ML Old Bridge 18-Mar-1981

O & Y v. Old Bridge

Revised Old Bridge Acreage Calculations

pgs = 45

Note - some pages totally illegible

ML000730E

Brown Sullivan Arfaa

MEMORANDUM

TO: Henry Hill, Guliet Hirsch, Andy Sullivan, Martin Prince

FROM: Erik Peter Axelson

RE: REVISED OLD BRIDGE ACREAGE CALCULATIONS

DATE: March 18, 1981

Jim Watson, P.E. of McCormick, Taylor & Associates will certify the following calculations for various land uses in Old Bridge Township:

Land Use	Total Acreage	Developed Acreage	Vacant Acreage
RESIDENTIAL			
- R-20	1,334	932	402
- R-15	1,250	901	349
- R-7	2,224	2,156	68
Single-Family Sub-total:	4,808	3,989	819
- PD	8,792	913	7,879
- AF	613	501	112
- AR	70	24	46
- TH	146	51	95
- TCD/C	140	38	102
Multi-Family Sub-total:	969	614	355
TOTAL RESIDENTIAL:	14,569	5,516	9,053
NON-RESIDENTIAL			
- CC	494	275	219
- CM	164	31	133
- CN	87	80	7
- CR	216	13	203
Commercial Sub-total:	961	399	562

(Continued)

- M-5	364	143	221
- OG	289	220	69
- SD	1,932	449	1,483
- TCD/A,B,D	180	156	24
Office/Industrial Subtotal:	2,765	968	1,797
TOTAL NON-RESIDENTIAL:	3,726	1,367	2,359
DEVELOPMENT ZONES:	18,295	6,883	11,412
WS ZONES:	6,857	(6,857)	--
TOTAL:	25,152	13,740	11,412

Jim also compared our developed / undeveloped overlay with two of the aerial photographs we used and pronounced the overlay as extremely accurate.

The complaint should be amended in the following places:

p. 7, Paragraph e.	Change	11,036 to	11,412
p.13, Paragraph b.	Change	2,162 to	2,224
	Change	32 to	45
	Change	1% to	2%
	Change	.3% to	.4%

Erik Peter Axelson
Planning/Landscape Design
BROWN/SULLIVAN/ARFAA

EPA/jk

Brown Sullivan Arfaa

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Planning/Landscape Design
BROWN/SULLIVAN/ARFAA

EPA/jk

McCormick, Taylor & Associates, Inc.

CONSULTING ENGINEERS • 1617 JOHN F. KENNEDY BOULEVARD • PHILADELPHIA, PA. 19103 • (215) LOCUST 9-2400

March 20, 1981

Mr. Martin Prince, R.A., AICP
Project Manager
Brown Sullivan Arfaa
2314 Market Street
Philadelphia, Pennsylvania 19103

REFERENCE: Old Bridge Township Project
New Jersey
MTA Project No. 3752

ATTENTION: Erik Peter Axelson

Gentlemen:

We have reviewed the zoning map for the Township of Old Bridge, Middlesex County, New Jersey dated November 10, 1976, and last revised August, 1979 in correlation with a developed land use overlay prepared by your office. Without assuming verification of the overlay, we are prepared to verify the developed and undeveloped areas in each zoning category. The areas were planimetered using a Bruning Planimeter type 33 on a 1"=1600' composite plan. Our findings in acres are as follows:

Land Use	Developed	Undeveloped	Total
Residential			
R-20	932	402	1,334
R-15	901	349	1,250
R-7	2,156	68	2,224
Subtotal	3,989	819	4,808
PD	913	7,879	8,792
AF	501	112	613
AR	24	46	70
TH	51	95	146
TCD	16	80	96
Subtotal	592	333	925
TOTAL	5,494	9,031	14,525

Land Use	Developed	Undeveloped	Total
Non-Residential			
CC	275	219	494
CM	31	133	164
CN	80	7	87
CR	13	203	216
Subtotal	399	562	961
M-5	143	221	364
OG	220	69	289
SD	610	1,546	2,156
Subtotal	973	1,836	2,809
TOTAL	1,372	2,398	3,770
Watershed	-	-	6,857
GRAND TOTAL	6,866	11,429	25,152

Very truly yours,

McCORMICK, TAYLOR & ASSOCIATES, INC.

James R. Watson

James R. Watson, P.E.

W-1

ENGINEERING STUDY

OF

AVAILABLE WATER RESOURCES

IN

WESTERN MADISON TOWNSHIP

MIDDLESEX COUNTY, NEW JERSEY

PREPARED FOR

[illegible]

IN

MADISON TOWNSHIP

ENGINEERING, SURVEYING & PLANNING CONSULTANTS
[illegible]
[illegible], NEW JERSEY [illegible]

APRIL 197[illegible]

MAYNARD THUM, P.E. & L.S.

Plates 1 & 2 not included obtain from ESP. [illegible]

TABLE OF CONTENTS

WATER SUPPLY FEASIBILITY STUDY
WESTERN SECTOR
MADISON TOWNSHIP, MIDDLESEX COUNTY, N.J.

PURPOSE:

In order to arrive at an independent assessment of the existing public water supplies in the central and western area of the Township of Madison, an appointment was set up with the New Jersey State Department of Environmental Protection, Division of Water Resources. The initial contact was made on January 9, 197[illegible]. The meeting took place on March 11, 197[illegible] at 10:00 A.M. in the office of Mr. Raymond A. Webster, P.E., Supervising Environmental Engineer, Bureau of Water Control. The result of this meeting and subsequent investigations is set forth below.

AREA DESCRIPTION

The "Madison Municipal Utilities Authority" through its facilities provides potable water to the Township of Madison.

The water is derived entirely from ground water sources by means of deep wells scattered throughout the Township. Ground water in this area of the State contains objectionable amounts of iron and other substances which must be removed prior to use, therefore, the wells are generally accompanied by water treatment plants. However

is provided by means of elevated tanks, standpipes, and groundlevel storage tanks in conjunction with booster pumps. The facilities thourn interconnected primarily serve a particular locality.

The area of the Township in the vicinity of New Jersey State Highway Route 1? is served by two production and storage facilities. The first designated in this report as Plant No. 1 is located on New Jersey State Highway Route 1? between Oak Street and Pine Street. The second designated in this report as Plant No. ? is located on New Jersey State Highway Route ? and Throckmorton Lane. The particulars of these Plants are set forth on Tables I and II hereafter. Distribution of potable water is accomplished by means of 10" diameter and 12" diameter feeder lines generally limited to the existing built-up areas.

TOPOGRAPHY & GEOLOGY

Madison Township lies entirely within the Atlantic Coastal Plain physiographic province. The portion in question is characterized by large areas of lowlands. Elevations above mean sea level range from ?? feet to about 1?? feet. The surface drainage of the area is in a northerly direction wholly within the Raritan River water shed. The land is laced with numerous streams including the Ireside Brook, Parsley Brook, Matchaponix Brook, Deep Run and their various tributaries which eventually reach the South River and Raritan River.

A generalized geologic section of the area reveals bedrock of various geologic ages which outcrops northerly and westerly of Raritan River. The bedrock dips gently in a southeasterly direction and in this area of Madison Township lies from roughly 200 feet to 600 feet below the surface. Overlying this surface are various layers of marine deposited sands, silts, and clays. The several lower strata form what is generally known as the Raritan Formation. The strata generally found include the Raritan Fire Clay, Farrington Sand, Woodbridge Clay, Sayreville Sand (north and east), South Amboy Fire Clay (north and east), Old Bridge Sand, Amboy Stoneware Clay (north and east), and at the surface, the Cape May Formation. The sand strata which dip southeasterly to the coast are water bearing and constitute the most important source of ground water for the portion of Middlesex County southeast of the Raritan River and adjoining Monmouth County. The outcrop or recharge areas of the formations immediately upstream from this portion of the Township of Madison extend northwesterly as far as Farrington Lake at the North Brunswick boundary, the nearest being the Old Bridge Sand followed by the Farrington Sand. Generalized sketches of the outcrop area and geologic section are shown on Plates I and II at the back of this report. Detailed reports relating to geology, stratigraphy, and the aquifers have been prepared and are available through the State of New Jersey and Rutgers University.

To the north east, South River, Sayreville, South Amboy areas, portions of the Farrington, Old Bridge and Sayreville sands outcrop in areas under or inundated by salt water.

SALT WATER ENCROACHMENT

FARRINGTON SAND MEMBER

A Chloride (salt) concentration above 250 ppm is noticeable to the taste and is the limit recommended by the U. S. Public Health Standards for potable water. Since the natural chloride concentration in the Farrington is less than 5 ppm, the 10 ppm isochlor contour generally indicates salt water intrusion.

The safe yield of the Farrington Sand Member in the Sayreville area has been limited by salt water encroachment. Salt water has been advancing southeasterly through Sayreville toward the Perth Amboy Water Company's Runyon well field.

This salt water intrusion has led to the abandonment of several industrial wells in the Sayreville area. Salt water movement through the Farrington Sand Member is attributed to overpumping and leaks in the protective overlay of clay that would seal the aquifer off from the Raritan River and Washington Canal. The most critical area has been southeast of the Washington Canal. Some of the protective clay layer was removed by unwise construction practices in dredging operations decades ago.

Since this problem was first recognized 25 years ago there have been several thoughts on how to stop or reverse the salt water encroachment. A tidal dam across the Raritan River downstream from the Washington Canal has been proposed as well as lining the canal and river channels with an impermeable material such as clay. Another plan is to maintain a fresh water head near the sources of contamination. This would be accomplished by artificial recharge through well injection. These injections and reduced pumpage would create a fresh water head above the adjoining river. This condition would halt the salt waters advancement, however, additional water would have to be obtained for recharge purposes either from storm runoff or the discharge from a sewerage treatment facility.

OLD BRIDGE SAND MEMBER

There has been no evidence of widespread salt water encroachment into the Old Bridge Sand Member. In general ground water levels in this aquifer are above mean sea level. Chloride concentrations in excess of 10 ppm have been recorded in samples taken from test wells in the vicinity of South River and Deep Run. The concentration in these samples fluctuate and is attributed to overflow during high tides seeping into the outcrop area. There is no pumping in this immediate area and this brackish water appears to be normal bank storage and not indicative of salt water intrusion.

A composite method of halting salt water intrusion would be to construct a tidal dam across the South River, this would impound fresh water to recharge the Old Bridge Sand Member while protecting it from high tides.

In past years, the advance of chloride concentrations has been through the Farrington Sand Member southeasterly along the downdip (slope) of the aquifer wells located several miles to the southwest would have no appreciable influence on the salt water advancement as they would be located across the strike at a 90° angle from the direction of the downdip.

EXISTING PLANTS

As previously mentioned, the principal public water sources in the central and western sector of Madison Township are the facilities of the Madison Municipal Utilities Authority.

Plant No. 1 located on New Jersey State Highway Route 18 diverts water from both the Old Bridge and the Farrington Sands. Although existing diversion rights granted by the Water Policy and Supply Council limit diversion to 30 million gallons per month for each aquifer or a total of 60 million gallons per month, the plant is capable of producing and treating 75 million gallons per month. The plant did in fact exceed its diversion rights from the Old Bridge Sands by 0.673 million gallons in July of 1974. The total diversion from this plant during that month was 32.331 million gallons.

Plant No. 2 located at New Jersey State Highway Route 9 and Throckmorton Lane also diverts water from both aquifers. The diversion granted to this plant is 30 million gallons per month from the Old Bridge Sands and 30 million gallons per month from the Farrington Sands or a total of 120 million gallons per month. The pumpage and treatment capability of this plant is 150 million gallons. The maximum pumpage from this plant also occurred during July of 1974 and the actual diversion exceeded the allotment by 12.614 million gallons.

It must be noted however that even though the pumpage of certain wells exceeded the diversion rights, the total pumpage for Plants 1 and 2 of 174.945 million gallons was below the total diversion rights of 180 million gallons for these two plants.

The maximum demand occurred during the month of July when there is excessive use of water for irrigation, pools, etc. During the remainder of the year the demand is considerably less, in fact Plant No. 2 has been shut down during the winter months.

The total existing production capability of the two plants is 225 million gallons per month, the maximum demand in 1974 was about 175 million gallons per month hence not withstanding the diversion rights, the facilities have an excess water supply of 50 million gallons per month. It would be in the best interest of the Township of Madison for the Madison Municipal Utilities Authority to seek additional diversion rights from the Water Policy and Supply Council to conform with the present capabilities of the plants. The additional supply would provide both a greater factor of safety to the residents and would be available for growth within the Township.

PROPOSED SUPPLY

The proposal for an extensive residential community in this part of Madison has been informally presented by Llewelyn Davies Associates on behalf of Olympia and York Ltd. While the project is still in the planning stage and the final development scheme has not been determined, a reasonable future water demand can be established. Based upon a projected number of homes of approximately 5,000 units, and an average population density of 4 persons per household, the future population of this project is estimated at about 20,000 persons. The daily demand therefore is approximately 2 million gallons or a monthly total of 60 million gallons.

From the foregoing section it is obvious that the existing facilities of the Authority can not wholly satisfy the demand generated by this project. Although if additional diversion up to plant capacity is obtained, approximately 50% of the project could be served. Hence it will be necessary to develop additional sources of potable water. The magnitude of the new facilities for this project is on the order of one million gallons per day including a well, treatment unit and storage unit.

In order to minimize the effects of a new well upon the production capabilities of existing wells, of both Madison Township and adjoining communities, and at the same time efficiently serve this prime area of Madison the

proposed well would ideally be located southwesterly of Madison Township Plants 1 and 2. The depth and specific capacity of such a well is speculative at this point in time, however, data from surrounding wells and geologic information available will guide the location and diameter of an exploratory well. Furthermore pumping tests of an exploratory well and simultaneous monitoring of adjoining wells will supply the data required for the development of a production well. This data will include the safe yield, water quality, static level, drawdown, influence in any or existing wells, etc. Plate No. 3 shows existing wells in the general area in addition to the possible location of a new well.

Based upon the foregoing information, a production and treatment facility can be constructed which will have a reliable and safe yield and which will not be detrimental to existing production wells both within the Township of Madison, and the neighboring municipalities.

INFLUENCE OF WELLS

Predicting the influence one well will have on another can only be determined by drilling and monitoring observation wells in the same aquifer.

However, using data compiled by pumping and yield tests in adjacent wells, average values for transmissability and specific capacity can be obtained. In theory these

values indicate that the cone of influence for a one million gallon per day well would not extend beyond 2 miles.

A production well at the location under study would have no noticeable effect on the productivity of neighboring wells in the same aquifer.

CONCLUSION

The Township of Madison is underlain by the most productive aquifers in central and southerly portion of the State of New Jersey. The various water bearing sands are collectively known as the Raritan and Magothy Formations. The formations are situated on and generally follow the contour of the underlying bedrock being level in a northeasterly direction (strike) and sloping downward (dip) southeasterly toward the continental shelf. Due to population and industrial pressure, certain branches of the formation have been overdeveloped resulting in salt water intrusion into the aquifer. The problem is presently limited to the Farrington member in the Sayreville and South Amboy area. Since the condition was first analysed, a number of wells in the above areas have become unfit and were consequently abandoned. Careful management of groundwater supplies has prevented similar problems in the Old Bridge member. The area of Madison Township under consideration is located some four to five miles across strike of the problem area and immediately down dip of the recharge areas of the Raritan Formation. Hence the source of groundwater in this portion of the aquifer is the outcrop of the Old Bridge and Farrington Sands in Monroe Township and East Brunswick Township generally to the west of New Jersey State Highway Route 18.

The development of a groundwater supply in the western portion of Madison should have little effect if any on the existing wells of the Madison Township Municipal Utilities Authority some 2.5 miles distant and even less bearing on the salt water encroachment problem some 6 miles northeasterly. Careful monitoring and testing of existing wells is necessary to protect existing supplies and ensure the productivity of this very important natural resource.

To ensure the availability of potable water to the citizens of Madison Township and water for planned economic growth of the community, it is recommended that first application be made to the State of New Jersey for the right to divert an additional 5 million gallons per month total from the prospective existing wells to fully utilize the capacity of the existing facilities. Secondly, in anticipation of growth, application be made to the State for the diversion of 30 million gallons per month from a new well to be developed to the south and west of the existing facilities mentioned herein. Lastly it should be noted that a number of re-charge wells which are operating successfully have been constructed in the State. The purpose of these wells is to utilize the aquifer as an underground reservoir for the storage of treated water. In general terms during periods of the year when the water demand is extremely low, the treated water can be used for consumption

is pumped back into the aquifer for storage to be withdrawn during the following season of high demand. This process makes additional treated water available on demand without taxing the capability of wells and treatment plants. Furthermore, it stabilizes the rate of withdrawal from the aquifer. The foregoing is an additional method which should be considered in the future water planning for the Township.

Data obtained from New Jersey Department of Environmental Protection, Bureau of Water Control

TABLE NO. [illegible]

PLANT NO. 1

LOCATION: NEW JERSEY STATE HIGHWAY ROUTE 18 & [illegible] STREET

TREATMENT CAPACITY (DAILY) = 2.5 MG

TREATMENT CAPACITY (MONTHLY) = 75.0 MG

WELLS	AQUIFER	APPROX. DEPTH	PUMP CAPACITY
10	Old Bridge Sand	175'	[illegible]50 GPM = [illegible].5 MGD
11	Old Bridge Sand	175'	[illegible]50 GPM = [illegible].5 MGD
5	Farrington Sand	37[illegible]'	[illegible]00 GPM = 0.7 MGD
6	Farrington Sand	350'	[illegible]00 GPM = [illegible] MGD
TOTAL 4			[illegible] GPM = [illegible] MGD

EXISTING DIVERSION RIGHTS

Old Bridge Sand	3[illegible] MG/ Month	= 1 MGD
Farrington Sand	30 MG/ Month	= 1 MGD
TOTAL	[illegible] MG/ Month	= [illegible] MGD

MAXIMUM DIVERSION-OCCURRANCE JULY [illegible]

Old Bridge Sand	30.673 MG
Farrington Sand	11.658 MG
TOTAL PUMPAGE	[illegible].331 MG

EXCESS (OLD BRIDGE SAND ONLY) 0.67[illegible] MG

TABLE NO. 11

PLANT NO. 2

LOCATION: THROCKMORTON LANE & NEW JERSEY STATE HIGHWAY ROUTE 9

TREATMENT CAPACITY (DAILY) = 5.0 MG

TREATMENT CAPACITY (MONTHLY) = 152.0 MG

WELLS	AQUIFER	APPROX. DEPTH	PUMP CAPACITY
1	Old Bridge Sand	250'	750 GPM = 1.0 MGD
2	Old Bridge Sand	250'	750 GPM = 1.0 MGD
3	Farrington Sand	480'	1000 GPM = 1.5 MGD
4	Farrington Sand	480'	1000 GPM = 1.5 MGD
TOTAL 4			3500 GPM = 5.0 MGD

EXISTING DIVERSION RIGHTS

Old Bridge Sand	30 MG/Month	= 1 MGD
Farrington Sand	90 MG/Month	= 3 MGD
TOTAL	120 MG/Month	= 4 MGD

MAXIMUM DIVERSION - OCCURRENCE JULY 1978

Old Bridge Sand	34.862 MG
Farrington Sand	97.752 MG
TOTAL PUMPAGE	132.614 MG
EXCESS	12.614 MG

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ENGINEERING SURVEYING PLANNING ASSOCIATES

Division of Goodman, Allgair & Scott
Woodbridge and Howell, New Jersey

BOX 258, U.S. HIGHWAY 9
HOWELL, NEW JERSEY 07731
(201) 462-7400

JOHN L. GOODMAN L.S.
JOHN H. ALLGAIR P.E., L.S., P.P.
WILLIAM N. SCOTT, L.S., P.P.
E. ROBERT LEWIS P.E., L.S.
PETER W. STRONG P.E.
JOHN J. STEFANI P.E.
ROBERT MCKENNA E.I.T.
HARRY CHRISTIE JR., P.E., L.S.
ERNEST MITCHELL L.S.
JAMES F. ARDIZZONE L.S.
RUSSELL I. KNUDSON L.S.
WILLIAM F. SCHULTZ L.S.
DAVID J. SAMUEL E.I.T.
PHILIP GILMAN L.S.

PLEASE REFER
TO OUR FILE NO. 78M2700

APPENDUM TO
ENGINEERING STUDY
OF
AVAILABLE WATER RESOURCES
IN
WESTERN MADISON TOWNSHIP
MIDDLESEX COUNTY, NEW JERSEY

PREPARED FOR
OLYMPIA AND YORK PROPERTIES
IN
OLD BRIDGE TOWNSHIP

NOVEMBER, 1978

Since the original "water availability" report was compiled in 1975, the existing conditions of and surrounding the Olympia-York properties have changed very little. The name of the Township has changed from Madison to Old Bridge and there has been a nominal growth in the number of dwellings throughout the Township. Therefore, while we have not obtained new figures on water consumption in the Township, we would not expect significant changes from 1975.

However, we do know that there may be significant changes in the Township, in general, as well as in the area of the Olympia-York properties, specifically. There have been approximately 1000 residential units approved to be built that are either just beginning or have not yet begun construction. This number of units would increase the average water consumption by some 0.4 MGD or 12 million gallons per month. With the growth that has already occurred, we would expect that at least 15 million gallons of the water authorities estimated 50 million gallon excess production capability is either being used or is committed to potential users.

We have also noted that J. Robert Hillier's office estimates that approximately 6200 units can be achieved on the Olympia-York property, based on present zoning and practicality. The original estimate in 1975 was for 5,000 units and a population of 20,000 persons. The new estimate of 6200 units would produce an expected population of about 25,000 persons. This would result in an estimated average water comsumption of about 2.5 MGD or 75 million gallons per month as opposed to the original estimate of 2.0 MGD or 60 million

gallons per month. Thus, where we had originally anticipated a need for one million gallon per day well, treatment, and storage, it appears probable that any new facilities to serve the Olympia-York property would require 1.5 to 2.0 million gallons per day based on updated figures.

We must also point out that we are aware of another project on the other side of Texas Road which has recently approached the Planning Board with preliminary sketches for 3,000-3,500 residential units on approximately 1,000 acres. While the project, known as Woodhaven Village, is in its early stages and a number of alternatives are being considered for water service, it is possible that some sort of joint venture, advantageous to both parties as well as the Township, could be worked out for this area.

Elson T. Killam Associates Inc

MEMORANDUM

To File Date January 29, 1980

From Jim Coe

Subject Meeting on January 25, 1980 With DEP Water Resources Division

Job No 710

On the morning of January 25, 1980, Peter Homack and myself met with Mr. Ray Webster of the New Jersey Department of Environmental Protection Water Resources Division. Mr. Webster's function with the DEP involves approval and recommendations relative to the diversion rights for water supply sources throughout the State. Mr. Webster has been with the State for many years and is very knowledgeable with respect to the State's water supply resources, he is also intimately familiar with actions of the Water Policy and Supply Council which approves all major diversions of ground or surface waters within the State.

Mr. Webster explained to us that in order to obtain rights to divert ground water an application must be filed which includes an engineering report discussing the diversion and its potential effects on groundwater supplies in the area. Upon receiving the application notification is given to all those holding diversionary rights within a five mile radius with a request for objections. If no objections are filed, the Water Policy and Supply Council would generally act in accordance with the recommendation of Mr. Webster's staff. If objections are filed a hearing follows during which the objectors and the applicant submit expert testimony to the Water Policy and Supply Council in order to aid them in reaching the proper determination on the application. Mr. Webster indicated that there have been times when the applicant or the objector has appealed the decision of Water Policy and Supply Council, but to date a determination of the Water Policy and Supply Council has not been overturned.

We discussed with Mr. Webster water supply in that portion of Middlesex County which includes Old Bridge Township. Mr. Webster was very familiar with the various water systems in the area and spoke at length regarding the problem of salt water intrusion, particularly into the Farrington Sands Aquifer. This Aquifer is the more productive Aquifer which exists in the Old Bridge Area the other being the Old Bridge Sands Aquifer. The Old Bridge Sands Aquifer characteristically provides water with very high iron concentrations and low yield, however, it is not subject to the salt water intrusion of the Farrington Aquifer. Mr. Webster confirmed and

underscored our suspicions that a very serious water supply problem exists in this portion of the State.

He told of a situtation where East Brunswick requested diversion rights for three to four new wells, approximately two to three years ago. This application resulted in numerous objections, among them the PJ Schwietzer Paper Company, who was represented in an engineering capacity by Garity and Miller, particularly a Mr. William Severs. This application requested diversions from the Farrington Aquifer which is the only one available in East Brunswick Township. The application was denied, East Brunswick appealed the decision of the Council, and the decision was upheld in the courts.

In another situation Monroe Township has applied for additional diversion rights, objections in this case were also filed by PJ Schwietzer despite an 11 mile distance from the proposed diversion. In this case no final determination has yet been made. A test well has been constructed and it is supposed if this well has no affect on other wells in the area that the diversion rights would be granted.

Mr. Webster indicated that the Council would not approve of new wells constructed for diversion from Farrington Aquifer, but felt that there would be few (if any) objections, and a favorable determination by the Council for diversion from the Old Bridge Sands Aquifer. Unfortunately, however, the Old Bridge Sands provides a questionable potable water source in regard to both quanitity and quality. Mr. Webster suggested that the 208 Study would provide some general information relating to the water supply problems in this area. He stated, however, that it did not provide ultimate solutions for the lack of water supply, other than perhaps in very general terms. The 208 Study may be helpful, however, in assessing the overall situation and we will obtain a copy of it and review it with respect to this development.

Upon our questioning Mr. Webster, indicated that there is no present application by the OBMUA for additional diversionary rights. The last rights were granted in 1969 at which time diversion rights of 222.5 million gallons per month (approximately 7.5 MGD) were granted. Mr. Webster stated that there may be some movement in the future by the Water Policy and Supply Council towards a system whereby diversion rights would expire within a five to ten year period, after which time water utility companies and Authorities would have to reapply for diversion rights, demonstrating the effect of these diversions and also their conservation practices.

Data on the present usage of water in the OBMUA system is as follows:

Year	Peak Monthly Supply
1978	188.4
1977	188.0
1974	185

The maximum annual average flow during recent years was in 19[illegible] 4.61 MGD was reported. This data indicates that the [illegible]MUA may have an excess of diversion rights over current use in the order of 32 million gallons per month (approximately 1 MGD). State records indicate that current number of customers is 10,000 with a population of 58,500. This data indicates a water consumption of approximately 300 gallons per customer which is normal. The relationship between peak monthly flow and average annual flow was also discussed and it was felt that this was also normal to water systems in the State with a factor of about 1.5 (peak month to average month).

The potential for groundwater recharge was also discussed. Mr. Webster indicated this has been successfully accomplished in Wildwood which uses well water to recharge the groundwater in certain areas. Discussion continued concerning the use of treated sewage effluent and it was stated the State would require that the recharge effluent would have to be equivalent in quality to the prevailing groundwater in the area. Extensive treatment including nitrogen and phosphorous removal would have to be provided to accomplish this. It was estimated that two to three recharge walls would probably have to be provided for each supply well in order for the system to operate effectively. Although, Mr. Webster saw the merits of such a system he felt substantial objections would occur if such a system was proposed.

Mr. Webster indicated that he was surprised to hear the developers within Old Bridge were proceeding with planning for major developments in the area having not established the availability of water supply. He also questioned whether such projects had been brought before the Planning Board and whether they had been advised of the limitations of supply in the area by that body or by other Township Authorities. We advised him that it was our understanding that one developer who has proposed 1750 units, has the Township's approval to proceed subsequent to various legal proceedings between the Township and that developer. Although, it was agreed that it would be conceivable that adequate water supply could be made available within the excess diversion rights. Mr. Webster indicated that there was good possiblity that the Township would reach its diversion limits prior to that development being completed resulting in serious problems for the Township, the Water Policy and Supply Council, and the developer.

cc: Peter Homack

January 28, 1980

MEMORANDUM RE. MEETING WITH RAY WEBSTER, TRENTON,
FRIDAY, JANUARY 25, 1980

RE. OLYMPIA AND YORK

Ray Webster had indicated that it would be very difficult to obtain a water supply in Old Bridge Township to serve a major developer. He indicated that it would not be possible to obtain water from the Farrington Sands aquifer. He stated that withdrawal from the Old Bridge aquifer might be permitted but this was a very poor quality of water with very high iron, with low-yielding wells.

Background

All of this area obtains its potable water supply from sub-surface sources. Within Old Bridge Township, Perth Amboy obtains its primary supply (about 5 m.g.d) withdrawn from this aquifer. Perth Amboy has about 110 wells in the Old Bridge Sands and two wells only from the Farrington Sands.

Duhernal which comprises Dupont Companies, National Lead, etc. also withdraws its supply near the Duhernal Lake area. Just north, the Peter J. Schweitzer Paper Company obtains its water from the Farrington Sands. East Brunswick, Munroe Township, as well as Old Bridge and others, obtain the major portion of their supply from the Farrington Sands.

Recently, East Brunswick made application for the withdrawal of additional water from the Farrington Sands to meet their requirements. They hired Leggette, Brashears & Graham, Inc. as their groundwater experts. The Peter J. Schweitzer Paper Company opposed this application (as well as many others), and they engaged the firm of Geraghty and Miller. After an extensive hearing in Trenton, in which Geraghty and Miller conclusively proved that additional water could not be withdrawn, the hearing terminated and the decision rendered that East Brunswick would not withdraw any more water from this supply. The matter was carried to an Appeal Court, and the decision of the Water Policy and Supply Council was upheld.

Among other things, there is a serious problem of salt water intrusion in the aquifer. The source is attributed to the Washington Canal which is located in South River. This problem, accompanied with declining water table, has led Water Policy and Supply to conclude that there cannot be any further withdrawal from this aquifer, and Mr. Webster predicted that any application by Old Bridge M.U.A. would be rejected. He indicated that some consideration might be given to permitting withdrawal of some water from the Old Bridge Sands.

Mr. Webster indicated that the Old Bridge M.U.A. had in the aggregate rights to withdrawal of 222.5 million gallons per month. He indicated that the annual average is about 4.5 m.g.d. Based upon the records in Trenton, the following represent the maximum withdrawals in the maximum month for the following years:

1974	185 m.g.
1977	188 m.g.
1978	188.4 m.g.

Thus, the MUA does have a safety factor of about 34 m.g. per month which is only about 1 m.g.d.

The foregoing would indicate that in the maximum month, the aggregate use in the various water systems is about 6 m.g.d. which is not a significantly high peak monthly rate when the average is about 4 - 4.5 m.g.d. per year.

On the other hand, Mr. Webster pointed out that the last few years have been relatively wet and that in the event of a drought, he could see 222.5 m.g.d. per month easily exceeded with the present connected population. It is reported that the present population is about 58,800 people and that there are approximately 16,900 connections.

It is obvious from the above that with an increase of some 50% or more in connections contemplated for only two developments, that Old Bridge M.U.A. cannot supply this quantity of water and would have to make application for additional withdrawal rights which apparently are not available.

The following represent some of the information available concerning present rights from the various separate water systems:

Brown Town

2 wells in Farrington	-	90 m.g. per month
2 wells in Old Bridge	-	30 m.g. " "
Total		120 m.g. " "

Madison Township

2 wells in Farrington	-	30 m.g. per month
2 wells in Old Bridge	-	30 m.g. " "
Total		60 m.g. " "

Midtown Water Company

30 m.g. per month allowable six months of the year
(May 1, through September 30)

Lawrence Harbor

1 well in Old Bridge	-	15½ m.g. per month
1 well in Farrington	-	15½ m.g. " "
Total		31 m.g. " "

Total from both wells cannot exceed 23.5 m.g. per month. The Water Resources Division of DEP records the reported record of diversion which must be reported to Trenton. These records are available for detailed perusal but in general indicate that an excess supply is not readily available.

Mr. Webster indicated that both the 201 and 208 reports now required have a further adverse effect upon water supply development and the projection of population growth. He indicated that because of the limitations in water supply in this area, he did not see how further population growth was possible.

mH/ba

Elson T. Killam Associates Inc.

27 Bleeker Street, Millburn, New Jersey 07041
Telephone (201) 379-3400

Environmental and Hydraulic Engineers

Peter Homack
Chairman of the Board

July 29, 1980

Mr. Lloyd Brown
43 Beech Hill Circle
Princeton, New Jersey 08540

Subject: Water Supply for Olympia & York

Dear Lloyd:

Spoke to Charles Cahoon of Alaimo's office today. He stated that they have a study underway for the Old Bridge Water Authority, and that an expansion program is in the works and going on right now. He stated that they have made an initial contact with Water Policy and Supply (Webster). As he stated, he has "felt them out" concerning the availability of water. However, no formal application has been made for water supply from the W. S. Council. He stated it would be about three months before they completed their study and before they would be in a position to recommend that a hearing be held for increased water supply rights.

He indicated that water was available from the Old Bridge Sands, and that they were aware of the fact that they would not be able to obtain their supply from the Farrington Sands. He stated that as far as he knew, only 2,000 units had been approved by the Planning Board. He was not aware of the number of units from Olympia and York, and I furthermore offered to send him back-up data if this would be helpful.

I also indicated that Kupper's studies of the Deep Run reflected the need for a very large parallel interceptor sewer and that this work was underway and that in the Irisic Brook watershed, we anticipated possibly, 11,000 units in the foreseeable future, with the ultimate projection of some 20-25,000 in the entire area.

When I tried to press him for specific information such as his projections of water need and the timetable for expanding and developing their water supply sources, he simply stated that he "did not have this information available".

Mr. Lloyd Brown
Princeton, New Jersey 08540
- 2 -

In summary, I would urge a follow-up and, perhaps, we should offer to them some of the projections which have been made for sanitary sewerage facilities in both the Deep Run and Irisic Brook watersheds.

Sincerely yours

ELSON T. KILLAM ASSOCIATES, INC.

Peter Homack

PH/ba
cc Jim Coe
cc Wendell Smith, Esq.

Elson T. Killam Associates Inc.

MEMORANDUM

To Peter Homack Date February 5, 1981

From Jim Coe

Subject Olympia & York Water Supply

Job No. 710

I called Ray Webster of the Department of Environmental Protection today and questionned him as to whether the Old Bridge Municipal Utilities Authority had submitted an application for additional diversion rights. I reminded him that we had been down to see him a year or so ago concerning this. Mr. Webster stated that an application has not been filed and in fact "there has not even been an inquiry."

bah

March 6, 1981

OLYMPIA & YORK

OLD BRIDGE TOWNSHIP

I. Summary of Salient Factors

1. Up until this point, we had utilized a total of 9,000 residential units for the O & Y development plus 1,500 equivalent units of commercial development.
2. In addition, an estimated 7,500 units were determined to be tributary and would have to be served (this may not be ultimate density potential, it is based upon 4 units/acre).
3. Based on the foregoing, it was determined that the approximate sewage outlet requirements to serve this and possible tributary areas would be about 3.4 million gallons/day. (18,000 x 3.2 x 65 x 90% = 3.4 MGD). This would correspond to water supply "diversion right" requirements of about 3.7 MGD (annual average) or 167 million gallons/month (maximum month).
4. With regard to disposal of sewage, it was determined that the Iresick Brook Interceptor Sewer is able to accommodate approximately 7,400 units -- provided that the restrictive section on Sandfield Road was paralleled.
5. If equalization facilities were installed prior to discharge into the Iresick Brook Interceptor, it might be possible to increase the total connections to this line (3,600 units or a total of 11,000 units). The foregoing estimates are over and above the present connections in Old Bridge estimated to be about 4,000 and the connections from Monroe Township estimated to be about 2,200 for a total of about 6,200.

We have been unable to obtain confirmation of the foregoing estimates either from the Middlesex County Utilities Authority, and are relying on information received by phone conversations with the Old Bridge Sewerage Authority, and we have independently metered and measured the flow in Iresick Brook.

6. We have determined that this interceptor sewer flows about one-half full or less even over peak flow conditions.

7. While the capacity of this line varies from reach to reach, it appears that at the lower end prior to discharge into Sandfield Road, the average daily flow is about 1.12 MGD and this would equate to about 4,500 units at an estimated per unit flow of 250 gallons/day. This causes us to question the 6,200 units estimated by Old Bridge.

8. It is reported that Monroe has rights to a peak flow of 2.0 MGD in the Iresick Brook interceptor. The connection from Monroe to the Iresick Brook is not at the upper end, it is connected at a point midway between Sandfield Road and the O & Y tract. We have estimated that the peak flow of 2.0 MGD would be equal to about 3,200 connections as a maximum (2.0 MGD ÷ (2.5 x 250)). We have not been able to ascertain whether Monroe has reached this number of connections, but expect that they have not.

9 It is reported that the sewage flow from Monroe is metered. These records have not as yet been obtained from the Middlesex County Utilities Authority. Based upon the past studies, we had determined that the total number of potential connections to Iresick Brook would be as many as 30,000 units plus any

additional rights Monroe may have. This compares with a maximum estimated capacity of the line of 17,200 units (6,200 + 11,000) units. Even if the Monroe connections were removed from the Old Bridge system, it would appear that a parallel interceptor or a relief pipeline will be required to accommodate the potential upstream development in the Iresick Brook watershed and adjacent watersheds likely to be connected by pumping stations.

10. The foregoing does not relate to any of the reported problems in the Deep Run watershed which is adjacent to Iresick Brook and which would serve -- on Old Bridge Sewage Authority Master Planning -- a relatively small but significant area of the proposed O & Y development. We have planned that this area would be pumped into the Iresick Brook watershed and has been considered within the foregoing.

II. Proposed Modifications in Planning of O & Y Development

1. It is our understanding that the latest planning for the O & Y tract could result in approximately 13,088 units instead of 9,000 units. In addition, 1,200,000 square feet of commercial development is planned, and our previous estimate of 1,500 equivalent units is no longer valid.

2. If the foregoing is now final (and we would appreciate an early review and check), we have re-estimated the water requirements for the diversion rights which would have to be obtained for this development as being 2.35 MGD (13,088 x 2.8 x 60 gpd) + (1,200,000 x .125 gpd) = 2.35 MGD). This equates to a diversion request of about 106 mg/month in lieu of 167 MGD. It should be noted that this revised estimate does not make allowances as hereinbefore for adjoining developments should it be considered. In the event that it is found necessary to make allowances for these areas which are interspersed within this development and adjacent thereto, we have estimated that the requested diversion would be approximately 170 mg/month.

3. With regard to the collection and disposal of sewage from this tract, it has been determined that the average daily sewage flow will be approximately 2.3 MGD (in lieu of 3.4 MGD). The Iresick Brook interceptor will require relief facilities in the future to accommodate not only the utilization development proposed for O & Y but also for the planned development in adjacent areas which are tributary to Iresick Brook.

III. Suggested Planning for Water Supply and Sewage Disposal

1. The MUA will have to obtain additional diversion rights of approximately 170 mg/month of which 106 mg/month alone would be required for the O & Y development. It should be noted that these diversion rights would be required essentially to serve a rather limited area in the Iresick Brook and adjacent water shed, which comprises about 20% of the town. The present rights in Old Bridge are reported to be 7.75 MGD or about 232.5 million gallons/month.
2. Fortunately, the MCUA has recently completed a major expansion of their facility including their treatment plant for a parallel South River Interceptor Sewer which has provided additional capacity for Monroe, Old Bridge, and other areas. While we have not been able to obtain the Kupper report setting forth the basis of design including the number of units which have been provided for in both Monroe and Old Bridge, we believe that this information was submitted to DEP and EPA and is a matter of public record. The MCUA is now looking for customers to reduce their exhorbitant charge to present users.

The only problem in providing adequate outlet facilities for the proposed tract is in pursuading the OBSA to provide the necessary improvements to their inadequate connection system. It is obvious that the original planning for sanitary sewers was inadequate. For example, the bottleneck in Sandfield Road is inexcusable. This should be remedied immediately.

Feb 5, 1981

OB

EVALUATION OF EXISTING WATER SUPPLY FACILITIES

Water supply in Old Bridge Township is furnished by the public water system operated by the Old Bridge Township Municipal Utilities Authority and private wells. The more densely populated portions of the Township being served by the public water system and more rural areas being served by individual private wells. The Old Bridge Township Municipal Utilities Authority consists of several interconnected water systems which had operated as separate water companies prior to their being acquired by the OBMUA.

The OBMUA serves approximately 16,000 customers having an estimated population of 58,500 persons. The maximum annual average flow during the recent years was in 1977 when an average of 4.61 MGD was consumed. The OBMUA obtains its water supply from wells located throughout the Township. Since 1969 the diversion rights issued by the State Water Policy and Supply Council, which limit the allowed withdrawal of water, have been 222.5 million gallons per month (approximately 7.5 MGD). This amount is based upon the maximum monthly flow. The peak monthly usage in Old Bridge Township during recent years has not exceeded 190 million gallons. Accordingly, approximately 32 million gallons per month, or an average peak month demand of 1 MGD, appears to be available. Present consumption is approximately 300 gallons per day per unit as an annual average and approximately 400 gallons per unit as a peak month demand. This suggests that the water supply system is capable of accepting about 2500 additional customers under the existing diversion rights.

The Olympia & York property could be served by extensions and reinforcement of the OBMUA system. In particular that portion of the system

previously known as the Madison Water Company. Connections to the terminus of the system along Englishtown Road, Maple Street and along Route 18 in the vicinity of Pinetree Apartments could be accomplished. A major interconnection from the water treatment plant on Route 18 could be constructed along a Jersey Central Power & Light Right Of Way to the Olympia & York property.

In view of the limited available diversion rights and also limitations upon existing treatment and storage facilities, it is expected that additional wells, treatment and storage facilities will be necessary to serve the southwest portion of the Township and in particular the Olympia & York development. Within the Olympia & York development there are properties which appear suitable for the construction of such facilities. The water bearing aquifers which underlie other portions of the Township also underlie portions, if not all, of the Olympia & York development. The Olympia & York also owns land which is among the highest in elevation within the Township. A portion of this property would be very suitable for the construction of a water storage tank.

In order to better assess the capability of local aquifers to supply water for the development contemplated, it was recommended that Olympia & York obtain the services of a groundwater hydrologist. The firm of Geraghty & Miller, Inc., has been retained by Olympia & York to evaluate the water supply capabilities of the aquifers which underlie the Olympia & York site. Geraghty & Miller is a highly regarded firm specializing in hydrogeologic studies and have provided expert testimony before the Water Policy and Supply Council with regard to applications for diversion rights.

ConverseWardDavisDixon

REPORT OF GEOMORPHIC FLOODPLAIN 2400 ACRE DEVELOPMENT OLD BRIDGE, NEW JERSEY

Seattle WA
San Francisco CA
Pasadena CA
Anaheim CA
Las Vegas NV
Cincinnati OH