Preliminary Evaluation of Wastewater Disposal Capacity: Hazelett – Bayside Parcel Colchester, Vermont

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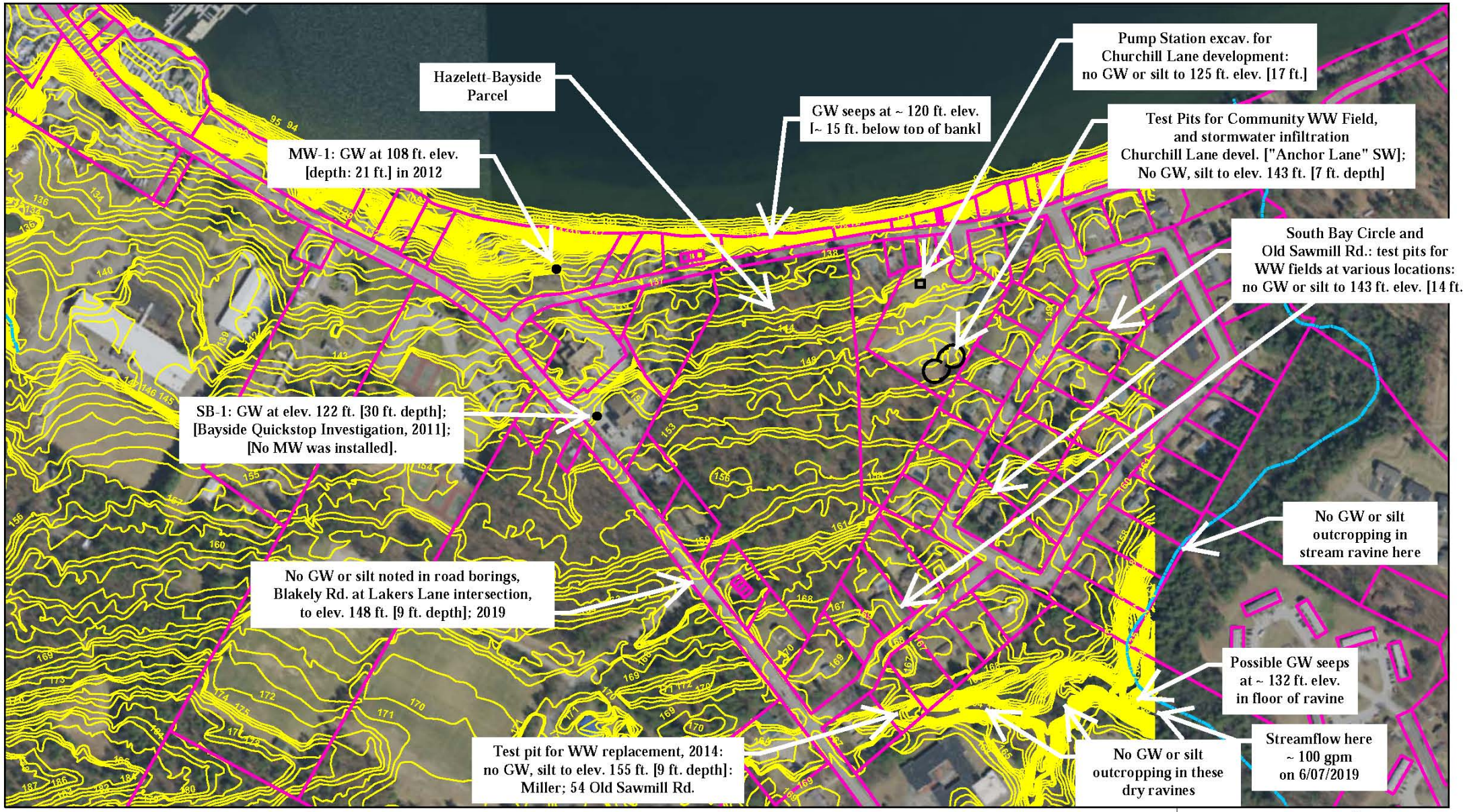

Parcels, Topo [ft. above sea level], orthophoto from VCGI.

Bayside Hazelett Parcel

SOILS and GROUNDWATER DATA on NEARBY PARCELS

0 150 300 Feet
1 inch = 300 feet

N W E S

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June 6, 2019
Map produced by: C. Heindel.
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VT's INDIRECT DISCHARGE REGULATIONS:

[Pertain to land-based WW disposal of greater than 6,500 gpd]

- **Three independent capacities must be evaluated:**

1. **Sufficient application area [horizontal];**

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- **Three independent capacities must be evaluated:**

1. **Sufficient application area [horizontal];**
2. **Sufficient vertical room for induced groundwater mound [maintain min. 3.0-ft. unsaturated zone below infiltrative surface];**
3. **Compliance with "Aquatic Permitting Criteria"**

[provides presumption of compliance with Vermont Surface Water Quality Standards].

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1. Sufficient Application Area [Horizontal Area]:

ADEQUATE FOR 100,000 – 120,000 GPD

- **By Drip Dispersal; or**
- **By Conventional Leachfield**

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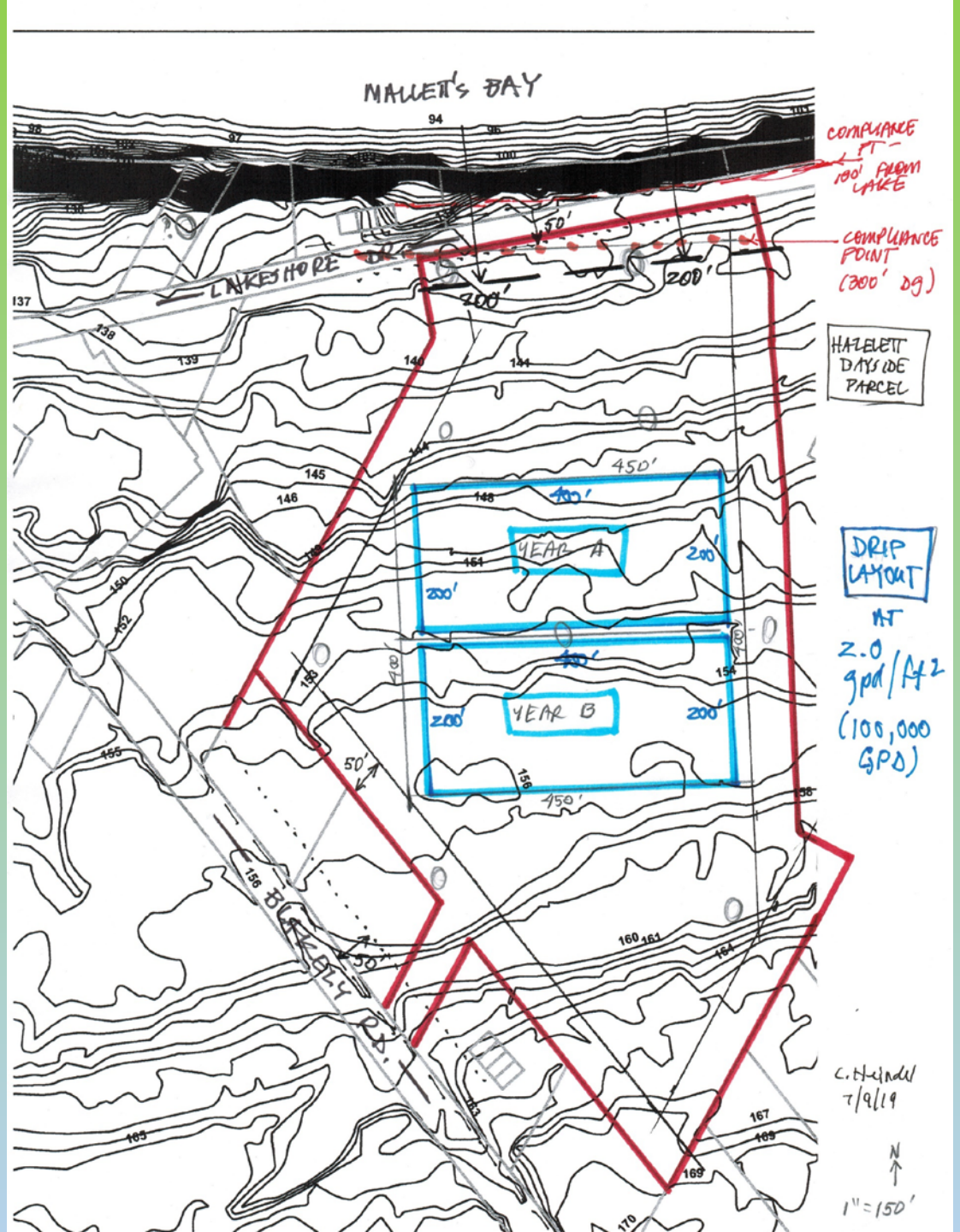

DRIP DISPERSAL

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PILOT TEST, DRIP DISPERSAL FIELD:

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Perc-Rite® Drip Dispersal System, distributed by Oakson, from American Manufacturing:

- ***0.5-in. diameter***
- ***Emitters located every 2 ft.***
- ***Emitter discharge rate: 0.61 gal/hour, over wide pressure range.***

PILOT TEST, DRIP DISPERSAL FIELD:

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DRIP DISPERSAL INSTALLATIONS
In Wooded Areas

[Lyme, CT]

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Woods of Hazelett-Bayside Parcel

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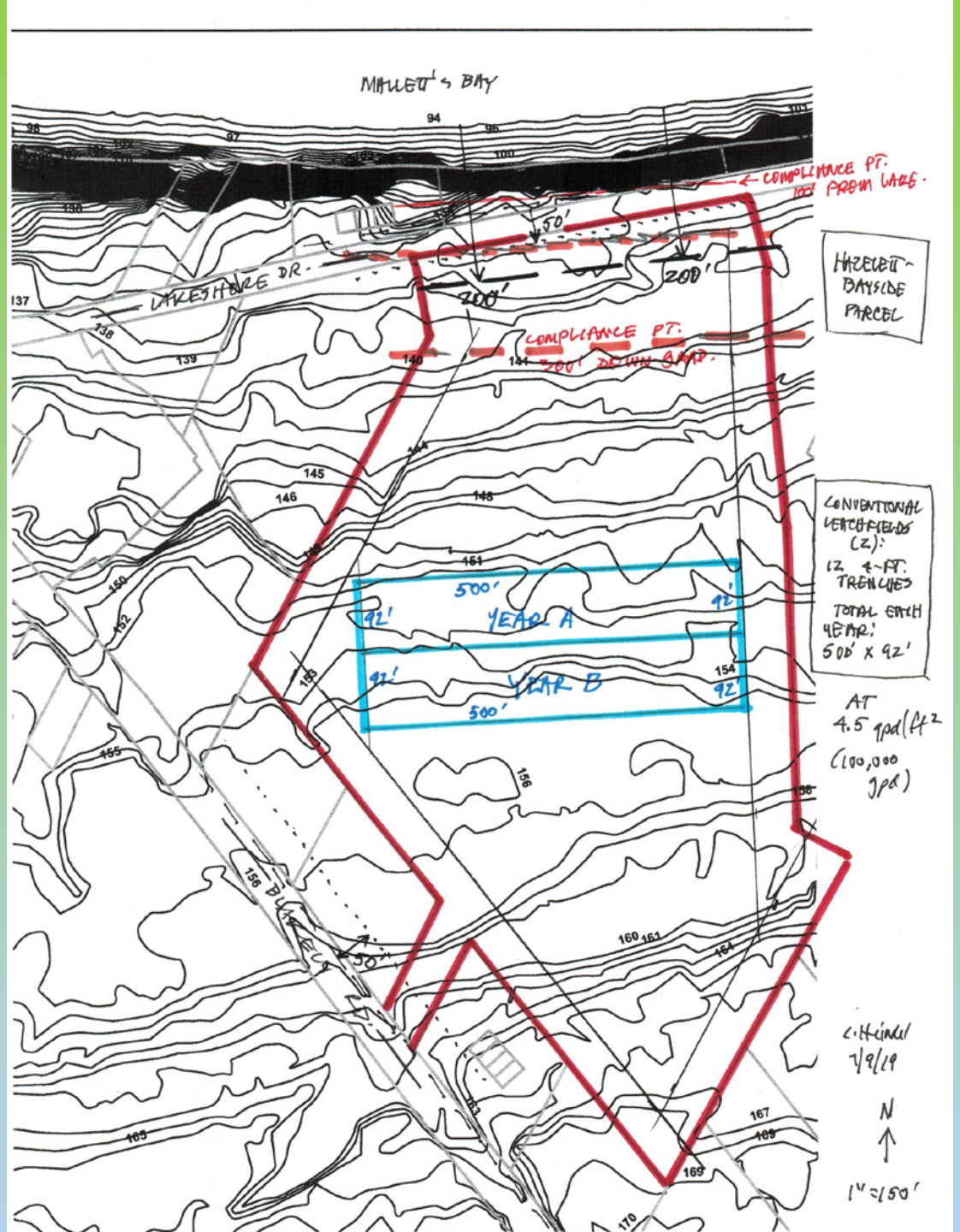

CONVENTIONAL LEACHFIELD

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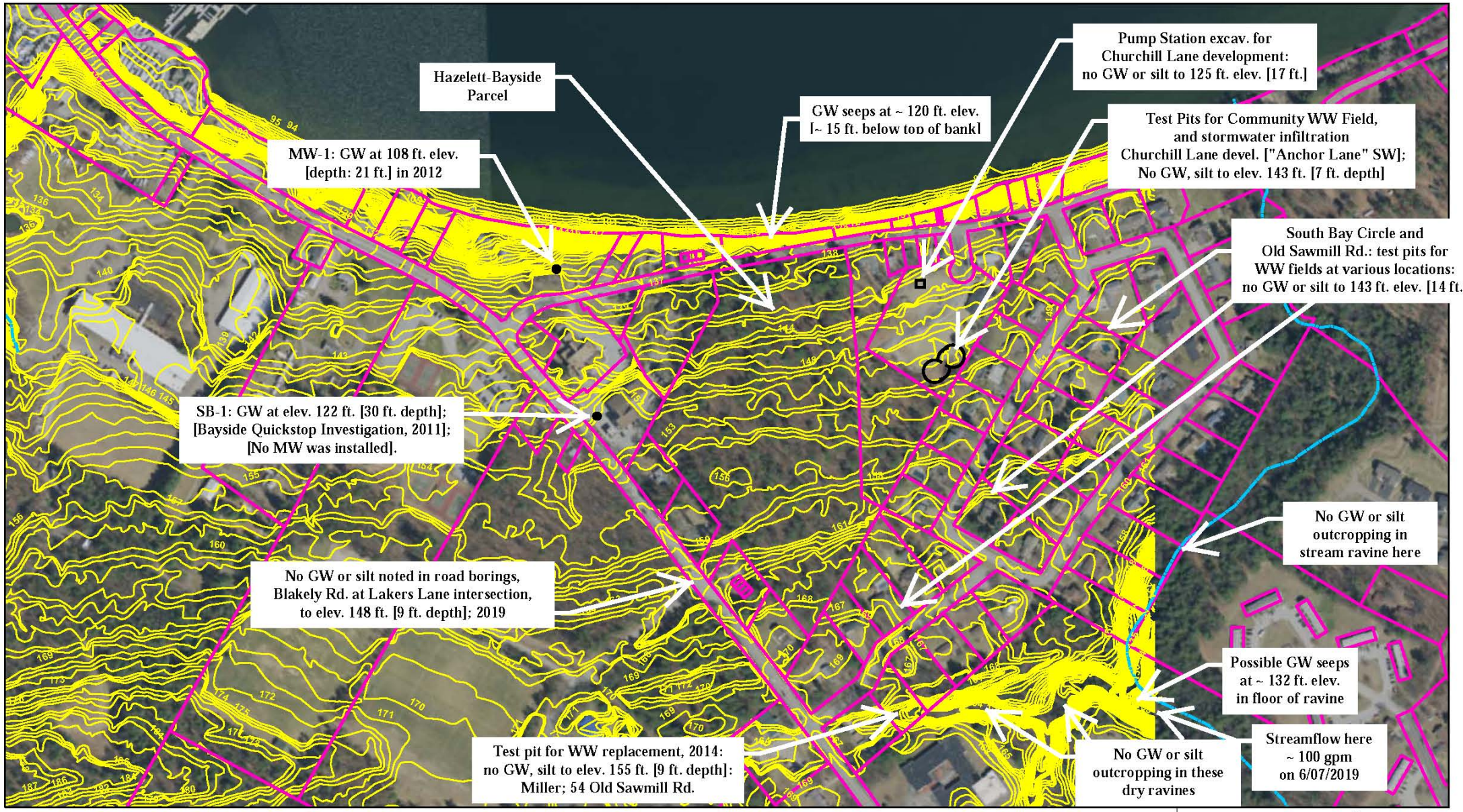
CONVENTIONAL LEACHFIELD

2. Sufficient Hydrogeologic Capacity [Induced Groundwater Mound]:

APPEARS TO BE ADEQUATE FOR 100,000 – 120,000 GPD

- **Based on conservative calculations [see Report];**
- **AND based on limited data, from surrounding properties**



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3. Compliance with Aquatic Permitting Criteria [meet VT Surface Water Quality Standards]:

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- **Based on Pilot Test conducted on site at Bromley Resort with similar conditions [deep sands & gravels]**

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- **Based on Pilot Test conducted on site at Bromley Resort with similar conditions [deep sands & gravels]**

CRITICAL NUTRIENTS are toughest hurdle:

- **Not increase Total Diss. P by more than 0.001 mg/L;**
- **Not increase Nitrate Nitrogen above 2.0 mg/L.**

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3. Compliance with Aquatic Permitting Criteria [meet VT Surface Water Quality Standards]:

APPEARS LIKELY,
for 100,000 – 120,000 GPD

- **Not increase Total Diss. Phosphorus by more than 0.001 mg/L;**
- **Not increase Nitrate Nitrogen above 2.0 mg/L.**

- **Compliance Point: in Groundwater 300 ft. down-gradient.**

- **SO: Needs Site-Specific confirmation**

AND

Tertiary Treatment

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Tertiary Treatment, Per Indirect Discharge Rules:

Parameter	Monthly Average Mg/L	Daily Maximum Mg/L
Biological Oxygen Demand [5-day]	10	18
Total Suspended Solids	10	18
Total Dissolved Phosphorus	0.5	1.0
Total Kjeldahl Nitrogen	5	10
Ammonia [as N]	1	2.0
Nitrate Nitrogen	5	10

Treatment Levels, Per Indirect Discharge Rules:

TABLE #12: MINIMUM SEWAGE TREATMENT REQUIREMENTS BASED ON DESIGN CAPACITY AND DISPOSAL METHOD

Design Capacity (gallons per day)	Disposal Method	Minimum Treatment Level Required
6,500 - 30,000	Leachfield	Primary (Septic tank)
30,001 - 50,000	Leachfield	Secondary + (1)
50,001 and greater	Leachfield	Tertiary
6,500 and greater	Sprayfield	Secondary

(1) Secondary 'plus' treatment level from recirculating sand / textile filters. See Table #13.

Treatment Levels, Per Indirect Discharge Rules:

TABLE #13: EFFLUENT LIMITATIONS FOR EACH TREATMENT LEVEL

	Effluent Limitation (in mg/L) by Treatment Level			
Parameter	Septic Tank	Secondary	Secondary + (1)	Tertiary
Biochemical Oxygen Demand (5-Day)	N/A	30 (2)	15 (3)	10 (4)
Total Suspended Solids	N/A	30 (2)	15 (3)	10 (4)
Total Dissolved Phosphorus	N/A	N/A	N/A	0.5 (5)
Total Kjeldahl Nitrogen	N/A	N/A	N/A	5 (6)
Ammonia (as N)	N/A	N/A	N/A	1 (7)
Nitrate nitrogen	N/A	N/A	N/A	5 (8)
Total Nitrogen (as N)	N/A	N/A	N/A	N/A

Treatment Levels:
Avoid Tertiary Treatment?

- **Wastewater Flows below 50,000 gpd;**

- **May not meet Aquatic Permitting Criteria, particularly Phosphorus removal [not increase TDP in groundwater by more than 0.001 mg/L]**

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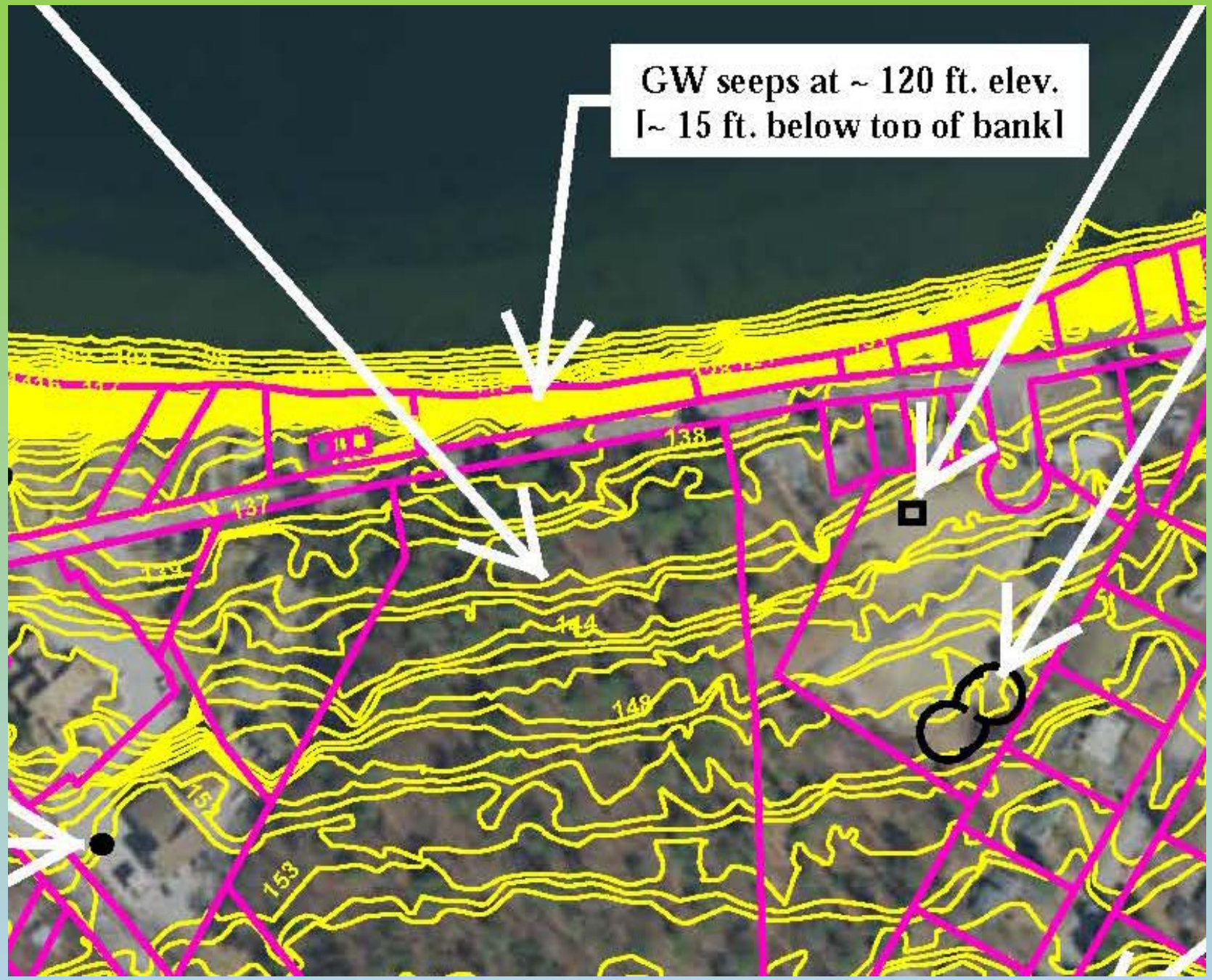
Slope Stability Issue, East Lakeshore Drive



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Next Steps:

1. **Evaluate the potential risk of large-scale WW disposal on the slope stability between East Lakeshore Drive and Malletts Bay.**

2. **Evaluate soil characteristics, groundwater depths, groundwater flow directions -- by borings and monitoring wells throughout and around the parcel.**

3. **Water level monitoring in the monitoring wells through the seasonal high water table period [March 1 – May 31].**

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Next Steps:

1. Evaluate the potential risk of large-scale WW disposal on the slope stability between East Lakeshore Drive and Mallet's Bay.

2. Evaluate soil characteristics, groundwater depths, groundwater flow directions

-- by borings and monitoring wells throughout and around the parcel.

3. Water level monitoring in the monitoring wells

through the seasonal high water table period [March 1 – May 31].

Further evaluations would then be considered, after these initial steps are taken:

- **Determine groundwater flow directions,**
- **Determine compliance point[s] for Indirect Discharge Permit,**
- **Conduct pilot test to document nutrient removal.**

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Questions?

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