

**DRAFT**

TOWNSHIP OF MOUNT OLIVE

MORRIS COUNTY, NEW JERSEY

AMENDMENT TO THE MASTER PLAN  
LAND USE PLAN ELEMENT - 2003 MASTER PLAN

ADOPTED:

\_\_\_\_\_, 2023

PREPARED BY THE MOUNT OLIVE PLANNING BOARD

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Charles T. McGroarty, P.P., AICP  
License No. 4145

The original of this document has been signed and sealed pursuant to N.J.A.C. 13:41-1.3

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## **I. INTRODUCTION**

This Amendment to the Land Use Element of the Mount Olive Township 2003 Master Plan and Master Plan Reexamination (2003 Master Plan) as adopted by the Mount Olive Planning Board on December 11, 2003 and amended thereafter (2004, 2007, 2010, 2015) modifies Section 5 entitled Master Plan Elements of the 2003 Master Plan, specifically Section 5.1.1 entitled Residential Land Uses and Map No. 11 entitled Land Use Plan to establish a new category of residential land use to be known as the R-8 Residential Zone District.

## **II. PURPOSE OF LAND USE AMENDMENT**

The purpose in establishing a new zone district is to provide a suitable location for affordable housing consistent with the objectives of the Township's Housing Element and Fair Share Plan (HE/FSP). Unlike the R-5ML, R-6, R-7, and FTZ-4/PURD inclusionary districts where a percentage of the total units are reserved for low and moderate-income households, this new R-8 zone will be one hundred percent affordable. This is made possible by the Township acquiring lots 21 and 28 in Block 3203 expressly for this purpose. Both parcels are now vacant (Exhibits 1 and 2, respectively).

## **III. LOCATION OF PROPOSED R-8 RESIDENTIAL ZONE DISTRICT**

The new R-8 category would replace the R-4 zone designation as applied to lots 28 and 21 in Block 3203, otherwise known as 23 and 20 Stonewald Court Drive, respectively. The parcels are located at the terminus of Stonewald Court Drive and Yale Street in the Budd Lake section of the Township (Exhibit 3). Combined, lots 21 and 28 comprise 1.5 acres. The area surrounding the former Cobblestone site is residential in character with lots varying in size, many of which consist of less than the current R-4 standard of 10,000 square feet.



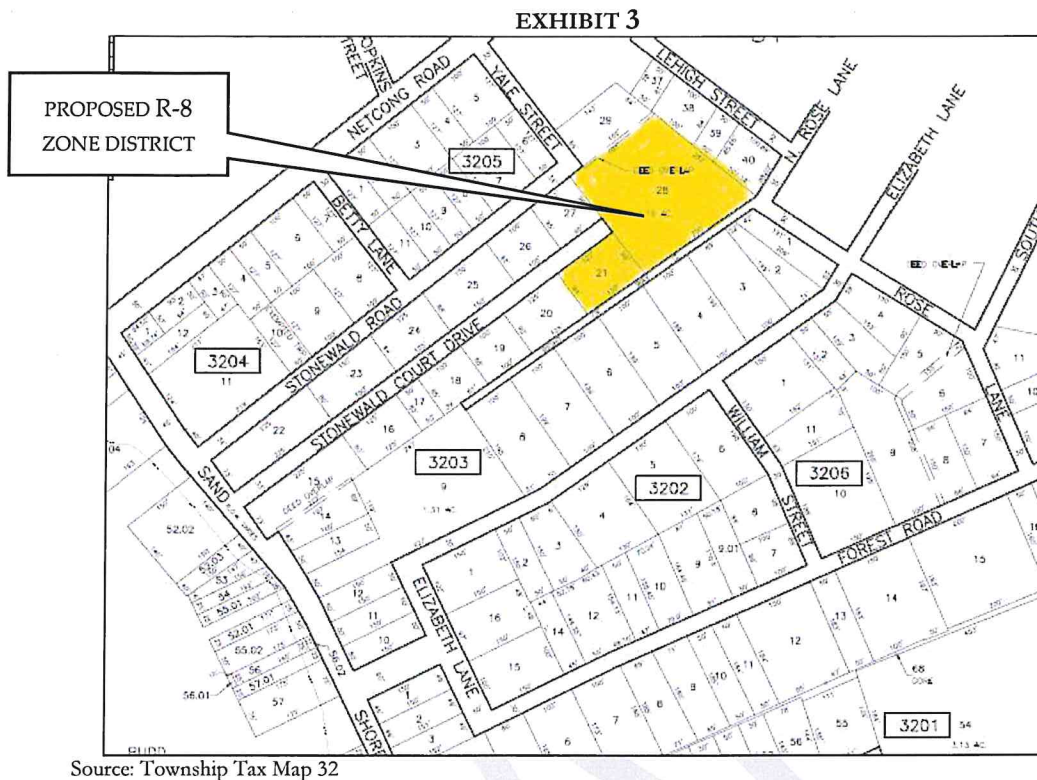
EXHIBIT 1



EXHIBIT 2







#### IV. AREA HISTORY

Lot 28 was the site of the former Cobblestone nursing home. This facility was described in an April 2012 appraisal report as a

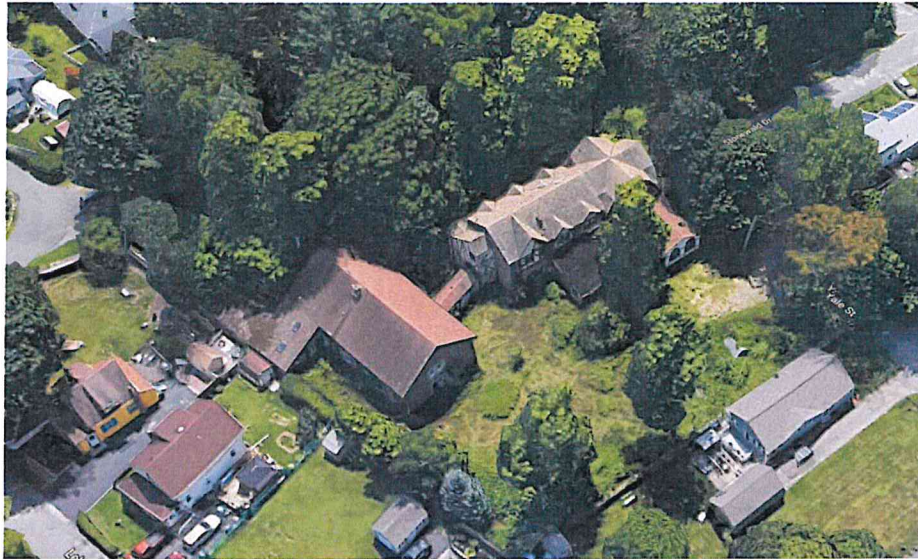
“...convalescent/palliative care facility containing 12,486 ±SF and 61 previously licensed beds (the State of NJ revoked the subject’s license) which has been shut down since March of 2008 per State of NJ regulations and has not been operated since approximately 2007. The improvements were constructed in 1890 and vacant and in fair-poor conditions as of the effective appraisal date.”<sup>1</sup>

Utilizing the Mount Olive Affordable Housing Trust Fund<sup>2</sup>, the Township acquired both properties through eminent domain in July 2015 and subsequently had the structures demolished and an environmental assessment done to prepare the site for redevelopment. An aerial view and photos of the buildings prior to demolition are presented below (Exhibits 4, 5, 6 & 7).

<sup>1</sup> Appraisal of Real Property, Cobblestone Health Care Facility Potential Residential Redevelopment Property 20-23 Stonewald Court Drive Budd Lake, Morris County, New Jersey, Integra Realty Resources, April 12, 2012, page 12

<sup>2</sup> Chapter 550, Article IX.

**EXHIBIT 4**



SOURCE: GOOGLE IMAGE

**EXHIBIT 5**





**EXHIBIT 6**



**EXHIBIT 7**





Amendment to the Master Plan Land Use Plan Element – 2003 Master Plan  
\_\_\_\_\_, 2023

Township Tax Map 32 shows a linear path, 15 feet in width, identified as a Right-of-Way accessed at the intersection of Rose Lane and North Rose Lane and extending westward terminating at Lot 9 otherwise known as 57 Elizabeth Lane (Exhibit 8). This lane appears to be represented on a 1948 plat entitled *Stonwald Court* prepared by F.W. Salmon, C.E. dated January 15, 1948, with the notation: *Now or formerly Mrs. E.C. Oppenheim* which likely served as a connection between the Oppenheim home on Elizabeth Lane and the adjacent land that eventually became Stonwald Court Drive (Exhibit 9).

The Oppenheim lands are shown on a portion of a plat entitled *Stonwald Park Budd Lake, N.J. Mrs. E.C. Oppenheim – Owner*, prepared by F.W. Salmon, C.E. dated March 21, 1921 (Exhibit 10). Although it is not clear the right-of-way was ever officially recorded, this pathway remains in place and will continue undisturbed by any development in the proposed R-8 zone district (Exhibit 11). It is unclear when the spelling of the street was modified to read: Stonewald.

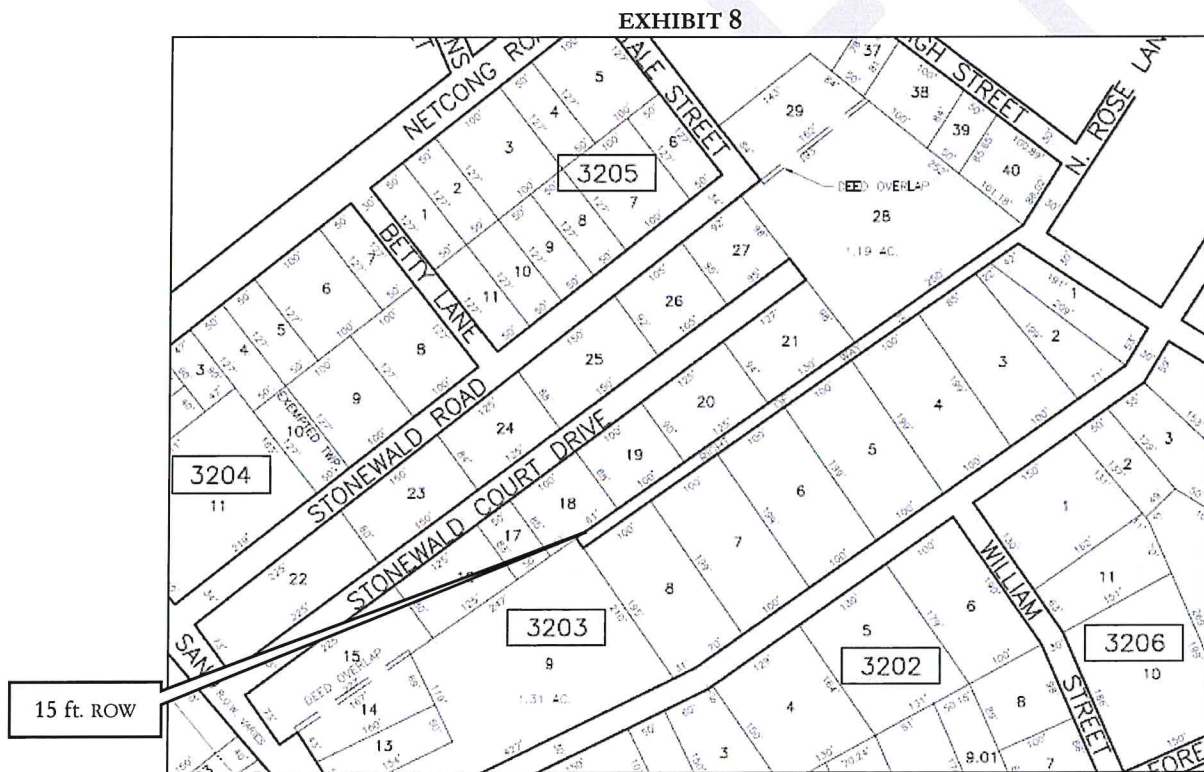


EXHIBIT 9

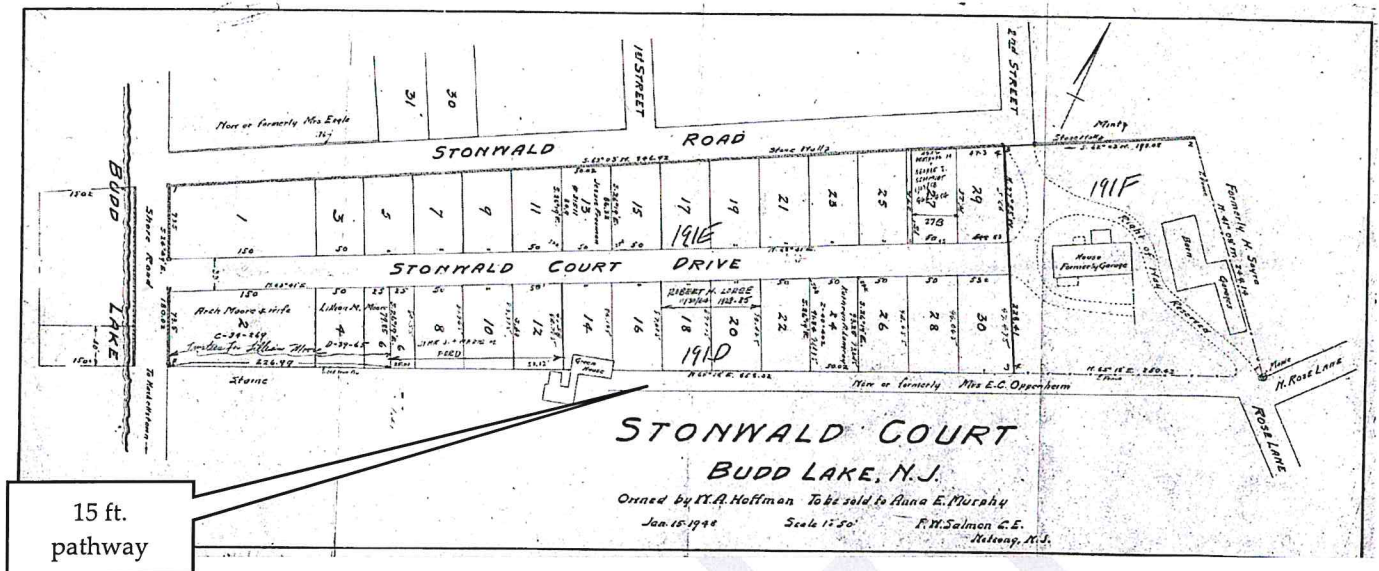
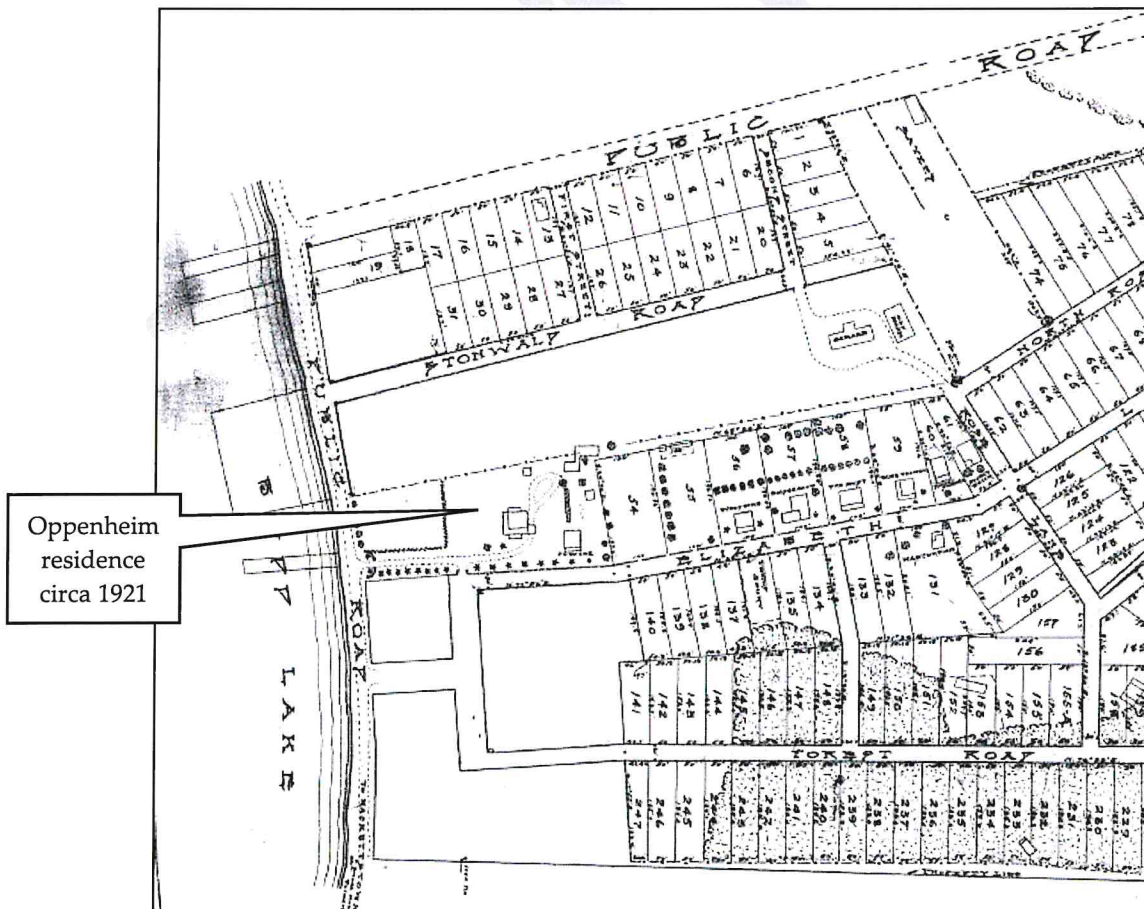
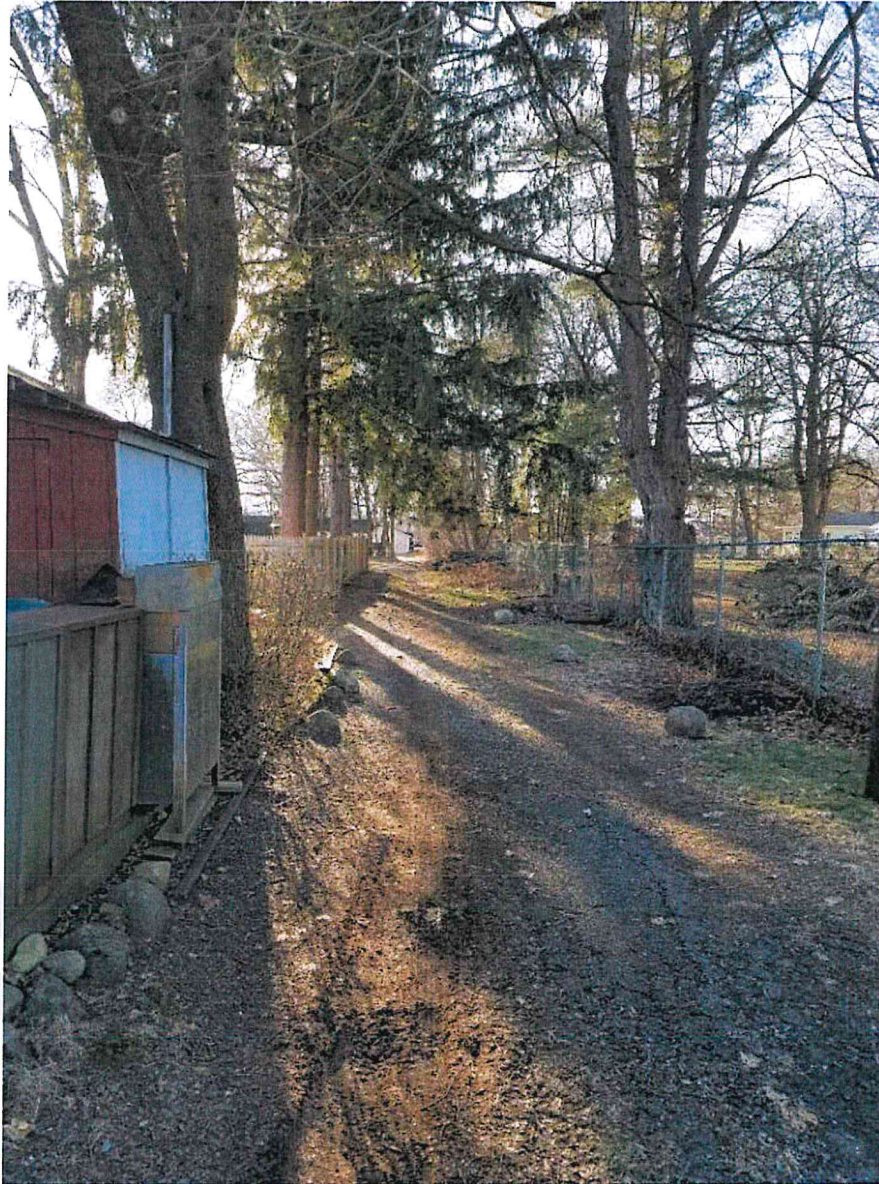


EXHIBIT 10





**EXHIBIT 11**



**VIEW WEST OF RIGHT-OF-WAY  
ROSE LANE / NORTH ROSE LANE  
LOTS 21 & 28 TO RIGHT OF CHAIN LINK FENCE**



**V. CONSISTENCY WITH THE MOUNT OLIVE 2003 MASTER PLAN AND 2017 HOUSING ELEMENT & FAIR SHARE PLAN**

The 2003 Master Plan and Master Plan Reexamination report acknowledged the substantive certification of the Township's second round Housing Element in 1996 with a recommendation to continue compliance mechanisms, as follows:

Continue proposals in Housing Plan that received substantive certification from the New Jersey Council on Affordable Housing (COAH) and monitor new requirements as they are published to maintain compliance in the next round.<sup>3</sup>

That “next round” was characterized by significant changes in rules and procedures summarized in the Township's December 2017 Third Round HE/FSP as follows:

This Housing Plan Element has been prepared in accordance with the Municipal Land Use Law, specifically N.J.S.A. 40:55D-28b(3), to address Mount Olive Township's cumulative housing obligation for the period commencing in 1987 and extending to June 30, 2025. This Plan has also been prepared pursuant to the New Jersey Fair Housing Act (N.J.S.A. 52:27D-310 et seq.) which outlines the mandatory requirements for a Housing Plan Element, including an inventory and projection of the municipal housing stock; an analysis of the demographic characteristics of the Township's residents and a discussion of municipal employment characteristics. As required by the New Jersey Fair Housing Act, municipalities that choose to enact and enforce a zoning ordinance are obligated to prepare a Housing Element as part of the community's Master Plan.

The Mount Olive Planning Board adopted its second round Housing Element and Fair Share Plan on July 18, 1996. As noted in that document, the Plan “...is an update of the Housing Element and Fair Share Plan last prepared and adopted as a part of the Master Plan in August 1986. That document reflected the fact that the township had reached a settlement with the Public Advocate in its affordable housing litigation and that settlement agreement, approved by the Court, provided the township with a six year period of repose. Repose expired in mid-1991. This document

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<sup>3</sup> 2003 Master Plan and Master Plan Reexamination, prepared by Robert A. Michaels, P.P., AICP, adopted December 11, 2003, Section 4.0 Goals and Objectives, 4.2 Housing Plan, p. 42

provides a basis for petitioning COAH for substantive certification to cover the period 1987 through 1989.” [Housing Element and Fair Share Plan, prepared by John J. Lynch, PP/AICP]

Subsequent to adoption of the HE/FSP, the Township was subject to a “builders remedy” lawsuit in 1997 which was dismissed by the Court on February 4, 1999. Later that year, on September 1, 1999 COAH granted substantive certification for Mount Olive’s HE/FSP.

The Township adopted its third round HE/FSP on November 10, 2005 addressing the cumulative obligation from 1987 through 2014 and, with authorization from the Township Council, submitted the HE/FSP with a petition for substantive certification to COAH on December 2, 2005. COAH staff issued comprehensive report on the HE/FSP on August 17, 2006 and the Planning Board then revised the Plan in accordance with that report and adopted an amended third round HE/FSP on October 19, 2006 which, in turn, was resubmitted to COAH on November 9, 2006. COAH’s review found the revised HE/FSP satisfactory and scheduled it for the Council’s public hearing of February 14, 2007 for approval but, in an unfortunate bit of timing, the Appellate Division decision on January 25, 2007 invalidated key components of N.J.A.C. 5:94 and N.J.A.C. 5:95 thus putting a stay on all pending petitions for substantive certification.

In response to modified third round rules (N.J.A.C. 5:96 and N.J.A.C. 5:97) adopted by COAH in June 2008, the Mount Olive Planning Board adopted a Housing Element and Fair Share Plan on September 17, 2009. Authorization was then granted by the Mount Olive Township Council for submittal to COAH, again with a petition for Substantive Certification on November 5, 2009. Receipt of the Township’s petition was acknowledged by COAH on January 8, 2010.

In a decision issued on October 8, 2010 the Appellate Division invalidated a number of provisions in N.J.A.C. 5:97 including its central component, the “growth share” methodology; a decision later upheld by the New Jersey Supreme Court on September 26, 2013. COAH again drafted revised third round rules (N.J.A.C. 5:98 Procedural and N.J.A.C. 5:99 Substantive) which were to apply to a period commencing on November 17, 2014, however; COAH deadlocked on a vote to officially adopt the most recent version of the third round rules at their October 20,

2014 meeting, which resulted in the March 15, 2015 decision by the N.J. Supreme Court [In re Adoption of N.J.A.C. 5:96 & 5:97 by N.J. Council on Affordable Housing] to remove COAH from the process and placing jurisdiction back with the courts.

Mount Olive has agreed to terms with the Fair Share Housing Center [FSHC] as reflected in the Settlement Agreement scheduled for a Final Judgment of Compliance hearing on January 12, 2018. This Settlement Agreement which is dated July 20, 2017 and attached hereto as Appendix A, requires the acceptance of the present and prospective affordable housing obligation numbers as calculated by FSHC's expert, David Kinsey, PhD. While the Township does not endorse the methodology nor conclusions of Dr. Kinsey's report, Mount Olive nonetheless agrees to the present and prospective need obligation as set forth therein in order to resolve this matter. Mount Olive has continuously worked to provide opportunities to address its low and moderate income housing obligation and finds the Settlement Agreement in accordance with this objective. Accordingly, the new Fair Share Plan for Mount Olive Township addresses the following affordable housing obligation:

- Prior Round (1987-1999) 45
- Prospective Need (2014-2024) 634
- Present Need (Rehabilitation) 139
- Total Obligation 818<sup>4</sup>

As part of the strategy to address its prospective need obligation, the Cobblestone site was included with a projected build-out of ten affordable units.<sup>5</sup>

## **VI. AFFORDABLE HOUSING OBJECTIVES**

The proposed R-8 district will implement one of the objectives set forth in the Township's Third Round Housing Element and Fair Share Plan, adopted on December 21, 2017 by the Mount Olive Planning Board, endorsed by the Township Council on January 16, 2018 and granted judicial approval on March 16, 2018 by Hon. Maryann L. Nergaard, J.S.C. to transform the former Cobblestone nursing

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<sup>4</sup> Mount Olive Township Housing Element & Fair Share Plan, December 21, 2017, prepared by Charles T. McGroarty, P.P., AICP, pp. 4-6

<sup>5</sup> *Ibid.* p. 17



home property to a municipally sponsored one hundred percent affordable housing site. As early as 2013 the Mount Olive Planning Board identified the Cobblestone site as an opportunity to do in-fill housing to address, in part, the Township's third round affordable housing obligation as set forth in a Reexamination Report at that time which read as follows:

1. Cobblestone

The Township of Mount Olive, in its effort to provide opportunities for affordable housing, intends to partner with Homeless Solutions, Inc., a non-profit organization which specializes in the development and management of affordable housing to acquire and develop lots 21 and 28 in Block 3205\* (hereinafter referred to as the Cobblestone site) to redevelop the tract with 15-to-20 units as a municipally sponsored 100 percent affordable housing project pursuant to N.J.A.C. 5:97-6.7. The Township has committed up to \$950,000 from its Affordable Housing Trust Fund to ensure the success of this endeavor.

Acquisition of former nursing home site located on Lot 28 in Block 3205\* and Lot 21, a contiguous undeveloped parcel, provides such an opportunity. The former nursing home has been closed for a number of years. The deteriorated condition of the building and grounds represents a blighted condition upon the surrounding residential neighborhood of single family homes. Combined lots 21 and 28 comprise approximately 1.5 acres and are located within the Budd Lake sanitary sewer service area thus enhancing the potential for residential redevelopment. The importance of acquiring and utilizing the properties in question for affordable housing is magnified by the impact of the Highlands Water Protection and Planning Act (P.L. 2004, C. 120) in Mount Olive wherein 80 percent of the Township now falls within the extremely restrictive Preservation Area which essentially prohibits the type of development envisioned here. As a consequence of the Highlands Act, the Township must utilize lands within the remaining 20 percent of the municipality within the less restrictive Planning Area – including the properties in question – to address the lion's share of its affordable housing obligation.

As part of its compliance with COAH's regulations to achieve substantive certification, Mount Olive has also prepared a Spending Plan and a development fee ordinance, approved by COAH and adopted by the Township Council in August 1999 to create a dedicated revenue source for affordable housing. On June 14, 2012, COAH

approved an amended Spending Plan submitted by Mount Olive for the purpose of committing \$1.2 million from the Township's Affordable Housing Trust Fund to various projects. Included in this amended Spending Plan is a commitment of \$750,000 for acquisition and preparation (demolition of existing structures, soils analysis, well testing, etc.) of the Cobblestone site and to supplement other funding sources available to Homeless Solutions, Inc. in order to develop the affordable units and supporting infrastructure. An additional \$200,000 has also been committed to this project to satisfy COAH's "affordability assistance" assistance for low and very low income unit requirements in accordance with N.J.A.C. 5:97-8.8.<sup>6</sup>

**[\* The correct Block designation is 3203]**

At the time of the 2013 Reexamination report the Township anticipated that Homeless Solutions, a nonprofit organization, would be the entity to develop the site with some 15-to-20 units in a townhouse configuration. For various reasons Homeless Solutions was not able to proceed with the project resulting in the selection of Morris Habitat for Humanity given their experience in the affordable housing sector. After a number of meetings between Habitat for Humanity and the Planning Board Master Plan Committee, assisted by the Township's planner, consultant engineer, business administrator and representatives from the departments of Public Works and Police, the concept of single-family, detached dwellings on fee simple lots emerged as the best option.

**VII. NEW JERSEY HIGHLANDS STATUS**

Mount Olive Township is located within the New Jersey Highlands Region. The parcels in question, lots 21 and 28 in Block 3203 are situate in the Highlands Planning Area portion of the municipality which is not subject to the restrictive controls imposed by the Highlands Water Protection and Planning Act and N.J.A.C.7:38. The proposed R-8 zone, like the surrounding R-4 zone falls within the Budd Lake Sanitary Sewer Service Area thus enabling central sewer connections to the proposed R-8 zone.

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<sup>6</sup> Periodic Reexamination Report of the Master Plan and Development Regulations June 20, 2013, prepared by Charles T. McGroarty, P.P., AICP pp. 31-33.

**VIII. CONSISTENCY WITH THE MUNICIPAL LAND USE LAW**

The proposed R-8 zone district will achieve multiple land use planning purposes as set forth in the Municipal Land Use Law (N.J.S.A. 40:55D-2). These are as follows:

**a. To encourage municipal action to guide the appropriate use or development of all lands in this State, in a manner which will promote the public health, safety, morals, and general welfare**

The purchase of lots 21 and 28 by the Township and the demolition of the vacant and dilapidated buildings removed an attractive nuisance that was a blight on neighboring residential properties. By establishing this area to provide one hundred percent municipally sponsored affordable housing, the Township has taken the initiative to utilize one of the recognized mechanisms to generate affordable housing in New Jersey. The removal of vacant buildings to redevelop the site for affordable housing promotes the public health, safety, morals and general welfare.

**e. To promote the establishment of appropriate population densities and concentrations that will contribute to the well-being of persons, neighborhoods, communities and regions and preservation of the environment**

The proposed R-8 zone anticipates a maximum of ten residential lots at minimum lot size of 5,000 sq. ft. with appropriate setbacks and coverage requirements to ensure adequate light, air and open space. The density for this ten-lot development equates to 6.6 units per acre, slightly above the 4 units per acre of adjacent R-4 district yet in character with the established development pattern.

**f. To encourage the appropriate and efficient expenditure of public funds by the coordination of public development with land use policies**

The Township has prudently applied funding to acquire and prepare this site for the proposed affordable housing through its Affordable Housing Trust Fund established to provide financial support for this type of endeavor.

**g. To provide sufficient space in appropriate locations for a variety of agricultural, residential, recreational, commercial and industrial uses and open space, both public and private, according to their respective environmental requirements in order to meet the needs of all New Jersey citizens**



The proposed R-8 zone recognizes the established neighborhood character of single family homes and provides a suitable in-fill grouping of new homes on appropriate sized parcels within this vacant 1.5 acre tract. It is located outside the restrictive Highlands Preservation Area, is accessible by existing public streets, and will be served by the Township's Budd Lake sanitary sewerage system.

**i. To promote a desirable visual environment through creative development techniques and good civic design and arrangement**

Habitat For Humanity's professionals have extensive experience with such infill projects using their portfolio with varied architectural features such as gabled roofs and open porches to ensure an aesthetically appealing addition to the existing neighborhood fabric as illustrated in examples shown in Exhibit 12.

**EXHIBIT 12**



**FRONT ELEVATION**

SCALE: 1/4" = 1'-0"



**PROPOSED FRONT ELEVATION ALTERNATE A**

SCALE: 1/4" = 1'-0"



**PROPOSED FRONT ELEVATION 2 BEDROOM**

SCALE: 1/4" = 1'-0"





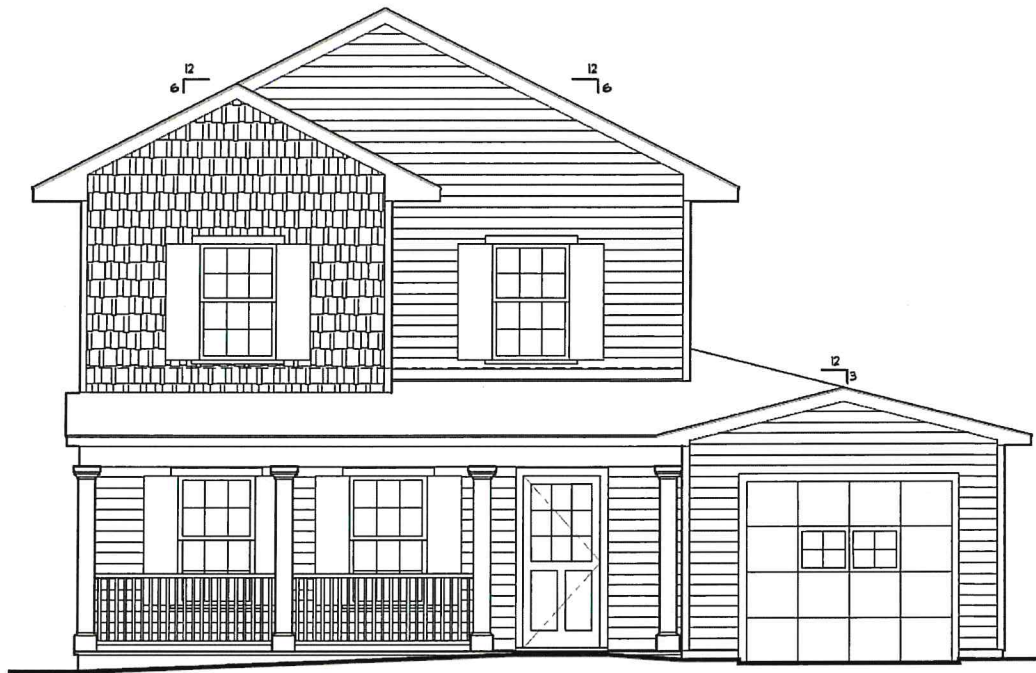
**PROPOSED FRONT ELEVATION ALTERNATE B**

SCALE: 1/4" = 1'-0"



**PROPOSED FRONT ELEVATION ALTERNATE C**

SCALE: 1/4" = 1'-0"



**PROPOSED FRONT ELEVATION ALTERNATE C**

SCALE: 1/4" = 1'-0"

Source: Habitat for Humanity

**m. To encourage coordination of the various public and private procedures and activities shaping land development with a view of lessening the cost of such development and to the more efficient use of land**

The efforts by the Township to redevelop 1.5 acres of previously underutilized land within one of the oldest residential neighborhoods in Mount Olive in partnership with Habitat for Humanity creates an opportunity to employ both land and funding in a productive, efficient manner.

#### **IX. PROPOSED DEVELOPMENT STANDARDS AND CONDITIONS**

This proposed R-8 zone will allow for single family detached dwellings restricted to income-qualified low and moderate-income households. The units will be deed-restricted accordingly. Each lot will have a minimum area of 5,000 sq. ft. (0.11 ac.) with 45 feet of street frontage and related bulk requirements to ensure appropriate setbacks, land coverage and the like (Exhibit 13).



**EXHIBIT 13**

Minimum lot area (sq. ft.)	5,000 sq. ft.
Lot width	45 ft.
Lot depth	70 ft.
<b>Principal building setbacks</b>	
Front yard	20 ft.
Side yard (each)	8 ft.
Rear yard	25 ft.
<b>Accessory structure setbacks</b>	
Front lot line	60 ft.
Side yards (each)	5 ft.
Rear yard	5 ft.
Maximum height (principal structure)	35
Maximum height (accessory structure)	12 ft.
Maximum building coverage	30 percent
Maximum total impervious coverage	40 percent

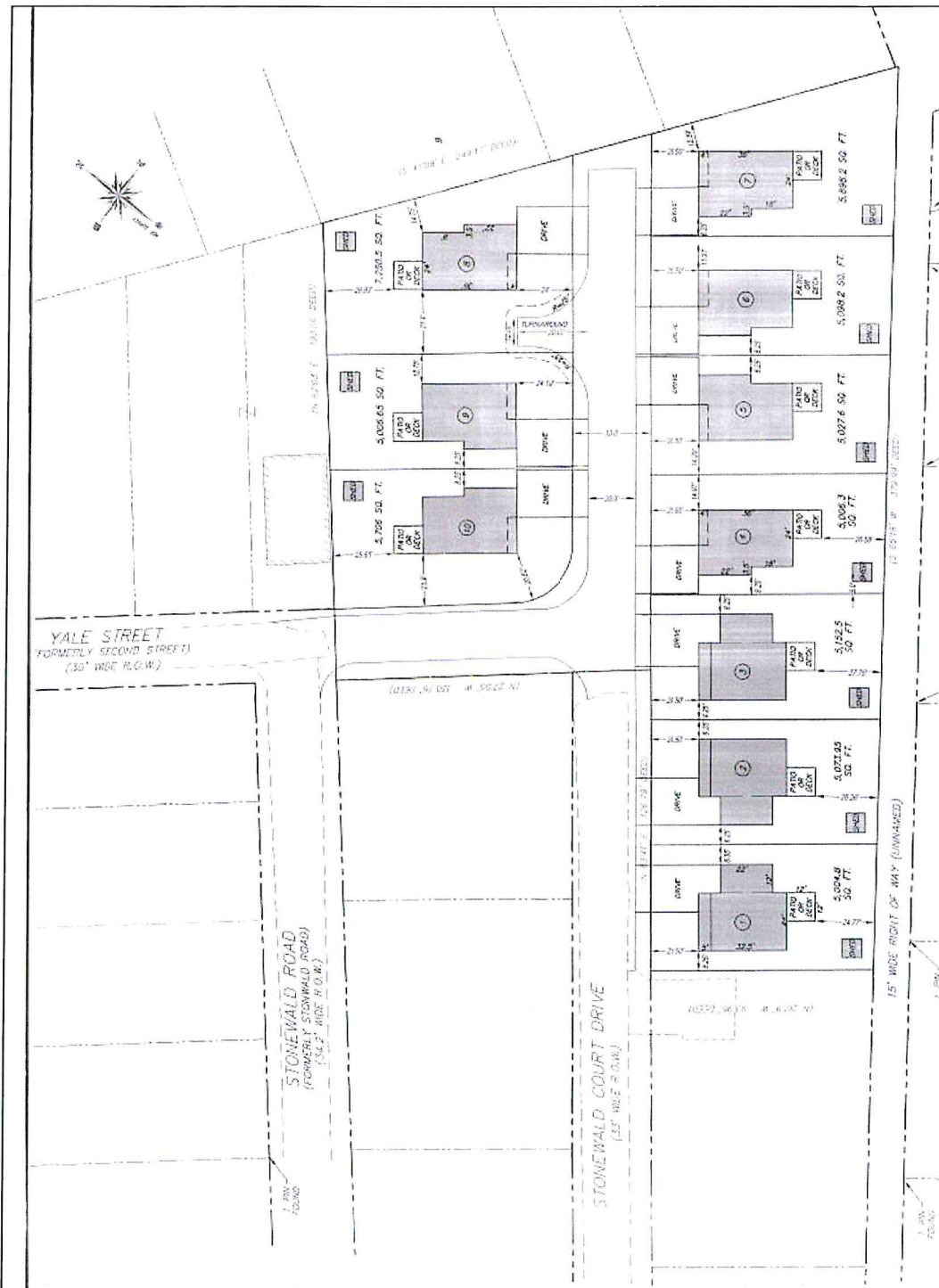
To implement better traffic circulation in this area, Stonewald Court Drive should be extended into the tract to allow for a conforming turn-around configuration. The expanded street should likewise connect with Yale Street to provide both ingress and egress from Netcong Road as well as Stonewald Court Drive (Exhibit 14).

The former nursing home was served by several on-site wells for potable water. To ensure that a change to ten individual wells will not present a problem for service to the new homes nor interfere with existing wells in proximity to the proposed development site, the Township engaged the services of a professional hydrogeologist to provide an analysis. The report, prepared by Matthew J. Mulhall, P.G. of M<sup>2</sup> Associates Inc., determined that water supply to ten individual residential lots will not be a problem and there will be no adverse impact to neighboring wells. Mr. Mulhall's complete report is included herein as Appendix A. The study's conclusion is as follows:

Based on the data collected during the 2017 hydrogeologic evaluation, it can be concluded within a reasonable degree of scientific certainty that using private on-lot wells to meet the water-supply demands of the 10 single-family homes will not result in adverse impacts to natural resources or other users of the same aquifer systems encountered beneath Block 3203 Lots 21 and 28.<sup>7</sup>

<sup>7</sup> Hydrogeologic Evaluation of Block 3202 Lots 21 and 28, Mount Olive Township Morris County, New Jersey prepared by Matthew J. Mulhall, P.G. M2 Associates Inc., dated March 17, 2023, page 21.

EXHIBIT 14



Source: *Concept Plan "C" for 20 & 23 Stonewald Court Drive Lots 21 & 28 Block 3203*, prepared by Alfred A. Stewart, Jr. of Stewart Surveying & Engineering, LLC, dated September 30, 2022.



**X. CONCLUSION**

The proposed R-8 zone district will provide a maximum of ten single family homes exclusively for qualified low and moderate income households. This will achieve a long-standing objective to provide a variety of affordable housing options within the Township. Redevelopment of the former Cobblestone site will specifically fulfill one of the aims of the June 2013 Master Plan Reexamination Report, the December 2017 Housing Element & Fair Share Plan and its attendant approved Spending Plan.

This new zone represents the culmination of efforts to remove the vacant buildings and eliminate the deleterious conditions left in the wake of the former nursing home's abandonment of the site to prepare the way for well designed in fill development.

**APPENDIX A**

DRAFT





**HYDROGEOLOGIC EVALUATION OF  
BLOCK 3203 LOTS 21 AND 28,  
MOUNT OLIVE TOWNSHIP  
MORRIS COUNTY, NEW JERSEY**

**MARCH 17, 2023**

Prepared for:

Chuck McGroarty, PP, AICP  
Director of Planning  
Mount Olive Municipal Building  
204 Flanders-Drakestown Road  
Mount Olive, New Jersey 07828

Prepared by:

A handwritten signature in blue ink, which appears to read 'Matthew J. Mulhall'. The signature is fluid and cursive, with the first and last names being more prominent.

Matthew J. Mulhall, P.G.

M<sup>2</sup> Associates Inc.  
56 Country Acres Drive  
Hampton, New Jersey 08827  
(908) 238-0827



**HYDROGEOLOGIC EVALUATION OF  
BLOCK 3203 LOTS 21 AND 28,  
MOUNT OLIVE TOWNSHIP  
MORRIS COUNTY, NEW JERSEY**

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## APPENDIX

### A. Well Records



## **HYDROGEOLOGIC EVALUATION OF BLOCK 3203 LOTS 21 AND 28, MOUNT OLIVE TOWNSHIP MORRIS COUNTY, NEW JERSEY**

### **INTRODUCTION**

M<sup>2</sup> Associates Inc. was retained on February 21, 2023, by Mount Olive Township to conduct a hydrogeologic evaluation of the properties currently listed as Block 3203 Lots 21 and 28 also known as the Cobblestone Village site. The Township is proposing with Habitat for Humanity to construct 10 single-family homes on 5,000 ft<sup>2</sup> lots. Lots 21 and 28 currently encompass 13,362 and 52,509 ft<sup>2</sup>, respectively.

In October 2017, M<sup>2</sup> Associates completed a hydrogeologic evaluation of Block 3203 Lots 21 and 28 as part of the Cobblestone Village Project. The 2017 evaluation was conducted to determine the feasibility of using on-site wells to provide water to 20 new multi-family affordable housing residential units. In lieu of constructing the 20 multi-family units, the Township will construct 10 single-family units.

### **SITE CONDITIONS**

#### **LOCATION**

Block 3203 Lots 21 and 28 are located along Stonewald Court Drive in the Budd Lake section of Mount Olive Township. These two lots combined are referenced herein as the site. The site location is shown on Figure 1.

Figure 2 is a mosaic of 2020 aerial photographs obtained from the New Jersey Geographic Information Network (NJGIN) depicting the site and surrounding properties. The former Cobblestone Village residential health care facility and associated buildings are observable on the aerial photographs.

#### **GEOLOGY**

Stanford (2011) indicates that with the exception of a small (approximately 415 ft<sup>2</sup>) section in the northern corner of Lot 28, the site is underlain Glacial Lake Hopatcong deposits. These Late Wisconsinan (75,000 to 11,000 years ago) sand, gravel, pebble, and boulder deposits outcrop along the northern shore of Budd Lake. Based on Stanford's (2011) mapping, the coarse-grained Glacial Lake Hopatcong deposits may extend to 80 feet below ground surface. These coarse-grained sediments are underlain by silt, fine-grained sand, with clay deposited earlier in Glacial Lake Hopatcong. Beneath the sediments deposited in Glacial Lake Hopatcong, sand and gravel deposited during the Illinoian (191,000 to 130,000 years ago) glaciation have been mapped. These thick glacial deposits can yield large quantities of water directly or indirectly to a well.



Figure 1: Location of Block 3203 Lots 21 and 28, Mount Olive Township, New Jersey.

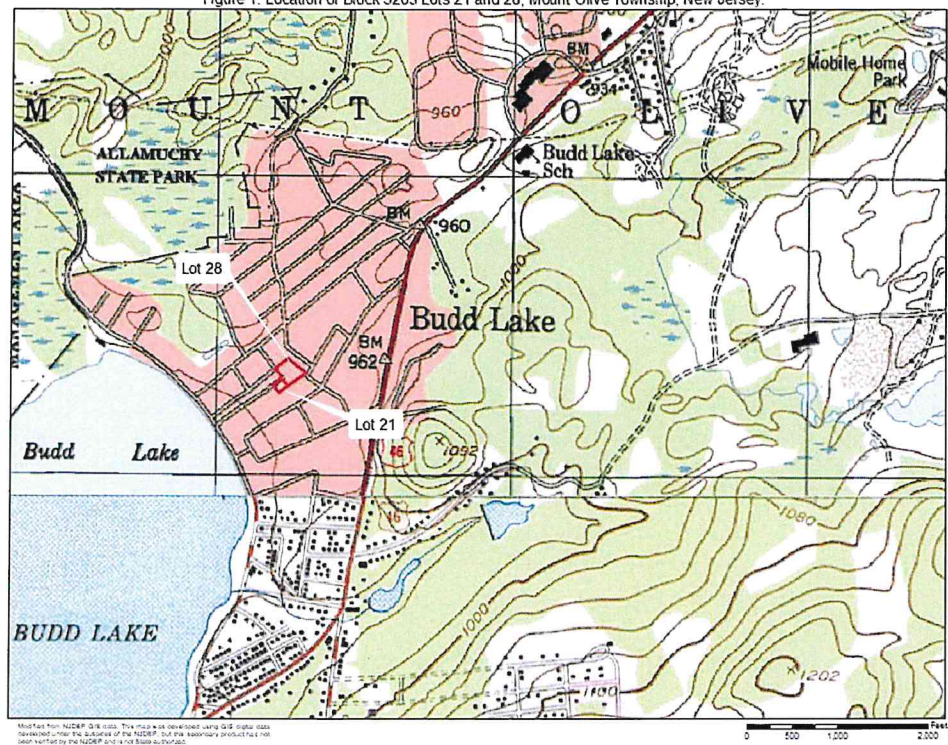


Figure 2: 2020 Aerial Photographs of Block 3203 Lots 21 and 28, Mount Olive Township, New Jersey.





NJGS mapping of bedrock topography indicates that the top of consolidated rock beneath the site may be 150 to more than 200 feet below ground surface. As mapped by Volkert (2018), bedrock beneath the site is Precambrian pyroxene granite. The pyroxene granite is part of the Mesoproterozoic (1.6 to 1 billion years ago) Lake Hopatcong Intrusive Suite, and is described as medium- to coarse-grained, green-gray granite.

## 2017 EVALUATION

### WELL CONSTRUCTION

The 2017 plan for the site was for the construction of 20 multi-family units. This plan would require the installation of a public community water-supply well as defined and regulated by New Jersey Department of Environmental Protection (NJDEP). The well installed and used to supply water to the residential health facility on the property was installed in 1944. Given the age and construction of this well, it could not be used as a public community water-supply well. Reportedly, the 6-inch diameter well was completed in bedrock at 198 feet below ground surface. Although this well could not serve the proposed project, it was used as an observation well during aquifer testing and is referenced herein, as 1944 Well.

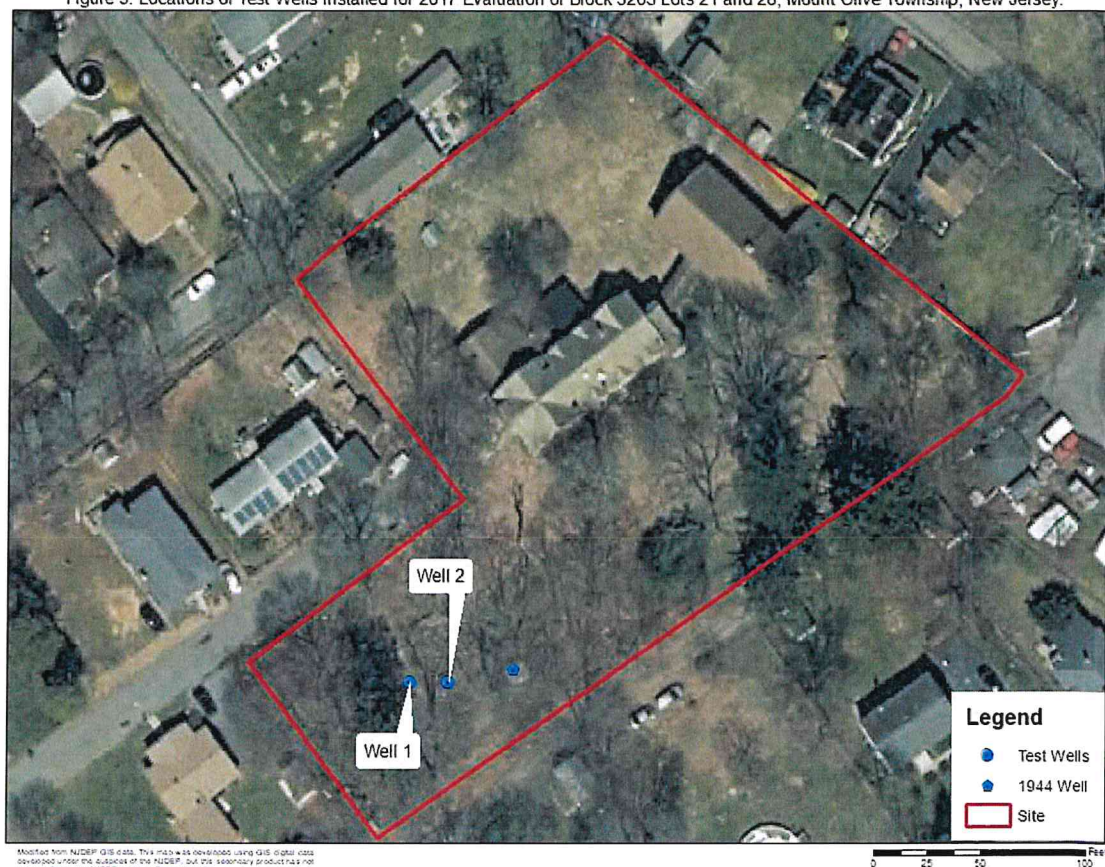
Two new test wells were installed under the supervision of a New Jersey-licensed Master Well Driller, Donald Colaluce of Colaluce Well & Pump Service. It was intended for one well to serve as the primary source of water to the 20 multi-family units and the second well to serve as a backup resource if the pump failed in the primary well. These wells were installed in accordance with NJDEP regulations for public community water-supply wells. It should be noted that the 10 single-family homes will each utilize an on-lot well or private well that will not require the same regulatory review as the public community water-supply wells that were installed for the 2017 evaluation.

Test Well 1 (Well Permit No. E201414071) was installed by Mr. Colaluce between November 3 and 7, 2014. The 6-inch diameter well was completed to 225 feet below ground surface. Six-inch diameter casing extends from approximately 2 feet above ground surface to 180 feet below ground surface. The well is completed open hole in the Precambrian bedrock from 180 to 225 feet below ground surface.

Test Well 2 (Well Permit No. E201511497) was installed by Mr. Colaluce starting on February 8 and finishing on February 10, 2016. This 6-inch diameter well was constructed by installing 6-inch diameter casing from approximately 2 feet above ground surface through glacial sediments and weathered bedrock to 180 feet below ground surface and completing the well as open-hole in the Precambrian rock to 225 feet below ground surface. Well records for both wells are provided in Appendix A.

The locations of the two test wells and the former Cobblestone Village well (1944 Well) are shown on Figure 3. The coordinates of each well were determined with a hand-held global positioning system (GPS) unit. The ground surface elevation of the wells was obtained from U.S. Geological Survey (USGS) Lidar data obtained from NOAA.

Figure 3: Locations of Test Wells Installed for 2017 Evaluation of Block 3203 Lots 21 and 28, Mount Olive Township, New Jersey.



The New Jersey State Plane Coordinates and elevations for the three wells are as follows:

Test Well	Permit No.	Easting	Northing	Elevation (ft amsl)
1	E201414071	426775.90	745009.00	945.03
2	E201511497	426794.30	745008.90	945.21
1944	None available	426824.82	745015.37	945.51

### WATER-SUPPLY DEMANDS

The 2017 evaluation calculated water demands for the 20 multi-family residential units. These demands were based on twelve 2-bedroom units, four 3-bedroom units, and four 1-bedroom units. Demands were calculated using Residential Site Improvement Standards (RSIS) of 210, 150, and 125 gallons per day (gpd) for the 3-, 2-, and 1-bedroom units. The estimated total demand is 3140 gpd, which equates to a well production capacity of 2.18 gallons per minute (gpm).



## **AQUIFER TESTING**

### **Test Well 1**

#### **PHASES**

An aquifer test was conducted in Test Well 1 starting on March 11, 2016 and terminating on March 20, 2016. The test was conducted in three phases. During all three phases, water levels were measured and recorded in all three wells with In-Situ LevelTroll® 500 or 700 units every 30 seconds.

The first phase was the background phase with no pumping at the site to assess antecedent influences. The second phase involved the pumping of Well 1 at a constant rate and measuring drawdown in the three wells. The third phase started after the pump was turned off and recorded water-level recovery.

The background phase was initiated on March 11, 2016 at 18:00 hours and continued to March 14, 2016 at 13:22:30 hours when the pumping phase was initiated. An attempt was made to start the pumping phase earlier on March 14, 2016 but the meter needed to be replaced. Once the pumping phase was started, it continued for 4336 minutes until 13:38:30 hours on March 17, 2016 when the pump was turned off and the recovery phase started. The recovery phase was terminated at 06:05 hours on March 19, 2017 after 2427 minutes when the water level in the pumping well was equal to the static water level prior to pumping and residual drawdown was zero.

At the start of the recovery phase, the pump was turned off by Colaluca Well & Pump Service for approximately 2 minutes to disconnect the meter. The pump was restarted to facilitate the collection of water samples and operated for approximately 26 minutes. While it was advisable for the samples to be collected during the pumping phase, this short-term operation of the pump at the start of the recovery phase did not adversely affect the water-level data and these data were reliable for further analyses.

#### **RATE**

During the pumping phase, a calibrated flow meter provided by Colaluca Well & Pump Service was used to measure the flow rate and record the total volume of water withdrawn from the well. A total volume of 44,150 gallons was withdrawn from Test Well 1 in 4336 minutes indicating an average rate of 10.2 gallons per minute (gpm). The pumping rate was more than 4.5 times the average daily demand rate of 2.18 gpm.

#### **WATER LEVELS**

Water levels as measured immediately before the start of pumping (static water level), and at the end of the pumping and recovery phases are summarized below. Drawdown in each well resulting from the pumping of Test Well 1 at 10.2 gpm is included in the summary table. Residual drawdown and the percent recovery for each of the wells are also included in the table.



### Test Well 1

Well	Static Water Level (ft btoc)	Depth to Water at End of Pumping Phase (ft btoc)	Total Drawdown (ft)	Depth to Water at End of Recovery Phase (ft btoc)	Residual Drawdown (ft)	Percent Recovery
1	14.047	19.953	5.906	14.047	0	100.00
2	14.598	20.31	5.712	14.64	0.042	99.71
1944	9.475	12.664	3.189	9.497	0.022	99.77

The data for Test Well 1 indicate a specific capacity of 1.73 gpm per foot of drawdown (gpm/ft). In slightly more than 40 hours, the water level in the pumping well had fully recovered and water levels in the aquifer had returned to depths similar to those measured prior to pumping. Further analyses of the Well 1 data with respect to aquifer characteristics is provided below. The water-level data from both tests can be provided if requested.

In 2017, it was concluded based on the aquifer testing that Test Well 1 has the capacity to provide the water needed for the 20 multi-family units. During the testing, the well produced 14,662 gallons per day, which is nearly five times the average daily demand of the project proposed in 2017.

### Test Well 2

#### PHASES

An aquifer test was conducted in Test Well 2 from March 19, 2016 to March 26, 2016. Similar to the Test Well 1 test, the Test Well 2 test was conducted in three phases.

The background phase of the Well 2 test was initiated on March 19, 2016 at 09:30 hours and ended with the start of pumping on March 21, 2016 at 09:48 hours. Pumping continued until March 24, 2016 at 09:54:30 hours for a total duration of 4326.5 minutes. The recovery phase was terminated on March 26, 2016 at 06:34 hours after 2679.5 minutes when the water levels in the three wells were essentially equal to the pre-pumping static level and background influences were causing fluctuations that made further data collection unnecessary. Water levels in all three wells had recovered in 45 hours.

#### RATE

During the pumping phase, a calibrated flow meter provided by Colaluze Well & Pump Service was used to measure the flow rate and record the total volume of water withdrawn from Test Well 2. A total volume of 44,195 gallons was withdrawn from Test Well 2 in 4326.5 minutes of pumping. The average rate was 10.2 gpm. Again, the rate for the test was more than 4.5 times greater than the average daily demand for the 20-unit project.

## WATER LEVELS

Water levels as measured immediately before the start of pumping, and at the end of the pumping and recovery phases are summarized below. Total drawdown at the end of the pumping phase, residual drawdown at the end of the recovery phase, and the percent recovery for each of the wells is also tabulated.

### Test Well 2

Well	Static Water Level (ft btoc)	Depth to Water at End of Pumping Phase (ft btoc)	Total Drawdown (ft)	Depth to Water at End of Recovery Phase (ft btoc)	Residual Drawdown (ft)	Percent Recovery
2	14.613	20.711	6.098	14.67	0.057	99.61
1	14.033	20.011	5.978	14.086	0.053	99.62
1944	9.511	12.579	3.068	9.563	0.052	99.46

Similar to the results for Test Well 1, the data from Test Well 2 indicate a productive well with a specific capacity of 1.67 gpm/ft. The data indicate that water levels in the aquifer quickly recover when the pump is turned off. In 2017 it was concluded based on the aquifer testing that Test Well 2 has the capacity to provide the water needed for the 20 multi-family unit project. During the testing, the well produced 14,710 gallons per day, which is four times the average daily demand of the 2017 proposed project.

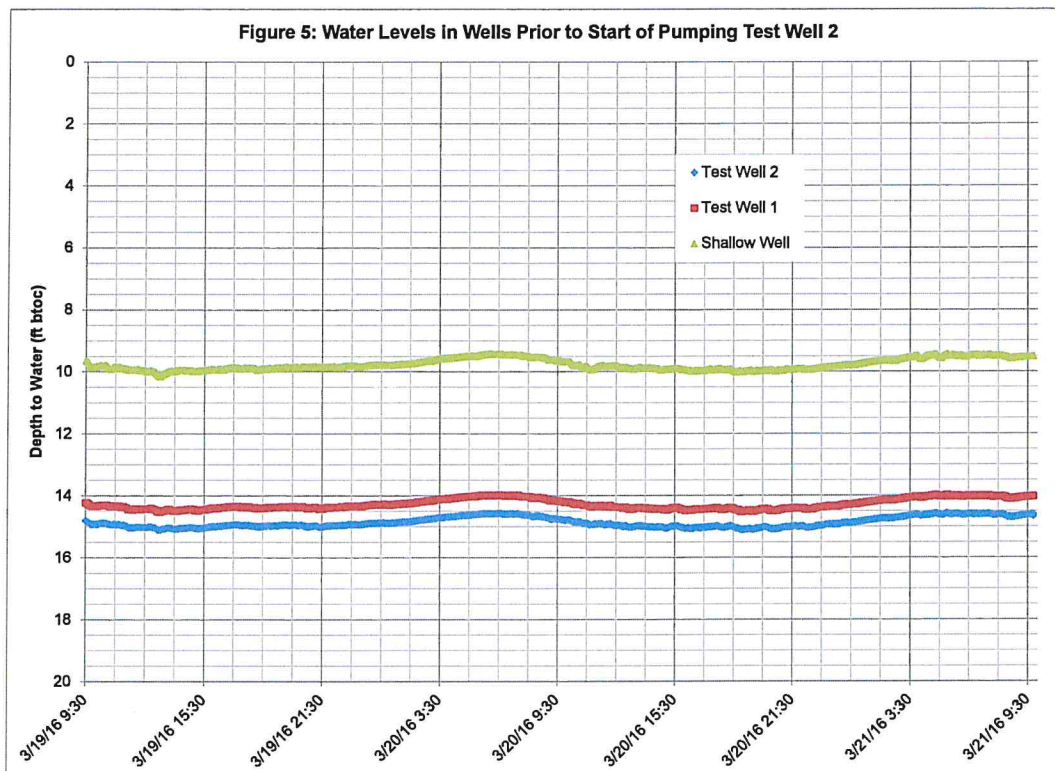
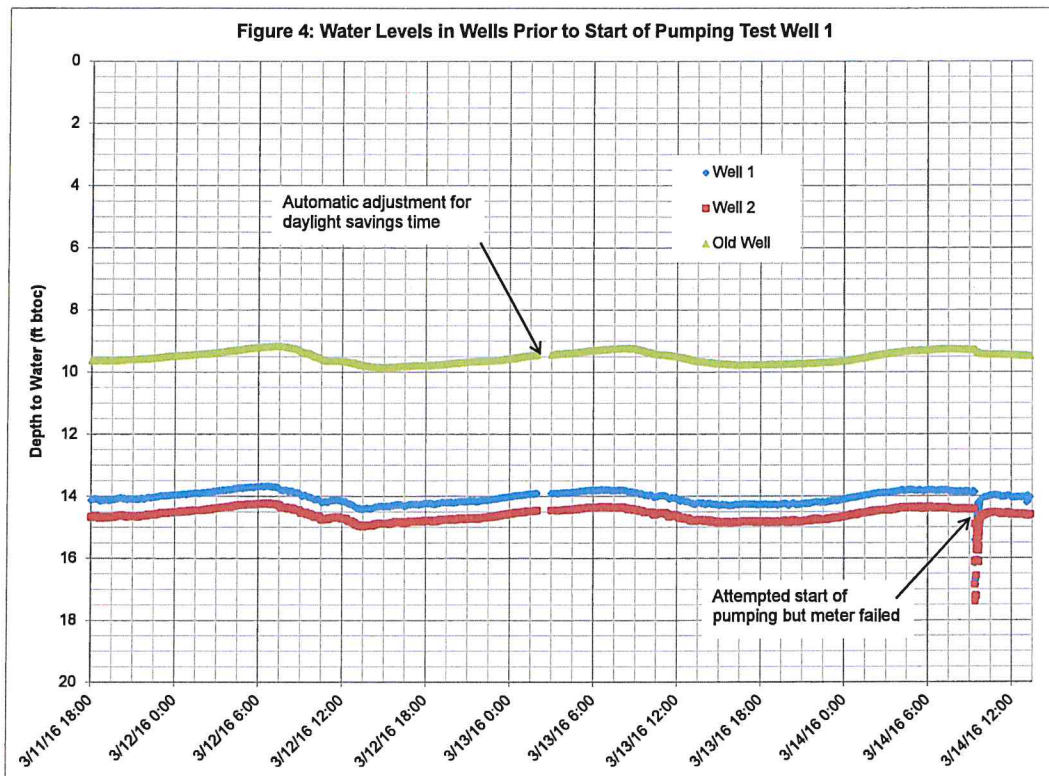
## Summary

Test Wells 1 and 2 were each pumped continuously for more than 72 hours at 10.2 gpm. During each day of pumping the two wells individually produced more than 14,660 gallons which, is nearly five times the average daily demand of the 20 multi-family unit project. Water levels were lowered approximately 6 feet in the pumping well when each well was pumped, and water levels recovered in less than 46 hours after the pump was turned off. The data indicate that Test Well 1 or Test Well 2 could provide water to the project with the alternative well serving as a backup in the event of mechanical failure of pumping equipment in the primary well.

## DATA ANALYSES

### Background Phases

The data from the two aquifer tests were further analyzed to determine aquifer characteristics and potential interference effects. Water levels in the three wells during the background phase for the Well 1 test are shown on Figure 4 and for the Well 2 test are shown on Figure 5.



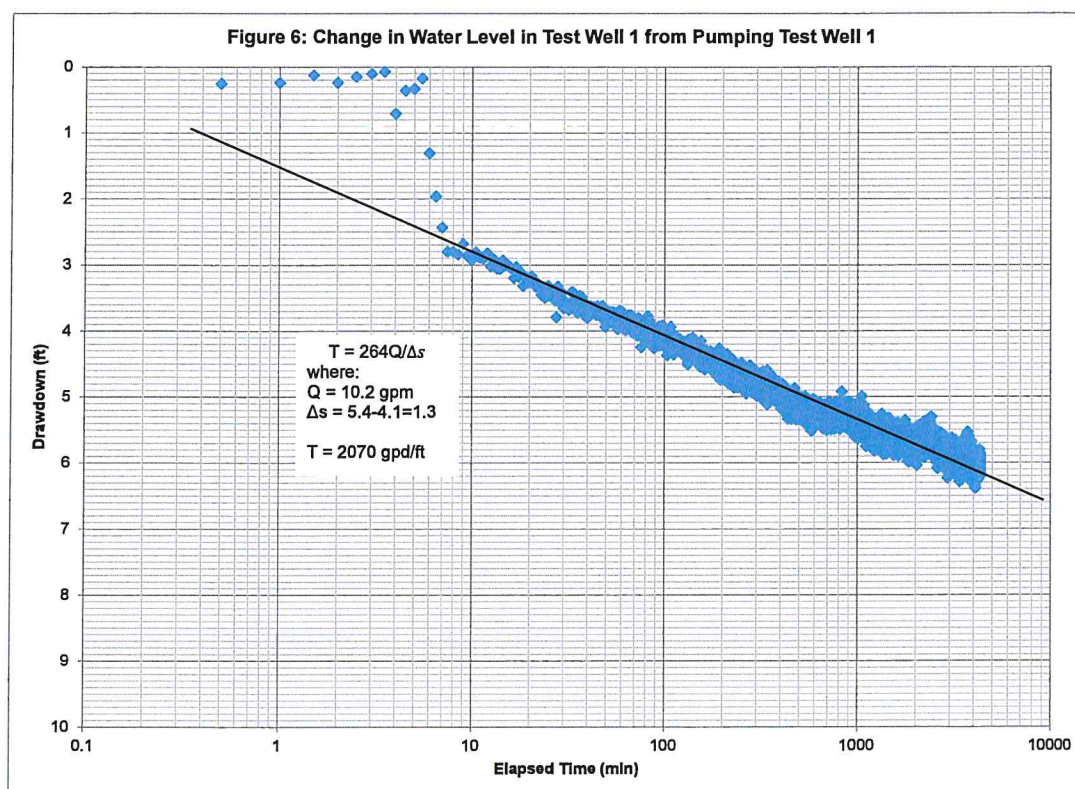


A one hour gap appears in the data during the Well 1 test because of the change to daylight savings time. On Figure 4, drawdown is apparent in Wells 1 and 2 starting at 09:23 and ending at 09:28 hours when an attempt was made to start the Well 1 pumping phase. The pumping phase was quickly stopped after it was determined the meter was not operating.

During the background phases for the two tests, water levels in the three wells fluctuated as much as 0.7-foot per day. Water levels increase from early evening to early morning hours and decrease from early morning to early evening hours indicating probable human influence. The data indicate that water levels in the wells at the site are likely influenced by off-site pumping. Two public community water supply wells are located approximately 2300 feet due east and several public non-community wells are located along U.S. Highway 46 also to the east of the site. This minimal interference does not adversely affect use of the proposed wells.

### Pumping Phase

Water-level drawdown data from the pumping phase for the Well 1 test are depicted on Figures 6, 7, and 8. Water-level drawdown data from the Well 2 test are shown on Figures 9, 10, and 11.



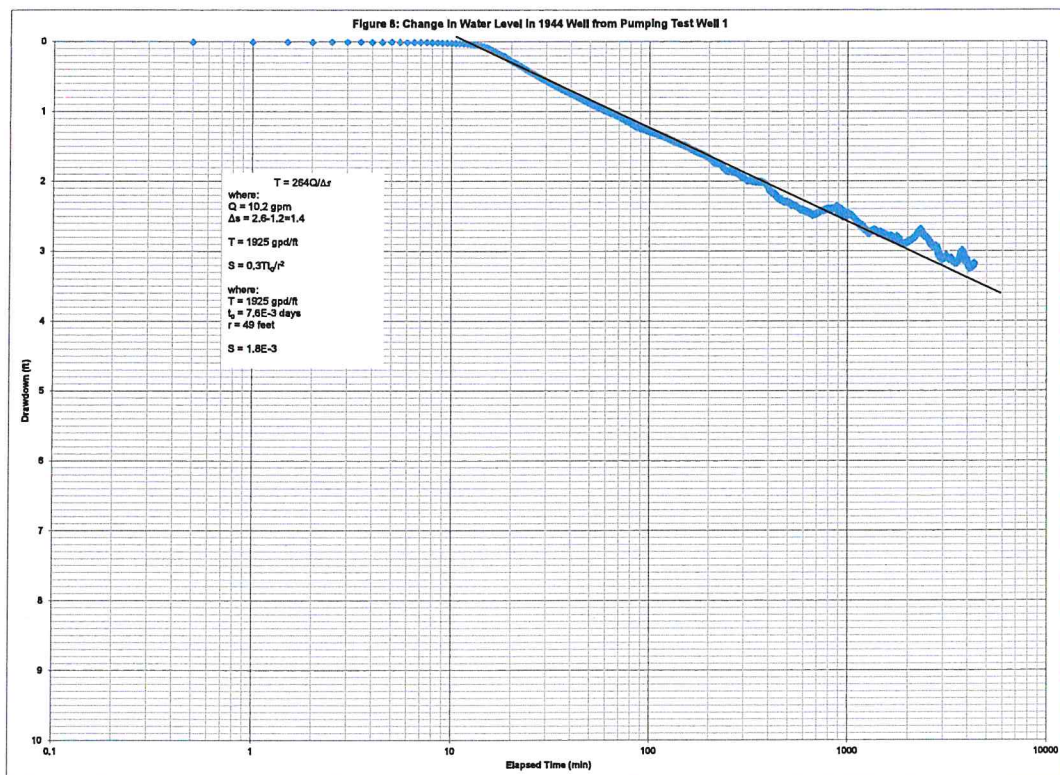
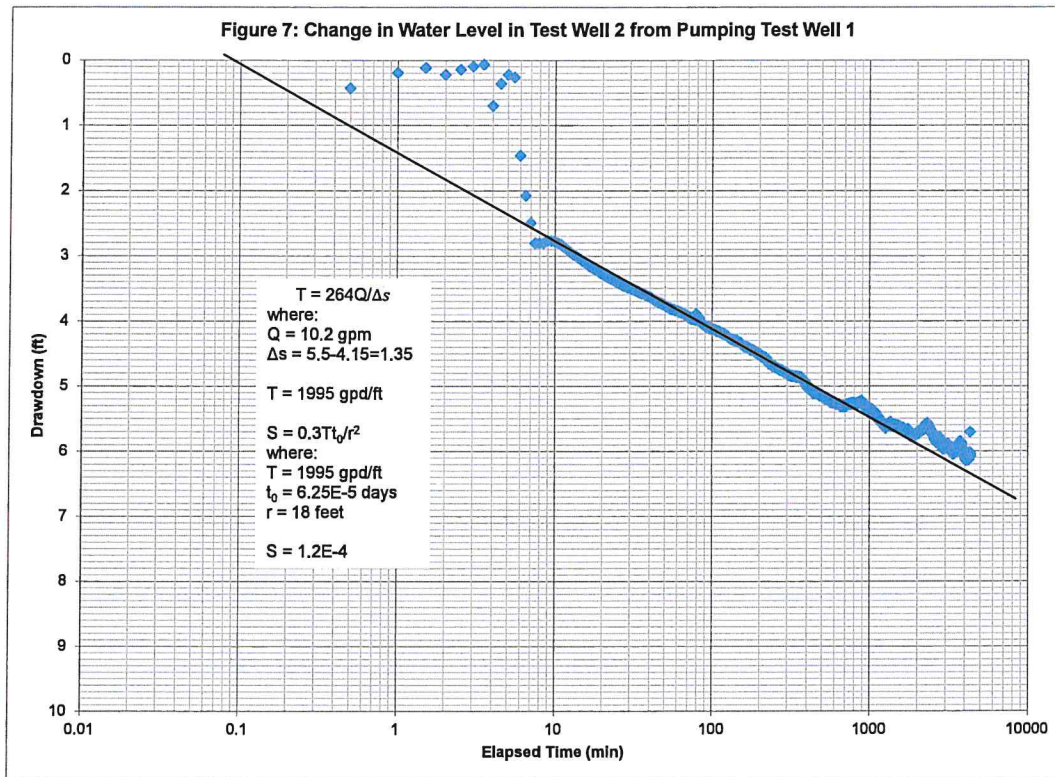






Figure 9: Change in Water Level in Test Well 2 from Pumping Test Well 2

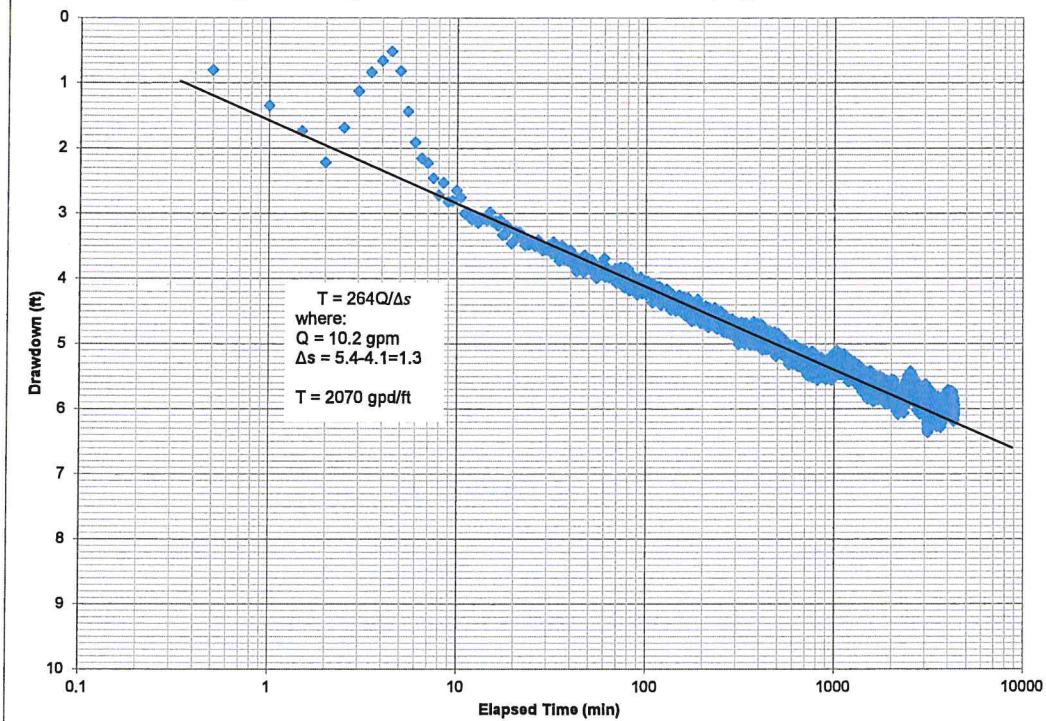
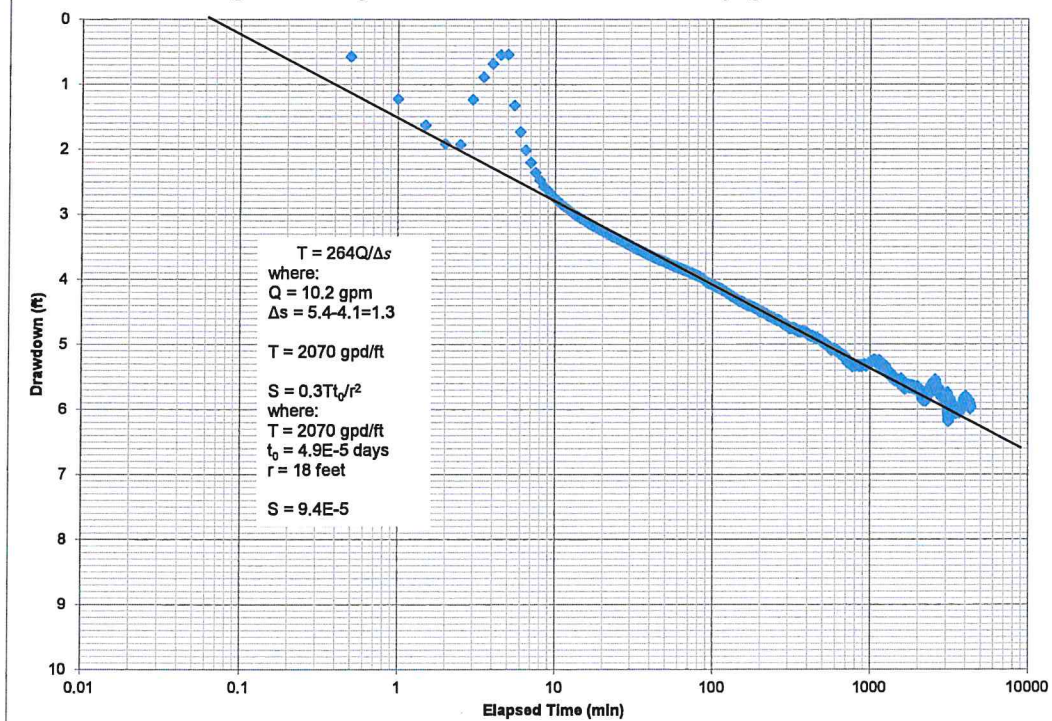
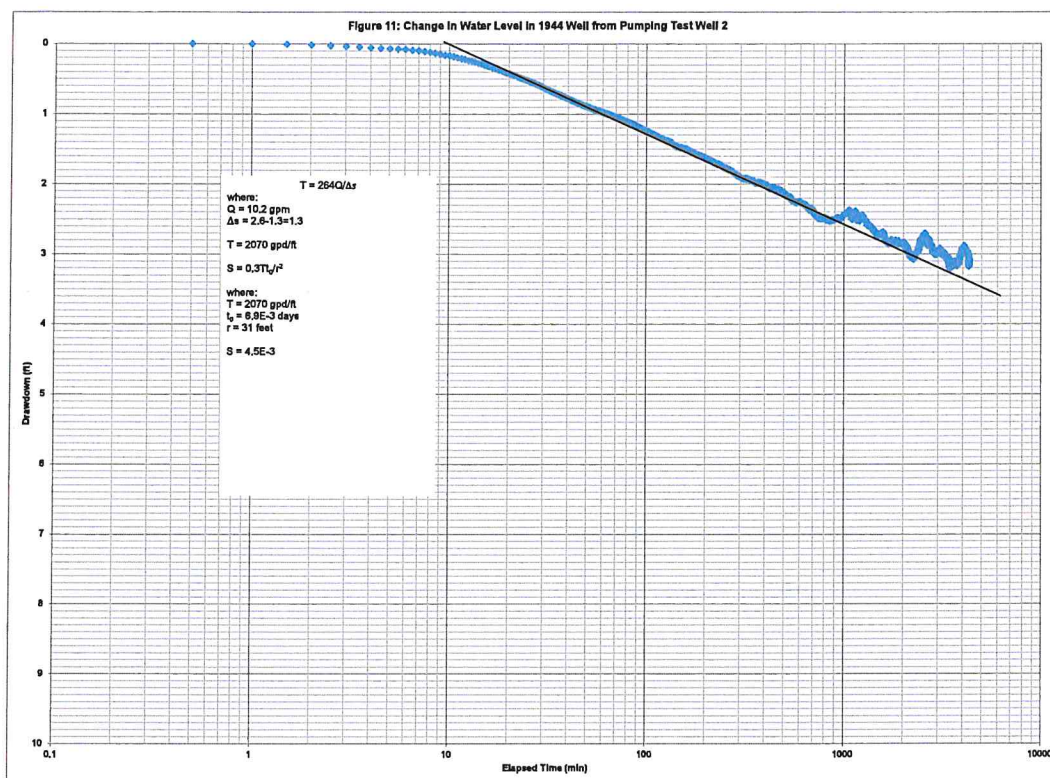


Figure 10: Change in Water Level in Test Well 1 from Pumping Test Well 2







The data from the pumping phases were analyzed with the Cooper-Jacob (1946) Non-Equilibrium Well Equation as detailed in Driscoll's Groundwater and Wells (p. 218 1986 Second Edition). The calculations of aquifer transmissivity and storage coefficient are shown on the figures with the results tabulated below. The data from both pumping phases are consistent with respect to aquifer transmissivity and storage coefficient.

#### Well 1 Test

Well	Transmissivity (gpd/ft)	Storage Coefficient (dimensionless)
1	2070	
2	1995	1.20E-04
1944	1925	1.80E-03

#### Well 2 Test

Well	Transmissivity (gpd/ft)	Storage Coefficient (dimensionless)
2	2070	
1	2070	9.40E-05
1944	2070	4.50E-03

The aquifer characteristics determined from the pumping phase data indicate a confined to semi-confined bedrock aquifer beneath the site that has sufficient transmission and storage capacity to provide the water the 20 multi-family unit project. The results indicated that one of the two wells could serve as the primary well with the other in stand-by mode for emergencies.

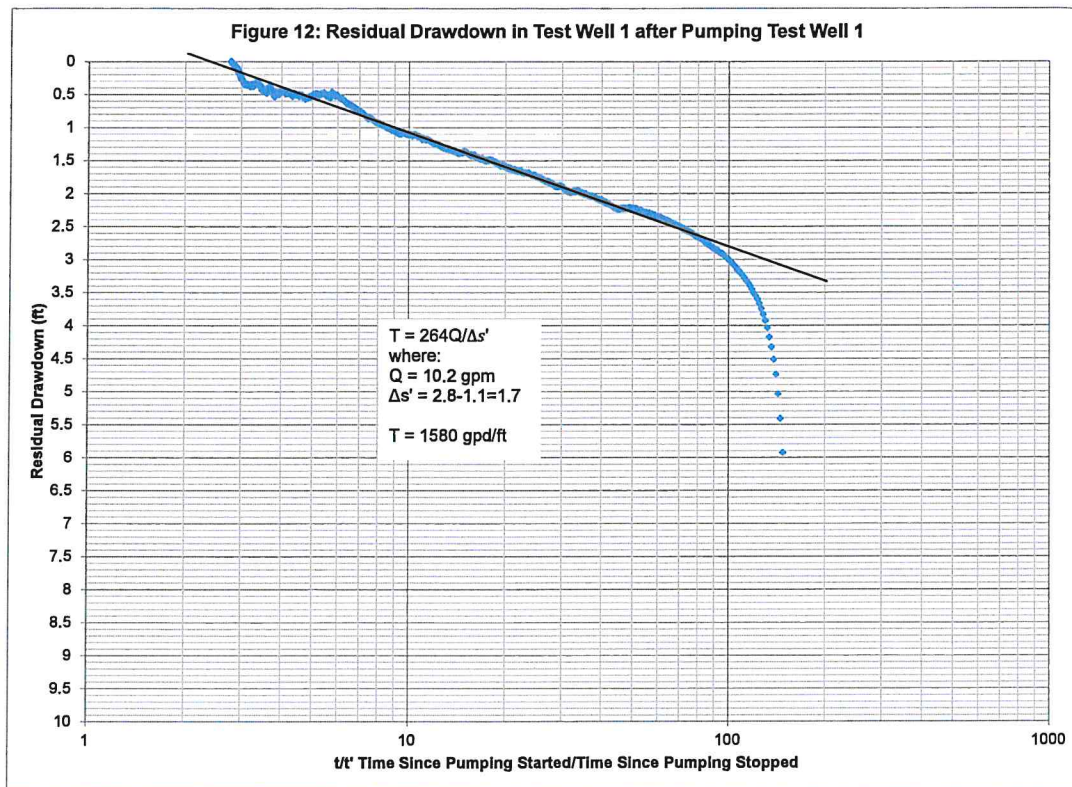
## Recovery Phase

The data from the recovery phase of both tests were analyzed using the Theis (1935) Residual Drawdown Method as detailed Driscoll's Groundwater and Wells (p. 252 1986 Second Edition). The data from the Well 1 test are shown on Figures 12, 13, and 14 and the data from the Well 2 test are shown on Figures 15, 16, and 17.

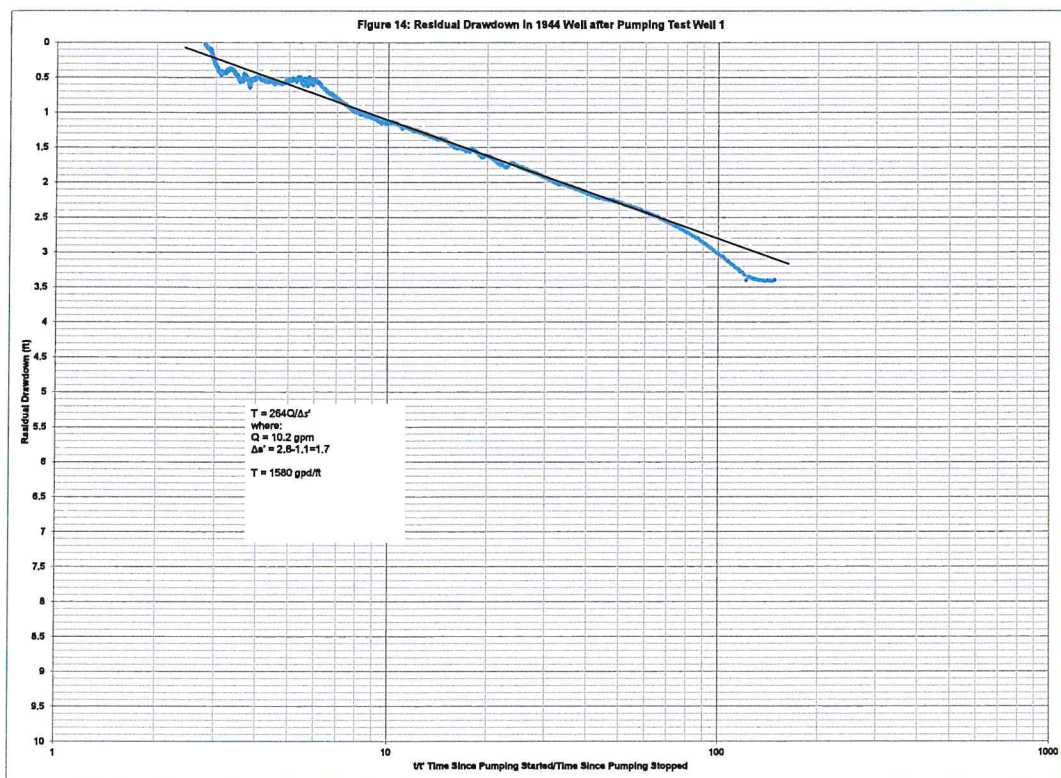
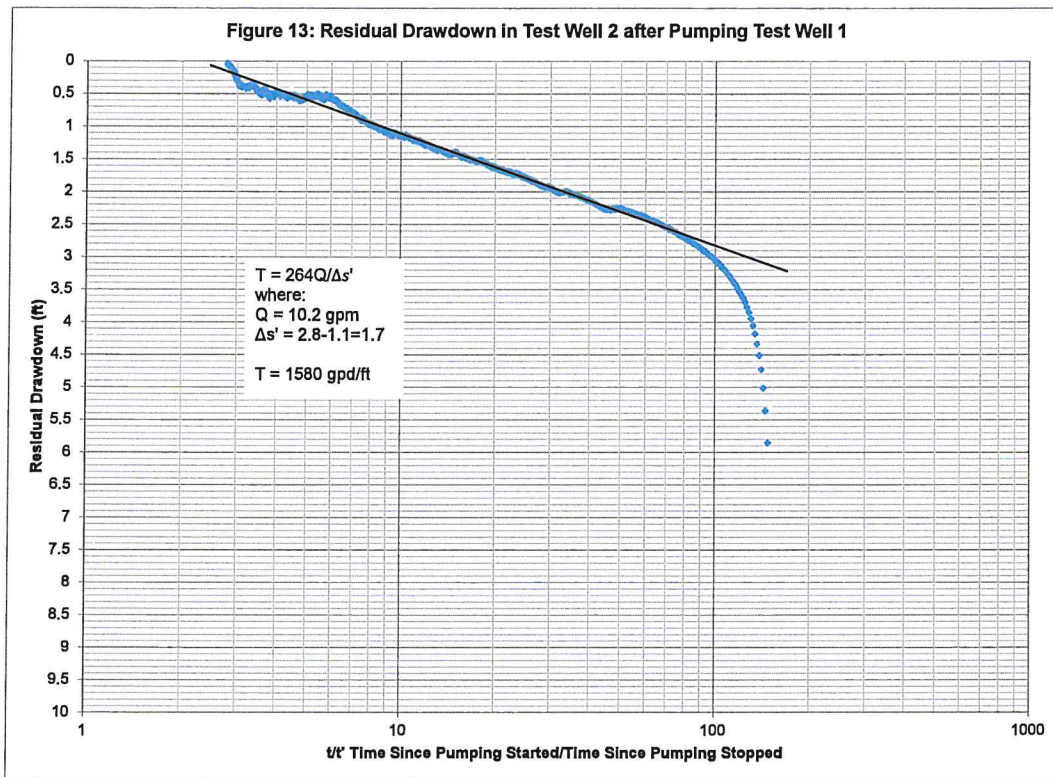
The results indicate that recovery was complete, and groundwater was not mined or permanently removed from aquifer storage. The results indicate some inelastic response of the aquifer to pumping but that response is negligible and does not preclude use of the wells for meeting water-supply demands. The inelastic response is typical of many New Jersey aquifer systems.

The data from the Well 1 test indicate a slightly lower aquifer transmissivity than determined from the pumping phase of this test probably because the well was pumped for 26 minutes at the start of the recovery phase to obtain water samples. The results of the Well 2 test indicate a slightly greater aquifer transmissivity.

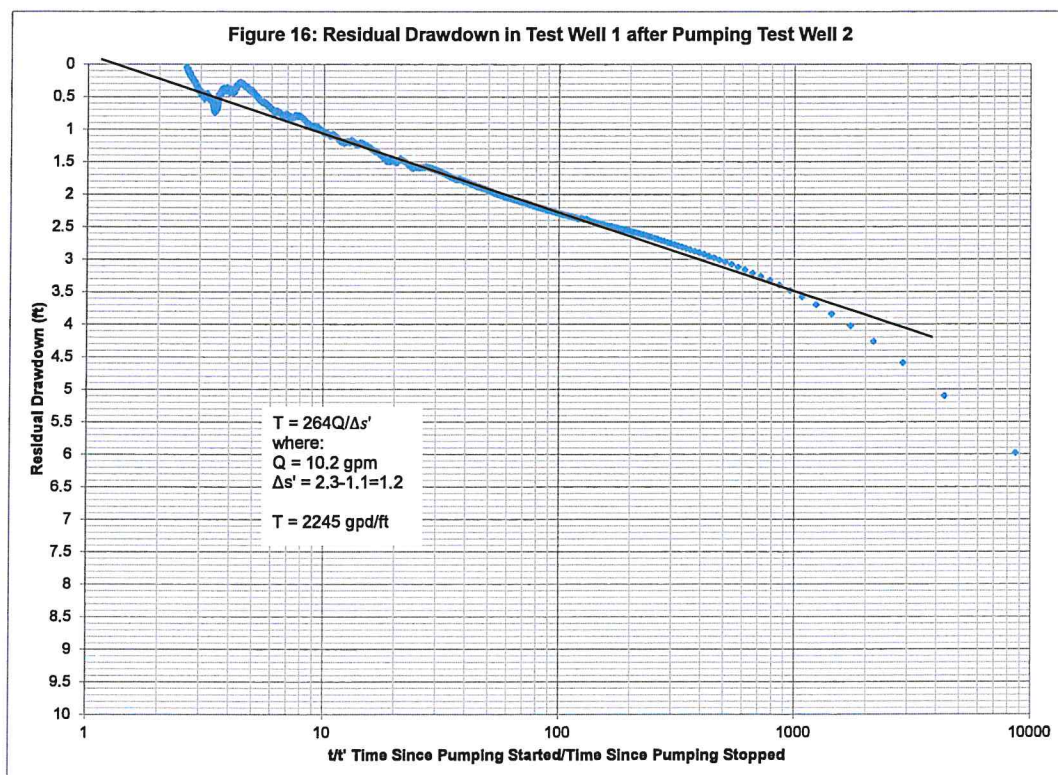
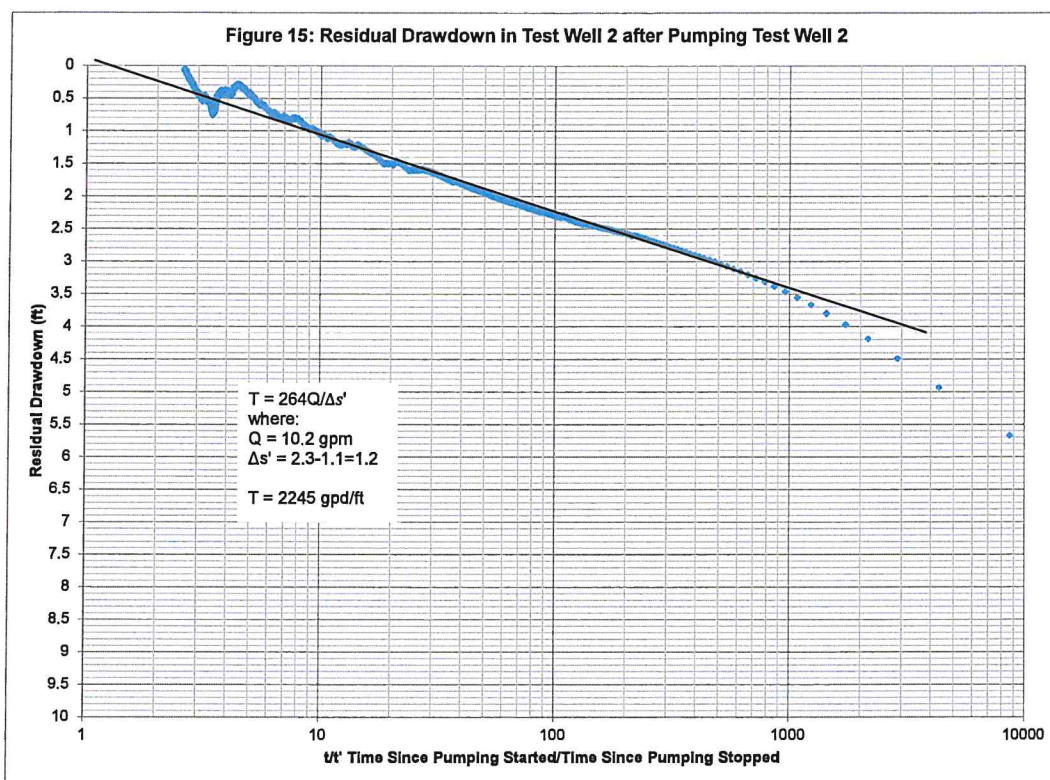
The data from both tests confirm the pumping phase results and indicate an aquifer with sufficient transmission capacity to adequately meet the demands of the 20 multi-family unit project without causing adverse impacts to other natural resources or users of the same aquifer system.

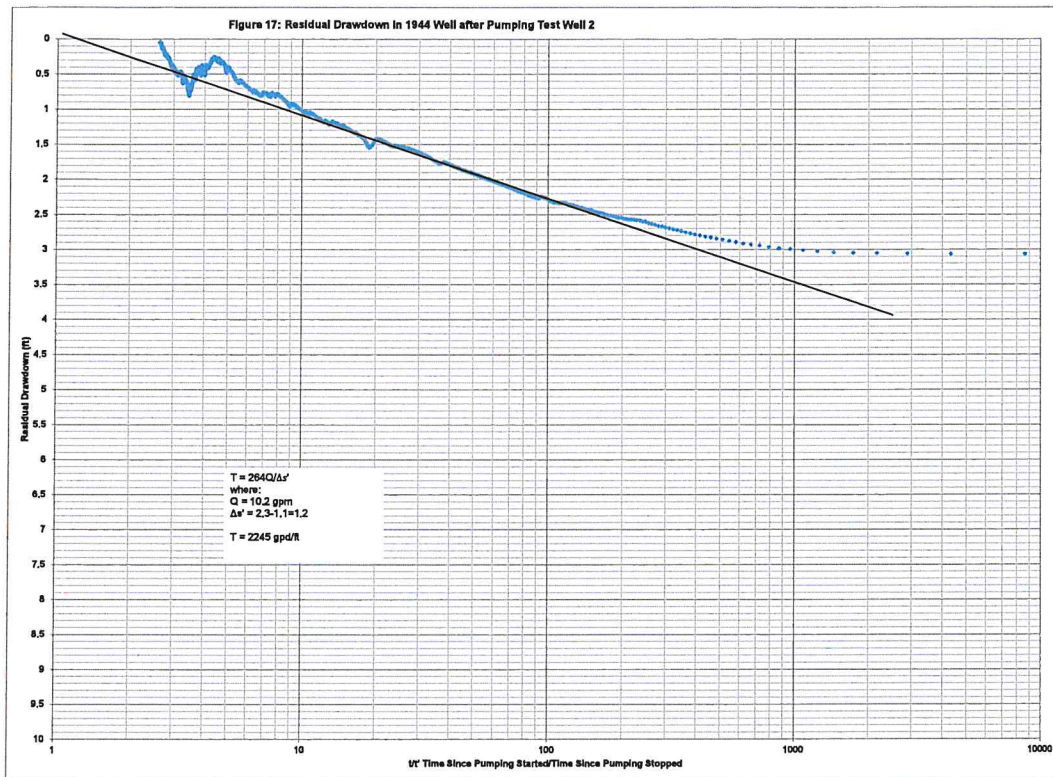












## RADIUS OF INFLUENCE

The radii of influence created by the pumping of Wells 1 and 2 during the aquifer tests were calculated using the Cooper-Jacob Modified Non-Equilibrium Equation. This equation is as follows (Driscoll 1986 p. 219):

$$s = \frac{264Q}{T} \log \frac{0.3Tt}{r^2S}$$

In these equations, the parameters are as follows:

$s$  = Drawdown in feet (1-foot).

$Q$  = Discharge or pumping rate in gallons per minute (10.2 gpm).

$T$  = Transmissivity of the aquifer in gallons per day per foot (gpd/ft) (2070 gpd/ft).

$t$  = Time in days (3 days).

$r$  = Radius in feet (equation solved for this value).

$S$  = Storage coefficient of the aquifer and is dimensionless (0.00011 or average of values calculated for Wells 1 and 2).



The calculations indicate that within 1700 feet of each well, water levels were lowered in the bedrock aquifer 1 foot or more after three days of pumping at 10.2 gpm. Maximum drawdown within the zone was at the pumping wells and equaled 5.9 feet in Well 1 and 6.1 feet in Well 2. The distance between these two wells is 18 feet.

#### **PUBLIC COMMUNITY WELL APPROACH**

The 2017 hydrogeologic evaluation was conducted assuming that the wells would serve as public community water-supply wells. With one well as the primary source and the second as a backup resource if a mechanical failure occurred in the primary well. As a result, the wells were installed and tested in accordance with N.J.A.C. 7:10-11.7(h). A 72-hour test was completed in Test Wells 1 and 2 for the 20 multi-family unit project. Both of these wells are completed in consolidated Precambrian rock. Each well was test at a rate (10.2 gpm) nearly five times greater than the design capacity rate of 2.18 gpm needed to provide 3,140 gallons of water needed for the 20 units.

During the last 6-hours of the Well 1 test, the water level in Well 1 was virtually unchanged with no additional drawdown. During the last 6-hours of the Well 2 test, the water level in Well 2 declined 0.135-foot or at a rate of 0.0225 ft/hour. Drawdown in both wells during the last 6 hours of the pumping phases was less than the 0.2 ft/hour equilibration rate allowed for a public-community water-supply well in N.J.A.C. 7:10-11.7(h)1. Drawdown in both wells during the aquifer tests had stabilized for a minimum period of six hours.

As indicated above, water levels stabilized in the pumping wells during the tests. Calculations of drawdown after 30 days of continuous pumping using the Cooper-Jacob equation and all the parameters listed above with the exception that time is changed from 3 to 30 days indicates that an additional 1.3 feet of drawdown may be observed in Test Wells 1 or 2 after 30 days of continuous pumping at 10.2 gpm. At a pumping rate of 2.18 gpm, the additional drawdown in the pumping well would be less than 0.3-foot or less than 4-inches. The data and calculations indicate the pumping either Test Well 1 or Test Well 2 to meet the daily demands of the 20 multi-family unit project would not result in dewatering of the well or aquifer or adverse impacts to other users.

#### **WATER-QUALITY**

During each aquifer test, water samples were obtained and analyzed for parameters listed as Primary and Secondary Drinking Water Standards. The samples were analyzed by Agra Environmental and Laboratory Services of Dover, New Jersey. Metals or other parameters that were detected in the samples are summarized below. Parameters, such as Total Coliform, e. coli, or volatile organic compounds, for which analyses were completed but are not listed below, were not detected. NJDEP drinking water standards for the detected parameters are provided for comparison.



### Analytical Results of Water Samples Collected during Well 1 Aquifer Test

Parameter	Result	Standard	Units
Barium	0.09	2	mg/l
Fluoride	0.26	4	mg/l
Sulfate	4.06	250	mg/l
Sodium	6.05	50	mg/l
Alkalinity	24		mg/l
Chloride	18.1	250	mg/l
Corrosivity	-2.405	(+/-) 1	
Hardness	73	50-250	mg/l
pH	6.95	6.5-8.5	S.U.
Total Dissolved Solids	110	500	mg/l
Nitrate	1.397	10	mg/l
New Jersey Gross Alpha	0.18	15	pCi/l
Radium-226	0.08		pCi/l
Radium-228	0.352		pCi/l
Total Radium 226+228	0.432	5	pCi/l
Uranium	0.096	30	µg/l

### Analytical Results of Water Samples Collected during Well 2 Aquifer Test

Parameter	Result	Standard	Units
Barium	0.219	2	mg/l
Chromium	1.52	100	µg/l
Sulfate	4.22	250	mg/l
Sodium	8.5	50	mg/l
Alkalinity	60		mg/l
Chloride	18.4	250	mg/l
Corrosivity	-1.549	(+/-) 1	
Hardness	74	50-250	mg/l
pH	7.08	6.5-8.5	S.U.
Total Dissolved Solids	134	500	mg/l
Nitrate	1.357	10	mg/l
New Jersey Gross Alpha	0.9	15	pCi/l
Radium-226	0		pCi/l
Radium-228	0.298		pCi/l
Total Radium 226+228	0.298	5	pCi/l
Uranium	0.121	30	µg/l

Samples from both wells indicated that groundwater could be used as a source of drinking water. The data indicated a probable need to treat the water to reduce potential corrosive effects, but this can be accomplished with standard household treatment systems. Corrosivity is a secondary standard adopted for aesthetic reasons and not a primary standard, which were adopted for health-based purposes. The USGS indicates that aquifer systems beneath New Jersey have a "very high potential" for corrosive groundwater.

## **CONCLUSION**

The conclusion of the 2017 hydrogeologic evaluation was that either Test Well 1 or Test Well 2 could serve as the primary well providing water to the 20 multi-family units. The well not serving as the primary source would serve as a backup in standby mode for emergencies such as mechanical failure of a pump.

The data from the aquifer testing indicated that the bedrock aquifer was semi-confined and receiving leakage from a hydraulically connected aquifer. It is likely that the thick glacial sediments beneath the area serve as reservoir that releases water to underlying bedrock fractures. The data further indicate that groundwater beneath the site could be used to provide drinking water to the residents with possibly, minor treatment.

Both wells were tested at nearly five times the rate needed to meet the average daily demands of the proposed 20 multi-family units. Drawdown in the pumping wells was limited and would not result in adverse impacts to natural resources or other nearby users of the same aquifer systems. These same conclusions can be made with respect to the modified plan for the site.

## **2023 MODIFIED PLAN**

### **WATER DEMANDS**

In lieu of constructing 20 multi-family units on the site, it is currently proposed to construct 10 single-family homes on 5,000 ft<sup>2</sup> lots with each lot provided water from an on-lot well. The 2023 modified plans indicate two 4-bedroom, five 3-bedroom, and three 2-bedroom single-family homes will be constructed for a total of ten units.

Typical dwelling unit densities are less than 3 persons per home. For example, Mount Olive Township's 2020 census data indicate 28,886 persons living in 11,183 dwelling units indicating a dwelling unit density of 2.58 persons per unit. N.J.A.C. 7:10-12.6 Table 1 indicates that for single-family homes, water use is 100 gpd per person. N.J.A.C. 7:10 is the NJDEP's safe drinking water regulations. The RSIS indicate that for single-family homes, water use is 100 gpd per person. Using these water use rates and the average dwelling unit density for Mount Olive Township, the residents of a single-family home in the Township use an average of 258 gpd.

For the 10 proposed units, the total water demand would be 2,580 gpd. N.J.A.C. 7:14-23.3 indicates for single-family homes with 3 bedrooms or more, the average daily water use is 300 gpd per unit. For 2-bedroom units, the average daily demand is 225 gpd per unit. N.J.A.C. 7:14 are the NJDEP regulations for disposal of wastewater. Based on the water use rates per unit size listed in N.J.A.C. 7:14, the 10 homes will use 2,775 gpd. This estimate provides an upper limit to water use within the proposed homes.

Based on NJDEP regulations for water supply and wastewater disposal, the 10 single-family homes will impose less demands on groundwater resources beneath the site than



the 2017 proposed 20 multi-family unit project. The 2017 proposal required an average pumping rate of 2.18 gpm to meet potential average daily demands. The 2023 proposal of 10 single-family homes will require an average pumping rate of 1.93 gpm.

### **SAFE YIELD**

The 2017 hydrogeologic evaluation concluded that the aquifer beneath the site has sufficient capacity to transmit groundwater at a minimum rate of 10.2 gpm without resulting in adverse impacts to natural resources or other users. During these tests, more than 14,660 gallons of water were withdrawn from the aquifer during each day of pumping. The total withdrawn is more than five times the average daily demand of 10-home project.

The aquifer testing indicated that the aquifer has sufficient transmissive capacity to provide the water needed for the single-family homes to individual wells. The testing further indicated that groundwater withdrawn from the well is quickly replenished and water-level recovery is rapid.

Analyses of water samples collected during the two aquifer tests indicate that groundwater within the bedrock aquifer beneath the site does not contain man-made or natural contaminants that would preclude the use of the water for drinking water purposes. Treatment to reduce corrosivity may be useful but this treatment can be conducted using standard systems designed for household use.

The aquifer systems beneath the site have sufficient capacity to provide groundwater with sufficient quality to serve as drinking water within the 10 proposed single-family homes. Private on-lot wells can be used to meet the daily demands of each home without resulting in adverse impacts to natural resources of other nearby users of these same resources.

### **RADIUS OF INFLUENCE**

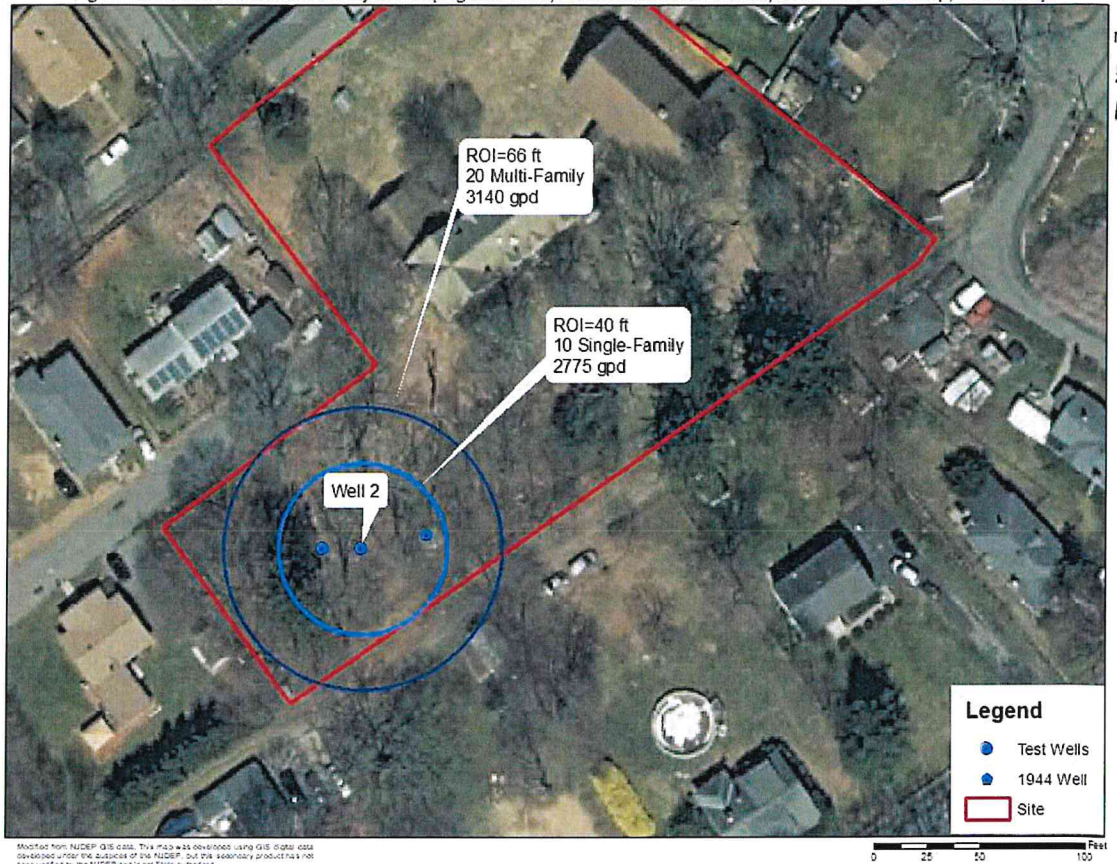
In New Jersey, the standard approach for calculating the radius of influence is to determine the distance from the pumping well where the water level will be lowered one foot within the aquifer after three days of continuous pumping. For example, and as detailed above, during the 2017 aquifer tests at a pumping rate of 10.2 gpm, the radius of influence was 1700 feet.

The radius of influence for a public community water-supply well pumping at an average rate of 2.18 gpm to meet the demands of the 20 multi-family unit project would be approximately 66 feet. If a single well was used to meet the daily demands of the 2023 proposal of 10 single-family homes, the radius of influence for the well pumping at an average rate of 1.93 gpm would be 40 feet.

These calculations use the same Cooper-Jacob (1946) Modified Non-Equilibrium equation and aquifer characteristics employed for the 2017 evaluation that was prepared for submittal to NJDEP. The calculated radius of influence centered on Test Well 2 for the 2017 and 2023 project scenarios are shown on Figure 18.



Figure 18: Radius of Influence for Project Pumping Scenarios, Block 3203 Lots 21 and 28, Mount Olive Township, New Jersey.



The radius of influence depicted for the 10 single-family homes was calculated using Test Well 2 as the source of water at an average pumping rate of 1.93 gpm. However, each lot will have a well installed to provide water to the house constructed on that lot and therefore, the average pumping rate per well will be 0.193 gpm. At this rate, the radius of influence for each well will be less than 1-foot from the well. The pumping of the individual wells will not extend beyond the existing property boundaries and will not result in adverse interference to water levels in any nearby wells.

## CONCLUSION

Based on the data collected during the 2017 hydrogeologic evaluation, it can be concluded within a reasonable degree of scientific certainty that using private on-lot wells to meet the water-supply demands of the 10 single-family homes will not result in adverse impacts to natural resources or other users of the same aquifer systems encountered beneath Block 3203 Lots 21 and 28.

## REFERENCES

- Driscoll, Fletcher G. 1986. Groundwater and Wells. Second Edition. Johnson Division. St. Paul, MN.
- Stanford, Scott D. 2011. "Surficial Geology of the Stanhope Quadrangle, Sussex and Morris Counties, New Jersey." New Jersey Geological Survey (NJGS) Digital Geodata Series OFM 22. <http://www.njgeology.org/geodata/dgs10-2.htm>
- Volkert, Richard A. 2018. "Bedrock Geologic Map of the Stanhope Quadrangle, Sussex and Morris Counties, New Jersey." New Jersey Geological Survey (NJGS) Digital Geodata Series OFM 124.





## **APPENDIX A: WELL RECORDS**

New Jersey State Department of Environmental Protection  
Bureau of Water Allocation and Well Permitting  
Mail Code 401-04Q PO BOX 420 Trenton, NJ 08625-0420 Tel: 609-984-6831

Well Permit Number  
**E201414071**

### WELL RECORD

**PROPERTY OWNER:** COBBLESTONE HEALTH CARE FACILITY

Company/Organization: business

Address: 30 Stonewald Ct. Drive Budd Lake, New Jersey 07828

**WELL LOCATION:** Care Center

Address: 20 Stonewald Ct. Dr.

County: Morris

Municipality: Mount Olive Twp

Lot: 21

Block: 3203

Easting (X): 426766 Northing (Y): 744996  
Coordinate System: NJ State Plane (NAD83) - USFEET

**DATE WELL STARTED:** November 3, 2014

**DATE WELL COMPLETED:** November 7, 2014

**WELL USE:** NON-PUBLIC REPLACEMENT

Other Use(s): \_\_\_\_\_

Local ID: well #1

### WELL CONSTRUCTION

Total Depth Drilled (ft.): 225

Finished Well Depth (ft.): 225

Well Surface: 2 ft. Above Grade

	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt/Rating/Screen # Used (lbs/ch no.)
Borehole	0	80	10		
Borehole	80	225	6		
Casing	0	180	6	Steel	19lbs/astm53
Casing	0	80	10	Steel	36lbs/astm53
Screen					

	Depth to Top (ft.)	Depth to Bottom (ft.)	Outer Diameter (in.)	Inner Diameter (in.)	Bentonite (lbs.)	Neat Cement (lbs.)	Water (gal.)
Grout	0	80	10	6	0	3760	247
Gravel Pack							

Grouting Method: Pressure method (Tremie Pipe)

Drilling Method: Air Rotary

### RECORD OF TEST

Test Date: November 7, 2014

Pump Equipment: drill rig air

Well Yield: 150 gpm

Static Water Level: 15 ft. below land surface

Pumping Water Level: 200 ft. below land surface

### PUMPING EQUIPMENT

Installed: Not Installed

Installer's Name: \_\_\_\_\_

Pump Type: \_\_\_\_\_

Depth to Pump:    ft. below land surface

Pump Capacity:    gpm

Total Design Head:    ft.

Pump Horsepower:    hp

If pump tested Discharge Rate: 40 gpm  
Duration of Test: 6 hours

### ATTACHMENTS

### GEOLOGIC LOG

0 - 180: brown GM - Silty gravels, gravel-sand-silt mixtures overburden

180 - 225: blue/grey CR - Competent Rock granite

### ADDITIONAL INFORMATION:

Driller of Record: Donald Colaluca,  
MASTER LICENSE # 0001643

Company: COLALUCE WELL & PUMP SERVICE



**WELL RECORD**

**PROPERTY OWNER:** COBBLESTONE HEALTH CARE FACILITY

**Company/Organization:** business

**Address:** 30 Stonewald Ct. Drive Budd Lake, New Jersey 07828

**WELL LOCATION:** Care Center

**Address:** 20 Stonewald Ct. Dr.

**County:** Morris **Municipality:** Mount Olive Twp **Lot:** 21 **Block:** 3203

**Easting (X):** 426782 **Northing (Y):** 745018  
**Coordinate System:** NJ State Plane (NAD83) - USFEET

**DATE WELL STARTED:** February 8, 2016

**DATE WELL COMPLETED:** February 10, 2016

**WELL USE:** TEST WELL FUTURE POTABLE USE

**Other Use(s):** \_\_\_\_\_ **Local ID:** test well

**WELL CONSTRUCTION**

**Total Depth Drilled (ft.):** 225 **Finished Well Depth (ft.):** 225 **Well Surface:** 2 ft. Above Grade

	Depth to Top (ft.)	Depth to Bottom (ft.)	Diameter (inches)	Material	Wgt/Rating/Screen # Used (lbs/ch no.)
Borehole	0	180	10		
Borehole	80	225	6		
Casing	0	180	6	Steel	19lbs/astm53
Casing	0	80	10	Steel	36lbs/astm53
Screen					

	Depth to Top (ft.)	Depth to Bottom (ft.)	Outer Diameter (in.)	Inner Diameter (in.)	Material		
					Bentonite (lbs.)	Neat Cement (lbs.)	Water (gal.)
Grout	0	180	10	6	0	7615	500
Gravel Pack							

**Grouting Method:** Pressure method (Tremie Pipe)

**Drilling Method:** Air Rotary

**RECORD OF TEST**

**Test Date:** February 10, 2016

**Pump Equipment:** drill rig air

**Well Yield:** 150 gpm

**Static Water Level:** 15 ft. below land surface

**Pumping Water Level:** 200 ft. below land surface

**PUMPING EQUIPMENT**

**Installed:** Not Installed

**Installer's Name:**

**Pump Type:**

**Depth to Pump:**  ft. below land surface

**Pump Capacity:**  gpm

**Total Design Head:**  ft.

**Pump Horsepower:**  hp

**If pump tested** **Discharge Rate:** 10 gpm

**Duration of Test:** 72 hours

**ATTACHMENTS**

**GEOLOGIC LOG**

0 - 158: brown CL - Inorganic clays of low to medium plasticity, gravelly/sandy/silty/lean clays overburden

158 - 225: blue/grey CR - Competent Rock granite

**ADDITIONAL INFORMATION:**

**Driller of Record:** Donald Colaluca,  
MASTER LICENSE # 0001643

**Company:** COLALUCE WELL & PUMP SERVICE