Enter your transmittal number → X239159
Transmittal Number

Your unique Transmittal Number can be accessed online: http://mass.gov/dep/service/online/trasmfrm.shtml

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: DEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application. **Copy 2** must accompany your fee payment. **Copy 3** should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA
02211

*** Note:**
For BWSC Permits, enter the LSP.

A. Permit Information

BRP WS 17	Approval to Conduct a Pumping Test
1. Permit Code: 7 or 8 character code from permit instructions	2. Name of Permit Category

Replacement Wells
3. Type of Project or Activity

B. Applicant Information – Firm or Individual

Town of Wayland
1. Name of Firm - Or, if party needing this approval is an individual enter name below:

Ouellette, P.E.	Don	
2. **Last Name** of Individual	3. **First Name** of Individual	4. MI

41 Cochituate Road
5. Street Address

Wayland	MA	01778	508-358-3672	
6. City/Town	7. State	8. Zip Code	9. Telephone #	10. Ext. #

	douellette@wayland.ma.us
11. Contact Person	12. e-mail address (optional)

C. Facility, Site or Individual Requiring Approval

Happy Hollow Wells
1. Name of Facility, Site Or Individual

266 Old Connecticut Path
2. Street Address

Wayland	MA	01778		
3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #

PWS No. 3315000-03G, -04G		
8. DEP Facility Number (if Known)	9. Federal I.D. Number (if Known)	10. BWSC Tracking # (if Known)

D. Application Prepared by (if different from Section B)*

Tata & Howard, Inc.
1. Name of Firm Or Individual

67 Forest Street
2. Address

Marlborough	MA	01752	508-303-9400	
3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #

Randal Suozzo, P.E.	
8. Contact Person	9. LSP Number (BWSC Permits only)

RECEIVED
AUG - 1 2011
DEP
NORTHEAST REGIONAL OFFICE

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☐ yes ☒ no
   If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit:

EOEA File Number

F. Amount Due

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Special Provisions:

1. ☒ **Fee** Exempt (city, town or municipal housing authority)(state agency if fee is $100 or less).
   There are no fee exemptions for BWSC permits, regardless of applicant status.
2. ☐ Hardship Request - payment extensions according to 310 CMR 4.04(3)(c).
3. ☐ Alternative Schedule Project (according to 310 CMR 4.05 and 4.10).
4. ☐ Homeowner (according to 310 CMR 4.02).

Check Number	Dollar Amount	Date

TATA & HOWARD

Water and Wastewater Consultants

July 29, 2011

Mr. James Persky
Department of Environmental Protection, Bureau of Resource Management
205B Lowell Street
Wilmington, Massachusetts 01887

Subject: BRP WS 17, Transmittal No. X239159
Happy Hollow Replacement Wells
Wayland, Massachusetts
T&H No. 2208

Dear Jim:

On behalf of the Wayland Department of Public Works (DPW), Tata and Howard, Inc. is presenting the following plan to replace existing Well Nos. 1 (3315000-03G) and 2 (3315000-04G) at the Town's Happy Hollow well site. The existing wells are sited within the 100-year floodplain, and experience seasonal flooding. As discussed during the April 20, 2011 site walk with the Massachusetts Department of Environmental Protection (MassDEP), the Town intends to replace the existing wells with three smaller diameter wells located outside the floodplain. In addition, the Town intends to replace the existing Chemical Feed Facility relocating it outside the floodplain, while concurrently providing chemical safety upgrades. The Town has conducted test well investigations on site and coordinated a preliminary site walk with MassDEP to discuss replacement well options. The following describes the existing well site conditions, the work completed to date, and the Town's proposal to replace the wells.

Existing Conditions

Currently, the existing supply wells that provide water to the Town of Wayland, receive chemical addition through a common below-grade chemical injection vault. Well No. 1 is a 24-inch by 48-inch gravel packed well approximately 42-feet deep, installed in 1948. The well is equipped with a 40 HP constant feed vertical turbine pump. Well No. 2 is a 24-inch by 48-inch gravel packed well approximately 47-feet deep, installed in 1952. The well is equipped with a 75 HP vertical turbine pump. The combined permitted maximum daily withdrawal rate of the source wells is 1.3 million gallons per day (mgd). The Happy Hollow Wells are located in the southwestern section of the distribution system off Old Connecticut Path, adjacent to the Wayland High School. The two wells are connected to the distribution system through a 12-inch diameter water main.

Tata & Howard
www.tataandhoward.com
67 Forest Street, Marlborough, MA 01752
T. 508-303-9400 F. 508-303-9500

Lakeville, MA Portland, ME
Meriden, CT Goodyear, AZ Nashua, NH

The existing well house structures are subject to seasonal flooding and are situated within the buffer zone of the adjacent wetlands resource area. Further, the protective Zone I radii of the two wells encompass multiple parcels; and while owned by the Town, are under the jurisdiction and control of various Town entities. There also exist several stormwater drainage outfalls that are not completely controlled by the Department of Public Works, and have been identified on previous sanitary surveys by MassDEP. Further, routine maintenance and system improvements onsite are subject to permission from other agencies within Town.

Approximately 30 percent of the existing Zone I areas are comprised of land used for the Wayland High School, including sports fields; approximately 15 percent encompass land that is categorized as wetland resource area; 25 percent of the existing Zone I is within a former gravel pit, which is currently inactive; and the remaining 30 percent of land within the Zone I is wooded.

Test Well Investigations

In January 2011, representatives from the Denis L. Maher Company (DLM) installed three 2.5-inch diameter test wells at the Happy Hollow well site, as a part of the test well exploration program, to identify potential replacement well locations for Well No. 1 and Well No. 2. The test wells were sited adjacent to a former gravel pit, now inactive, and owned by the Town (see Figure No. 1 - Locus Map in Attachment A). Following installation, the test wells were pumped for a short duration to determine the hydraulic characteristics and potential yield of each well and to collect water quality samples.

DLM installed Test Well No. 1-11 to the southeast of Well No. 1. The position of each test well was selected due to the limitations imposed by the expansive wetland resource area located immediately to the north of the existing supply wells and floodplain elevation. Each test well was driven incrementally, and Test Well No. 1-11 was installed to a total depth of 58 feet below ground surface (bgs). The well was outfitted with a 50 slot screen and pumped for four hours at 45 gallons per minute (gpm) with 26 inches of vacuum. The maximum drawdown experienced in Test Well No. 1-11 was 1.21 feet.

Test Well Nos. 2-11 and 3-11 were installed to the south and west of Well No. 1 and Well No. 2, respectively. Test Well No. 2-11 was installed to a depth of 42 feet and outfitted with a six foot long, 60 slot screen and pumped for four hours at 50 gpm with 26 inches of vacuum. The maximum drawdown experienced in Test Well No. 2-11 was 1.03 feet. Test Well No. 3-11 was installed to a depth of 36 feet, and outfitted with a six foot long, 60 slot screen and pumped for three hours at 60 gpm with 27 inches of vacuum. The maximum drawdown experienced in Test Well No. 3-11 was 1.61 feet.

The approximate locations of the test wells are shown on the Site Plan labeled Figure No. 2 in Attachment A, test well logs and preliminary pumping test data is included in Attachment B.

Water Quality

Water quality samples from the test wells were collected during well development. Initial laboratory results show water quality characteristics of the test wells are not significantly different from the existing supply wells. Table No. 1 provides a brief comparison of the preliminary laboratory results for Test Well Nos. 1-11, 2-11 and 3-11 and the current water quality characteristics of the Happy Hollow Wells for selected parameters.

Table No. 1
Comparison of Water Quality Data
Happy Hollow Wells
Wayland, Massachusetts

	Depth (feet)	pH	Iron (mg/L)	Manganese (mg/L)	Turbidity (NTU)
MCL/SMCL	-	6.5-8.5	0.3	0.05	N/A
Existing Well No. 1	42	6.7	ND	ND	1.2
Existing Well No. 2	47	6.7	ND	ND	1.2
Test Well No. 1-11	58	6.1	0.11	0.008	0.3
Test Well No. 2-11	42	6.2	0.05	ND	0.3
Test Well No. 3-11	36	5.8	0.08	0.029	0.6

Conclusions

The data collected during test well installation and the subsequent water quality sampling indicates that replacement of the existing sources is a viable option. Drawdown experienced in the test wells at the reported pumping rates suggests that three 18-inch by 12-inch gravel packed wells pumped at a combined rate of 1.3 mgd can be supported by the aquifer in these locations. No additional withdrawal is proposed from this site; therefore, New Source Approval for this not applicable. Additionally, the preliminary water quality test results indicate that pH adjustment is required. Provisions for physically disconnecting the existing Happy Hollow Wells will be submitted with a separate BRP WS 36 permit in accordance with section 4.21 of the guidelines. It is the Town's intention to disconnect the existing wells from the distribution system, but keep them available as irrigation wells or emergency backup.

Proposal for Replacement Wells

Based on the results of the test well investigations, the Town of Wayland proposes to replace the existing Happy Hollow Well Nos. 1 and 2 with three 18-inch by 12-inch gravel packed wells, (see Figure No. 3 – Gravel Packed Well Detail, in Attachment A) . During the site walk with MassDEP, Tata & Howard and the Town discussed the possibility of replacing the existing two gravel packed wells with three smaller diameter wells. There are several advantages to installing three smaller diameter wells configured as a wellfield over singular gravel packed wells. Three wells will provide increased operational flexibility. In the event it is necessary to take one of the wells offline during times of high water usage, the Town will be better equipped to meet system

demands. During normal operation, more distributed withdrawals from the aquifer will provide increased opportunity for recovery.

Construction of a new facility to house updated pump control systems and chemical feed processes will also accompany replacement of the wells. Relocation of the pump controls and chemical feed systems will eliminate several issues and concerns associated with the existing infrastructure. Further, the proposed location of the replacement wellfield and associated pump control station, in a southerly direction, significantly reduces the potential for seasonal flooding and moves the existing water supply operation further from the adjacent wetlands resource area.

Because the depth of the replacement wells will be greater than 27 feet, construction of the replacement wells in a wellfield configuration will not reduce the Zone I protective radius from 400 feet to 250 feet from each well. Consequently, the DPW will work cooperatively with the Wayland High School so that the lacrosse field and other sports fields located within the Zone I radius of Replacement Well No. 1R are maintained with no herbicides and low nitrate fertilizer treatments. Additionally, the DPW will continue to work with the Wayland High School to adhere to the Town's Aquifer Protection District Bylaw, discontinuing non-conforming land use activities within the Zone I of the wells.

Pumping Test Proposal

After the 18-inch by 12-inch wells are installed, the Town intends to conduct a 50-hour pumping test. The pumping test will begin with a staggered startup of each replacement well, and once the start up of each well has been completed, all three replacement wells will be pumped together, continuously for 48 hours at a rate of approximately 300 gpm per each well. Step-drawdown tests will be conducted on each well to determine individual pumping rates. The Town proposes the start-up of the replacement wells be staggered by one hour, beginning with the startup of replacement Well No. 1R (located at Test Well No. 1-11), followed by the startup of replacement Well No. 2R (located at Test Well No. 2-11), followed by the startup of Replacement Well No. 3R. All three replacement wells will then be pumped concurrently for 48 hours. The existing Happy Hollow Well No. 1 and No. 2 will remain off during the pumping test. Town proposes to pump the three replacement wells at a combined rate of approximately 1.3 mgd, and is not requesting an increase in withdrawal above the permitted rate of the existing wells.

Drawdown will be recorded by both manual measurements and automatic pressure transducers in each production well. Manual and transducer measurements will also be recorded at Test Well Nos. 1-11, 2-11, and 3-11 and in the existing Well Nos. 1 and 2. Hydrogeologic investigations of the Happy Hollow well site were completed by AECOM, Inc. in 2010. Various monitoring wells and driven point wells were installed at that time to determine the impact of the existing wells on the adjacent wetlands resource area. Select monitoring wells and driven point wells will be utilized during the pumping test to measure drawdown and monitor wetland resource areas. Staff gauges will be included at driven point well locations where standing water is observed.

Measurements will be recorded in accordance with section 4.3.1.4 of Chapter 4 of the *Guidelines for Public Water Systems*. Table No. 2 presents the existing monitoring wells and driven point wells that will be observed during the pumping test. Monitoring locations are depicted on the Site Plan, Figure No. 2, in Attachment A. Available well logs for the monitoring wells are located in Attachment C.

Table No. 2
Pumping Test Monitoring Locations
Happy Hollow Wells
Wayland, Massachusetts

	Well Type	Approximate Distance from Well No. 1 (feet)	Top of Casing/Pipe Elevation (feet)	Depth of Screened Interval (feet bgs)
Happy Hollow Well No. 1	24"X48" GPW	0	±122	30-42
Happy Hollow Well No. 2	24"X48" GPW	250	±122	35-50
Replacement Well No. 1R	18"X12" GPW	85	TBD	-
Test Well No. 1-11	2.5" steel	85	TBD	41-47
Replacement Well No. 2R	18"X12" GPW	125	TBD	-
Test Well No. 2-11	2.5" steel	125	TBD	36-42
Replacement Well No. 3R	18"X12" GPW	305	TBD	-
Test Well No. 3-11	2.5" steel	305	TBD	30-36
Driven Point Well (DP-1) + Staff Gauge 1	1.25" steel	180	119.6	3-5
Driven Point Well (DP-3) + Staff Gauge 2	1.25" steel	375	116.4	3-5
Driven Point Well (DP-4) + Staff Gauge 3 (new)	2.5" steel	TBD	TBD	TBD
Monitoring Well 5-09	2.5" steel	435	124.9	70-74
Monitoring Well 6-09	1.5" PVC	245	124.5	60-65
Monitoring Well 7-09	1.5" PVC	645	145.1	50-55
Monitoring Well 8-09	1.5" PVC	1,215	130.5	50-60

As shown on the site plan, various monitoring wells are located on the adjacent Wayland High School property. The high school is under reconstruction, which may limit accessibility to some of the monitoring wells listed in Table No. 2. Should any of the test wells become inaccessible

or determined unresponsive, MassDEP will be informed prior to the pumping test. Discharge from the three pumping wells will be directed into a sedimentation basin using temporary piping. The sedimentation basin will be constructed at least 400 feet down-gradient of replacement Well No. 3R located approximately as shown on Figure No. 2.

Water Quality Analyses

Water quality samples will be taken just prior to shutdown from each replacement well and tested individually for inorganic compounds, secondary contaminants, coliform bacteria, nitrate and nitrite. The Town proposes to use composite samples from each of the wells for volatile organic compounds (VOCs) and synthetic organic compounds (SOCs). The samples will be gathered and delivered to a MassDEP-certified laboratory individually, and combined in the lab for testing.

Field sampling for pH, odor, specific conductance, carbon dioxide, and temperature will be measured in the pumping wells and in the immediate vicinity of Staff Gauge 2 to provide information on potential surface water influence on the replacement wells.

Once the pumping test is complete, a letter report accompanied by BRP WS 19/20 permit, outlining the findings will be transmitted to MassDEP for review and approval. The letter will include an evaluation of the data gathered during the pumping test, a surveyed site plan and as-built well designs showing the location, elevation and physical characteristics of the replacement wells and their Zone Is. Design plans and specifications for the construction of the replacement chemical feed pump building, and submersible pumps, electrical and communication plans, chemical feed system and water main connection to the distribution system will be provided with a BRP WS 29 application, under separate cover.

We trust that the information provided is sufficient for your review and approval, however should you have any questions, please do not hesitate to contact us.

Sincerely,

TATA & HOWARD, INC.

Jack O'Connell, P.E.
Senior Vice President

cc: Mr. Don Ouellette, P.E. – Wayland Department of Public Works

Massachusetts Department of Environmental Protection
Bureau of Resource Protection – Drinking Water Program

BRP WS Application

For Drinking Water Program (Water Supply) Permits or Approvals

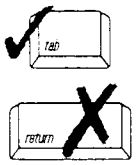
X239159
Transmittal Number

Facility ID# (if known)

A. Application

1. Is this application for ☒ an Original or ☐ a Resubmittal?

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



2. Applicant:

Mr. Don Ouellette, P.E.			41 Cochituate Road	
Name			Address	
Wayland	MA	01778		508-358-36-72
City	State	Zip	Contact	Telephone

3. Consultant:

Tata & Howard, Inc.			67 Forest Street	
Name			Address	
Marlbororugh	MA	01752	Randal Suozzo, P.E.	508-303-9400
City	State	Zip	Contact	Telephone

B. Permit

Please check the permit or approval for which you are applying:

Zone II Determination for Existing Sources
- ☐ BRP WS 07 Approval to Conduct Pump Test for Zone II Delineation
- ☐ BRP WS 08 Approval of Zone II Delineation

New Technology
- ☐ BRP WS 11 Minor New Technology Approval; where no field test required
  - ☐ Drinking Water Additive
  - ☐ Cross Connection Device
  - ☐ Water Vending Machine
  - ☐ Other (specify):
- ☐ BRP WS 12 Major New Technology Approval: where field testing is required
- ☐ BRP WS 27 New Technology with Third-party Approval
- ☐ BRP WS 28 Vending Site/Source Prototype
- ☐ BRP WS 31 Vending and POU/POE Devices with Third-party Approval

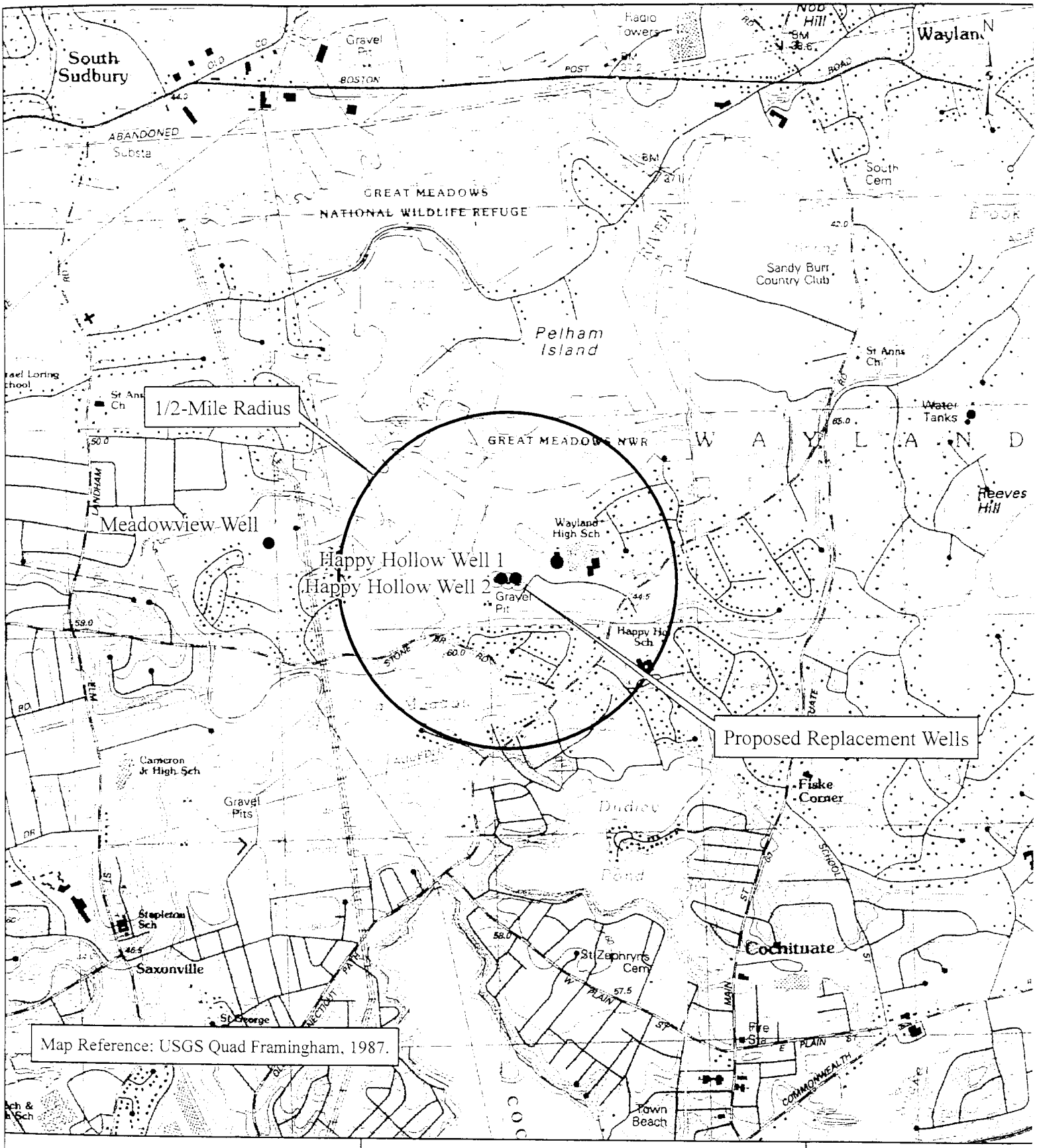
New Source Approvals <70 gpm
- ☐ BRP WS 13 Exploratory Phase, Site Examination, Land Use Survey and Approval to Conduct Pumping Test
- ☐ BRP WS 15 Pumping Test Report Approval and Approval to Construct Source
- ☐ BRP WS 37 Approval of Transient Non-Community Source Less than 7 Gallons per Minute (combines BRP WS 13 and BRP WS 15 submittals)

New Source Approvals = or > 70 gpm
- ☒ BRP WS 17 Exploratory Phase, Site Examination, Land Use Survey, and Conduct Pumping Test
- ☐ BRP WS 19 Pumping Test Report Approval
- ☐ BRP WS 20 To Construct Source

Water Treatment Approvals
- ☐ BRP WS 21A To Conduct Pilot Study < 40,000 gpd
- ☐ BRP WS 21B To Conduct Pilot Study = or > 40,000 gpd and < 200,000 gpd
- ☐ BRP WS 21C To Conduct Pilot Study = or > 200,000 gpd and < 1 mgd
- ☐ BRP WS 21D To Conduct Pilot Study = or > 1 mgd
- ☐ BRP WS 22A Pilot Study Report < 40,000 gpd
- ☐ BRP WS 22B Pilot Study Report = or > 40,000 gpd and < 200,000 gpd
- ☐ BRP WS 22C Pilot Study Report = or > 200,000 gpd and < 1 mgd
- ☐ BRP WS 22D Pilot Study Report = or > 1 mgd
- ☐ BRP WS 23A To Construct Facility <40,000 gpd
- ☐ BRP WS 23B To Construct Facility = or > 40,000 gpd and < 200,000 gpd
- ☐ BRP WS 23C To Construct Facility = or > 200,000 gpd and < 1 mgd
- ☐ BRP WS 24 To Construct Facility = or > 1 mgd
- ☐ BRP WS 25 Treatment Facility Modification
- ☐ BRP WS 29 Water Treatment: Chemical Addition Retrofits of Water Systems > 3,300 people
- ☐ BRP WS 30A Vending Installation Approval
- ☐ BRP WS 30B POU/POE Installation Approval
- ☐ BRP WS 34 Water Treatment: Chemical Addition Retrofits of Water Systems = or < 3,300 people
- ☐ BRP WS 35A Multiple Vending Installation Approval
- ☐ BRP WS 35B Multiple POU/POE Installation Approval

Water Quality Assurance
- ☐ BRP WS 26 Sale or Acquisition of Land for Water Source
- ☐ BRP WS 36 Abandonment of Water Source

Distribution System Modifications
- ☐ BRP WS 32 Systems > 3,300 people
- ☐ BRP WS 33 Systems = or < 3,300 people



TATA & HOWARD

Water and Wastewater Consultants

Date: July 2011 Scale: 1"=2000'

Locus Map

Happy Hollow Well Site
Wayland, MA

Figure No.

1

Nashoba Analytical, LLC Tel: 978-391-4428 Fax: 978-391-4543 LabNumber: 119105
31A Willow Road, Ayer MA 01432 Website: http://www.NashobaAnalytical.com Use this number with all correspondence

Client:

Denis L. Maher Co. LLC
7 Sculley Road P.O. Box 130
Ayer, MA 01432

ReportDate: 2/7/2011

Certificate of Analysis

Happy Hollow, Wayland MA

Parameter	Method	Count	Result	MCL	MRL	Date of Analysis	Analyst
- Well 1-11 52'-58'							
Sampled: 1/24/2011 3:00:00 PM by Cal							
Aluminum, MG/L	EPA 200.7		ND	0.2	0.01	2/7/2011	M-MA1118
Calcium, MG/L	EPA 200.7		33.5	Not Spec	1	1/25/2011	M-MA1118
Copper, MG/L	EPA 200.7		ND	1.3	0.01	1/25/2011	M-MA1118
Iron, MG/L	EPA 200.7	ND	0.11	0.3	0.01	1/25/2011	M-MA1118
Magnesium, MG/L	EPA 200.7		7.3	Not Spec	1	1/25/2011	M-MA1118
Manganese, MG/L	EPA 200.7	ND	0.008	0.05	0.005	1/25/2011	M-MA1118
Potassium, MG/L	EPA 200.7		1.5	Not Spec	1	1/25/2011	M-MA1118
Silver, MG/L	EPA 200.7		ND	0.1	0.01	2/7/2011	M-MA1118
Sodium, MG/L	EPA 200.7	?	76.4	See Note	1	1/25/2011	M-MA1118
Zinc, MG/L	EPA 200.7		0.008	5	0.005	1/25/2011	M-MA1118
Alkalinity, MG/L	SM 2320B	83	28	Not Spec	1	1/24/2011	M-MA1118
Chloride, MG/L	EPA 300.0		190	250	1	1/25/2011	M-MA1118
Color Apparent, CU	SM 2120B		ND	15	1	1/24/2011	M-MA1118
Hardness, Total, MG/L	SM 2340B		114	Not Spec	2	1/25/2011	M-MA1118
Nitrate as N, MG/L	EPA 300.0	?	2.6	10	0.05	1/25/2011	M-MA1118
Nitrite as N, MG/L	EPA 300.0		ND	1	0.01	1/25/2011	M-MA1118
Odor, TON	SM 2150B		0	3	0	1/24/2011	PN
pH, PH AT 25C	SM 4500-H-B	6.7 #	6.1	6.5 - 8.5	NA	1/24/2011	M-MA1118
Sulfate, MG/L	EPA 300.0		15.7	250	1	1/25/2011	M-MA1118
Total Dissolved Solids, MG/L	SM 2540C		388	500	1	1/31/2011	M-MA1118
Turbidity, NTU	EPA 180.1	1.2	0.3	Not Spec	0.1	1/24/2011	M-MA1118

MCL=Maximum Contaminant Level (EPA Limit), MRL = Minimum Reporting Level
Sodium Guidelines- Mass 20, EPA 250. # = Result Exceeds Limit or Guideline
ND = None Detected (<MRL), * = Background Bacteria Noted

Massachusetts Certified
Laboratory #MA1118

David L. Knowlton
Laboratory Director

Nashoba Analytical, LLC Tel: 978-391-4428 Fax: 978-391-4843
344 Willow Road, Ayer MA 01432 Website: http://www.NashobaAnalytical.com

LabNumber: **119182**

Use this number with all correspondence

Client:

Denis L. Maher Co. LLC
7 Sculley Road P.O. Box 130
Ayer, MA 01432

ReportDate: 2/7/2011

Certificate of Analysis

Happy Hollow, Wayland MA

Parameter	Method	Current	Result	MCL	MRL	Date of Analysis	Analyst
- Well 2-11 - 36'-42'		HH					
Sampled: 1/28/2011 1:00:00 PM by Cal							
Aluminum, MG/L	EPA 200.7		ND	0.2	0.01	2/7/2011	M-MA1118
Calcium, MG/L	EPA 200.7		30.5	Not Spec	1	2/3/2011	M-MA1118
Copper, MG/L	EPA 200.7		ND	1.3	0.01	2/3/2011	M-MA1118
Iron, MG/L	EPA 200.7	ND	0.05	0.3	0.01	2/3/2011	M-MA1118
Magnesium, MG/L	EPA 200.7		6.6	Not Spec	1	2/3/2011	M-MA1118
Manganese, MG/L	EPA 200.7		ND	0.05	0.005	2/3/2011	M-MA1118
Potassium, MG/L	EPA 200.7		ND	Not Spec	1	2/3/2011	M-MA1118
Silver, MG/L	EPA 200.7		ND	0.1	0.01	2/7/2011	M-MA1118
Sodium, MG/L	EPA 200.7	?	46.4	See Note	1	2/3/2011	M-MA1118
Zinc, MG/L	EPA 200.7		ND	5	0.005	2/3/2011	M-MA1118
Alkalinity, MG/L	SM 2320B	83	30	Not Spec	1	1/28/2011	M-MA1118
Chloride, MG/L	EPA 300.0		124	250	1	1/28/2011	M-MA1118
Color Apparent, CU	SM 2120B		ND	15	1	1/28/2011	M-MA1118
Hardness, Total, MG/L	SM 2340B		103	Not Spec	2	2/3/2011	M-MA1118
Nitrate as N, MG/L	EPA 300.0		2.8	10	0.05	1/28/2011	M-MA1118
Nitrite as N, MG/L	EPA 300.0		ND	1	0.01	1/28/2011	M-MA1118
Odor, TON	SM 2150B		0	3	0	1/28/2011	PN
pH, PH AT 25C	SM 4500-H-B	6.7 #	6.2	6.5 - 8.5	NA	1/28/2011	M-MA1118
Sulfate, MG/L	EPA 300.0		14.5	250	1	1/28/2011	M-MA1118
Total Dissolved Solids, MG/L	SM 2540C		324	500	1	1/31/2011	M-MA1118
Turbidity, NTU	EPA 180.1	1.2	0.3	Not Spec	0.1	1/28/2011	M-MA1118

MCL=Maximum Contaminant Level (EPA Limit), MRL = Minimum Reporting Level
Sodium Guidelines- Mass 20, EPA 250, # = Result Exceeds Limit or Guideline
ND = None Detected (<MRL), * = Background Bacteria Noted

Massachusetts Certified
Laboratory #MA1118

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LabNumber: **119354**
Use this number with all correspondence

Client:
Denis L. Maher Co. LLC
7 Sculley Road P.O. Box 130
Ayer, MA 01432

ReportDate: 2/17/2011

Certificate of Analysis

Happy Hollow, Wayland MA

Parameter	Method		Result	MCL	MRL	Date of Analysis	Analyst
- Well 3-11 - 32'-38'							
Sampled: 2/14/2011 11:30:00 AM by Cal							
Aluminum, MG/L	EPA 200.7		ND	0.2	0.01	2/17/2011	M-MA1118
Calcium, MG/L	EPA 200.7		15.4	Not Spec	1	2/15/2011	M-MA1118
Copper, MG/L	EPA 200.7		ND	1.3	0.01	2/15/2011	M-MA1118
Iron, MG/L	EPA 200.7		0.08	0.3	0.01	2/15/2011	M-MA1118
Magnesium, MG/L	EPA 200.7		3.2	Not Spec	1	2/15/2011	M-MA1118
Manganese, MG/L	EPA 200.7		0.029	0.05	0.005	2/15/2011	M-MA1118
Potassium, MG/L	EPA 200.7		ND	Not Spec	1	2/15/2011	M-MA1118
Silver, MG/L	EPA 200.7		ND	0.1	0.01	2/17/2011	M-MA1118
Sodium, MG/L	EPA 200.7		53.9	See Note	1	2/15/2011	M-MA1118
Zinc, MG/L	EPA 200.7		ND	5	0.005	2/15/2011	M-MA1118
Alkalinity, MG/L	SM 2320B		22	Not Spec	1	2/14/2011	M-MA1118
Chloride, MG/L	EPA 300.0		106	250	1	2/15/2011	M-MA1118
Color Apparent, CU	SM 2120B		ND	15	1	2/14/2011	M-MA1118
Hardness, Total, MG/L	SM 2340B		52	Not Spec	2	2/15/2011	M-MA1118
Nitrate as N, MG/L	EPA 300.0		1.5	10	0.05	2/15/2011	M-MA1118
Nitrite as N, MG/L	EPA 300.0		ND	1	0.01	2/15/2011	M-MA1118
Odor, TON	SM 2150B		0	3	0	2/14/2011	PN
pH, PH AT 25C	SM 4500-H-B	#	5.8	6.5 - 8.5	NA	2/14/2011	M-MA1118
Sulfate, MG/L	EPA 300.0		13.9	250	1	2/15/2011	M-MA1118
Total Dissolved Solids, MG/L	SM 2540C		234	500	1	2/15/2011	M-MA1118
Turbidity, NTU	EPA 180.1		0.6	Not Spec	0.1	2/14/2011	M-MA1118

MCL=Maximum Contaminant Level (EPA Limit), MRL = Minimum Reporting Level
Sodium Guidelines- Mass 20, EPA 250, # = Result Exceeds Limit or Guideline
ND = None Detected (<MRL), * = Background Bacteria Noted

Massachusetts Certified
Laboratory #MA1118

David L. Knowlton
Laboratory Director

Nashoba Analytical, LLC
31A Willow Road Ayer MA 01432
Tel: 978-391-4428 Fax: 978-391-4643
Web Site: http://www.nashobaanalytical.com

Lab/Invoice Number: **119354**
Use this number with all correspondence

Client:
Denis L. Maher Co. LLC
7 Sculley Road P.O. Box 130
Ayer, MA 01432

Report Date: 2/17/2011

Location: Happy Hollow, Wayland MA, Well 3-11 - 32'-38'
Sampled: 2/14/2011 11:30:00 AM by Ca

EPA 524.2

PARAMETER	MCL	RESULT	PARAMETER	MCL	RESULT
Benzene	5.0	ND	1,1,2,2-Tetrachloroethane	--	ND
Carbon Tetrachloride	5.0	ND	1,3-Dichloropropane	--	ND
1,1-Dichloroethylene	7.0	ND	Chloromethane	--	ND
1,2-Dichloroethane	5.0	ND	Bromomethane	--	ND
p-DichloroBenzene	5.0	ND	1,2,3-Trichloropropane	--	ND
Trichloroethene	5.0	ND	1,1,1,2-Tetrachloroethane	--	ND
1,1,1-Trichloroethane	200.0	ND	Chloroethane	--	ND
Vinyl Chloride	2.0	ND	2,2-Dichloropropane	--	ND
Monochlorobenzene	100.0	ND	o-Chlorotoluene	--	ND
ortho-Dichlorobenzene	600.0	ND	p-Chlorotoluene	--	ND
trans-1,2-Dichloroethylene	100.0	ND	Bromobenzene	--	ND
cis-1,2-Dichloroethylene	70.0	ND	1,3-Dichloropropene	--	ND
1,2-Dichloropropane	5.0	ND	1,2,3-Trimethylbenzene	--	ND
Ethylbenzene	700.0	ND	1,2,4-Trimethylbenzene	--	ND
Styrene	100.0	ND	1,3,5-Trimethylbenzene	--	ND
Tetrachloroethylene	5.0	ND	n-Propylbenzene	--	ND
Toluene	1000.0	ND	n-Butylbenzene	--	ND
Xylenes(Total)	10000.0	ND	Naphthalene	--	ND
Dichloromethane	5.0	ND	Hexachlorobutadiene	--	ND
1,2,4-Trichlorobenzene	70.0	ND	1,2,3-Trichlorobenzene	--	ND
1,1,2-Trichloroethane	5.0	ND	p-Isopropyltoluene	--	ND
Chloroform	--	ND	Isopropylbenzene	--	ND
Bromodichloromethane	--	ND	t-Butylbenzene	--	ND
Chlorodibromomethane	--	ND	sec-Butylbenzene	--	ND
Bromoform	--	ND	FluoroTrichloromethane	--	ND
m-Dichlorobenzene	--	ND	Dichlorodifluoromethane	--	ND
Dibromomethane	--	ND	Bromochloromethane	--	ND
1,1-Dichloropropene	--	ND	*MethylTertiaryButylEther	*70	ND
1,1-Dichloroethane	--	ND	Acetone		ND
			2-Butanone (MEK)		ND

% Recovery of Internal Standards:

4-Bromofluorobenzene 90
1,2-Dichlorobenzene-d 94

Date of analysis: 2/15/2011

ND=None Detected

Detection Limit: 0.5 ug/L

This analysis was performed at DEP Certified Laboratory #M-NH003

David L. Knowlton
Laboratory Director

Persky, James (DEP)

From: Persky, James (DEP)
Sent: Friday, September 16, 2011 11:37 AM
To: 'mhatch@wayland.ma.us'; 'water@wayland.ma.us'
Subject: FW: Wayland-Happy Hollow Replacement Wells

I e-mailed this to Mike Hatch on Wednesday. I got a message suggesting the e-mail may not have gone through, so I am sending it again.

Jim Persky
MassDEP Drinking Water Program

From: Persky, James (DEP)
Sent: Wednesday, September 14, 2011 2:56 PM
To: 'rsuozzo@tataandhoward.com'; 'mhatch@wayland.ma.us'
Cc: 'joconnell@tataandhoward.com'; Blain, Paul (DEP); Mahin, Thomas (DEP)
Subject: Wayland-Happy Hollow Replacement Wells

Mike,

This e-mail is to detail a couple of things I discussed on the telephone with Randy Suozzo earlier this month regarding the Happy Hollow replacement wells.

Approved Pumping Rate

Replacement well projects are not allowed to pump more than the approval rates of the wells being replaced. MassDEP has no record that approval rates were ever formally established for the Happy Hollow Wells. Therefore, I have been looking through our available records to determine what the approval rate should be – this would then become the approval rate for combined pumping from the replacement wells.

Approval rates for pre-existing wells are generally determined by looking at the maximum month of historic pumping and dividing the pumped volume by the number of days in that month. (There cannot be any extenuating circumstance that resulted in a pumping rate that was *excessively* higher than normal.)

The MassDEP Northeast Region has Annual Statistical Reports on file for Wayland from 2000 through 2010. Since I spoke with Randy, I have reviewed the pumping information in these. The highest month of combined pumping I found for the two Happy Hollow Wells was May 2001, when the wells combined for a daily average of 1.35 MGD. Therefore, based on the information I have now MassDEP would give the replacement wells an **approved withdrawal volume** of 1.35 MGD, which is equivalent to an **approved pumping rate** of 935 gpm. This is slightly higher than the 1.3 MGD figure (900 gpm) in the Tata & Howard proposal.

The Happy Hollow Wells have been in use for roughly 60 years. However, I only have pumping data since 2000. There may have been previous months when the wells pumped more than the May 2001 volume. **If the Town of Wayland has any historic records showing a higher pumping rate in previous years, please provide me with that data and we can perhaps establish a higher pumping rate for the Happy Hollow Wells.**

Pumping Test Scope of Work

The pumping test work that Tata & Howard has proposed goes beyond what MassDEP typically requires for replacement wells. We do not ordinarily require water level measurements in observation wells, drive points, and staff gauges, as included in the proposal. We also do not generally require testing for Inorganics (except nitrate and nitrite) or Synthetic Organic Compounds (SOCs) unless there is a known problem with the existing wells or a nearby contamination threat. The Town and Tata & Howard can choose to proceed with this Scope of Work, or you are welcome to propose a pumping test of lesser scope. In either case, MassDEP would prefer to have all three wells individually tested for VOCs instead of a single composite sample; the SOC sample may be eliminated to offset the cost. Information on MassDEP requirements for replacement wells can be found in Section 4.15 of the Drinking Water Guidelines.

Please let me know whether the Town has any additional historic pumping data for MassDEP to consider, and whether you wish to change the scope of the proposed pumping test. I will then complete the MassDEP letter on the replacement wells.

James Persky
MassDEP Drinking Water Program
Northeast Regional Office
(978) 694-3227
(978) 694-3498 (FAX)

TATA & HOWARD
Water and Wastewater Consultants

October 4, 2011

Mr. James Persky
Department of Environmental Protection, Bureau of Resource Management
205B Lowell Street
Wilmington, Massachusetts 01887

Subject: BRP WS 17, Transmittal No. X239159
Happy Hollow Replacement Wells
Wayland, Massachusetts
T&H No. 2208

Dear Jim:

Based on our correspondence with you, on behalf of the Wayland Department of Public Works (DPW), Tata and Howard would like to revise the scope of the pumping test proposed for the replacement of Happy Hollow Well No. 1 (3315000-03G) and 2 (3315000-04G). Please consider the following pumping test and water quality analyses proposal to replace that which was originally proposed in our July 29, 2011 letter.

Pumping Test Proposal

After the 18-inch by 12-inch wells are installed, the Town intends to conduct a 50-hour pumping test. The pumping test will begin with a staggered startup of each replacement well, and once the start up of each well has been completed, all three replacement wells will be pumped together, continuously for 48 hours at a rate of approximately 312 gpm per each well. Step-drawdown tests will be conducted on each well to determine individual pumping rates. The Town proposes the start-up of the replacement wells be staggered by one hour, beginning with the startup of replacement Well No. 1R (located at Test Well No. 1-11), followed by the startup of replacement Well No. 2R (located at Test Well No. 2-11), followed by the startup of Replacement Well No. 3R. All three replacement wells will then be pumped concurrently for 48 hours. The existing Happy Hollow Well No. 1 and No. 2 will remain off during the pumping test. Town proposes to pump the three replacement wells at a combined rate of approximately 1.35 mgd, and is not requesting an increase in withdrawal above the approved rate of the existing wells.

Drawdown will be recorded by both manual measurements and automatic pressure transducers in each production well. Manual and transducer measurements will also be recorded at Test Well Nos. 1-11, 2-11, and 3-11 and in the existing Well Nos. 1 and 2. Table No. 2 presents the monitoring locations and screened intervals.

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T. 508-303-9400 F. 508-303-9500
Lakeville, MA Portland, ME
Meriden, CT Goodyear, AZ Nashua, NH

Table No. 2
Pumping Test Monitoring Locations
Happy Hollow Wells
Wayland, Massachusetts

	Well Type	Approximate Distance from Well No. 1 (feet)	Top of Casing/Pipe Elevation (feet)	Depth of Screened Interval (feet bgs)
Happy Hollow Well No. 1	24"X48" GPW	0	±122	30-42
Happy Hollow Well No. 2	24"X48" GPW	250	±122	35-50
Replacement Well No. 1R	18"X12" GPW	85	TBD	-
Test Well No. 1-11	2.5" steel	85	TBD	41-47
Replacement Well No. 2R	18"X12" GPW	125	TBD	-
Test Well No. 2-11	2.5" steel	125	TBD	36-42
Replacement Well No. 3R	18"X12" GPW	305	TBD	-
Test Well No. 3-11	2.5" steel	305	TBD	30-36

Discharge from the three pumping wells will be directed into a sedimentation basin using temporary piping. The sedimentation basin will be constructed at least 400 feet down-gradient of replacement Well No. 3R located approximately as shown on Figure No. 2 (see July 29, 2011 letter).

Water Quality Analyses

Water quality samples will be taken just prior to shutdown from each replacement well and tested individually for secondary contaminants, coliform bacteria, volatile organic compounds (VOCs), nitrate and nitrite. The samples will be gathered and delivered to a MassDEP-certified laboratory individually, and combined in the lab for testing.

Field sampling for pH, odor, specific conductance, carbon dioxide, and temperature will be measured in the pumping wells and within the wetlands immediately adjacent to the well site to provide information on potential surface water influence on the replacement wells.

Once the pumping test is complete, a letter report outlining the findings accompanied by a proposed design for the replacement of the chemical feed equipment with either a BRP WS 29 permit, will be transmitted to MassDEP for review and approval. The letter will include an evaluation of the data gathered during the pumping test, a surveyed site plan and as-built well designs showing the location, elevation and physical characteristics of the replacement wells and their Zone Is. Design plans and specifications for the construction of the replacement chemical

feed pump building, and submersible pumps, electrical and communication plans, chemical feed system and water main connection to the distribution system will be provided. The Town of Wayland intends to abandon the existing Happy Hollow Well Nos. 1 and 2.

Should you have any further questions or comment regarding this proposal, please do not hesitate to contact us.

Sincerely,

TATA & HOWARD, INC.

Jack O'Connell, P.E.
Senior Vice President

cc: Mr. Don Ouellette, P.E. – Wayland Department of Public Works