EFFLUENT RECHARGE SITE 317 ROUTE 6

Project No. **12603461**
Revision No. **-**
Date **4/21/2025**

FIGURE 8

\\ghdnet\ghd\US\Hyannis\Projects\564\12603461\GIS\Maps\Working\12603461 Truro CCWP.aprx - 12603461 Truro Potential Effluent Recharge Site 317 Route 6
Print date: 21 Apr 2025 - 12:44

Data source: orthos2023: MassGIS. Created by: amarriott



DRAFT

Paper Size ANSI B

0 100

US Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: NAD 1983 2011
Grid: NAD 1983 2011 StatePlane Massachusetts Mnld FIPS 2001 FtUS

GHD

TOWN OF TRURO
TRURO, MA

POTENTIAL EFFLUENT RECHARGE SITE 9 GREAT HOLLOW RD

Project No. 12603461
Revision No. -
Date 4/21/2025

FIGURE 9

\\ghdnet\ghd\US\Hyannis\Projects\564\12603461\GIS\Maps\Working\12603461 Truro CCWP.aprx - 12603461 Truro Potential Effluent Recharge Site 9 Great Hollow Rd
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