WHY DO WE ASK YOU TO SIGN IN?

The Maryland Department of the Environment is posting this sign-in sheet so that we may generate a mailing list of concerned citizens, organizations and other members of the public for this permit application. You are not required to provide information on the sign-in sheet, but if you do, you may receive further information about the subject of this public hearing from the Maryland Department of the Environment.

As the Maryland Department of the Environment is a public agency subject to the Maryland Public Information Act, the sign-in sheet becomes part of the public record available for inspection by other members of the public. The permit applicant, the county or municipality, and elected officials may also receive copies, upon request, of this or any part of the public record.

If you have any questions about this, please contact the Water Supply Program at (410) 537–3590.

Maryland
Department of the Environment

Public Informational Hearing

Water Appropriation and Use Permit Application No. KE2021G001/01

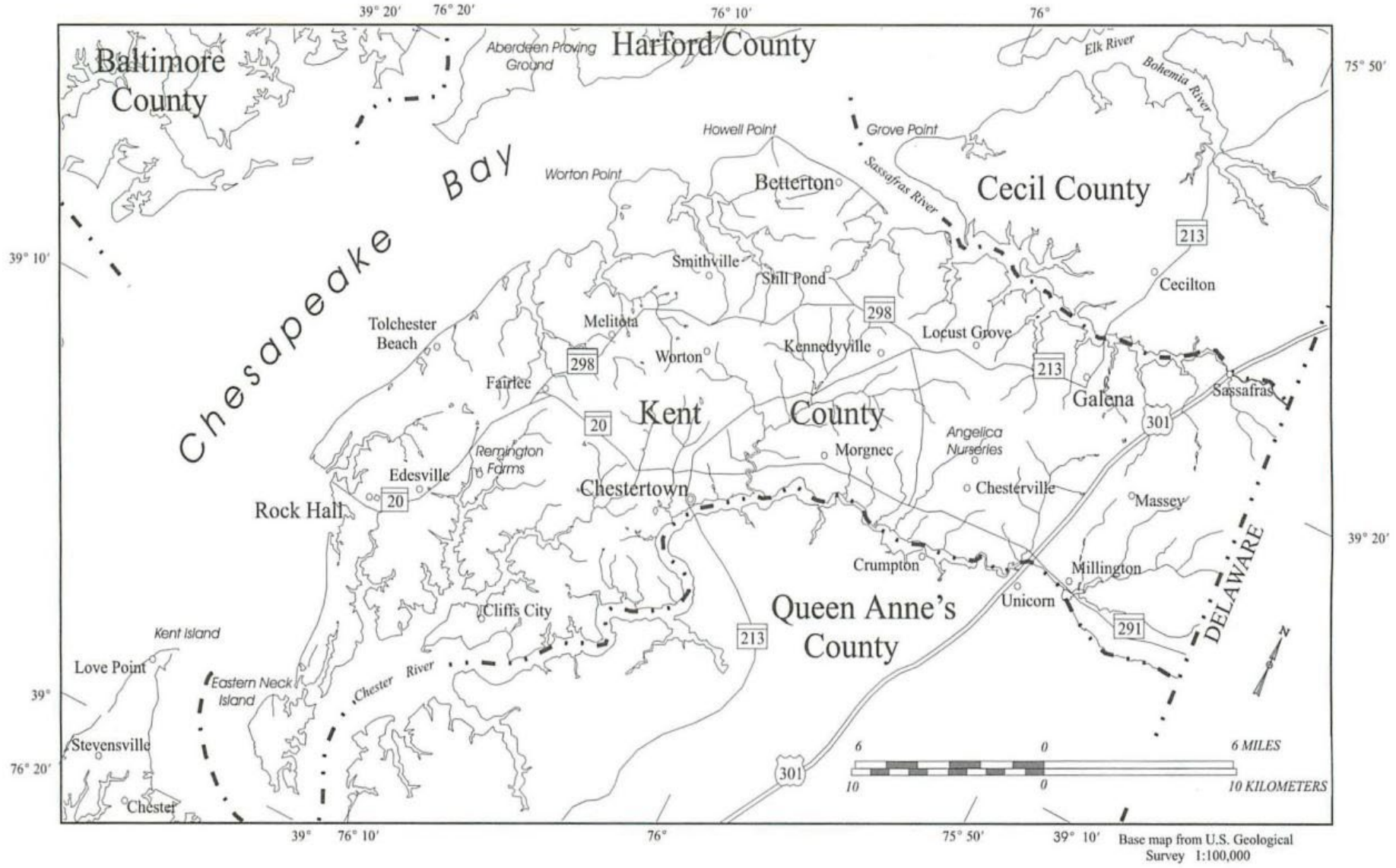
Applicant: Harborview Farms Partnership
Use: Crop irrigation

May 17, 2023 5:00pm

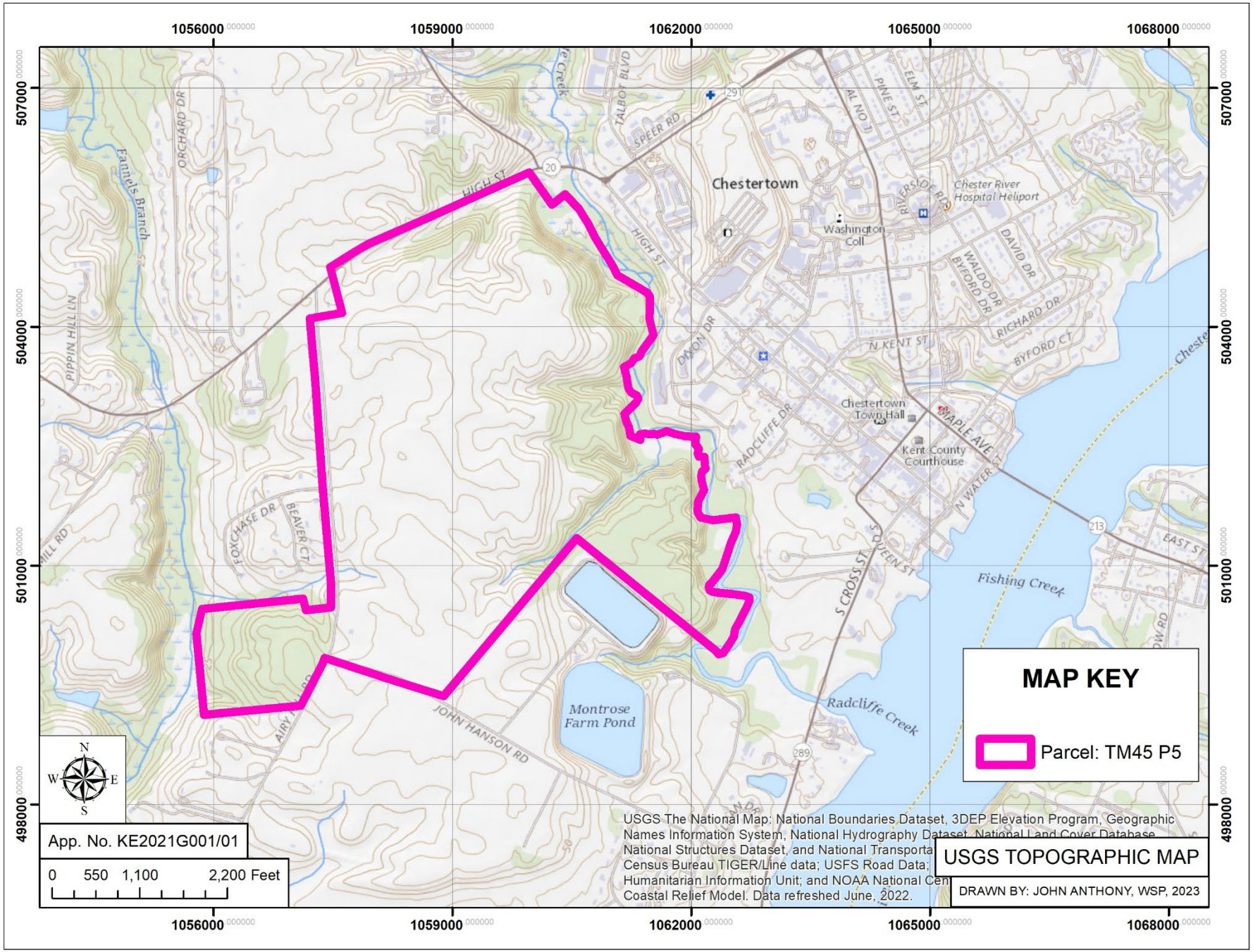
Chestertown, MD

REASONABLE USE DOCTRINE
Basis of Maryland water law

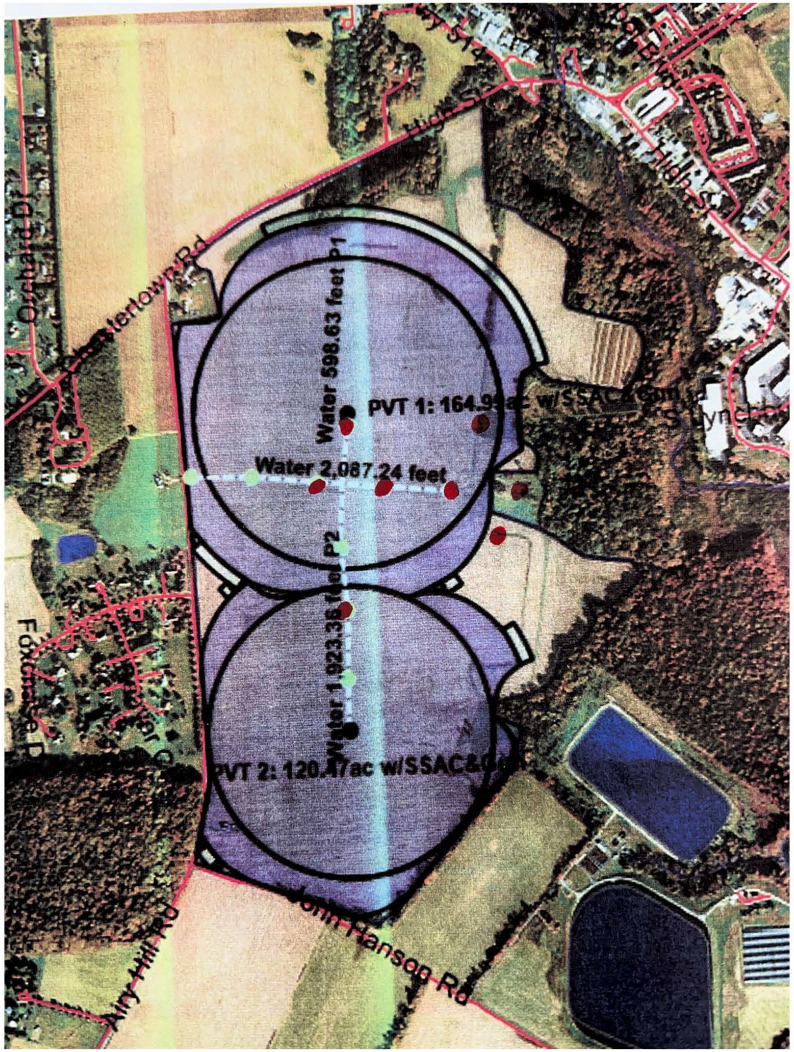
- All landowners have the right to make a reasonable use of the water associated with their property.
- Their rights are limited by the rights of other landowners and the ability of the resource to sustain the request.

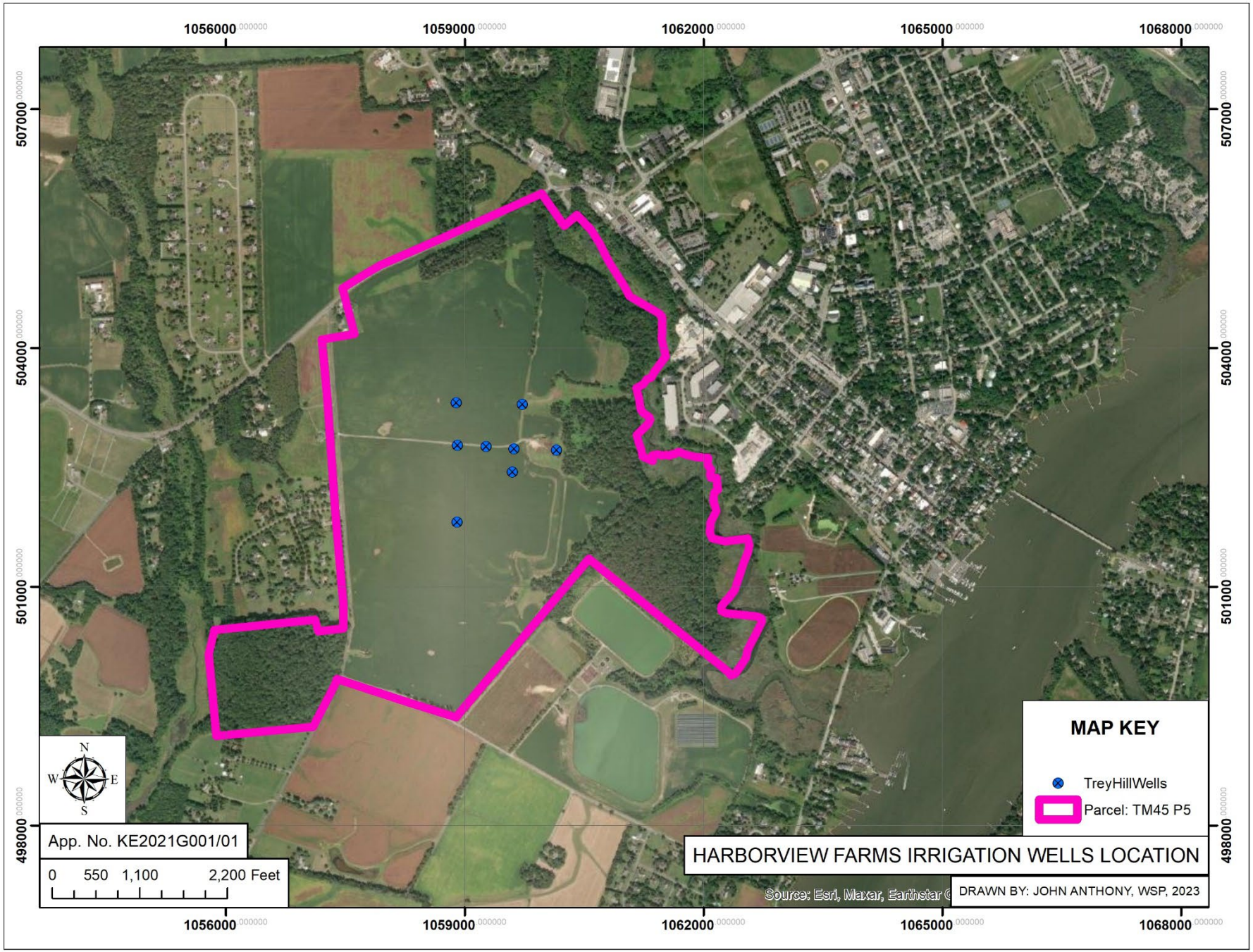


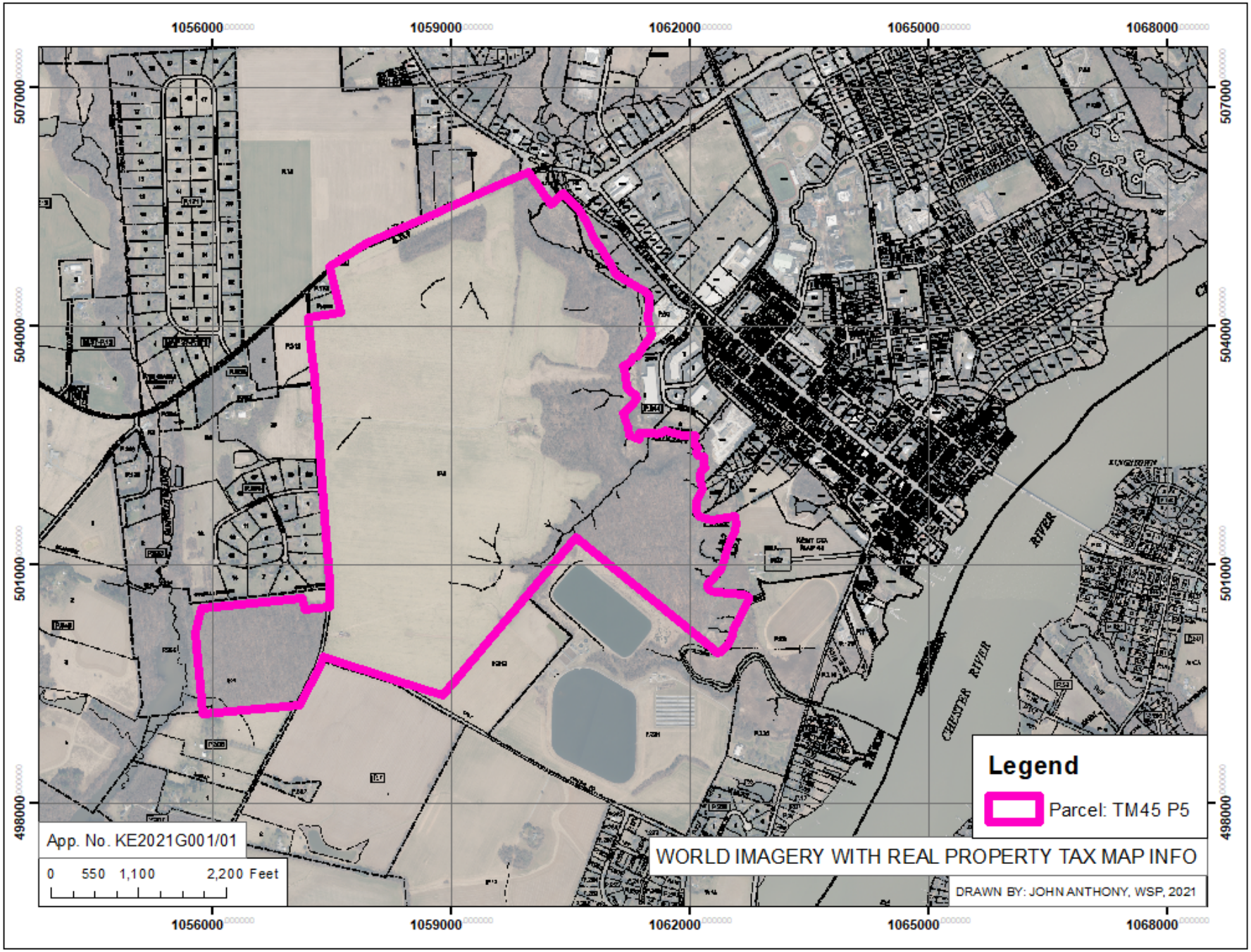
Source: RI-68, Maryland Geological Survey, Drummond, 1998


1056000
1059000
1062000
1065000
1068000
507000
504000
501000
498000
Chestertown
Chester River Hospital Heliport
Washington Coll
Chestertown Town Hall
Kent County Courthouse
Fishing Creek
Radcliffe Creek
Montrose Farm Pond
Fannels Branch
HIGH ST
SPEER RD
TALBOT BLVD
N KENT ST
MAPLE AVE
N WATER ST
S QUEEN ST
S CROSS ST
EAST ST
JOHN HANSON RD
RADCLIFFE DR
FOXCHASE DR
BEAVER CT
ORCHARD DR
PIPPIN HILL LN
DIXON DR
RIVERSIDE RD
PINE ST
ELM ST
DAVID DR
WALDO BYFORD DR
RICHARD DR
BYFORD CT
MAP KEY
Parcel: TM45 P5
N
W
E
S
App. No. KE2021G001/01
0 550 1,100 2,200 Feet
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transporta
Census Bureau TIGER/Line data; USFS Road Data;
Humanitarian Information Unit; and NOAA National Cen
Coastal Relief Model. Data refreshed June, 2022.
USGS TOPOGRAPHIC MAP
DRAWN BY: JOHN ANTHONY, WSP, 2023

Harborview Farms Irrigation Layout




1056000
1059000
1062000
1065000
1068000
507000
504000
501000
498000
N
W
E
S
App. No. KE2021G001/01
0 550 1,100 2,200 Feet
MAP KEY
TreyHillWells
Parcel: TM45 P5
HARBORVIEW FARMS IRRIGATION WELLS LOCATION
Source: Esri, Maxar, Earthstar
DRAWN BY: JOHN ANTHONY, WSP, 2023


1056000
1059000
1062000
1065000
1068000
507000
504000
501000
498000
CHESTER RIVER
Legend
Parcel: TM45 P5
App. No. KE2021G001/01
0 550 1,100 2,200 Feet
WORLD IMAGERY WITH REAL PROPERTY TAX MAP INFO
DRAWN BY: JOHN ANTHONY, WSP, 2021

Reasonableness of use :The 3 R's

1. The reasonableness of the requested quantity of water.
2. The reasonableness of the withdrawal on the resource.
3. The reasonableness of the withdrawal on other users of the resource.

Reasonableness of use :The 3 R's

1. The reasonableness of the requested quantity of water.

Reasonableness of requested quantity

Water Demand calculation is based on:

- Crop type
- Number of irrigated acres
- Dominant soil type
- Irrigation system type (water loss factor)
- Drought-year water demand for crops (acre inches)

KE2021G001/01 water demand:

- Crop type: grain corn
- Irrigated acreage: 258 acres
- Soil type: silty loam (USDA Web Soil Survey)
- Water loss factor: 1.15 (15%) (low-pressure center pivot system)
- Water demand: 11.7 inches for “high yield”

Calculated water demand

- **Annual average:** Total seasonal quantity / 365 days (one year)

  3,471 acre inches / 365 = **258,500 gallons per day**

- **Average in the month of maximum use:** (critical growing period) assumes all water used will be pumped 60 days

  3,471 acre inches / 2 / 30 days = **1,571,000 gallons per day**

- Quantities are based on a drought year water demand

- Note: WSP records show that long-term water use is about 50% to 60% of the total permitted quantities

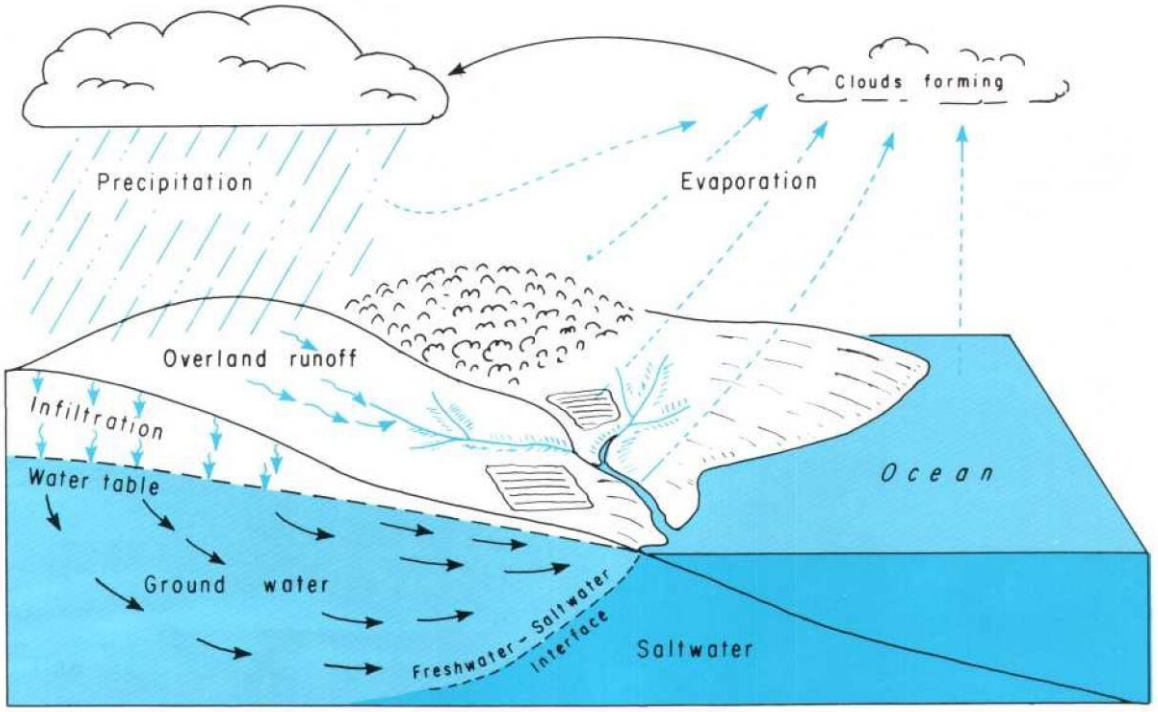
Reasonableness of use :The 3 R's

1. The reasonableness of the requested quantity of water.
2. The reasonableness of the withdrawal on the resource.
3. The reasonableness of the withdrawal on other users of the resource.

Reasonableness of use :The 3 R's

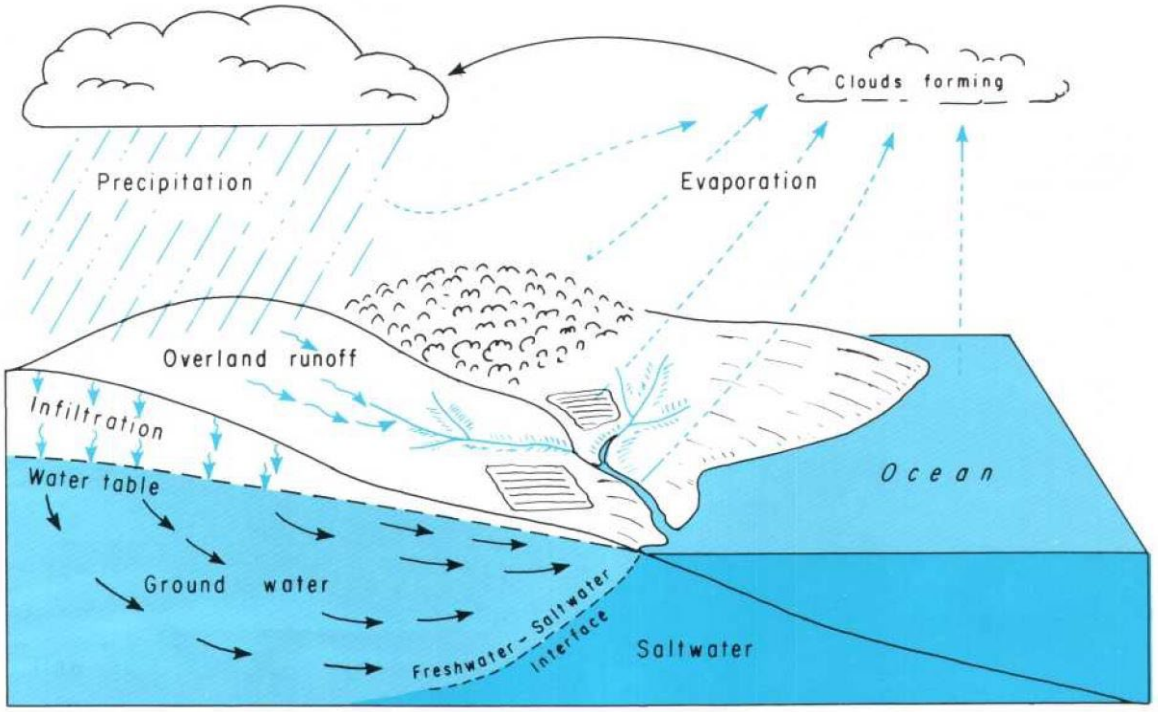
2. The reasonableness of the withdrawal on the resource.

Reasonableness of the withdrawal on the resource: (Aquia aquifer)



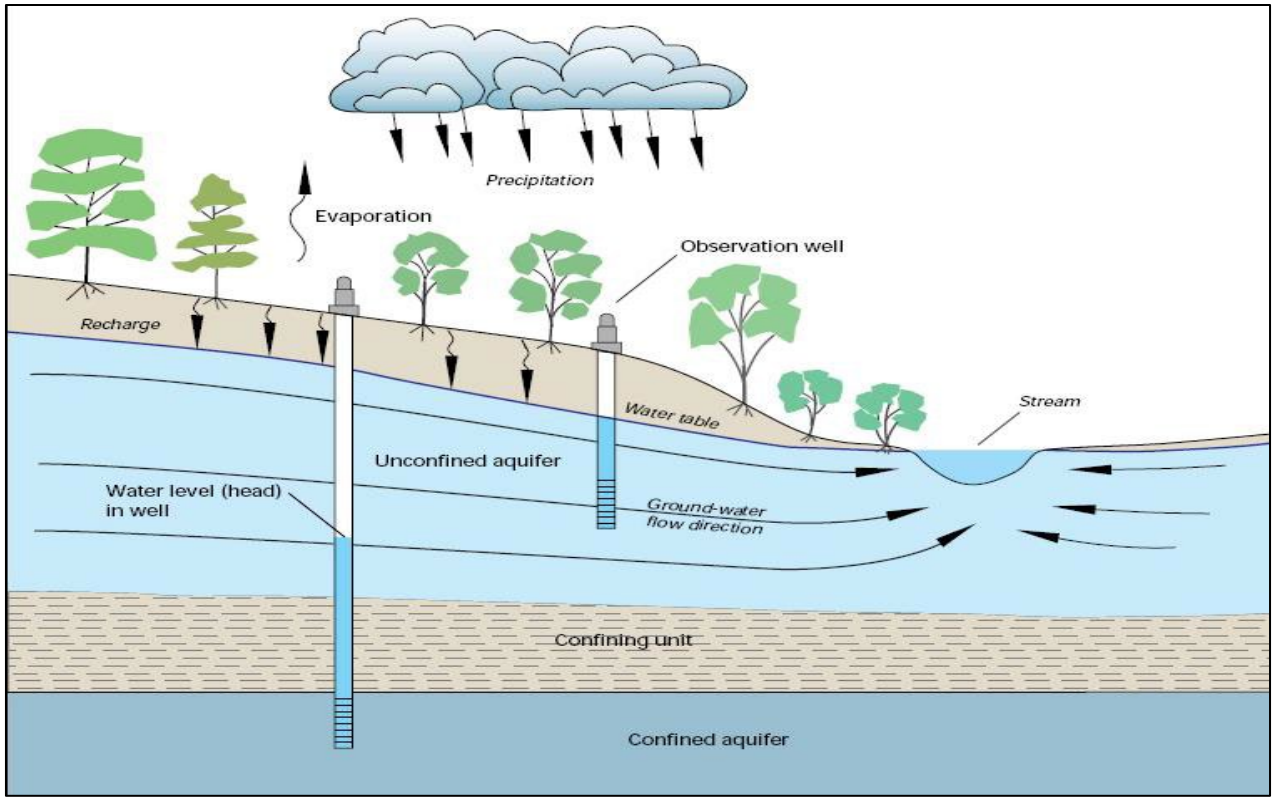
Source: Basic ground-water hydrology, U.S. Geological Survey, 1984, Water Supply Paper 2220, by Ralph Heath

The Hydrologic Cycle



Source: Basic ground-water hydrology, U.S. Geological Survey, 1984, Water Supply Paper 2220, by Ralph Heath

The Groundwater System



Source: U.S. Geological Survey, 1998, Circular 1139

Reasonableness of withdrawal on the resource (Aquia aquifer):

- Annual rainfall = 47.4 inches
- Groundwater recharge = 24.4 in. (51.5% of AR)
- Drought year recharge = 16.5 in. (68% of GWR)
- Base flow maintenance = 1.4 in.
- Available drought year recharge = 15.1 in (16.5-1.4)

Reasonableness of withdrawal on the resource (Aquia aquifer):

- Property area: 503 acres
- Available drought recharge = 7,595 acre inches (15.1 in * 503 ac)
- Seasonal water use = 3,471 acre inches
- Surplus recharge = 4,124 acre inches
- Infiltration recharge = 520 acre inches (15% of 3,471)
- Excess recharge on property = 4,644 acre inches
- Applicant's water use approx. 39% of available drought year recharge (2,951 consumptive/7,595 available)

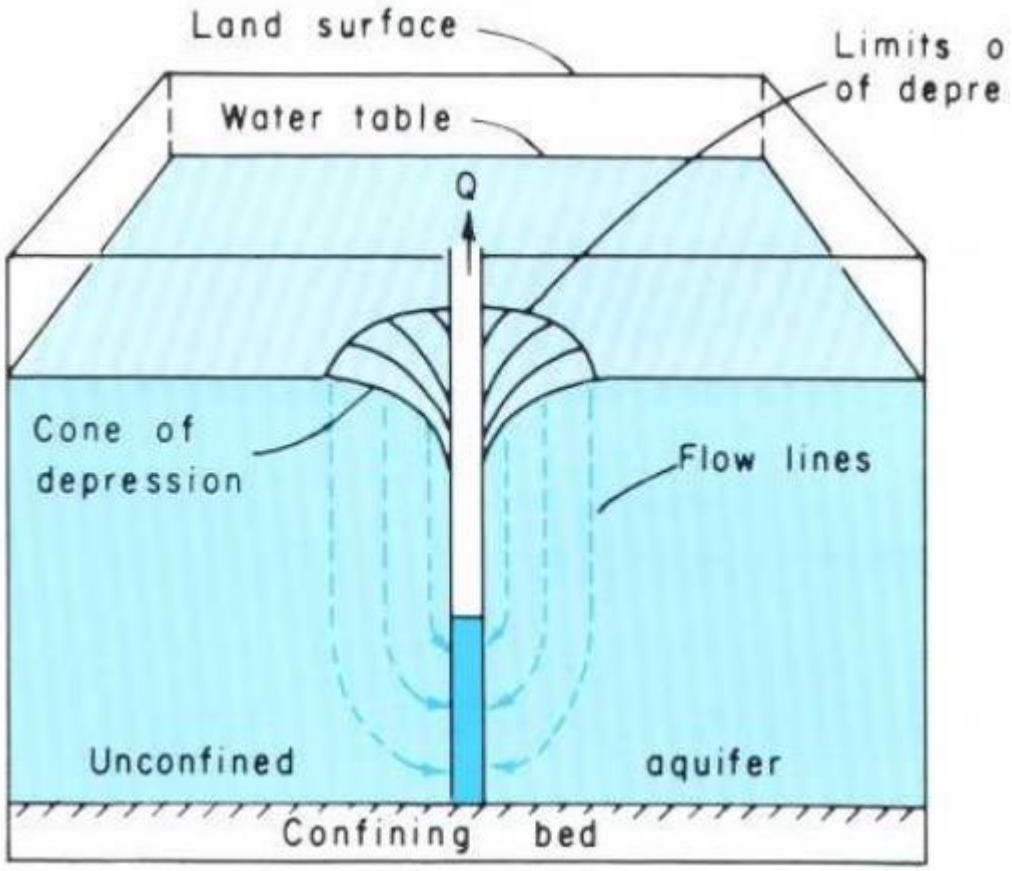
Reasonableness of use :The 3 R's

1. The reasonableness of the requested quantity of water.
2. The reasonableness of the withdrawal on the resource.
3. The reasonableness of the withdrawal on other users of the resource.

Reasonableness of use :The 3 R's

3. The reasonableness of the withdrawal on other users of the resource.

Reasonableness of the withdrawal on other users of the resource: cone of depression



Drawdown Modeling

- To determine the water level drop (drawdown) at a specified distance due to a well pumping:
  - Aquifer characteristics needed: (Transmissivity, Storativity)
  - Pumping rate (gallons per minute)
  - Pumping duration (days)
  - Theis nonequilibrium equation is used (Theis, 1935)

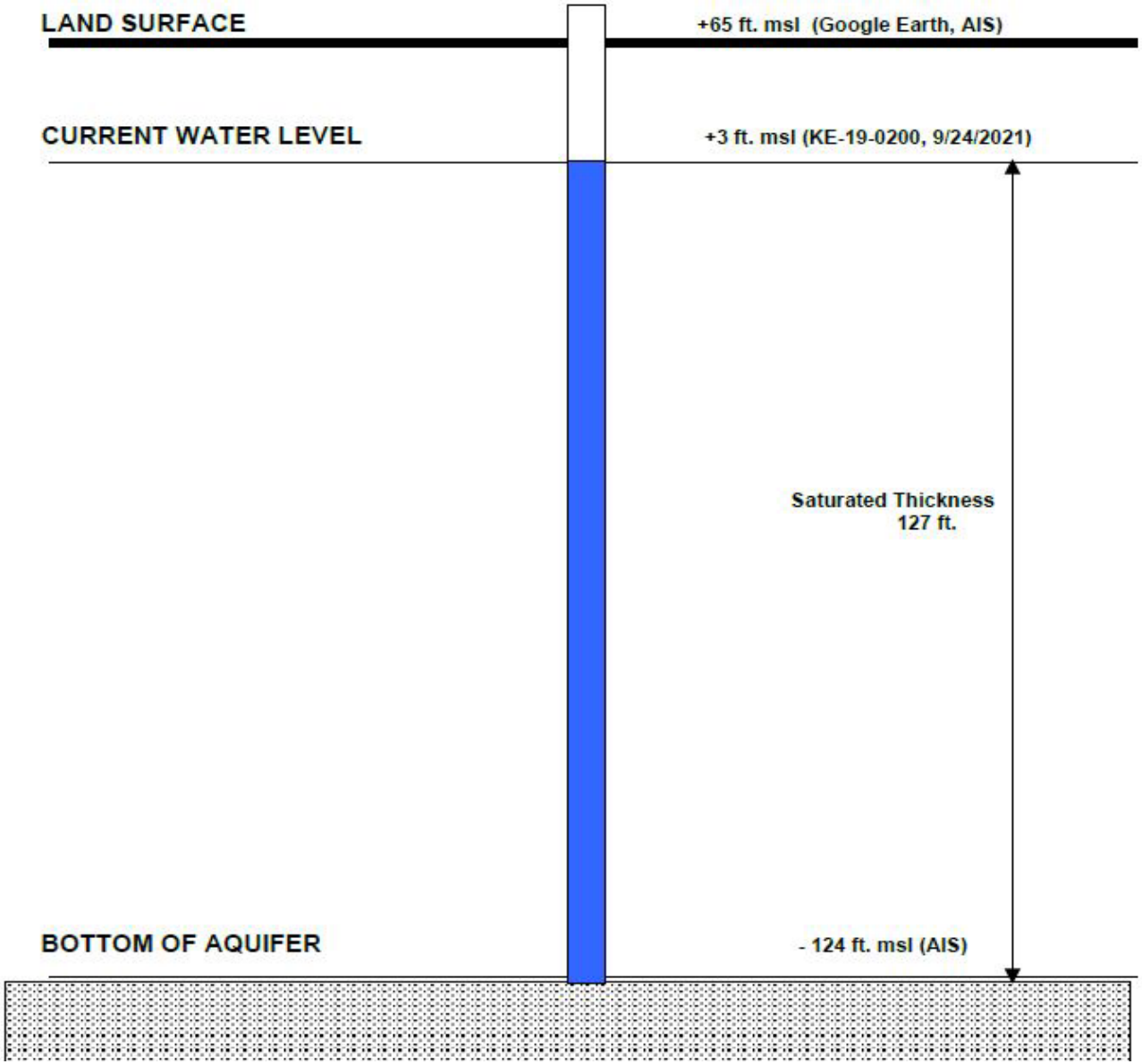
Drawdown Modeling

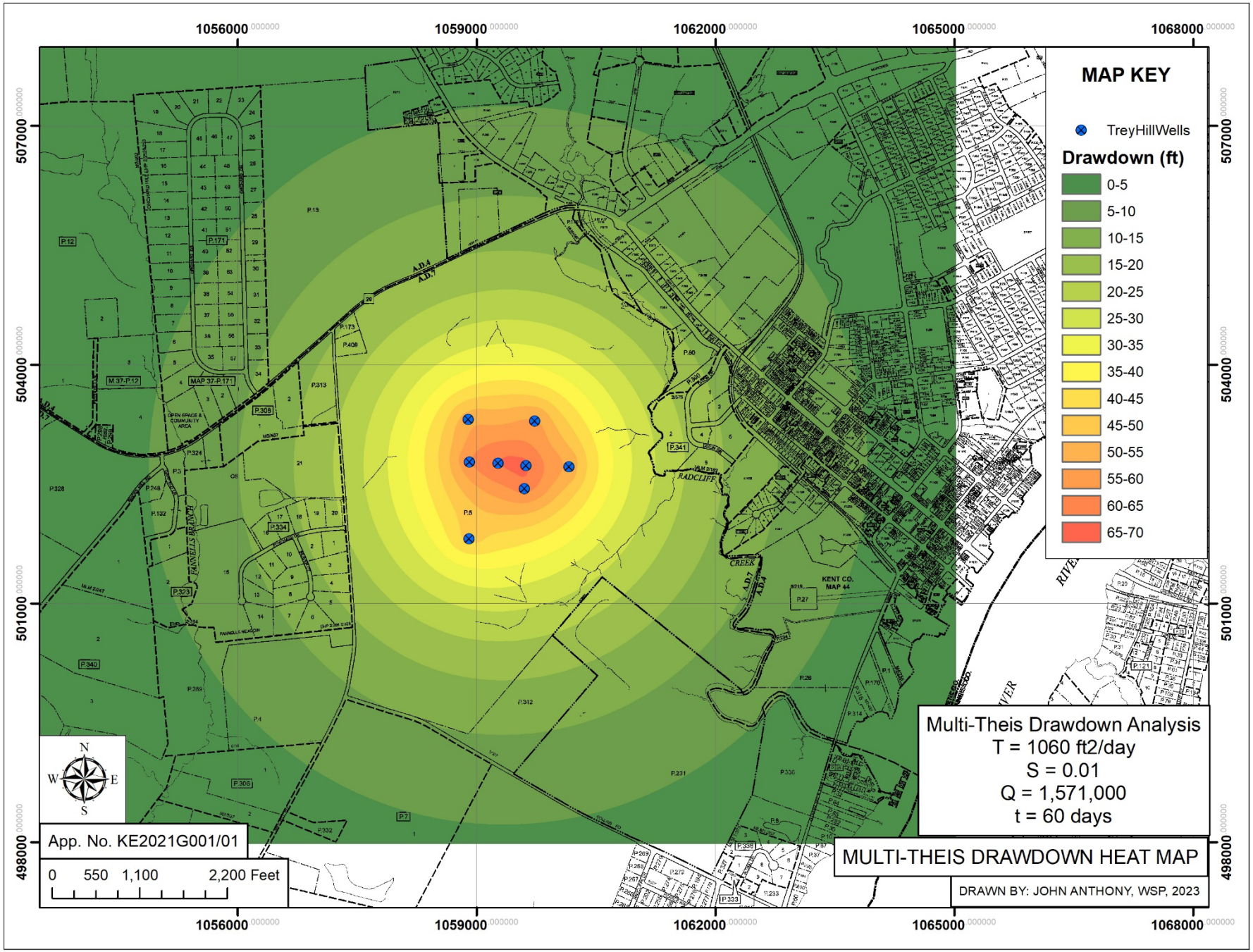
- Aquifer characteristics are from published geological reports, maps, well completion reports, and an on-site aquifer test.

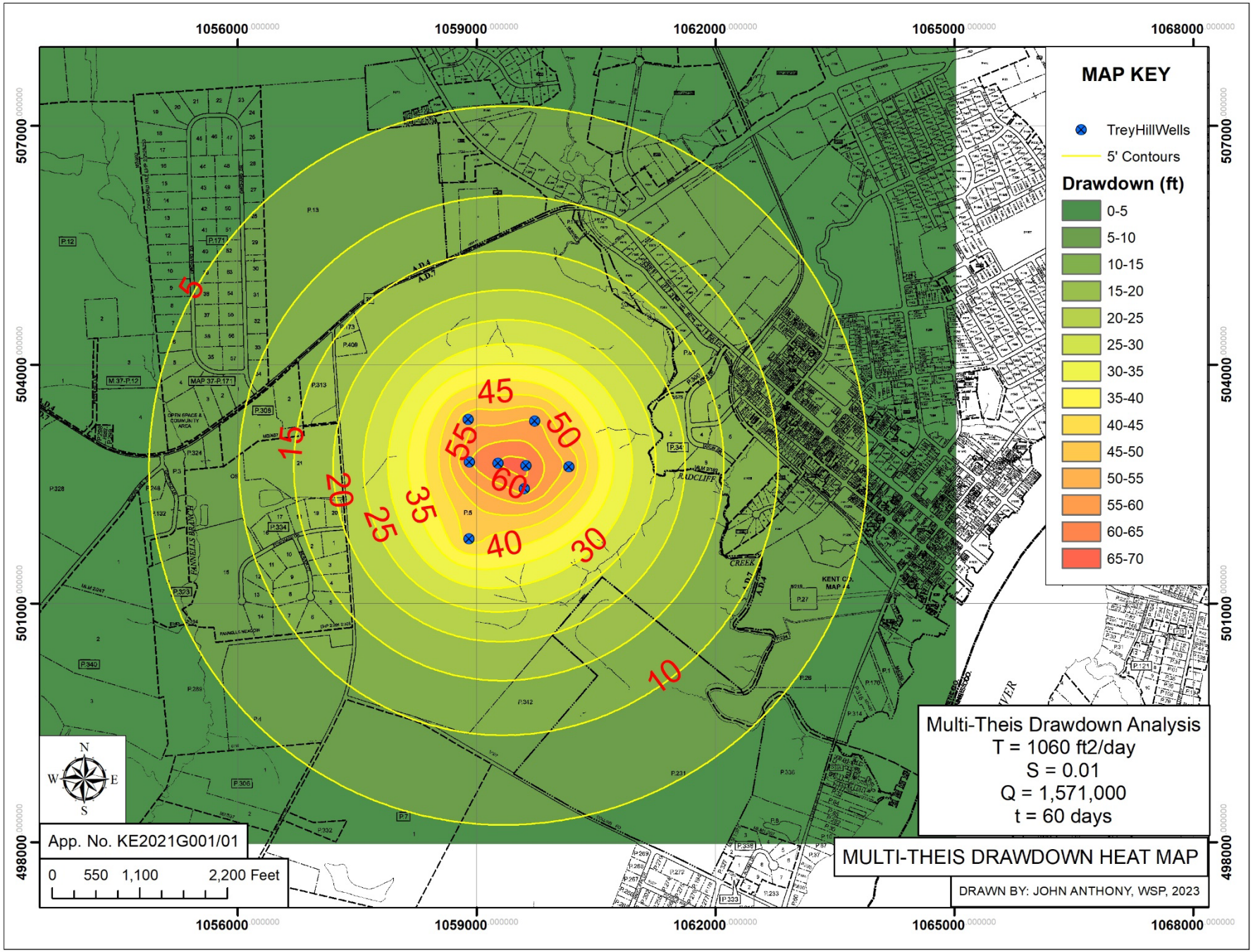
- Key aquifer data used in the modeling:
  - Transmissivity (T) = 1,060 ft^2/day
  - Storativity (S) = 0.01
  - Pumping rate = 1,571,000 gpd
  - Duration: 60 days
  - Assume there is no recharge

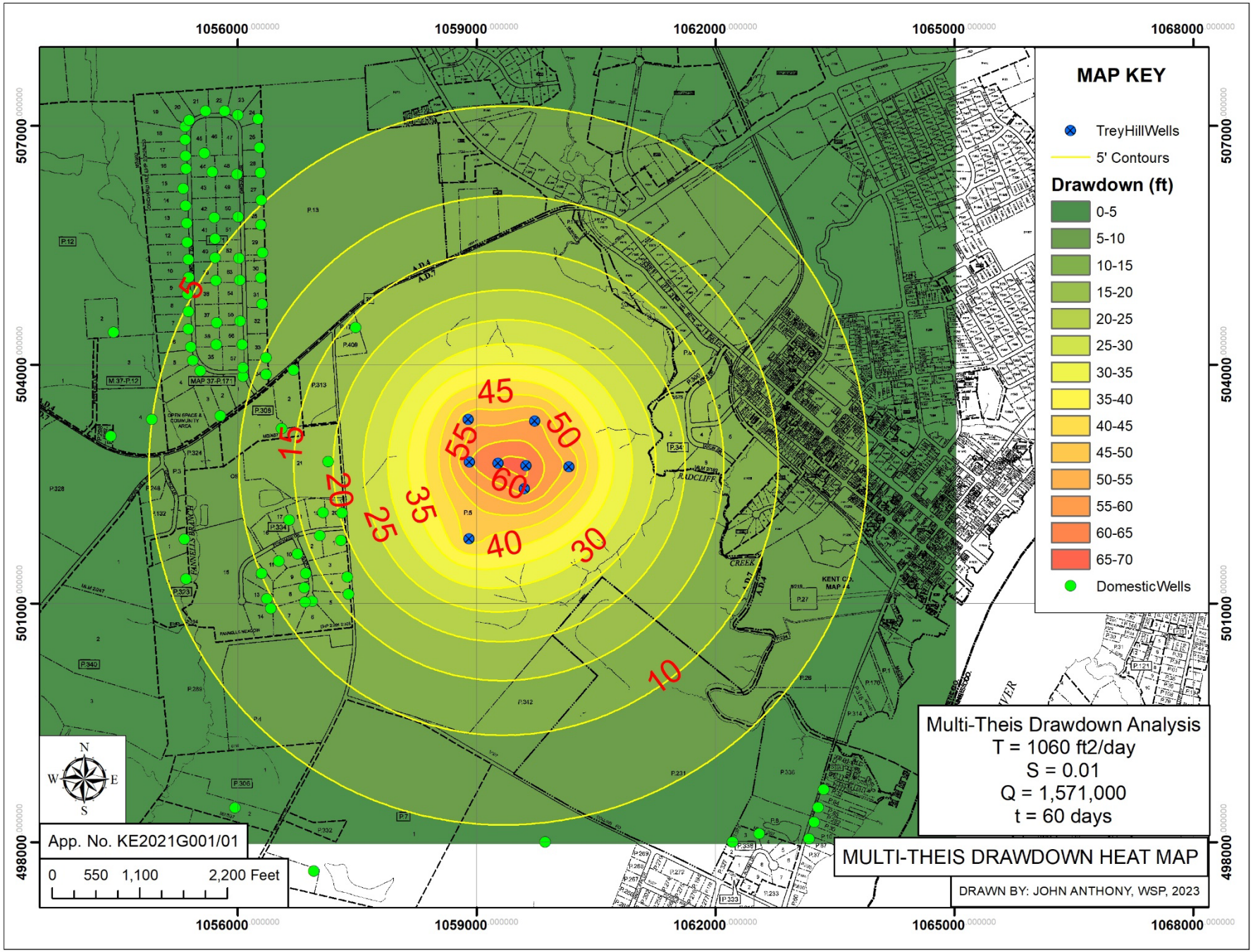
- The projected drawdown is 22’ at a distance of 2,000’ (property boundary) from the pumping center.

Simplified Aquia Aquifer Model




1056000
1059000
1062000
1065000
1068000
507000
504000
501000
498000
MAP KEY
TreyHillWells
Drawdown (ft)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
50-55
55-60
60-65
65-70
Multi-Theis Drawdown Analysis
T = 1060 ft2/day
S = 0.01
Q = 1,571,000
t = 60 days
MULTI-THEIS DRAWDOWN HEAT MAP
DRAWN BY: JOHN ANTHONY, WSP, 2023
App. No. KE2021G001/01
0 550 1,100 2,200 Feet
N
W
E
S


1056000
1059000
1062000
1065000
1068000
507000
504000
501000
498000
MAP KEY
TreyHillWells
5' Contours
Drawdown (ft)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
50-55
55-60
60-65
65-70
5
10
15
20
25
30
35
40
45
50
55
60
N
W
E
S
App. No. KE2021G001/01
0 550 1,100 2,200 Feet
Multi-Theis Drawdown Analysis
T = 1060 ft2/day
S = 0.01
Q = 1,571,000
t = 60 days
MULTI-THEIS DRAWDOWN HEAT MAP
DRAWN BY: JOHN ANTHONY, WSP, 2023


1056000
1059000
1062000
1065000
1068000
507000
504000
501000
498000
MAP KEY
TreyHillWells
5' Contours
Drawdown (ft)
0-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
50-55
55-60
60-65
65-70
DomesticWells
5
10
15
20
25
30
35
40
45
50
55
60
Multi-Theis Drawdown Analysis
T = 1060 ft2/day
S = 0.01
Q = 1,571,000
t = 60 days
N
W
E
S
App. No. KE2021G001/01
0 550 1,100 2,200 Feet
MULTI-THEIS DRAWDOWN HEAT MAP
DRAWN BY: JOHN ANTHONY, WSP, 2023

Summary – The 3R's

- KE2021G001/01 - proposed withdrawal of annual avg of 258,500 gpd and average of 1,571,000 gpd during the month of maximum use
- Total demand will NOT exceed the drought year recharge
- Nearest property line may see 22' fluctuation in groundwater levels due to maximum pumping
- Nearest well (farther than nearest property line) would see even less fluctuation (20') in groundwater levels

Questions Received before Hearing

- What are the permit conditions that will be in the permit to protect homeowners?
- What is the procedure should an issue occur?
- Would the guarantees/ permit conditions be transferred?
- Can we expect a change in water quality due to the withdrawal?

Maryland Department of the Environment

Water Supply Program

410-537-3590