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December 20, 2022

Appendix B: Supplement to HydroQuest December 5, 2022 report titled: *Proposed Terramor Glamping Project: Hydrologic and Land Use Based Justification for Issuance of a Positive SEQRA Declaration*

RE: Terramor Failed to Document Sufficient Water Supply Availability, Adverse Impact to Neighboring Homeowner Water Supplies, Wetland Impacts, and Potential Water Quality Degradation of Sacred Pond Waters Downstream of their Wastewater Discharge Location - A Negative SEQRA Declaration and/or a Public Hearing are NOT Warranted Because Significant Adverse Environmental Impacts are Clearly Demonstrated in the Limited Number of Homeowner Wells HydroQuest and Mid-Hudson Geosciences Were Able to Monitor During Terramor's Three Pumping Tests

Approval of any large-scale project should be predicated on rigorous aquifer testing, onsite and offsite well monitoring, analysis of empirical data, and conclusions supported by a technically valid data set. Terramor's Exhibit F (C.T. Male's 6-page November 30, 2022 Technical Memorandum on Water Supply, Treatment and Distribution) fails to do this. Terramor has failed to demonstrate that their proposed project will not have any significant environmental impact.

On December 6, 2022 Terramor provided the Town of Saugerties Planning Board with a large quantity of technical documents that included over 1,000 pages of material encompassing an Expanded EAF Narrative with 14 exhibits, a revised Site Plan/Special Use Application, a revised Stormwater Pollution Prevention Plan, and a letter from Whiteman, Osterman & Hanna (WOH). The WOH letter requests the Saugerties Planning Board to schedule a public hearing on the Terramor glamping proposal. Further, the Expanded EAF Narrative claims to have demonstrated that the project will not result in any significant adverse environmental impact and therefore a SEQRA Negative Declaration is warranted. These claims by Terramor are not well founded and do not fully address issues raised by Citizens Against Terramor in their document submission package of December 6, 2022. Issues raised in that submission by HydroQuest are further embellished here in Appendix B. It is essential to point out that much of the material submitted by Terramor revolves around meetings, material review, suggested mitigations, and sign-offs by various agencies involving technical aspects of the proposed project. This process has proceeded without SEQRA scoping, public review, public participation, and detailed analyses of alternatives.

As addressed by Citizens Against Terramor (CAT), this project should not be permitted within a Moderate-Density Residential (MDR) zoning district. If it were, evaluation of issues presented in December 6, 2022 CAT submissions justify a positive declaration of significant environmental impact under SEQRA, requiring preparation of a Draft Environmental Impact Statement. **It is premature to schedule a Public Hearing in the absence of a documented public water supply.**

Based on detailed reports submitted on behalf of Citizens Against Terramor by HydroQuest and others on December 6, 2022, numerous environmental questions remain unresolved. Furthermore, the content and quality of material submitted by Terramor on and before December 6, 2022 lack sufficient detail and credence upon which the Planning Board can rely on to make informed decisions. **This supplemental report (Appendix B) solidly accents important areas where Terramor has not provided sufficient supportive material upon which to advance the application, much less schedule a public hearing that they seek the Planning Board to conduct.**

Two environmental consulting firms, HydroQuest and Mid-Hudson Geosciences, with 93-years of combined hydrogeologic experience have reviewed Terramor's Exhibit F and found it to be wholly insufficient and lacking of technical detail to be of any use in making an informed decision regarding project approval and water supply. Instead, review of the C.T. Male Technical Memorandum (attached), when viewed in context with empirical well monitoring data collected by our firms, supports the following six conclusions supported, in part, by Figures 18, 19, 20, 21, and 22 and discussed below;

- HydroQuest and Mid-Hudson Geosciences empirical data document significant impact to homeowner water wells;

- All three of Terramor's aquifer tests impacted three of nine (33 percent) homeowner wells monitored with data loggers (transducers);

- It is highly likely that all three of Terramor's production wells are hydraulically interconnected, thereby raising well-founded concern that well yields may not be added together to obtained the needed project water demand;

- Equilibrium groundwater conditions were not achieved during Terramor's pumping tests, raising concern that yield values may not be safely maintained over time;

- Based on assessment of Exhibit F, Terramor's groundwater testing procedures and monitoring were sufficiently flawed such that either A) the project should be abandoned, or B) entirely new aquifer testing should be conducted and evaluated; and

- Potential water quality degradation of the Woodstock Jewish Congregation's sacred pond, situated 1,400 feet downstream of Terramor's wastewater discharge location, requires comprehensive evaluation (Figure 22).

Review of the bulleted material presented below, in combination with graphs and GIS maps, accents the need to reevaluate all technical material submitted by Terramor prior to holding a Public Hearing or considering issuance of a Negative Declaration.

- Limited information has been provided by the project applicant. Terramor's well report does not provide aquifer testing detail including drawdown and recovery water level data in production wells, static water levels in wells, water level monitoring data in all onsite observation wells during aquifer testing, timing of drawdown and recovery phases of testing, flow measurements, information of where pumped water was discharged, testing protocols, reference as to who did what during testing, water level monitoring devices and their calibration, aquifer characterization, planned well pumping scenarios, and other components of aquifer testing;

- Terramor's aquifer test report does not provide determinations of transmissivity (T) and storage coefficients (S). These are especially important because they define the hydraulic characteristics of a water-bearing formation. The coefficient of transmissivity indicates how much water will move through the formation, and the coefficient of storage indicates how much water can be removed by pumping;

- Common equations used to determine T and S from a pumping test require measurements of drawdown in at least one observation well. The Exhibit F well report provides no information regarding the use of existing onsite well use as observation wells and provides insufficient and inaccurate drawdown measurements of homeowner wells;

- Data from observation wells are usually more reliable and accurate than data from pumped wells, so time-drawdown plots from observation wells are most often relied upon to reveal the performance of an aquifer. Reference to Figure 20, for example, shows that even at a distance outward from Terramor's Lot 1 production well to the Pisani well (1,100 feet), the aquifer is struggling to keep up with a demand of 8 gallons per minute. This impact is shown on the steep slope on the semilog plot as projected downward beyond the end of the drawdown data. This dashed line predicts water levels after longer periods of continuous pumping. Here, we see that this pumping would likely dewater the Pisani well within about 45 days. However, if Terramor's production wells all draw groundwater from the same interconnected fracture set and more than one well is pumped at a time, as needed to meet Terramor water demand, the Pisani well may become dewatered before 45 days. If the aquifer had been able to keep up with the required demand from Terramor's Lot 1 well, the stated highest yielding site well, the projected water level on the plot would be almost horizontal, not steeply inclined at a 60° angle. **Terramor has not demonstrated that there is sufficient groundwater to meet project demand. Terramor has demonstrated that water levels in offsite homeowner wells will drop significantly, likely leading to dry wells**;

- Figure 18 shows approximate fracture pathways that interconnect all three Terramor production wells with the Pisani, Chadha, and Elder homeowner wells extending outward for over 2,500 feet;

- Figures 19, 20, and 21 show portions of the Terramor pumping tests where aquifer drawdown is increasing when their pumps are turned off. This response indicates that the pumping wells are pulling in groundwater from ever greater distances outward to keep up with the pumping demand. The downward slope of the drawdown portions of the graphs indicate that aquifer equilibrium conditions have not been achieved such that production well yields can be maintained (i.e., water entering the area of pumping influence is significantly less than pumping well yield);

- Importantly, pumping water from each of the Terramor production wells impacted the Pisani, Chadha, and Elder wells during each test. Figure 18 shows the hydraulic interconnections between production wells and homeowner wells, at distances to at least 2,500 feet from production wells;

- These proven well interconnections, based on HydroQuest and Mid-Hudson Geosciences transducer data strongly indicate that all three of Terramor's production wells are hydraulically interconnected. Normal aquifer testing procedures would frequently monitor water levels in all non-pumping onsite wells while individual wells were being pumped. This method would likely reveal fracture interconnectivity between onsite wells and, thus, interference between wells tapping the same groundwater source. In this more than likely scenario, Terramor's underlying premise that individual yields from separate production wells may be considered as being additive may not be hydrogeologically correct. As such, Terramor may not be able to meet projected water demand. Also, for a public water supply, the applicant must demonstrate adequate supply with the best well out of service;

- Four offsite homeowner wells were monitored by C.T. Male "*to determine if the water use on the Terramor site will impact water levels in the wells on the neighboring properties*." The four wells that Terramor monitored were Leavitt (1716 Route 2112), Pisani (11 Osnas Lane), Paynter (71 Raybrook Drive), and Pineriro (109 Cotton Tail Road). Their locations are shown on Figure 18;

- HydroQuest and Mid-Hudson Geosciences monitored nine homeowner wells, including the Pisani, Paynter, and Pineriro wells (Figure 18). Requests made to Terramor for information regarding which offsite wells they were going to monitor, as well as for a copy of their aquifer testing protocols were not satisfied. Nine wells were fitted with data loggers (aka transducers) programmed to record well water pressure every five minutes. Frequent data collection facilitates hydrogeologic interpretation;

- Well water impact was observed in the Pisani, Elder, and Chadha wells (Figure 18). Figures 19, 20, and 21 document impact on the Pisani and Elder wells. The Chadha well responded similarly to the Elder well. These three wells responded to each of the three pumping tests conducted by Terramor. Figure 21, for example, shows that about 1/3 of Elders' available well water column was drawn down during Terramor's first pumping test;

Figure 20 shows that greater than 40 percent of Pisani's available well water was depleted by Terramor during their second pumping test. Figures 19 and 21 show that aquifer recovery following Terramor's pumping tests took days. Pumping of multiple Terramor production wells to meet project demand may result in dewatering some homeowner wells within a few months;

- Three of the nine homeowner wells monitored by HydroQuest and Mid-Hudson Geosciences showed adverse impact from Terramor's pumping test. This is 33 percent of the wells selected for observation. Groundwater impacts were documented at distances to at least 2,500 feet from Terramor production wells. It is likely that many other homeowner wells will be impacted if the Terramor project advances;

- The results of Terramor's monitoring of four homeowner wells is documented in the form of three tables in the C.T. Male Technical Memorandum. A footnote on the tables states that no significant changes in water level was observed. This is particularly true of many water level values listed as being "*<15*" feet. A note at the base of each of their tables states *"<15 feet water level indicates the water level was observed visually due to shallow depth*." From a hydrogeologic perspective, this is completely unacceptable. The whole point of taking measurements to depth of water is to observe changes in time which are easily shown on a graph. A value of less than 15 feet is worthless, the water level could be going up or down which is an important part of the analysis. If you have a calibrated instrument capable of measuring water levels in wells during pumping tests, you use it and determine changes between readings. This way, hydrogeologists know how much aquifer drawdown or recovery has occurred since the last reading and quality information is gathered that is then used in aquifer characterization;

- Figure 19 accents the difference between Terramor's visual observations, their measured observations, and the highly accurate HydroQuest/Mid-Hudson Geosciences transducer data. Several issues resolve themselves on this figure. The red horizontal line reflects Terramor's observed limit of visual water depth assessment. Because 15 feet is a significant amount of water depth with an enormous amount of potential error, these visual observations were arbitrarily plotted at the -12-foot level below the top of the well casing. Looking, for example, at actual transducer level data plotted on 10-20-22, even if C.T. Male's water depth value were at -15 feet, their reading would be in error by 6 (six) feet. Other similar C.T. Male measurement errors may also be seen on Figure 19. Clearly, all of C.T. Male's well water data is suspect. As such, their aquifer testing data and conclusions should be discarded;

- Terramor's determination that no significant changes in water levels occurred in homeowner wells is also brought into question relative to the frequency of their well water measurements (besides the suspect nature of their reported well water level values). Reference to Figure 19, for example, shows Terramor's recorded water levels in the Pisani well. Individual Terramor readings are highlighted within black ovals. Over the duration of three pumping tests, Terramor made 12 (twelve) measurements to assess potential

pumping impact on the Pisani well. In this same time period, HydroQuest/Mid-Hudson Geosciences recorded water levels over 4,500 times in five-minute intervals. Interestingly, a close look at Figure 19 and the placement of Terramor's 12 measured water depth readings reveals that in the absence of the HydroQuest/Mid-Hudson Geoscience data, the observer would not know what the original static water level was at the start of the first, second, and third pumping tests. The Terramor data also fails to document any drawdown or recovery associated with the first and third pumping tests. For the most part, Terramor only documented a small portion of drawdown in the Pisani well during the second pumping test. However, no initial static/recovery level data was recorded to show overall change and the measured values are off by feet. Based this incomplete and inaccurate data, Terramor found no significant impact to Pisani's water supply;

- These findings of highly suspect Terramor water level monitoring and infrequent measurements bring into question whether the Leavitt (1716 Route 212) water level data recorded as all being <15 feet have merit. Perhaps, like at the Pisani well, well water drawdown and recovery periods were completely missed and the Leavitt well water supply was impacted. No assessment is possible based on the data provided;

- Reference to the three homeowner well water level data tables presented in the Terramor well report raises additional questions regarding the timing and accuracy of reported data. Some small minute intervals between well water level readings taken at different locations appear questionable in terms of being physically possible timewise, allowing for both travel time between wells, getting out of a car, taking a reading, returning to a car, and driving to the next location. In at least one case, water levels are recorded in two different wells at the same time. Some recorded water levels have no correlating time values;

- Terramor's Exhibit F (well report) depicts three semilog plots of drawdown versus time. They are labeled "*72-Hour Constant Rate Pumping Test.*" Yet, two of three plots have label boxes stating "*Adjusted Rate*." The Lot 23 pumping test graph, for example, shows a major change in drawdown slope associated with the adjusted flow rate. While a text box on the graph states the pumping rate was 4 gallons per minute, the pumping rate was not kept constant as specified in Part 5, Subpart 5-1 of the State Sanitary Code, Appendix 5B (Section 5-B.4). Driscoll (1986, Groundwater and Wells; the industry standard) recommends constant rate pumping tests with one or more observation wells so that key aquifer values can be calculated. HydroQuest emphasized the need to conduct aquifer testing with constant discharge rates in a letter dated October 4, 2022. No data is provided to explain important test particulars. Terramor provides no flow measurements and times, nor water level data charts, to evaluate testing conditions. Importantly, hydrogeologists conducting pumping tests seek to maintain a constant pumping rate to allow accurate aquifer characterization. Terramor did not follow this standard industry practice;

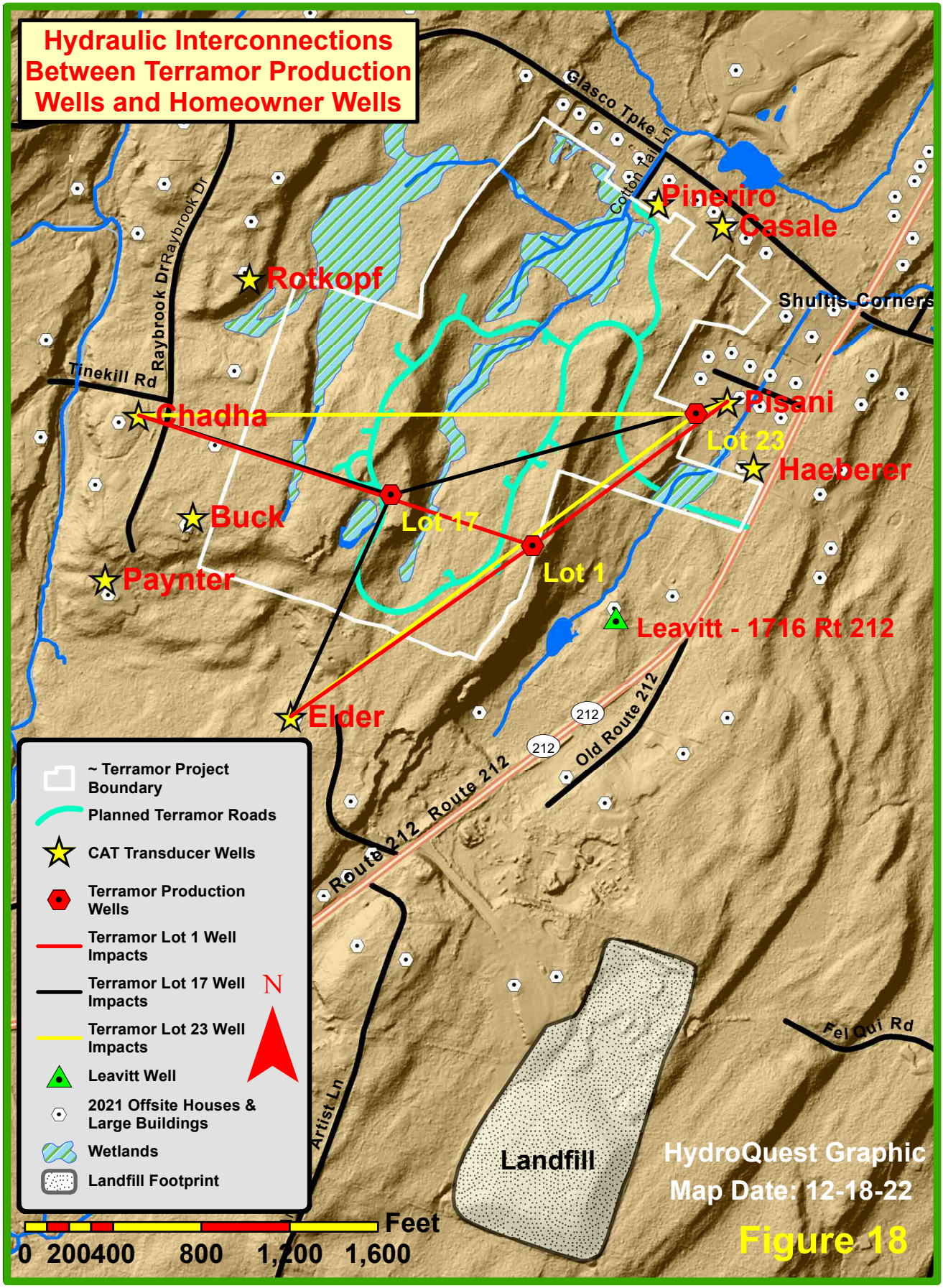
- Terramor also provided no documentation to demonstrate that a minimum of six hours of stabilized drawdown was observed at the end of each aquifer test as specified in Part 5, Subpart 5-1 of the State Sanitary Code, Appendix 5D Public Water Systems;

- Terramor shows three semilog drawdown versus time graphs. They provide no data nor graphs to show aquifer recovery as is specified in Part 5, Subpart 5-1 of the State Sanitary Code, Appendix 5B (Section 5-B.4). Recovery and whether water levels return to static levels is critical information used in assessing potential long-term aquifer performance (i.e., the aquifer's ability to meet project demand over time). HydroQuest and Mid-Hudson Geosciences' Figures 19 and 21 show multi-day aquifer recovery times in homeowner wells following Terramor's pumping tests. **Based on the Terramor well report submitted to the Planning Board in support of a negative SEQRA declaration, we recommend that either new aquifer testing be conducted, all project advancement be placed on hold until aquifer testing is comprehensively conducted, or the project application be dismissed**;

- Similarly, Terramor did not disclose where the pumping test water was discharged or whether there was risk that it infiltrated back into the underlying aquifer, thereby short-circuiting the water back into the aquifer. Such action would lead to higher estimates of well yield (gallons per minute);

- Apparently, Terramor elected to not monitor water levels in the nearby wetlands. This is an important omission because long-term groundwater pumping during dry and drought conditions may reduce or eliminate critical base flow to wetlands or, potentially, induce downward infiltration of wetland water; and

- Terramor plans to discharge "treated" wastewater into a northeastern portion of a healthy wetland complex. Some 1,400 feet downstream, project wastewater will flow into a sacred pond used by the Woodstock Jewish Congregation for high holy day rituals (Figure 22). This is unacceptable and therefore requires reevaluation.


Hydraulic Interconnections Between Terramor Production Wells and Homeowner Wells
Glasco Tpke
Cotton Tail Ln
Pineriro
Casale
Rotkopf
Raybrook Dr
Raybrook Dr
Shultis Corners
Tinekill Rd
Chadha
Pisani
Lot 23
Haeberer
Buck
Lot 17
Lot 1
Paynter
Leavitt - 1716 Rt 212
Elder
212
212
Old Route 212
Route 212
Route 212
Fel Qui Rd
Artist Ln
Landfill
~ Terramor Project Boundary
Planned Terramor Roads
CAT Transducer Wells
Terramor Production Wells
Terramor Lot 1 Well Impacts
Terramor Lot 17 Well Impacts
Terramor Lot 23 Well Impacts
Leavitt Well
2021 Offsite Houses & Large Buildings
Wetlands
Landfill Footprint
N
0 200400 800 1,200 1,600
Feet
HydroQuest Graphic
Map Date: 12-18-22
Figure 18

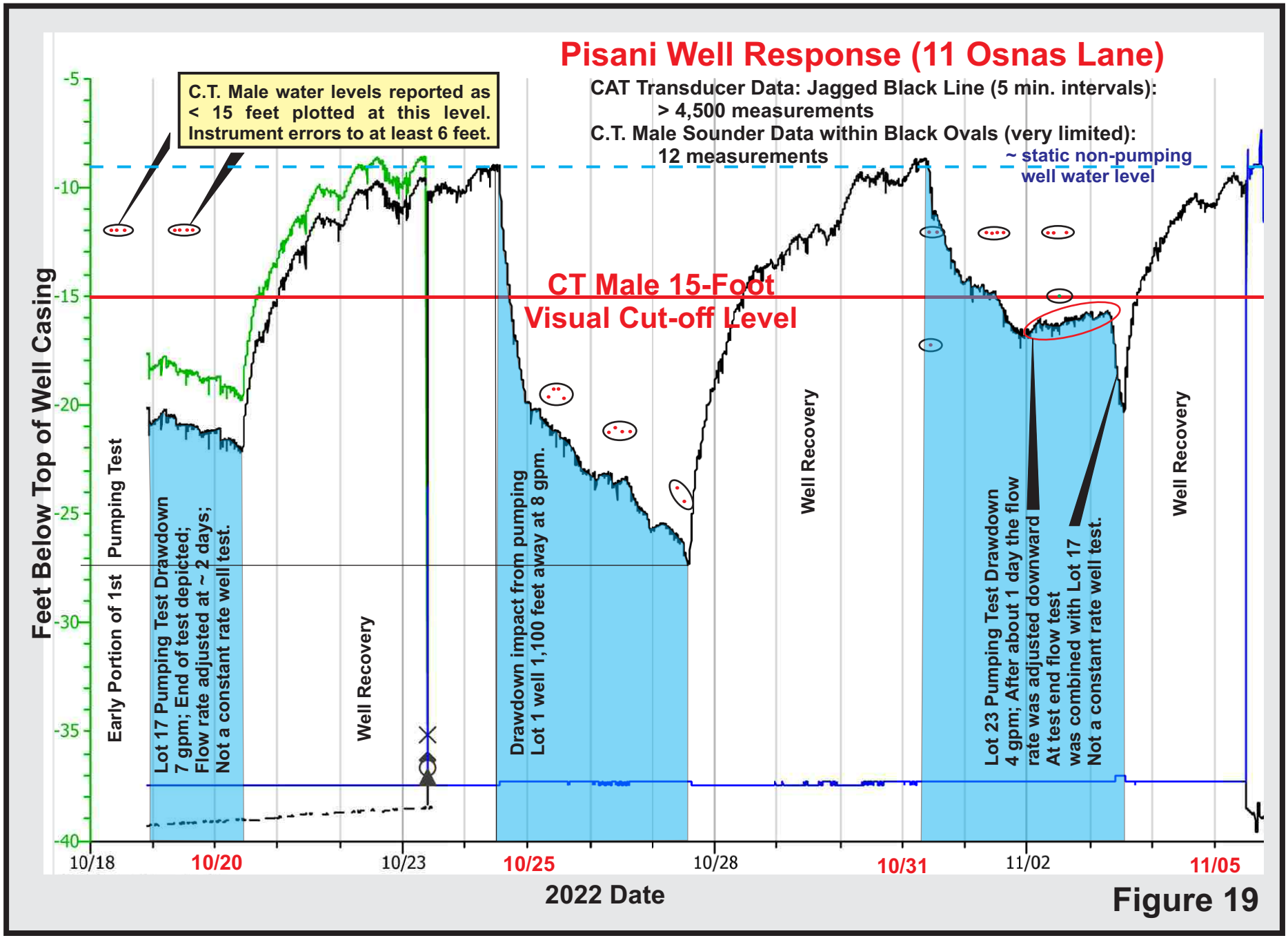
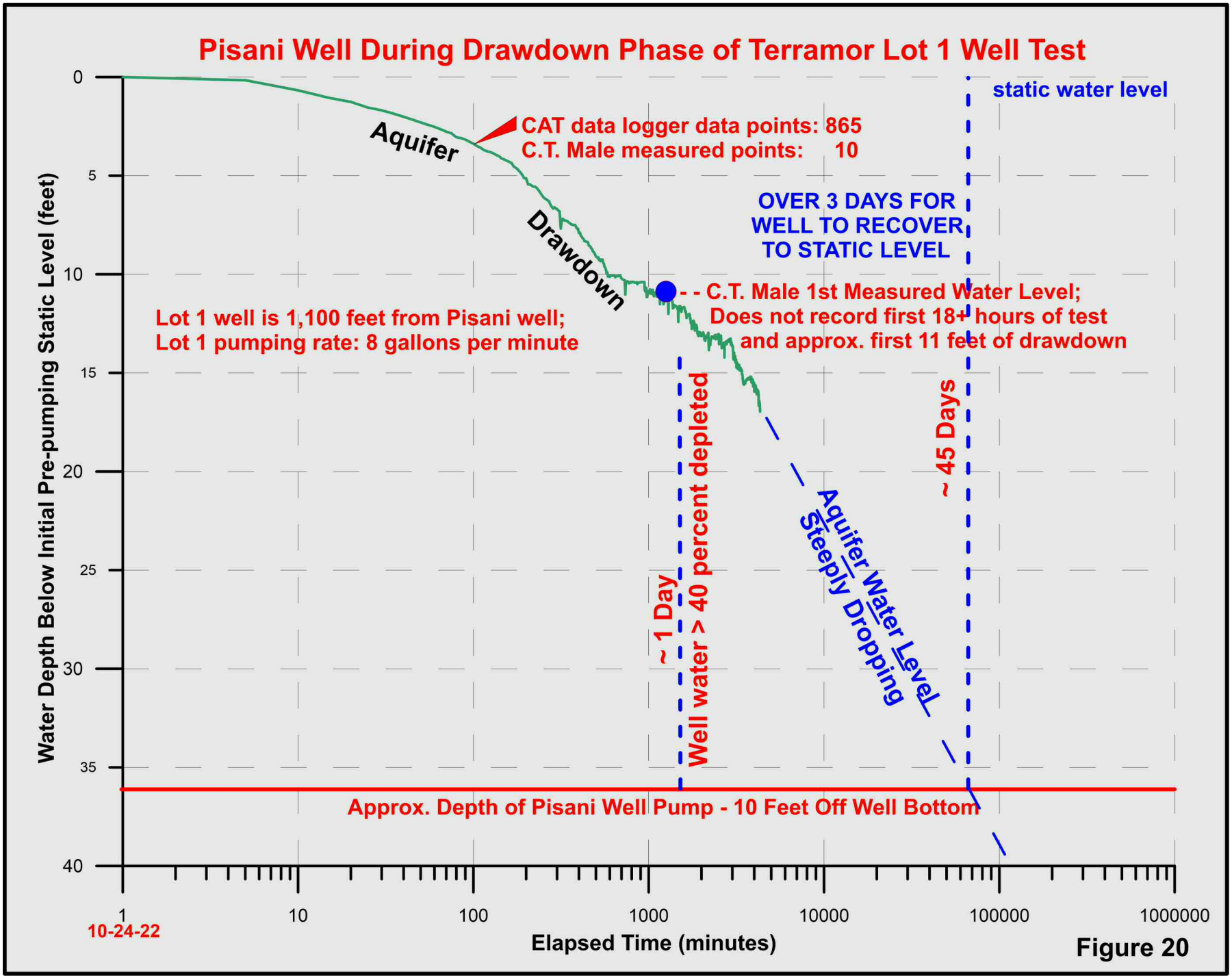

Pisani Well Response (11 Osnas Lane)
CAT Transducer Data: Jagged Black Line (5 min. intervals):
> 4,500 measurements
C.T. Male Sounder Data within Black Ovals (very limited):
12 measurements
C.T. Male water levels reported as < 15 feet plotted at this level. Instrument errors to at least 6 feet.
~ static non-pumping well water level
CT Male 15-Foot Visual Cut-off Level
Feet Below Top of Well Casing
-5
-10
-15
-20
-25
-30
-35
-40
Early Portion of 1st Pumping Test
Lot 17 Pumping Test Drawdown 7 gpm; End of test depicted; Flow rate adjusted at ~ 2 days; Not a constant rate well test.
Well Recovery
Drawdown impact from pumping Lot 1 well 1,100 feet away at 8 gpm.
Well Recovery
Lot 23 Pumping Test Drawdown 4 gpm; After about 1 day the flow rate was adjusted downward At test end flow test was combined with Lot 17 Not a constant rate well test.
Well Recovery
10/18
10/20
10/23
10/25
10/28
10/31
11/02
11/05
2022 Date

Figure 19


Pisani Well During Drawdown Phase of Terramor Lot 1 Well Test
Water Depth Below Initial Pre-pumping Static Level (feet)
0
5
10
15
20
25
30
35
40
static water level
Aquifer
CAT data logger data points: 865
C.T. Male measured points: 10
Drawdown
OVER 3 DAYS FOR
WELL TO RECOVER
TO STATIC LEVEL
- - C.T. Male 1st Measured Water Level;
Does not record first 18+ hours of test
and approx. first 11 feet of drawdown
Lot 1 well is 1,100 feet from Pisani well;
Lot 1 pumping rate: 8 gallons per minute
~ 1 Day
Well water > 40 percent depleted
Aquifer Water Level
Steeply Dropping
~ 45 Days
Approx. Depth of Pisani Well Pump - 10 Feet Off Well Bottom
1
10
100
1000
10000
100000
1000000
10-24-22
Elapsed Time (minutes)
Figure 20

Elder Well (31 Adams Road)

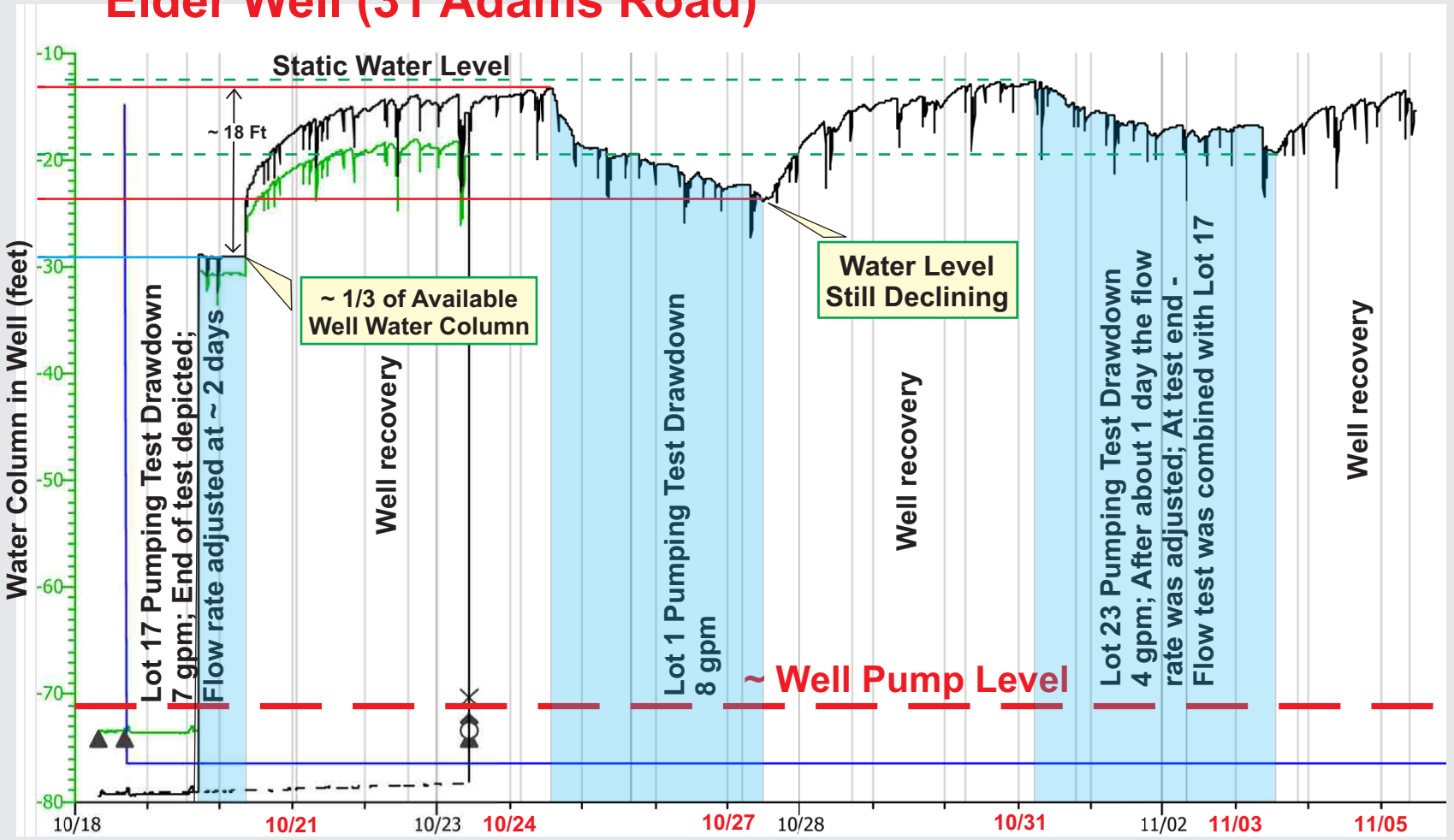


Figure 21

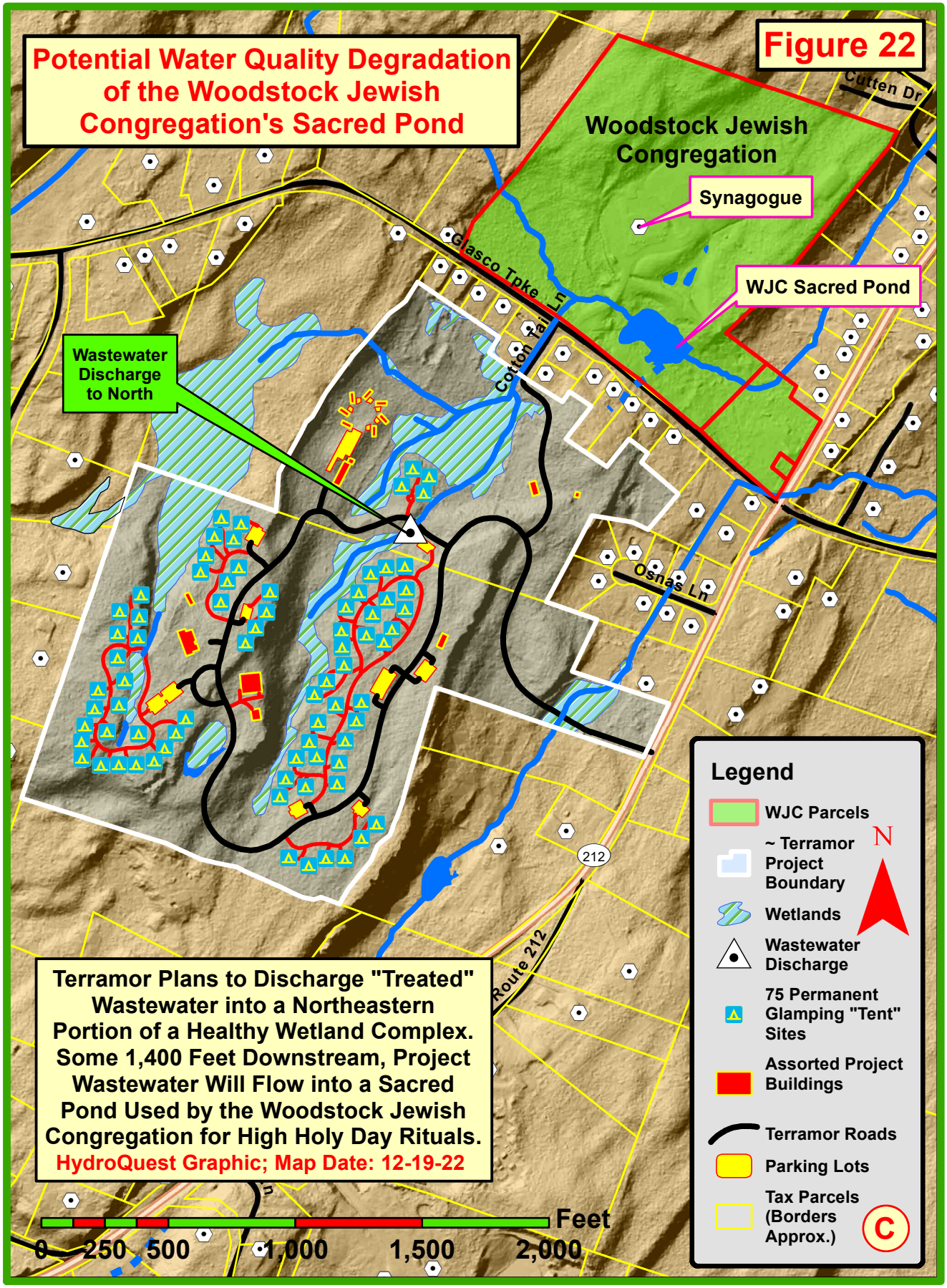


Figure 22
Potential Water Quality Degradation of the Woodstock Jewish Congregation's Sacred Pond
Woodstock Jewish Congregation
Synagogue
WJC Sacred Pond
Cutten Dr
Glasco Tpke
Cotton Tail Ln
Wastewater Discharge to North
Osnas Ln
212
Route 212
Terramor Plans to Discharge "Treated" Wastewater into a Northeastern Portion of a Healthy Wetland Complex. Some 1,400 Feet Downstream, Project Wastewater Will Flow into a Sacred Pond Used by the Woodstock Jewish Congregation for High Holy Day Rituals.
HydroQuest Graphic; Map Date: 12-19-22
Legend
WJC Parcels
~ Terramor Project Boundary
Wetlands
Wastewater Discharge
75 Permanent Glamping "Tent" Sites
Assorted Project Buildings
Terramor Roads
Parking Lots
Tax Parcels (Borders Approx.)
N
C
0 250 500 1,000 1,500 2,000 Feet

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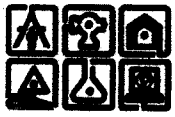


TECHNICAL MEMORANDUM

To: Terramor

From: C.T. Male Associates

Subject: Water Supply, Treatment and Distribution

Date: November 30, 2022

Project: **Terramor – Saugerties, NY**

SUMMARY

This technical memorandum provides the preliminary basis of design for the water system at the proposed Terramor Campground in Saugerties, Ulster County, New York.

DESCRIPTION OF FACILITIES WITH WATER DEMAND

The campground has 4 facility types with a need for water services.

1. Camping Sites
   a. The proposed project consists of 75 campsites with water and wastewater utilities. There are two types of sites: the Woody 35 and the Woody 45 with 45 sites and 30 sites each, respectively.

2. Guest Amenities
   a. The proposed project consists of a Lodge with a lounge area, bar seating and restaurant seating.
   b. The proposed project includes a pool with a cabana including bathrooms and a pavilion.

3. Operational Structures
   a. The proposed development consists of a Welcome Center and Maintenance Building

4. Employee Units

DESIGN WATER DEMANDS

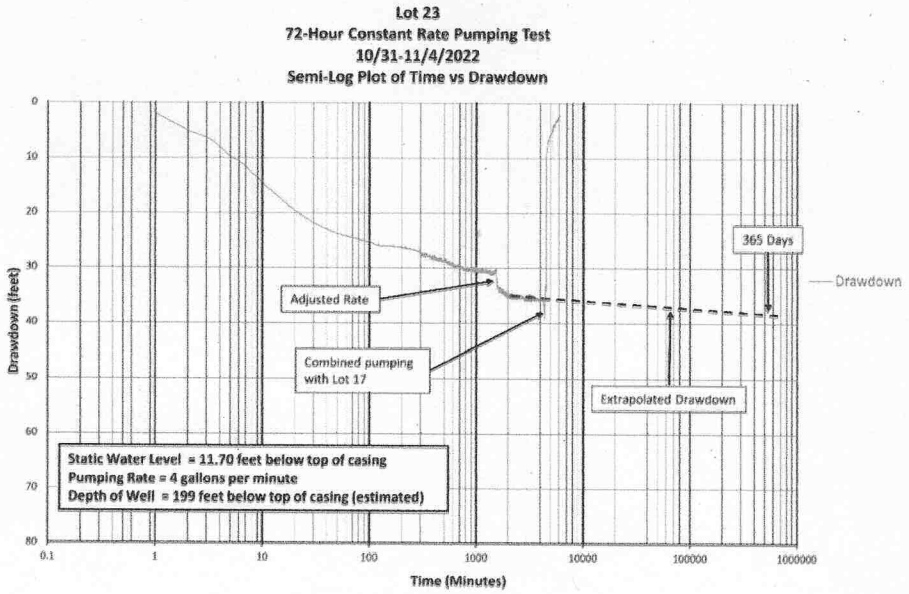
The calculations for the average daily water demands are shown in the table below:

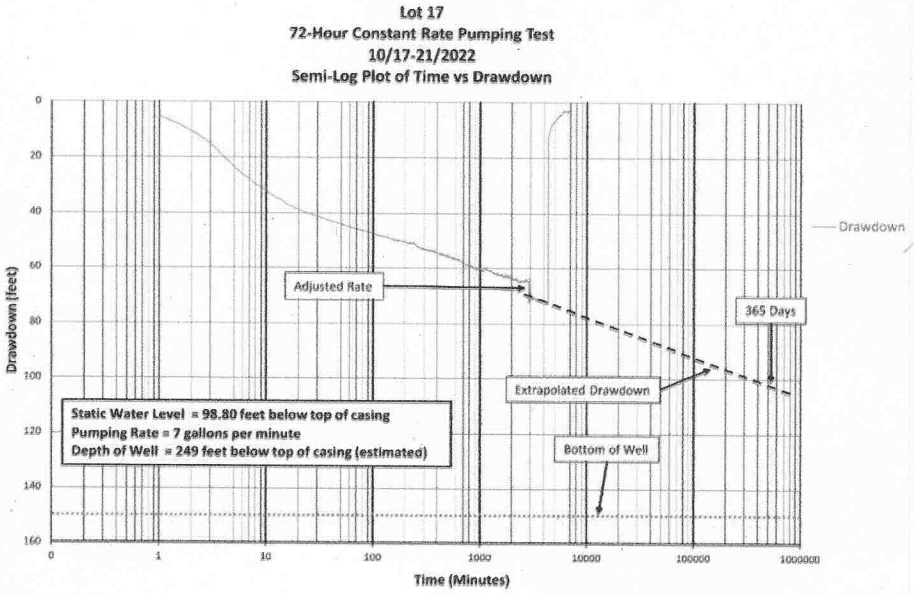
Water Demands and Wastewater Flows - Terramor Outdoor Resorts Saugerties				
	Unit	Quantity	Unit Water Use	GPD
Woody 35 Campsites	Max Occupancy	90	36	3240
Woody 45 Campsites	Max Occupancy	150	36	5400
General Manager's Unit	# Bedrooms	3	110	330
2 SuiteEmployee Units	# Bedrooms	4	110	440
4 Dorm Employee Units	# Workers	24	50	1200
Maintenance Building/Laundry	# Washing Machine	2	580	1160
Lodge - Tabletop	# Seats	40	35	1400
Lodge - Bartop	# Seats	28	20	560
Lodge - Lounge	# Seats	50	20	1000
Non-Residential Employees	# Employees	11	15	165
Total				14895

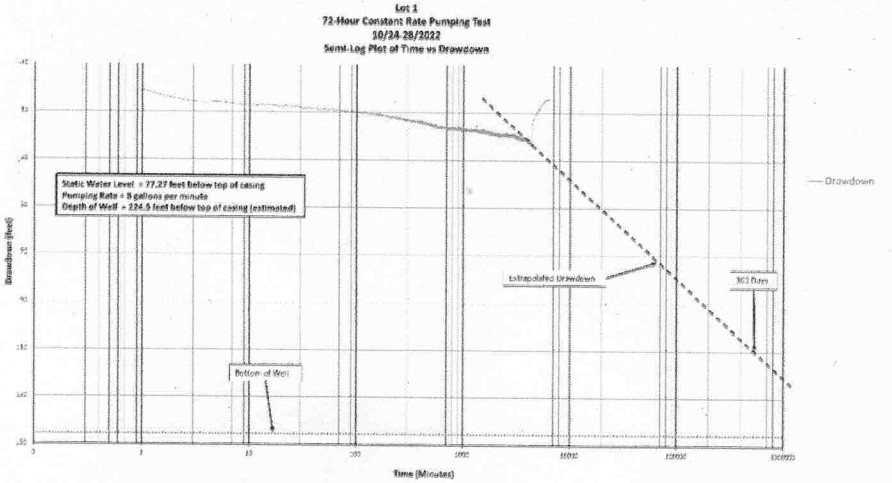
The unit water use per guest of 36 gallons per day was generated from actual water use at another Terramor Resort as recorded in the summer of 2022. The 36 gallons per day per guest water use includes all amenities including employees/employee units, a lodge and a pool. To be conservative, design flows for the amenities at this location (shown above) are calculated in addition to the guest unit water use.

WATER SOURCE

The proposed water sources for the proposed development will be from three of the six existing wells onsite which were originally installed for a development which was never constructed. Step testing and constant rate testing completed in October and November of 2022 suggests that the 3 wells have capacities of 4 GPM (5,760 GPD), 7 GPM (10,080 GPD), and 8 GPM (11,520 GPM). Based on the initial results of the yield testing, these three wells have the capacity to serve the proposed development according to the calculated average daily design flows. The locations of the three proposed well sources can be found on the Water and Wastewater Utility Plans submitted for Site Plan Approval. The water levels recorded during the yield testing is summarized in the charts on the following page.


Lot 23
72-Hour Constant Rate Pumping Test
10/31-11/4/2022
Semi-Log Plot of Time vs Drawdown
Drawdown (feet)
Time (Minutes)
Adjusted Rate
Combined pumping with Lot 17
365 Days
Extrapolated Drawdown
Drawdown
Static Water Level = 11.70 feet below top of casing
Pumping Rate = 4 gallons per minute
Depth of Well = 199 feet below top of casing (estimated)


Lot 17
72-Hour Constant Rate Pumping Test
10/17-21/2022
Semi-Log Plot of Time vs Drawdown
Drawdown (feet)
Time (Minutes)
Adjusted Rate
365 Days
Extrapolated Drawdown
Bottom of Well
Drawdown
Static Water Level = 98.80 feet below top of casing
Pumping Rate = 7 gallons per minute
Depth of Well = 249 feet below top of casing (estimated)



The data shown in the above charts is subject to further review and approval.

IMPACT OF WELL USE ON NEIGHBORING WELLS

During yield testing, the water level in four (4) neighboring wells was monitored to determine if water use on the Terramor site will impact water levels in the wells on the neighboring properties. The table below summarizes the water level recordings of the neighboring wells during each of the three 72-hour yield tests.

Lot 1 72-hour Pump Test - Neighborhood Well Level Monitoring								
	1716 Rout 212*		11 Osnas*		71 Raybrook		109 Cottontail Ln*	
Date	Time	Water Level (ft)	Time	Water Level (ft)	Time	Water Level (ft)	Time	Water Level (ft)
10/25/2022	8:08	<15	8:04	19.50	8:15	28.90	8:23	<15
	10:08	<15	10:02	19.30	10:13	28.00	10:20	<15
	12:11	<15	12:06	19.30	12:17	27.60	12:24	<15
	15:15	<15	15:08	19.60	15:01	27.70	14:56	<15
10/26/2022	8:05	<15	8:08	21.40	8:15	27.10	8:20	<15
	10:03	<15	10:06	21.00	9:54	27..1	10:32	<15
	12:15	<15	12:18	21.20	12:08	27.00	12:21	<15
	15:18	<15	15:15	21.20	15:07	27.40	15:03	<15
10/27/2022	10:00	<15	10:03	23.90	10:10	27.50	10:17	<15
	13:04	<15	13:07	24.60	13:00	27.40	12:56	<15
*<15 feet water level indicates the water level was observed visually due to shallow depth. No significant changes in water level observe								

Lot 17 72-hour Pump Test - Neighborhood Well Level Monitoring								
	1716 Rout 212*		11 Osnas*		71 Raybrook**		109 Cottontail Ln*	
Date	Time	Water Level (ft)	Time	Water Level (ft)	Time	Water Level (ft)	Time	Water Level (ft)
10/17/2022	--	<15	--	<15	--	--	--	--
	11:36	<15	--	<15	--	--	--	<15
10/18/2022	7:36	<15	7:40	<15	9:45	--	8:00	<15
	9:56	<15	9:51	<15	13:16	--	9:40	<15
	13:00	<15	13:11	<15	--	--	13:21	<15
10/19/2022	8:31	<15	8:40	<15	8:48	29.30	8:54	<15
	10:30	<15	10:40	<15	10:46	--	10:51	<15
	12:35	<15	12:40	<15	12:43	--	12:45	<15
	15:29	<15	15:33	<15	15:24	--	15:20	<15
10/20/2022	--	<15	--	<15	--	--	--	<15
	--	<15	--	<15	--	--	--	<15
* <15 feet water level indicates the water level was observed visually due to shallow depth. No significant changes in water level observed								
** Equipment malfunctions resulted in one level recording during testing. Water level was not visible.								

Lot 23 72-hour Pump Test - Neighborhood Well Level Monitoring								
	1716 Rout 212*		11 Osnas*		71 Raybrook		109 Cottontail Ln*	
Date	Time	Water Level (ft)	Time	Water Level (ft)	Time	Water Level (ft)	Time	Water Level (ft)
10/31/2022	9:12	<15	9:17	17.2	9:12	29.10	9:25	<15
	11:14	<15	11:17	<15	11:09	29.10	11:23	<15
	13:16	<15	13:19	<15	13:10	28.90	13:24	<15
11/1/2022	8:30	<15	8:37	<15	8:37	29.30	8:40	<15
	10:22	<15	10:24	<15	10:08	29.30	10:27	<15
	12:25	<15	12:28	<15	12:32	29.20	12:35	<15
	15:11	<15	15:09	<15	15:00	29.30	14:58	<15
11/2/2022	8:26	<15	8:30	<15	8:38	29.70	8:41	<15
	10:17	<15	10:20	<15	10:26	29.70	10:30	<15
	12:19	<15	12:21	15	12:28	29.80	12:32	<15
	15:11	<15	15:14	<15	15:10	29.7	15:07	<15
*<15 feet water level indicates the water level was observed visually due to shallow depth. No significant changes in water level observed								

WELL WATER CONVEYANCE AND TREATMENT

The wells will be equipped with submersible well pumps which will pump the groundwater from the wells to the maintenance building which will house the treatment, disinfection, storage, and pressure maintenance equipment. The well water lines will be HDPE pipeline.

Well water was be collected and sampled per the Ulster County DOH/NYSDOH requirements during the well yield testing to determine the raw water quality. Results of the sampling and water quality testing per NYSDOH requirements determine the final treatment requirements. Analytical results from two of the three wells are attached to this memo. Analytical results from the third well has not been finalized. Results of the testing available at two wells indicate that various forms of filtration will be required to address turbidity, iron, and manganese. The filtered water will be disinfected per the requirements of the NYSDOH/UCDOH. Analytical results for PFOA and PFOS showed detections of the compounds, but at concentrations below the New York State maximum contaminant level.

POTABLE WATER DISTRIBUTION

Potable water will be distributed throughout the proposed development through small

diameter HDPE waterlines. Adequate pressure will be maintained in the distribution system using booster pumps and pressure tanks at the maintenance building.

PERMITTING

The design for the source, treatment and distribution systems will be submitted to the UCDOH for review and approval.