BB DEVELOPMENT, LLC
Site Location of Development Act // Natural Resources Protection Act
Phase I – Oxford Casino – Oxford

EXCERPTS FROM THE DEPARTMENT'S RECORD

- Site Law & NRPA Applications, dated December 22, 2010 (relevant sections)

SECTION 1. DEVELOPMENT DESCRIPTION:

A. Narrative:

The ***Oxford Resort Casino*** development project will be a four-season commercial and entertainment resort facility. The project consists of a building complex for casino gaming activities, restaurants, and conference facilities; a 200 room hotel; a spa; outdoor recreational areas including tennis courts and jogging trails; ATV and snowmobile trailhead and parking area; RV park; and associated infrastructure such as parking, ponding areas, utilities, and vehicular circulation.

The project will be split into multiple phases for responsible growth. This application contains the first phase of development only. Future phases will be proposed and submitted to the Department for review and approval at a future time.

The first phase of the development includes a 65,000 square foot building, 1050 parking spaces, two site entrances, and associated utilities and appurtenances.

1. Objective and details:

The objective of this project is to provide Oxford County with Maine's first full-service gaming resort casino. The owner group of BB Development, LLC is fully committed to growing the Maine economy by providing jobs and providing millions of dollars in tax revenue to the State of Maine.

The project site is located on the northwest corner at the intersection of Main Street (Route 26) and Rabbit Valley Road in southern Oxford. The project site is comprised of several properties and has 97.3 acres of land.

The project site will be accessed by one new entrance on Route 26, which will be the main entrance for guests, and one new entrance on Rabbit Valley Road, which will serve for emergency use only for the first phase. The new building will have a 65,000 +/- square foot footprint, with an accessory temporary building for administrative purposes. Parking will be accommodated with 1050 spaces, mostly in two new parking areas. The project proposes 12.90 acres of new impervious area, with a total developed area of 27.63 acres.

Utilities are provided on-site. On-site water wells will be located just southeast of the building area. On-site septic will be handled by pre-treatment and on-site subsurface wastewater disposal fields located to the west. Three phase power will be brought from the Welchville Junction area to the site on existing utility poles, then conducted underground to the building.

2. Existing Facilities:

The existing site condition is largely undeveloped. The western two thirds of the site is wooded. The third closest to Route 26 is farmland. Three residential structures exist on site, though two have been abandoned. The third is a mobile home.

The site has a subtle ridge line running north-south near route 26. Most of the site slopes gently to the west, and is in the Hogan Pond watershed. A smaller area slopes gently easterly to Route 26, and is in the watershed of the Little Androscoggin River.

One stream was found on site, starting in about the center of the property and flowing westerly towards Hogan Pond. The stream is not depicted on the USGS map as a blue line. The start of the stream was reviewed on site by the former Department analyst Eric Ham. The stream will be protected by a 100 foot buffer setback, and is not proposed to be impacted.

A number of wetland areas exist on site. Two areas are noteworthy. Along the western edge of the farmland is a thin strip of wetland. The local farmers verbally indicated that these wetlands were created by farming activities and associated runoff and drainage routing; visual observation seems to corroborate their assertions. Regardless, the areas are existing wetlands, and are treated as such. Also, note a secondary wetland finger also running along the contour (not down gradient) west of the first wetland area; this wetland is crossed by a new access maintenance road.

Wetland impacts are proposed sufficient to trigger a Tier 2 Natural Resource Protection Act permit (submitted concurrently but under separate cover). Most of the wetland impacts will occur in the low-value wetlands along the edge of the farm fields.

A Phase 1 Environmental Site Assessment was performed for the site and is attached in Section 15. Four areas of concern were identified. Consequently, a Phase 2 Environmental Site Assessment was performed on site; the report is not yet available, but will be submitted to the Department soon. One area of soil pollution was encountered and removed. The Phase 2 work was done in contact and coordination with Maine DEP as required by law.

B. Topographic Map:

A copy of a U.S.G.S. topo map with the project boundary shown has been included as part of this Section.

C. Construction Plan:

The construction of this project will begin, pending approvals, as early in the Spring of 2011 as possible. The applicant intends to have construction completed in late 2011 or early 2012.

Tree clearing, grubbing, and bulk earthwork will start the process. The bulk earthwork on this project site will require that much of the project area be exposed at the same time. This exposure shall be limited to the time of the bulk earthwork only. The contractor will be required to follow the Erosion and Sedimentation Control Plan, which includes information on emergency measures while the site is exposed.

Concurrent with the bulk earthwork, the ponding areas will be built. During the earthwork process, the ponding areas will double as sedimentation basins.

During the late summer and early fall of 2011, the applicant proposes to have the site stabilized, including mulching and hard gravel surfaces in parking and road areas, prior to the November wet season. The ponds will be brought on-line to serve as treatment devices as designed. Building construction will continue until project completion. Beautification by finish work and planting will happen first along the Route 26 corridor to aid with visual quality.

D. Drawings:

1. Development Facilities: The Plans for this project depict the locations and sizes of the proposed roadways, parking areas, buildings, and infrastructure.

2. Site Work: The Plans for the site work related to this project show through post development contours throughout the site.

3. Existing Facilities: The existing facilities are shown on the Existing Conditions Plan. The existing residences will be removed.

4. Topography: The Plans show existing contour intervals at 2 feet, and proposed contour intervals at 1 foot.

Abutter List
B B Development, LLC
Oxford, Maine

Map R-03

Lot 25B
Joseph & Sally Korn
364 Rabbit Valley Rd.
Oxford, ME 04270

Lot 25
Hugh Poland
370 Rabbit Valley Rd
Oxford, ME 04270

Lot 29-1
Kevin & Brenda Moore
443 Rabbit Valley Rd
Oxford, ME 04270

Lot 29-2
Albert & Alberta Conant
453 Rabbit Valley Rd
Oxford, ME 04270

Lot 28
Craig & Sandra Tardiff
466 Rabbit Valley Rd
Oxford, ME 04270

Lot 29-3 and Lot 29-4
Thomas & Linda Pearl
469 Rabbit Valley Rd
Oxford, ME 04270

Lot 28B
Charlotte Howard & Stanley Palmer
474 Rabbit Valley Rd
Oxford, ME 04270

Lot 29-5
Robert & Deborah Bedard
477 Rabbit Valley Rd
Oxford, ME 04270

Abutter List
B B Development, LLC
Oxford, Maine

Lot 29-6
Joseph & Debra Nugent
485 Rabbit Valley Rd
Oxford, ME 04270

Lot 28A
Gary & Joyce Franklin
488 Rabbit Valley Rd
Oxford, ME 04270

Lot 29A
Allan & Denise Pressey
493 Rabbit Valley Rd
Oxford, ME 04270

Lot 29-7
Edward Lyons
501 Rabbit Valley Rd
Oxford, ME 04270

Lot 29B
Michael Pillsbury
513 Rabbit Valley Rd
Oxford, ME 04270

Lot 31-1
Raylene Goodwin
76 Main St
Oxford, ME 04270

Lot 31-2
Philip & Ann Hanson
94 Main St
Oxford, ME 04270

Lot 31
Carol & Christine Nalley Huotari
96 Main St
Oxford, ME 04270

Lot 30A
William & Lisa Leahy
108 Main St
Oxford, ME 04270

Abutter List
B B Development, LLC
Oxford, Maine

Lot 39A
Thea Bandy
186 Main St
Oxford, ME 04270

Lot 39B
Evan Thurlow
198 Main St
Oxford, ME 04270

Lot 40
Richard & Karen Elliott
208 Main St
Oxford, ME 04270

Lot 41
Paul Cote
216 Main St
Oxford, ME 04270

Lot 27
Fred Huntress Jr.
67 Strout Rd
Poland Spring, ME 04274

Lot 39 and Lot 42 and Lot 8
Evan A. Thurlow
119 Main St
Oxford, ME 04270

Lot 26
Chadbourne Tree Farms
P O Box 1750
Bethel, ME 04217

Lot 32
Wedgewood Development Corporation
11 Miles Ave
Old Orchard Beach, ME 04064

Lot 42A
Steve & Sandra Roderick
28 Tower Rd
Oxford, ME 04270

Abutter List
B B Development, LLC
Oxford, Maine

Lot 46
Elizabeth M. Geller Trust
Sidney & Elizabeth Geller
50 Burleigh St
Waterville, ME 04901

Map R-2

Lot 7
Suzanne Halls
167 Main St
Oxford, ME 04270

Lot 6B
Jeffrey Tirrell
P O Box 634
Oxford, ME 04270

Lot 6A1
Jim Russell
205 Main St
Oxford, ME 04270

Lot 6A
Kenneth Russell
203 Main St
Oxford, ME 04270

SECTION 3. FINANCIAL CAPACITY:

A. The project has not yet been bid. However, a cost estimate is included in this section which shows the total cost for site work in Phase 1 to be $6,746,000.

B. Financing:

The applicant has sufficient liquid funds that are immediately available to finance the project. A letter from Keybank is attached.

Summary of Opinion of Probable Site Costs: Phase 1

Earthwork		
	Site Demolition	$290,000.00
	Earthwork	$1,600,000.00
Erosion Control		$110,000.00
Paving and Surfacing		
	Pavement	$970,000.00
	Pavers	$70,000.00
	Curbing	$240,000.00
Utilities		$1,420,000.00
Site Improvements		$675,000.00
Landscaping		
	Grass	$321,000.00
	Plantings, etc.	$200,000.00
Other Costs		
	Contingency	$600,000.00
	Mobilization	$250,000.00
Total		$6,746,000.00

Key Private Bank

KeyBank National Association
Member FDIC

Mailcode: ME-01-99-0177
One Canal Plaza, 2nd Floor
Portland, ME 04101

Toll Free: 800-452-8762

December 17, 2010

BB Development, LLC
1570 Main St.
Oxford, ME 04270

Re: Project Financing for Oxford Resort Casino

This letter will serve to acknowledge that BB Development, LLC and its owners have liquid assets that are immediately available sufficient to construct the site development for the Oxford Resort Casino.

BB Development, LLC and Main-Land Development Consultants, Inc. have provided a cost estimate for site-related improvements totaling $6,746,000. The estimate includes site work from clearing and grubbing to final site stabilization. The estimate includes earthwork for on-site building areas, but does not include the building structures nor the interior work. The estimate does not include off-site aerial power improvements, nor off-site traffic improvements, should they become necessary.

The owners of BB Development, LLC have net liquid assets that are immediately available for the site construction costs in excess of $6,746,000.

Sincerely,

Stephen deCastro
Senior Vice President
Key Private Bank

SECTION 5. NOISE:

A. Developments Producing a Minor Noise Impact:

(4) Other Developments

(a) Type, source and location of noise. The bulk of the noise generated on site, including: people; music; slot machines; and PA systems, will be contained inside the building.

The development will develop human voice and traffic noise as people move on and about the site. The facility may have low music at the entrances similar to some restaurants. Mechanical units will be roof mounted and enclosed. An emergency generator will be located outside, but enclosed. Considering that the building and all the uses noted above will be hundreds of feet from the property boundary, no impact is anticipated.

(b) Uses, zoning and plans. The property is and has been zoned as Multi-Use. All along Route 26 is so zoned specifically to encourage commercial activity there.

(c) Protected locations. There are no nearby protected areas.

(d) Minor nature of impact. The applicant states that the noise impact will be minor and consistent with applicable Oxford ordinances. If some future outdoor event is planned that might cause more noise than stated, the applicant understands that this necessitates a modification to the permit.

(e). Demonstration. The project is similar in use and scope to a department store development. The applicant submits that no demonstration is necessary.

B. Developments Potentially Producing a Major Noise Impact::

Not Applicable

Section 6. Visual Quality

This project site is located on the west side of Route 26 at the intersection of Rabbit Valley Road. The area is known locally as Pigeon Hill, and the site sits 200 feet above the Little Androscoggin River (to the east) and Hogan and Whitney Ponds (to the west).

It is important to note that the area is already developed. Route 26, with all the associated traffic, headlights, work lights, and household lights, already exists. The site is bracketed by two cellular towers, and at least 5 other cell towers within 10 miles of the site were identified. A large farm, with reflective metal roofs and red buildings, is located across Route 26 from the proposed site.

There are no protected or perceived scenic views near the site. The property and surrounding areas are zoned Multi-Use specifically to attract commercial business.

Photos of the existing site area are included in this section as requested at the pre-submission meeting.

PROJECT VIEW-SHED

The project view-shed is mostly from/to the west and northwest, though views may also be available to the east over the roofs of the abutting farm buildings. Guests at the Oxford Resort Casino can expect to enjoy views towards the White Mountains.

However, even though the site is on a hill, it is one hill of many in rolling terrain. The hills are relatively low, not mountainous like that found in northern Oxford County. With relatively moderate existing grades (10% or less), trees adjacent to both the existing development and trees adjacent to surrounding roadways obscure the development from many locations.

To show this, Main-Land used Google Earth to analyze locations that might be able to see the development site. A printed map obtained from Google Earth is included in this section. Using this internet service, Main-Land identified 35 separate public locations that might see the project site. Then Main-Land visited each of the viewpoints to determine any visual impact was possible.

The majority of the view locations cannot see the project area. Most of the view locations have enough tree vegetation to screen most or all of Pigeon Hill from view. Some locations, such as Route 121 in Mechanic Falls, cannot see the site due to the flat nature of the top of Pigeon Hill. View locations at the furthest range of our study area might see the site, but it will appear small enough that the impact will be insignificant, especially compared to the nearby cell towers.

Two view points in particular have the most chance of visual impacts. The first is viewpoint #3 located at the end of Ivory Hill Road in Otisfield. Note that both cell towers, with associated lighting, are also visible from this location. The second viewpoint is #20, on the East Oxford Road in Oxford where, again, both cell towers bracket the development and the silver roofs of Crestholm Farm are evident. Further, note that these locations are just one spot on the road, not the full length of the road.

Lastly, this evidence, including photographs, was presented at the Maine DEP pre-application meeting. We were directed to write this section in the application, though a visual study above and beyond what is presented here would not be required.

DETERMINATION OF IMPACT

Determination of visual impacts is addressed in Chapter 315: Assessing and Mitigating Impacts to Existing Scenic and Aesthetic Uses, under Section 8. This section provides three criteria by which visual impacts can be examined and quantified.

Landscape Compatibility

The area around the project site is developed. Route 26 runs over the top of Pigeon Hill. Residential, agricultural, and commercial developments are all located nearby.

The proposed development proposes a number of methods to be appropriate to the landscape. First, landscape planting is a significant portion of the project. Landscape drawings are included in the Plans, which show shade trees, mid-level shrubs, and ground cover plantings indigenous to the region. Further, the building will have natural appearing materials as much as feasible, including stone, wood siding, and exposed timber frame elements. Building elevations are included in the Plans. Lastly, lighting is scaled to the development. Fixtures will be sharp cutoff and downcast.

The proposed development also proposes signs along Route 26. The signs will similarly be constructed of natural materials, including stone, timber, and perhaps iron bracket elements. Signs will be lit in keeping with the nature of a commercial and entertainment facility. Sign lighting will not be cast to glare offsite or towards traffic. The main sign will have a marquee and/or video element to advertise events at the facility. All signage will conform to the Town of Oxford sign ordinances.

Scale Contrast

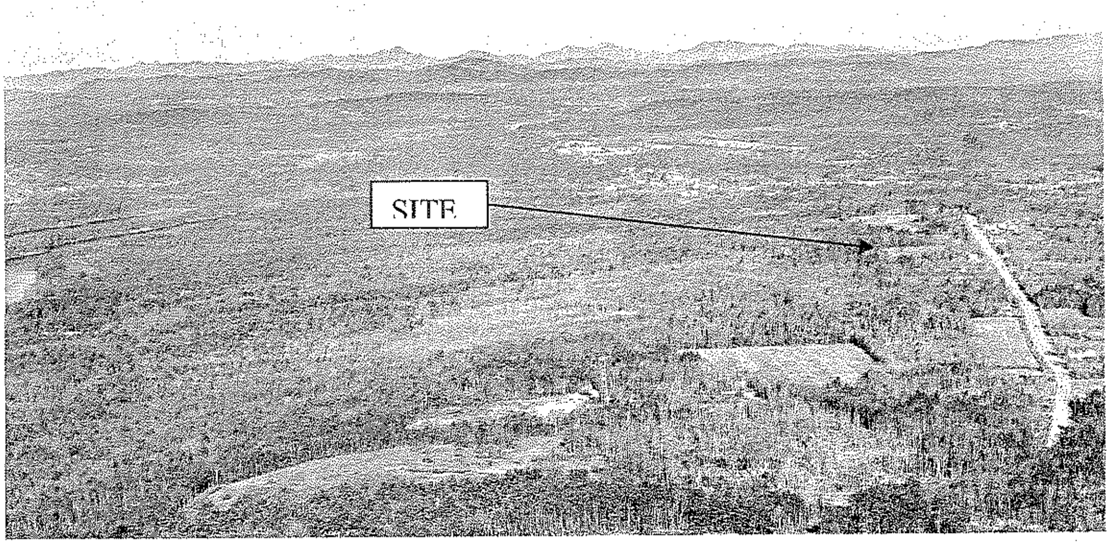
The project will be visible from Route 26, which is desirable for a commercial project next to a travel corridor. From the adjacent road, the applicant intends the project to have impressive scale while using a wood and stone siding to keep with the Maine tradition.

However, from a distance, it is expected that the project will be smaller in scale than the adjacent cell towers and similar in scale- while smaller in contrast- to Crestholm Farm.

Spatial Dominance

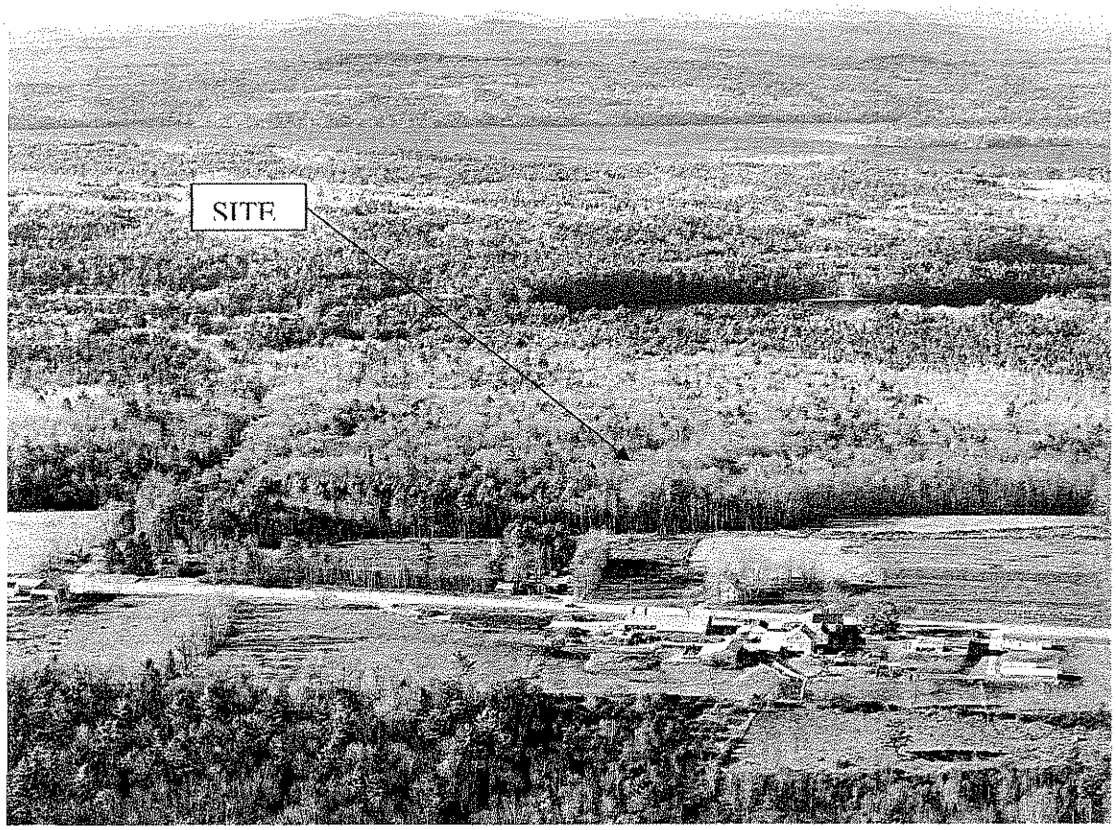
The proposed project will not spatially dominate the area. Again, due to abutting off-site structures that are taller, and with trees being preserved near to the building, this project will appear spatially similar or smaller than nearby developments. Given that the nearest viewpoint identified is about 4 miles distant, we do not anticipate that the project will dominate any view.

EXISTING SITE PHOTOS



Aerial Photo, south of site looking north. Route 26 is visible on the right with Welchville Junction visible in the upper right center of the picture. Hogan and Whitney Ponds are visible on the left. Note the southern cellular tower in the bottom center of the photo.

EXISTING SITE PHOTOS



Aerial Photo, east of site looking west. Route 26 is visible across the bottom of the picture, with Crestholm Farm in the foreground. Hogan Pond is partially visible mid-picture; Whitney Pond is hidden by tree cover. Thompson Lake is visible in the background.

EXISTING SITE PHOTOS

Garden area on left, field on right
Looking east. Crestholm Farm roofs visible over Route 26.

EXISTING SITE PHOTOS

Field Area at center of site, looking south towards Rabbit Valley Road

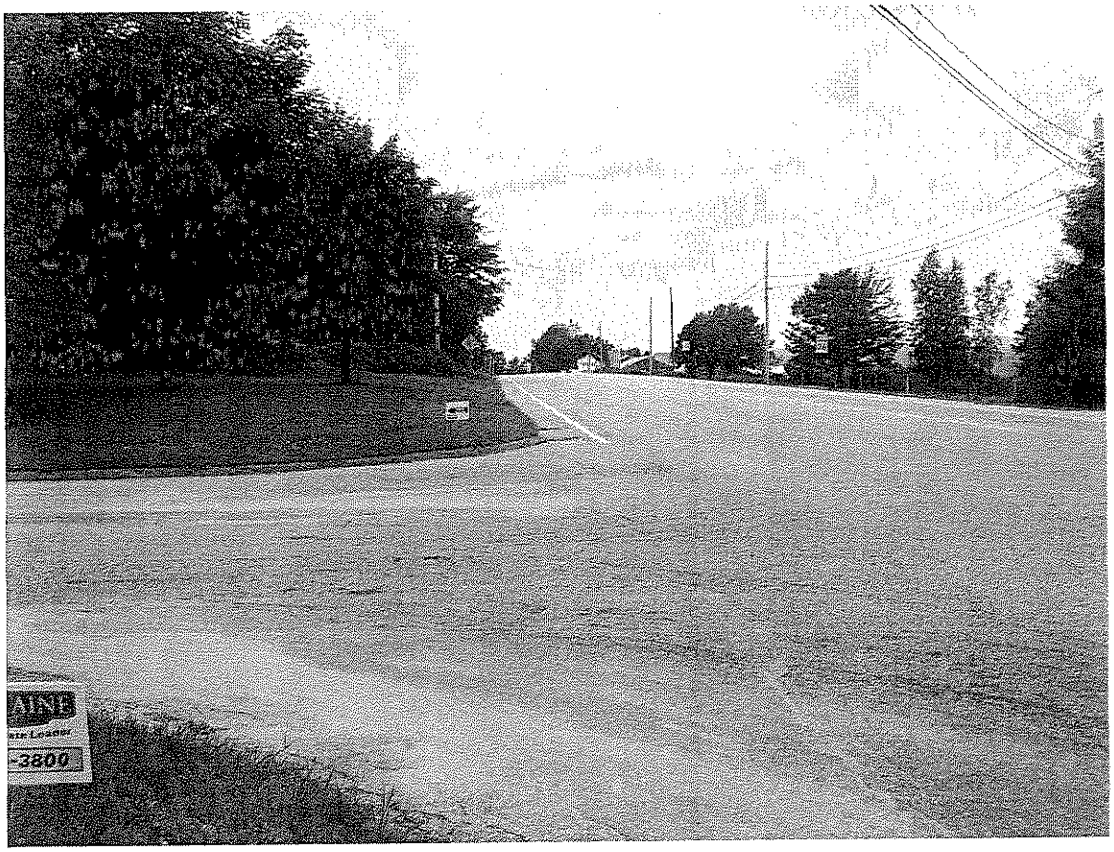
EXISTING SITE PHOTOS

Typical wooded area near center of site.

EXISTING SITE PHOTOS

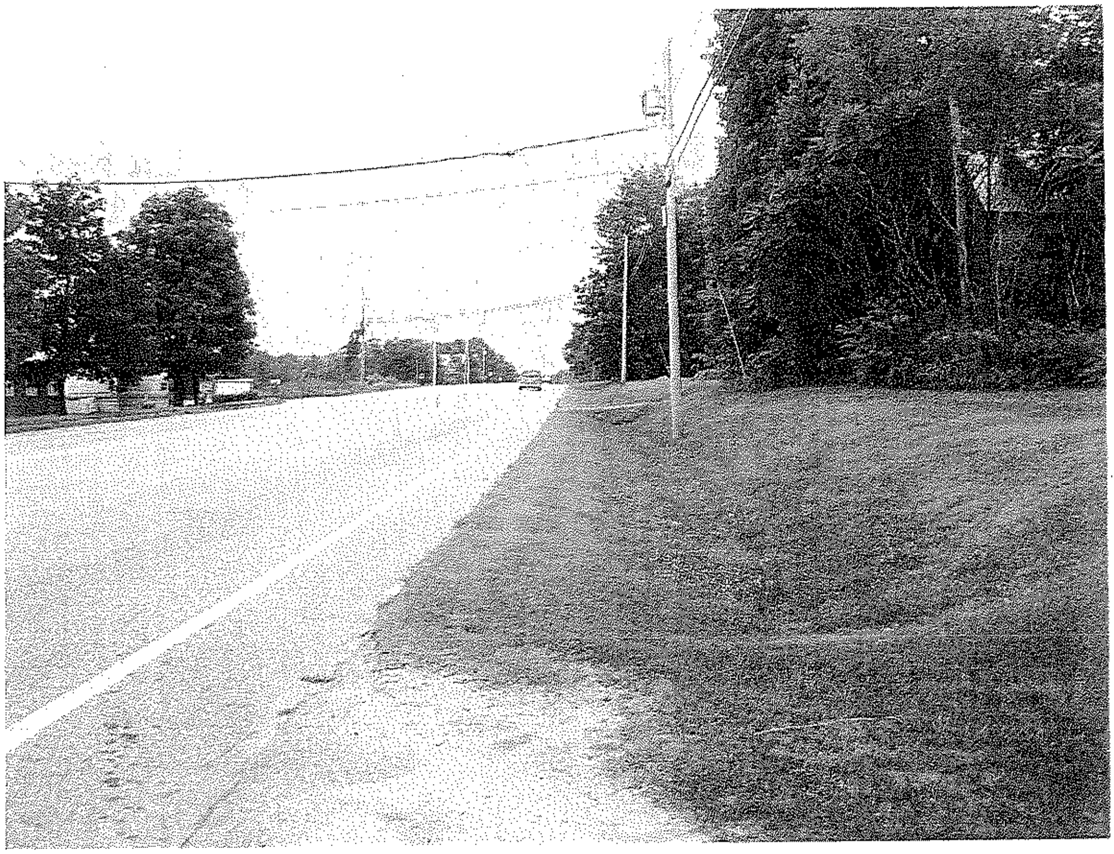
Previously cleared wetland area, north side of site. Currently regrowing.

EXISTING SITE PHOTOS



Intersection of Rabbit Valley Road and Route 26, looking northbound. Crestholm Farm is visible on the right side of Route 26 in the background.

EXISTING SITE PHOTOS



Route 26 opposite Crestholm Farm, looking southbound.

EXISTING SITE PHOTOS

Rabbit Valley Road, near Emergency Entry, looking westbound.

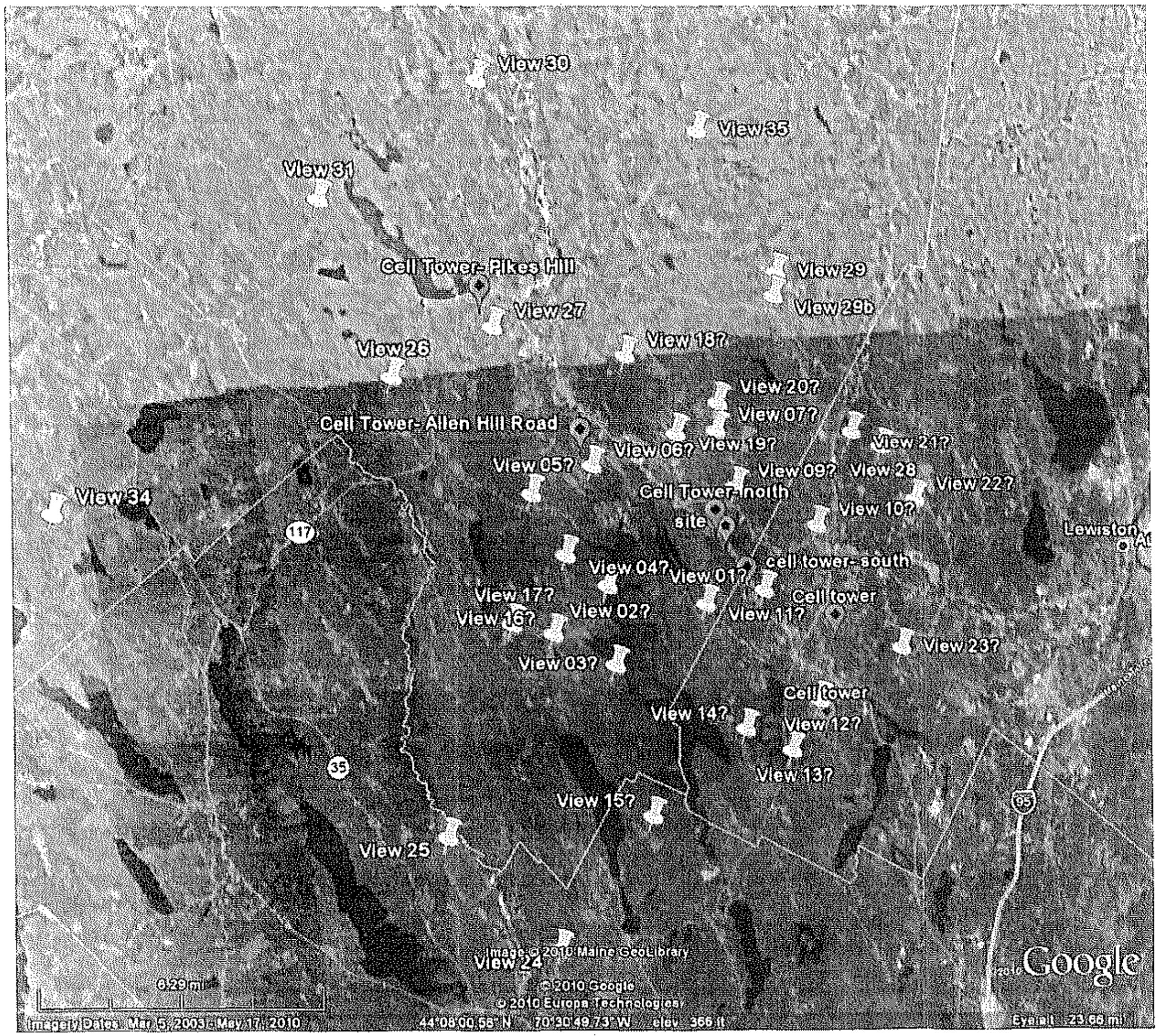
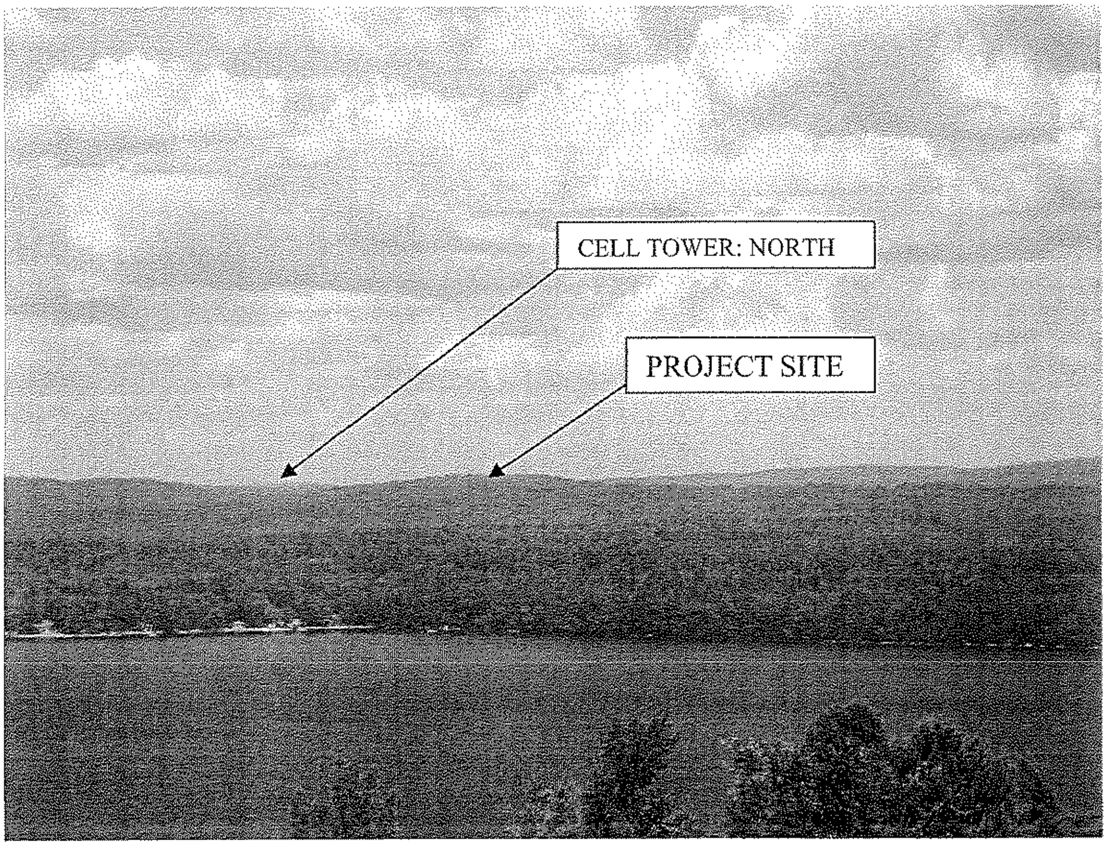

View 30
View 35
View 31
Cell Tower- Pikes Hill
View 29
View 27
View 29b
View 26
View 18?
View 20?
View 07?
Cell Tower- Allen Hill Road
View 21?
View 06?
View 19?
View 05?
View 09?
View 28
View 22?
View 34
Cell Tower- north site
View 10?
Lewiston
117
View 04?
cell tower- south
View 01?
View 17?
Cell tower
View 02?
View 16?
View 11?
View 23?
View 03?
Cell tower
View 14?
View 12?
35
View 13?
View 15?
View 25
95
Image © 2010 Maine GeoLibrary
View 24
© 2010 Google
© 2010 Europa Technologies
Google
6.29 mi
Imagery Dates: Mar 5, 2003 - May 17, 2010
44°08'00.58" N 70°30'49.73" W elev 366 ft
Eye alt 23.66 mi

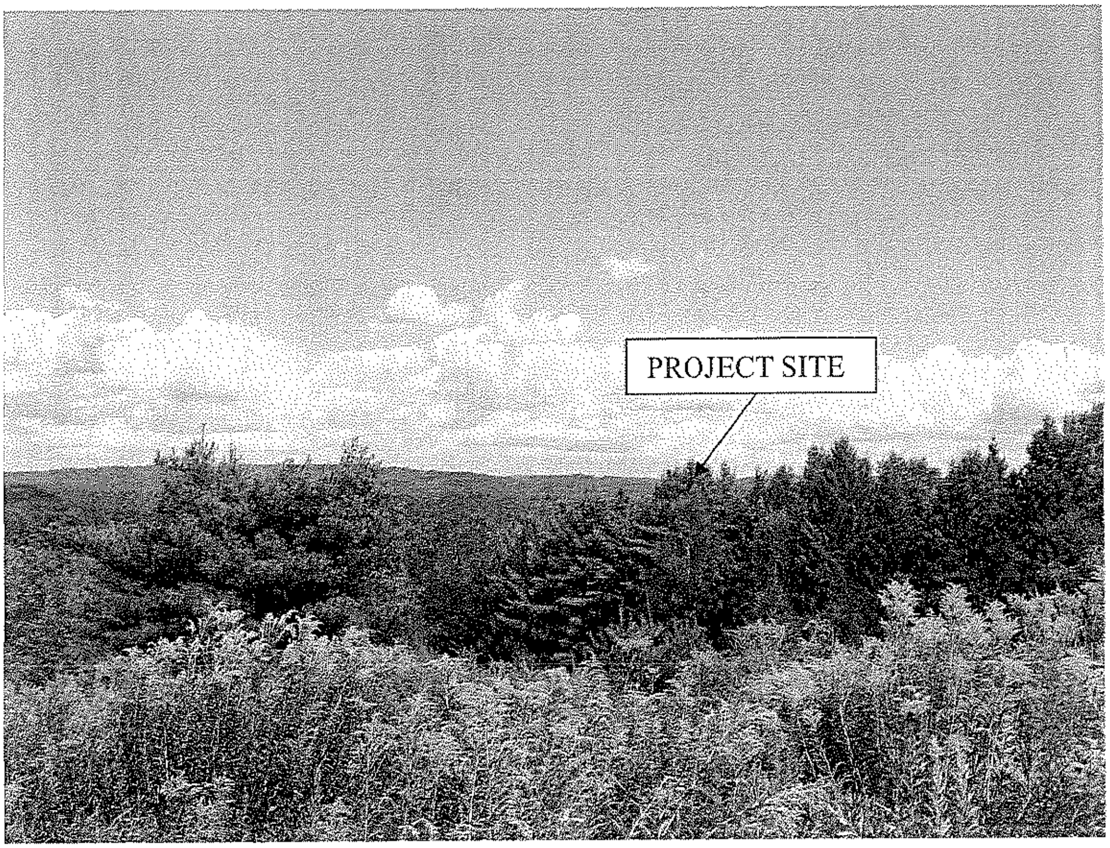
Photo #1: Location 3



Project Site from End of Ivory Hill Road in Otisfield
Overlooking Thompson Lake
Range: 4.3 miles
View Direction: Northeast

The *north* cell phone tower to the left of this photo gives scale and bearing to the site. The proposed development will be visible from this location though it will be significantly in the background of the viewshed which is Thompson Lake.

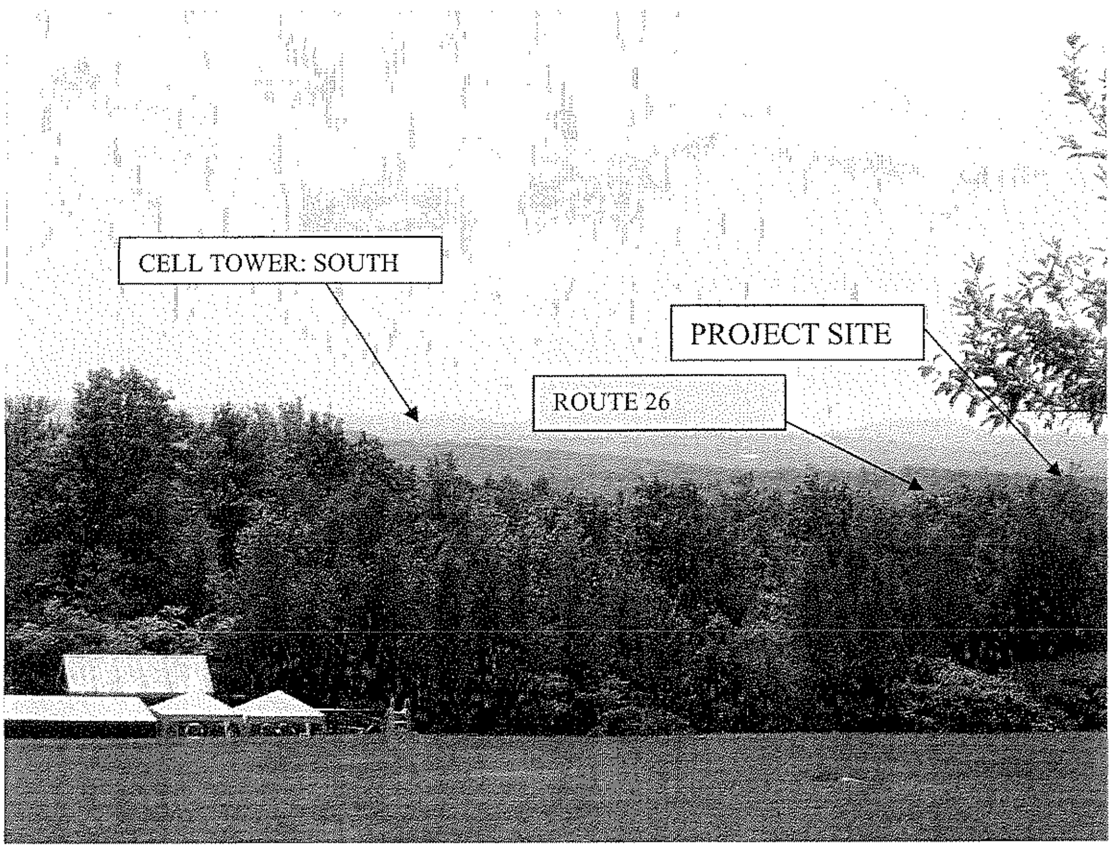
Photo #2: Location 6



Project Site from Allen Hill Road in Otisfield
Range: 4.2 miles
View Direction: Southeast

This is the best estimation of the project site location. Any cell towers are hidden by the forested hill background. The notch in the tree line may be Route 26. The project site is located behind the trees.

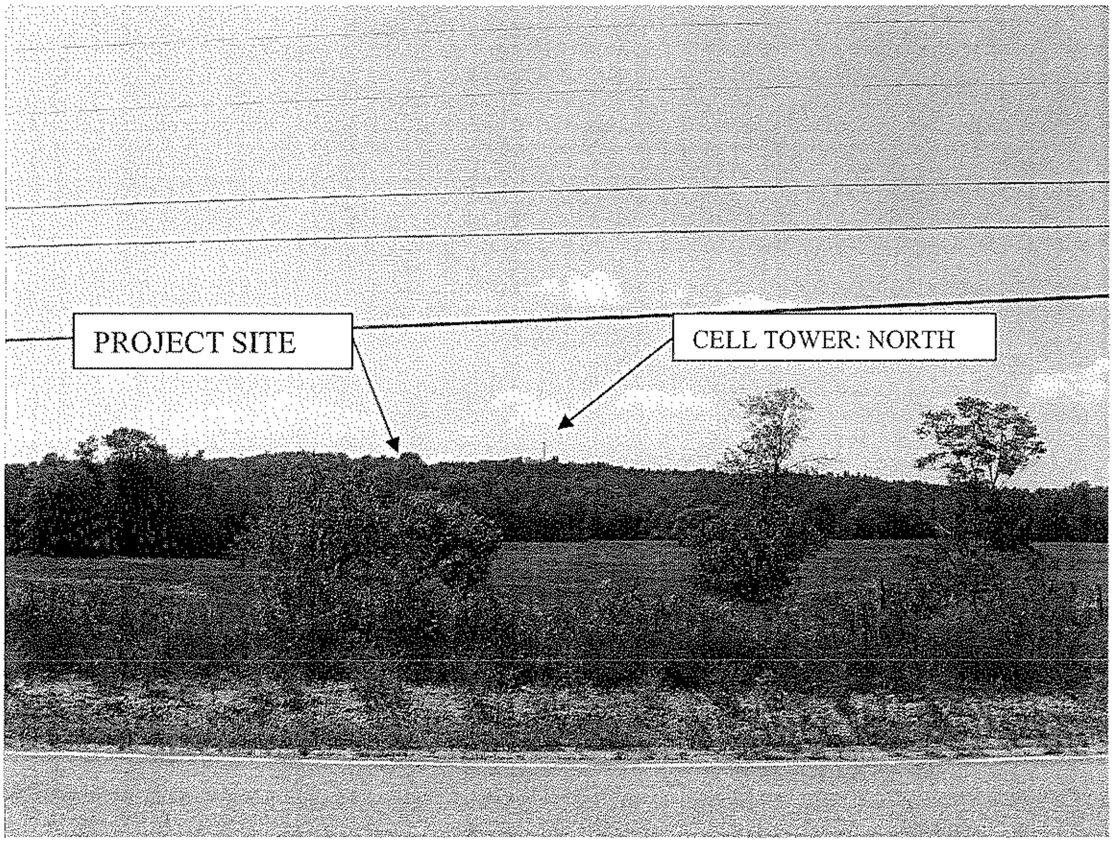
Photo #3: Location 8



Project Site from Robinson Hill Road in Mechanic Falls
Range: 2.2 miles
View Direction: Southwest

The *south* cell phone tower to the left of this photo gives scale and bearing to the site. The proposed development will be barely visible from this location due to vegetation. You can also see some of Route 26 just above the tree line in the foreground.

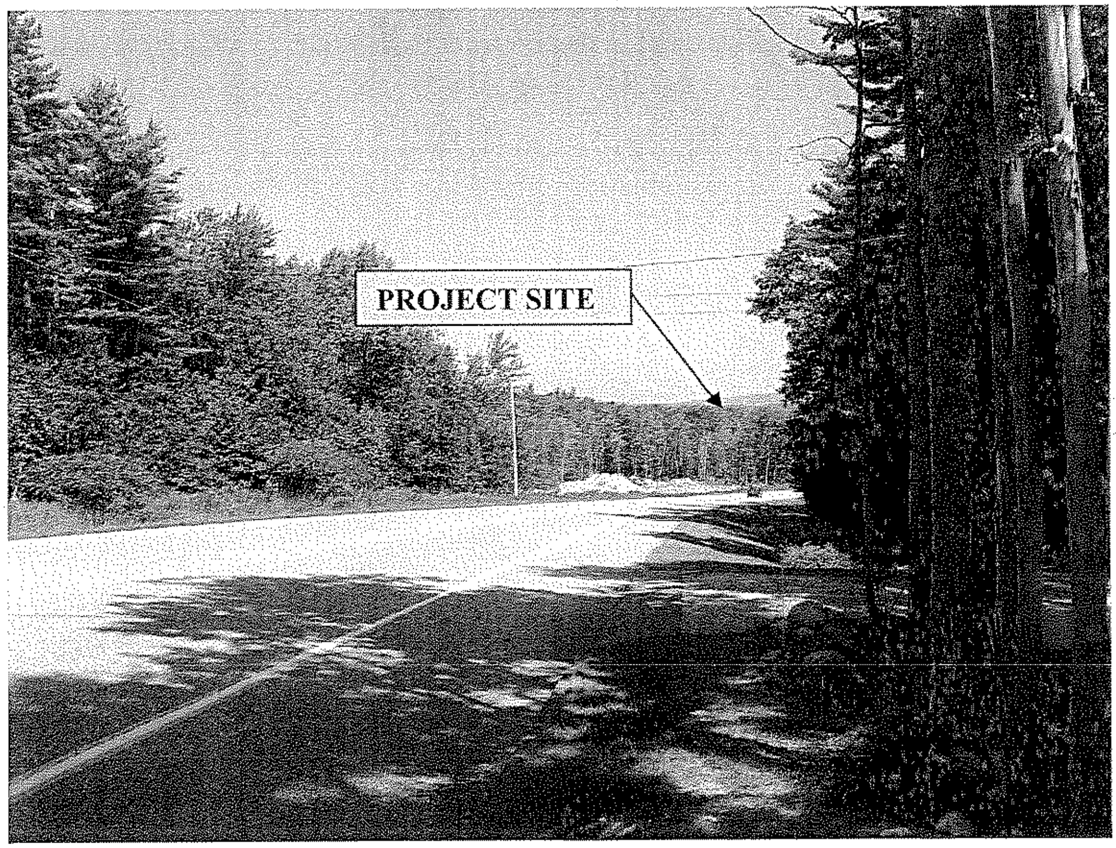
Photo #4: Location 9



Project Site from Route 121 in Mechanic Falls
Railroad Tracks Directly Behind
Range: 1.2 miles
View Direction: Southwest

The *north* cell phone tower in the center of this photo gives scale and bearing to the site. The proposed development will not be visible from this location because of the flat nature of the hilltop and the interceding trees. One notes that this is the same view line as Location 8, only closer to the site and lower in elevation.

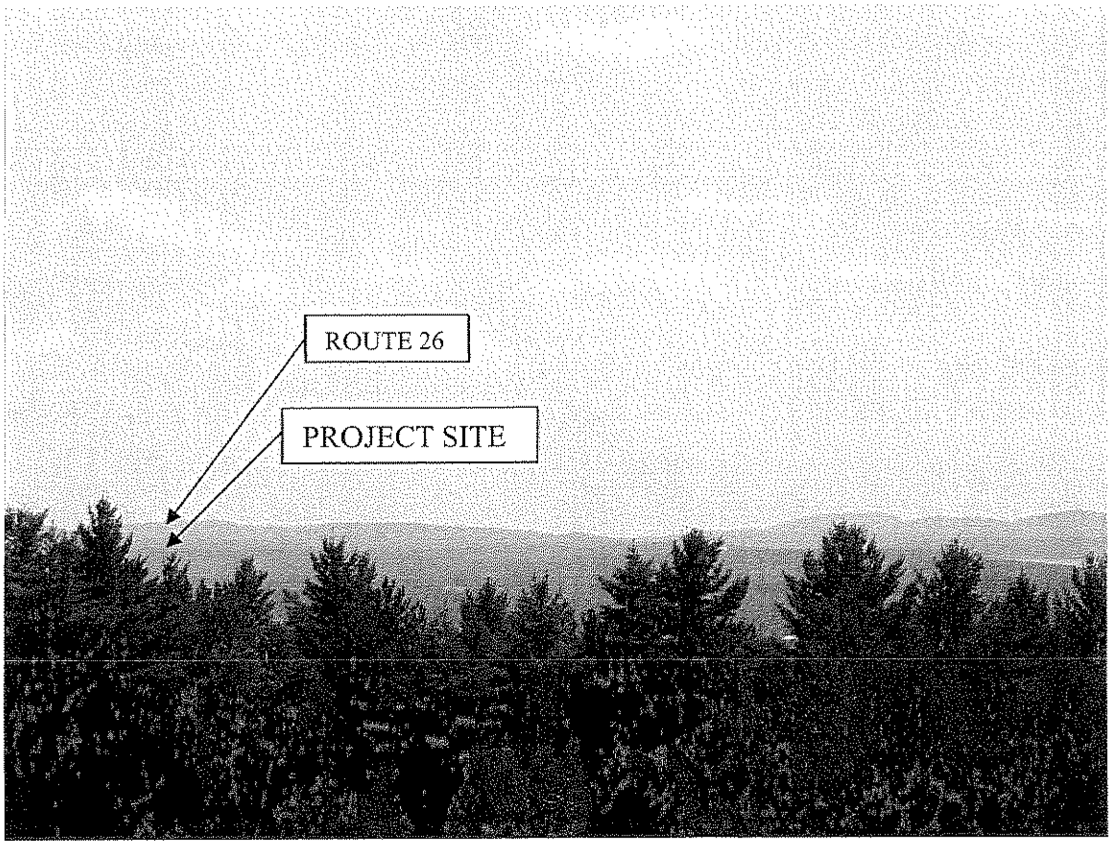
Photo #5: Location 11



Project Site from Route 26: Pigeon Hill
Range: 1.6 miles
View Direction: North/Northwest

The *north* cell tower is not visible in this photo as it is obscured by vegetation. The project site is therefore not visible from this location either. Parent Lumber Co. is perpendicularly to the right from this photo location.

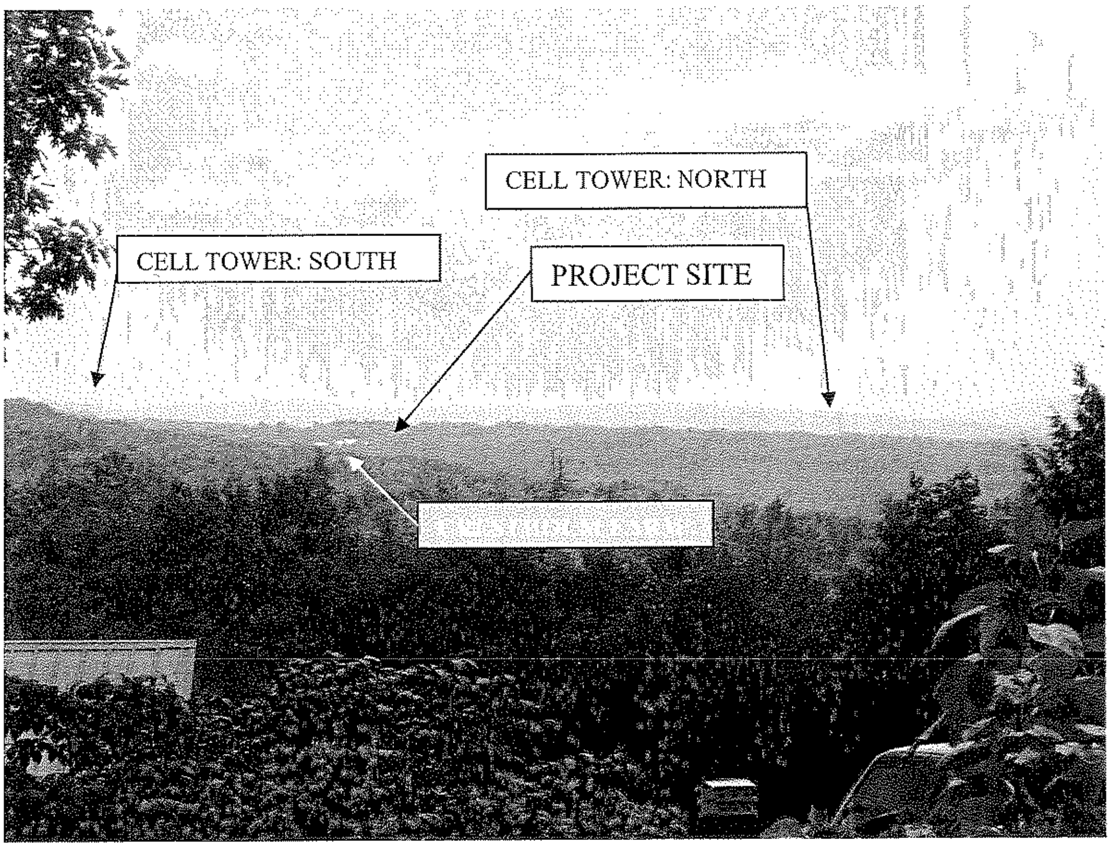
Photo #6: Location 18



Project Site from Whitney Hill (Town Farm Road) in Hebron
Range: 5.0 miles
View Direction: Southeast

In theory, the *north* cell phone tower should be visible in this photo. However, the combination of the distance from the photo location to the site and the green hill background make it impossible to see. One might make out a speck of light color in the green which appears to be Route 26 next to or near the site. The site is therefore expected to be visible by line of site from this location, but not without some significant optical magnification. This puts the project significantly in the background of the viewshed.

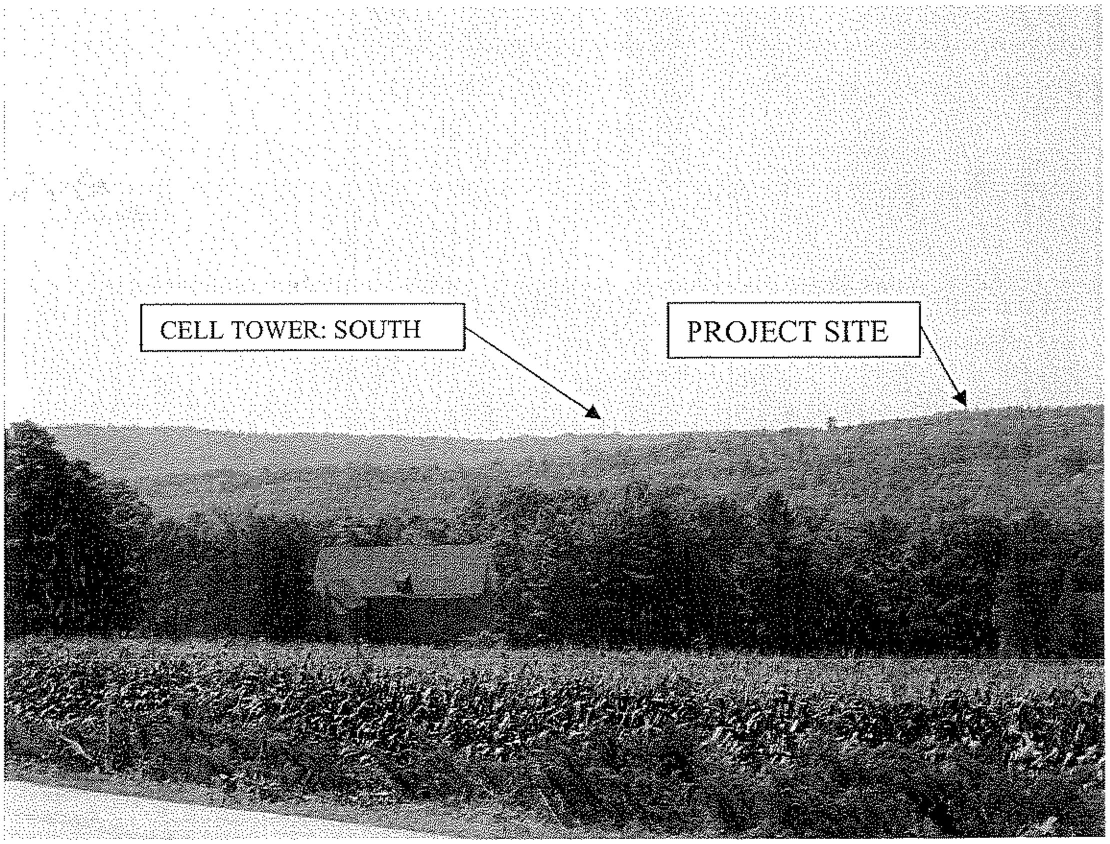
Photo #7: Location 20



Project Site from East Oxford Road
Range: 3.2 miles
View Direction: South

The *south* cell phone tower to the left of this photo and the *north* cell phone tower to the right of this photo give scale and bearing to the site. One can also see the Crestholm Farm directly across Route 26 from the project site, which shows up on the photo as a light colored patch.

Photo #8: Location 21



Project Site from Millett Road in Minot
Range: 4.0 miles
View Direction: Southwest

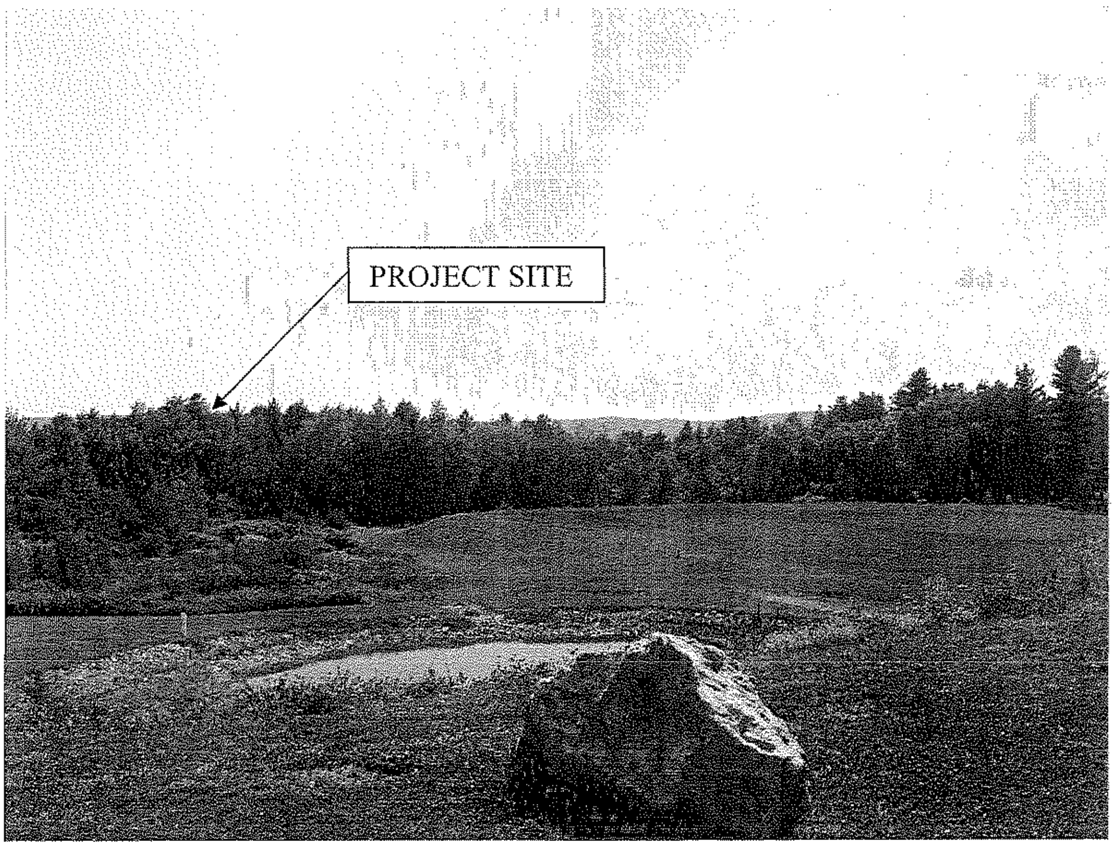
The *south* cell phone tower is visible in the center of this photo. The project site is not visible because it is behind the hill to the right side of the photo.

Photo #9: Location 27

Project Site from Eddie Kahkonen Road in Norway
Range: 7.6 miles
View Direction: Southeast

The site is possibly visible for a fleeting moment along the Eddie Kahkonen Road between the roadside vegetation. Route 26 just barely shows up as a light colored patch. The project site is around the bend of Route 26 and therefore behind the trees. Both the project site and Route 26 are significantly in the background of this viewshed.

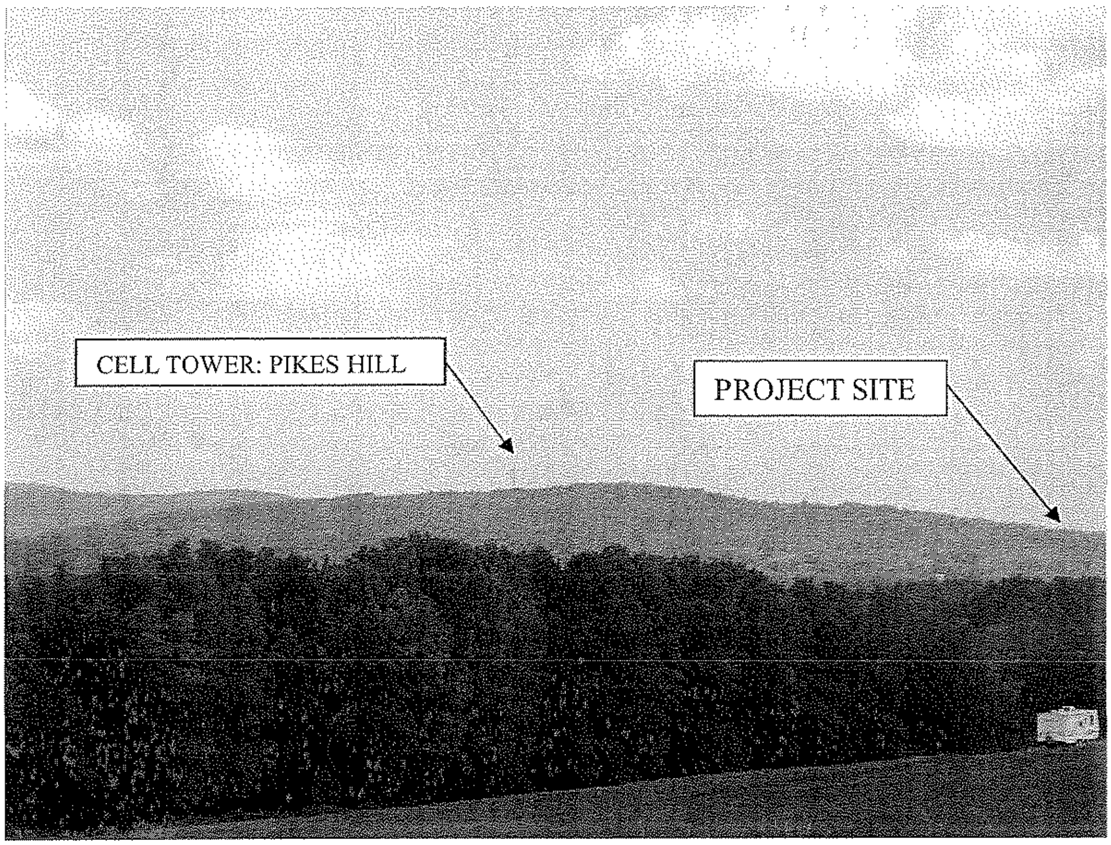
Photo #10: Location 29b



Project Site from Parking Lot at Hebron Academy
Range: 6.0 miles
View Direction: South

This photo shows the approximate project site location which is behind several substantial ridges. The project will not be visible from this location.

Photo #11: Location 31



Project Site from Norway Center Road in Norway
Range: 12.4 miles
View Direction: Southeast

The *Pikes Hill* cell phone tower in the center of this photo gives scale and bearing to the site. The proposed development will not be visible from this location due to the sheer distance. The Pikes Hill cell phone tower is approximately four miles from the photo location. The project site is another eight miles beyond the Pikes Hill tower. The project site is somewhere beyond the valley shown at the far right of the photo.

JCJARCHITECTURE

Maine Resort Casino - Oxford, Maine

SECTION 7. WILDLIFE AND FISHERIES:

The Maine DEP and the Department of Inland Fisheries & Wildlife have responded to a letter of inquiry regarding habitat on or near the project site. The enclosed letter and map indicate no essential habitat, nor any significant wildlife habitat on the project site.

The Fisheries Specialist has requested 100 foot buffers adjacent to the stream on-site. The applicant proposes the 100 foot setback to satisfy the concerns of the IF&W biologists.

Both letters are enclosed as part of this Section.

STATE OF MAINE

Department of Environmental Protection

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

August 9, 2010

Main-Land Development Consultants, Inc.
Attn: Robert Berry
PO Box Q
Livermore Falls, ME 04254

Re: Request for Significant Wildlife Habitat Information
Significant Wildlife Habitat Map for proposed commercial development along Rte 26, Oxford, Maine

Dear Mr. Berry:

Enclosed please find maps in response to your request for information regarding Significant Wildlife Habitat in Oxford, Maine. The map shows your approximate project area and was generated from Maine Geographic Information System (GIS) data layers maintained by the Maine Department of Environmental Protection (DEP) and the Maine Department of Inland Fisheries and Wildlife (IF&W). ***Based on this information, it appears that the proposed project is not located within a mapped significant wildlife habitat.***

Please note that GIS data layers for Vernal Pools that have already been identified are currently available; however, the project area should be screened by a qualified professional during the appropriate identification period to determine if significant vernal pools are present

Please be sure to consult with the Maine Natural Areas Program in order to obtain information regarding rare, threatened or endangered flora.

Enclosed please find a map of the proposed project site. Thank you for consulting the Department during the project planning process. Please feel free to contact the Department if you have questions or require additional information.

Maine Department of Inland
Fisheries and Wildlife
358 Shaker Road
Gray, Maine 04039

Telephone: 207-657-2345 ext.113
Fax: 207-657-2980
Email: brian.lewis @maine.gov

John Elias Baldacci, Governor

Roland Martin, Commissioner

September 8, 2010

Robert Berry
PO Box Q
Livermore Falls, Maine 04254

RE: Project Site in Oxford

Dear Robert Berry,

I have reviewed your request for fishery resource information, and there are no known threatened/endangered fish species or habitat in the vicinity of the proposed project. However, the Little Androscoggin river flows along the northeastern boundary of the area indicated. This river is heavily stocked with trout by MDIF&W and is a popular fishing destination. Our regional riparian buffer policy is outlined below.

Stream systems are vulnerable to environmental impacts associated with increased development and encroachment. If present, this project should be sensitive to these resource issues by including provisions for riparian buffers and minimizing any other potential stream impacts. Our regional buffer policy requests 100 foot undisturbed buffers along both sides of any stream or stream-associated wetlands. Buffers should be measured from the upland wetland edge of stream-associated wetlands, and if the natural vegetation has been previously altered then restoration may be warranted. This buffer requirement improves erosion/sedimentation problems; reduces thermal impacts; maintains water quality; supplies leaf litter and woody debris for the system; and provides valuable wildlife habitat. Protection of these important riparian functions insures that the overall health of the stream habitat is maintained.

Stream crossings, if applicable, must include provisions for adequate fish passage, and any in-stream work needs to be done between the first of July and the first of October. Project design should minimize the number of stream crossings. If you have any additional questions or concerns then feel free to contact us.

Sincerely,

Brian Lewis
Fishery Specialist
MDIFW

SECTION 10. BUFFERS:

The project proposes 100 foot setback buffers from the one stream on-site.

Deed covenants and restrictions associated with the stream buffer is included as part of this section.

Forms H1-3 SUGGESTED TEMPLATES FOR STORMWATER BUFFER DEED RESTRICTIONS. With some minor revisions the H-1 (Forested buffer, no disturbance) template may be used to protect undisturbed stream buffers.

Forested buffer, No disturbance FORM H-1 04/06

DECLARATION OF RESTRICTIONS (Forested Buffer, No Disturbance)

THIS DECLARATION OF RESTRICTIONS is made this _________day of _____________ , 20___, by BB Development, LLC, (name) 1570 Main Street, (street address) Oxford, (city or town) Oxford (county) County, Maine, 04270 (zipcode), (herein referred to as the "Declarant", pursuant to a permit received from the Maine Department of Environmental Protection under the Site Location of Development Act, to preserve a buffer area on a parcel of land near Rabbit Valley Road and Route 26. (road name)

WHEREAS, the Declarant holds title to certain real property situated in Oxford, (town) Maine described in a deed from Evan Thurlow (name) to BB Development, LLC, (name of Declarant) dated _______________, 20____, and recorded in Book ____ Page ____ at the ______________County Registry of Deeds, herein referred to as the "property"; and

WHEREAS, Declarant desires to place certain restrictions, under the terms and conditions herein, over a portion of said real property (hereinafter referred to as the "Restricted Buffer") described as follows: (Note: Insert description of restricted buffer location here)

WHEREAS, pursuant to the Site Location of Development Act, 38 M.R.S.A. §§ 481-490, and Department Rules for stormwater management, Chapter 500, promulgated by the Maine Board of Environmental Protection, Declarant has agreed to impose certain restrictions on the Restricted Buffer Area as more particularly set forth herein and has agreed that these restrictions may be enforced by the Maine Department of Environmental Protection or any successor (hereinafter the "MDEP"),

NOW, THEREFORE, the Declarant hereby declares that the Restricted Buffer Area is and shall forever be held, transferred, sold, conveyed, occupied and maintained subject to the conditions and restrictions set forth herein. The Restrictions shall run with the Restricted Buffer Area and shall be binding on all parties having any right, title or interest in and to the Restricted Buffer Area, or any portion thereof, and their heirs, personal representatives, successors, and assigns. Any present or future owner or occupant of the Restricted Buffer Area or any portion thereof, by the acceptance of a deed of conveyance of all or part of the Covenant Area or an instrument conveying any interest therein, whether or not the deed or instrument shall so express, shall be deemed to have accepted the Restricted Buffer Area subject to the Restrictions and shall agree to be bound by, to comply with and to be subject to each and every one of the Restrictions hereinafter set forth.

1. Restrictions on Restricted Buffer Area. Unless the owner of the Restricted Buffer Area, or any successors or assigns, obtains the prior written approval of the MDEP, the Restricted Buffer Area must remain undeveloped in perpetuity. To maintain the ability of the Restricted Buffer Area to filter and absorb stormwater, and to maintain compliance with the Site Location of Development Act and the permit issued thereunder to the Declarant, the use of the Restricted Buffer Area is hereinafter limited as follows.

a. No soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material will be placed, stored or dumped on the Restricted Buffer Area, nor shall the topography of the area be altered or manipulated in any way;

b. No trees may be cut or sprayed with biocides except for the normal maintenance of dead, windblown or damaged trees and for pruning of tree branches below a height of 12 feet provided two thirds of the tree's canopy is maintained;

c. No undergrowth, ground cover vegetation, leaf litter, organic duff layer or mineral soil may be disturbed except that one winding path, that is no wider than six feet and that does not provide a downhill channel for runoff, is allowed through the area;

d. No building or other temporary or permanent structure may be constructed, placed or permitted to remain on the Restricted Buffer Area, except for a sign, utility pole or fence;

e. No trucks, cars, dirt bikes, ATVs, bulldozers, backhoes, or other motorized vehicles or mechanical equipment may be permitted on the Restricted Buffer Area;

f. Any level lip spreader directing flow to the Restricted Buffer Area must be regularly inspected and adequately maintained to preserve the function of the level spreader.

Any activity on or use of the Restricted Buffer Area inconsistent with the purpose of these Restrictions is prohibited. Any future alterations or changes in use of the Restricted Buffer Area must receive prior approval in writing from the MDEP. The MDEP may approve such alterations and changes in use if such alterations and uses do not impede the stormwater control and treatment capability of the Restricted Buffer Area or if adequate and appropriate alternative means of stormwater control and treatment are provided.

2. Enforcement. The MDEP may enforce any of the Restrictions set forth in Section 1 above.

3. Binding Effect. The restrictions set forth herein shall be binding on any present or future owner of the Restricted Buffer Area. If the Restricted Buffer Area is at any time owned by more than one owner, each owner shall be bound by the foregoing restrictions to the extent that any of the Restricted Buffer Area is included within such owner's property.

4. Amendment. Any provision contained in this Declaration may be amended or revoked only by the recording of a written instrument or instruments specifying the amendment or the revocation signed by the owner or owners of the Restricted Buffer Area and by the MDEP.

5. Effective Provisions of Declaration. Each provision of this Declaration, and any agreement, promise, covenant and undertaking to comply with each provision of this Declaration, shall be deemed a land use restriction running with the land as a burden and upon the title to the Restricted Buffer Area.

6. Severability. Invalidity or unenforceability of any provision of this Declaration in whole or in part shall not affect the validity or enforceability of any other provision or any valid and enforceable part of a provision of this Declaration.

7. Governing Law. This Declaration shall be governed by and interpreted in accordance with the laws of the State of Maine.

____

(NAME)

STATE OF MAINE, ______________________ County, dated ___________________, 20__.
(County)

Personally appeared before me the above named ___________________________, who swore to the truth of the foregoing to the best of (his/her) knowledge, information and belief and acknowledged the foregoing instrument to be (his/her) free act and deed.

____
Notary Public

SECTION 12. STORMWATER MANAGEMENT:

A. Narrative:

The ***Oxford Resort Casino*** development project will be a four-season commercial and entertainment resort facility. The project consists of a building complex for casino gaming activities, restaurants, and conference facilities; a 200 room hotel; a spa; outdoor recreational areas including tennis courts and jogging trails; ATV and snowmobile trailhead and parking area; RV park; and associated infrastructure such as parking, ponding areas, utilities, and vehicular circulation.

The project will be split into multiple phases for responsible growth. This application contains the first phase of development only. Future phases will be proposed and submitted to the Department for review and approval at a future time.

The project site is located on the northwest corner at the intersection of Main Street (Route 26) and Rabbit Valley Road in southern Oxford. The project site is comprised of several properties and totals 97.3 acres of land.

The existing site condition is largely undeveloped. The western two thirds of the site is wooded. The third closest to Route 26 is farmland. Three residential structures exist on site adjacent to Route 26, though two have been abandoned. The third is a mobile home. The site has a subtle ridge line running north-south near route 26. Most of the site slopes gently to the west. A smaller area slopes gently easterly to Route 26.

One stream was found on site, starting in about the center of the property and flowing westerly. The stream is not depicted on the USGS map as a blue line. The start of the stream was reviewed on site by the former Department analyst Eric Ham.

The project site will be accessed by one new entrance on Route 26, which will be the main entrance for guests, and one new restricted entrance on Rabbit Valley Road, which will serve emergency vehicles and provide an alternate site access and exit. The new building will have a 65,000 +/- square foot footprint, with an accessory temporary building for administrative purposes. Parking will be accommodated with 1016 spaces, mostly in two new parking areas. The project proposes 12.90 acres of new impervious area, with a total developed area of 27.63 acres.

Stormwater from this site flows in two main directions. The bulk of the site drains westerly overland, eventually flowing into small streams, and into Hogan Pond. Hogan and Whitney Ponds drain to the Little Androscoggin River. A smaller portion of the eastern end of the site drains easterly to Route 26, through culverts, catch basins and channels, continues easterly overland directly into the

Little Androscoggin River.

1. Development Location: The project site is located on the northwest corner at the intersection of Main Street (Route 26) and Rabbit Valley Road in southern Oxford.

2. Surface Water on or Abutting the Site: A small intermittent stream starts in the approximate center of the site and drains westerly and into Hogan Pond. The stream is not a blue line on the USGS. There are no other existing waterbodies on or adjacent to the site.

3. Downstream Ponds and Lakes: This project, as stated above, is in the watershed of Hogan Pond and the Little Androscoggin Rivers.

4. General Topography: The general topography of the site consists of gentle to moderate slopes. Much of the site is wooded, though some of the site was used for farming and three residential structures.

5. Flooding: The site is not in a floodplain. See Section 19 of the SLODA application.

6. Alterations to Natural Drainage Ways: This project proposes to redirect area from the Hogan Pond watershed to the Little Androscoggin watershed. Doing so will remove significant amounts of pavement and parking from the more sensitive lake watershed.

7. Alterations to Land Cover: The alterations to existing land cover will consist of the construction of the proposed road network, parking, buildings, landscaping, wetponds, and septic fields. Much of this work takes place in the existing farming area.

8. Modeling Assumptions: The drainage calculations done for this project utilized the Hydro-Cad computer software for modeling.

9. Water Quantity Control: Stormwater from this site flows in two main directions. The bulk of the site drains westerly overland, eventually flowing into small streams, and into Hogan Pond. Hogan and Whitney Ponds drain to the Little Androscoggin River. A smaller portion of the eastern end of the site drains easterly to Route 26, through culverts, catch basins and channels, continues easterly overland directly into the Little Androscoggin River.

   The areas flowing easterly towards Route 26 will be controlled via two wetponds in series. Both wetponds are situated along Route 26 and will be used for quantity and quality control of parking and building developments; beautification of the entrance to the development; and wetland creation areas.

The areas flowing westerly towards Hogan Pond will be captured and treated via two other wetponds in series.

10. Water Quality Treatment: This project will utilize wetponds to meet quality treatment requirements.

11. Off-site Credits: Not Applicable

12. Compensation Fees: Not Applicable

13. Development Impacts: The development of this site is anticipated to have only minimal impacts to downstream areas. By utilizing the treatment methods described, both the quality of the run-off water and the quantity of the water should remain very close to the pre-development condition.

B. Maps:

1. Topographic Map: A copy of the U.S.G.S. 7-1/2 minute quadrangle showing the location of the property is enclosed in Section 1 of the DEP Site Location application.

2. Soils Map: A copy of the Class A High Intensity Soils Map is included as part of Section 11 of the DEP Site Location application. The soil information is also shown on the Drainage Plans included as part of this section.

C. Drainage Plans:

Both Pre-Development and Post Development Stormwater Control Plans have been prepared as part of this Section.

1. Contours: The Plans show 2-foot existing contours and 1 foot proposed contours on the project site.

2. Plan Elements: The Plans show all of the required elements, including a legend, north arrow, title block, revision block and areas for professional stamps.

3. Land Cover Types and Boundaries: The Plans show the tree lines, building locations, edges of pavement, and other land features of the project site.

4. Soil Group Boundaries: All of the soils on site are Hydrologic Group C and D soils. The soils map developed for Section 11 is also shown on the Drainage Plans.

5. Stormwater Quantity Subwatershed Boundaries: Drainage boundary lines for the subcatchments of the project site are shown on the Plans.

6. Stormwater Quality Subwatershed Boundaries: Drainage boundaries for the subcatchments of the project site are shown on the Plans.

7. Watershed Analysis Points: The Analysis Points used in the stormwater calculations are shown on the Plans.

8. Hydrologic Flow Lines: The hydrologic flow lines for each subwatershed are shown on the Plans.

9. Runoff Storage Areas: The proposed wetpond areas are shown on the Plans.

10. Roads and Drives: New roads and drives are shown on the Post-Development Drainage Plan.

11. Facilities: The existing facilities on site include 3 residences (2 have been abandoned), all three of which will be removed. New buildings and parking areas are shown.

12. Drainage Systems: New culverts, catch basins, and storm sewers are shown on the plans.

13. Natural and Man-made Drainage Ways: The Drainage Plans show the drainage ways.

14. Wetlands: The Plan shows the wetland areas on the project site.

15. Flooded Areas: There are no flooding areas on site.

16. Benchmark: The traverse stations used in the survey of this parcel are shown on the plan for benchmarks.

17. Stormwater Detention, Retention and Infiltration Facilities: The project Site Plans show the locations of the proposed wetponds.

18. Stormwater Treatment Facilities: The Plan shows all stormwater treatment facilities, as well as the drainage area contributing to each treatment facility.

19. Drainage Easements: There are no existing or proposed drainage easements.

D. Runoff Analysis: As part of this Section a runoff analysis has been included, comparing the pre-development condition to the post development condition.

1. Curve Number Computations: The analysis includes the computations of the curve number for each watershed, both pre and post conditions. This was done using HydroCad version 8.0.

2. Time of Concentration Calculations: The time of concentration calculations have been done using HydroCad for the pre and post conditions in all watersheds.

3. Travel Time Calculations: The travel time calculations have been done using HydroCad for the pre and post conditions in all watersheds.

4. Peak Discharge Calculations: The peak discharge calculations have been done using HydroCad for the pre and post conditions in all watersheds.

5. Reservoir Routing Calculations: Routing calculations for the proposed detention ponds are included in the Hydrocad calculations.

E. Flooding Standard Submissions:

Stormwater from this site flows in two main directions. The bulk of the site drains westerly overland, eventually flowing into small streams, and into Hogan Pond. Hogan and Whitney Ponds drain to the Little Androscoggin River. A smaller portion of the eastern end of the site drains easterly to Route 26, through culverts, catch basins and channels, continues easterly overland directly into the Little Androscoggin River.

As noted on the attached drainage plans, there are eight Watershed Analysis Points.

W.A.P. 'A' is one of two analysis points located along the northern boundary line of the property. Contributing subcatchments are made up of a mix of forested wetlands of Hydrologic Soils Group D soils and agricultural fields of Hydrologic Soils Group C soils. Water from W.A.P. 'A' flows to Hogan Pond.

W.A.P. 'B' is the second of two analysis points located along the northern boundary line of the property and is located west of W.A.P. 'A'. Contributing subcatchments are made up of a mix of forested wetlands of Hydrologic Soils Group D soils and forest land of Hydrologic Soils Group C soils. Water from W.A.P. 'B' flows to Hogan Pond.

W.A.P. 'C' is the most northerly of three analysis points located along the western boundary line of the property. Contributing subcatchments are made up of a mix of forested wetlands of Hydrologic Soils Group D soils and forest land of Hydrologic Soils Group C soils. Water from W.A.P. 'C' flows to Hogan Pond.

W.A.P. 'D' is the second of the three analysis points located along the northern boundary line of the property and is located south of W.A.P. 'C'. W.A.P. 'D' is also located at the point where the small intermittent stream leaves the site to abutting property. Contributing subcatchments are mainly made up of a mix of forested wetlands of Hydrologic Soils Group D soils, agricultural fields of Hydrologic Soils Group 'C' soils and forest land of Hydrologic Soils Group C soils. Water from W.A.P. 'D' flows to Hogan Pond.

W.A.P. 'E' is the third of the three analysis points located along the western boundary line of the property and is located south of W.A.P. 'D'. Contributing subcatchments are mainly made up of a mix of forested wetlands of Hydrologic Soils Group D soils and forest land of Hydrologic Soils Group C soils. Water from W.A.P. 'E' flows to Hogan Pond.

W.A.P. 'F' is located along the southern boundary line of the property where an abutting property juts into the project site. Contributing subcatchments are mainly made up of a mix of forested wetlands of Hydrologic Soils Group D soils and forest land of Hydrologic Soils Group C soils. A portion of the Rabbit Valley Road also contributes to this analysis point. Water from W.A.P. 'F' flows to Hogan Pond.

W.A.P. 'G' is the first of three analysis points located along the eastern boundary line of the property, which represent locations of interest within the drainage network along Route 26. Contributing subcatchments are mainly residential in nature and made up of a mix of forest land of Hydrologic Soils Group C soils and grassed area of Hydrologic Soils Group C soils. A portion of the Rabbit Valley Road also contributes to this analysis point. Water from W.A.P. 'G' flows to the Little Androscoggin River.

W.A.P. 'H' is the second of three analysis points located along the eastern boundary line of the property, which represent locations of interest within the drainage network along Route 26. Contributing subcatchments are mainly residential in nature and made up of a mix of forest land of Hydrologic Soils Group C soils and grassed area of Hydrologic Soils Group C soils. Water from W.A.P. 'H' flows to the Little Androscoggin River.

W.A.P. 'i' is the third of three analysis points located along the eastern boundary line of the property, which represent locations of interest within the drainage network along Route 26. W.A.P. 'i' is actually located slightly beyond the property line in order to analyze the affects of the development on offsite drainage facilities. Contributing subcatchments are mainly made up of a mix of forest land of Hydrologic Soils Group C soils, grassed area of Hydrologic Soils Group C soils, and agricultural fields of Hydrologic Soils Group C soils. Water from W.A.P. 'i' flows to the Little Androscoggin River.

As shown on the Drainage Summary Tables below, the flowrates at the watershed analysis points vary and generally decrease in the developed condition.

2 Year Storm Event

	Flow Rate (CFS)			
WAP	Pre-Develop	Post-Develop	Difference	% Difference
A	12.94	12.57	-0.37	-3%
B	6.06	6.06	0.00	0%
C	9	9	0.00	0%
D	11.09	8.8	-2.29	-21%
E	10.71	7.84	-2.87	-27%
F	2.57	0.54	-2.03	-79%
G	5.21	2.05	-3.16	-61%
H	3	0.23	-2.77	-92%
i	8.85	5.64	-3.21	-36%
Total	69.43	52.73	**-16.7**	**-24%**

10 Year Storm Event

	Flow Rate (CFS)			
WAP	Pre-Develop	Post-Develop	Difference	% Difference
A	25.65	24.92	-0.73	-3%
B	14.02	14.02	0.00	0%
C	21.32	21.32	0.00	0%
D	25.55	20.28	-5.27	-21%
E	25.39	19.02	-6.37	-25%
F	5.79	1.22	-4.57	-79%
G	10.4	3.63	-6.77	-65%
H	4.22	0.35	-3.87	-92%
i	17.19	11.75	-5.44	-32%
Total	149.53	116.51	**-33.02**	**-22%**

25 Year Storm Event

	Flow Rate (CFS)			
WAP	Pre-Develop	Post-Develop	Difference	% Difference
A	31.95	31.04	-0.91	-3%
B	18.15	18.15	0.00	0%
C	27.8	27.8	0.00	0%
D	33.14	26.3	-6.84	-21%
E	33.06	32.1	-0.96	-3%
F	7.46	1.57	-5.89	-79%
G	12.66	4.39	-8.27	-65%
H	4.46	0.4	-4.06	-91%
i	21.3	15.25	-6.05	-28%
Total	189.98	157	**-32.98**	**-17%**

At W.A.P. 'A', stormwater flowrates are controlled by a reduction in overall contributing area. Additionally, there is very little change in cover type from pre-development to post-development conditions. This method controls the stormwater peak flowrates to below the pre-development quantities.

At W.A.P. 'B', there are no changes to contributing subcatchments. Therefore peak flowrates are the same in the post-development condition as in the pre-development condition.

At W.A.P. 'C', there are negligible changes to contributing subcatchments. Therefore peak flowrates are the same in the post-development condition as in the pre-development condition.

At W.A.P. 'D', stormwater flowrates are controlled by a reduction in overall contributing area. Additionally, there is very little change in cover type from pre-development to post-development conditions. This method controls the stormwater peak flowrates to below the pre-development quantities.

At W.A.P. 'E', peak stormwater flowrates are controlled by Wetpond E1W, which has a significant amount of potential storage for peak flow attenuation. Wetpond E2W is also incorporated in the drainage network here, but does not provide any quantity controls. This method controls the stormwater peak flowrates to below the pre-development quantities.

At W.A.P. 'F', stormwater flowrates are controlled by a significant reduction in overall contributing area. Additionally, there is very little change in cover type from pre-development to post-development conditions. This method controls the stormwater peak flowrates to below the pre-development quantities.

At W.A.P. 'G', stormwater flowrates are controlled by a reduction in overall contributing area. Additionally, there is very little change in cover type from pre-development to post-development conditions. This method controls the stormwater peak flowrates to below the pre-development quantities.

At W.A.P. 'H', stormwater flowrates are controlled by a significant reduction in overall contributing area. This method controls the stormwater peak flowrates to below the pre-development quantities.

At W.A.P. 'i', peak stormwater flowrates are controlled by two wetponds in series, i9W and i8W, located at the entrance to the project. These ponds control flows with a very large potential storage volume and orifice restricted outflow for peak flow attenuation. This method controls the stormwater peak flowrates to below the pre-development quantities.

F. General Standards Submissions:

The purpose of a stormwater quality treatment plan is to insure that stormwater leaving the development does not have an adverse impact on the receiving water bodies. This plan proposes to utilize sound erosion and sedimentation control methods, collection and treatment of the stormwater, and proper site maintenance to assist in improving water quality leaving the project site.

1. Narrative.

The proposed project impacts a significant, though concentrated, area of the site. The impervious area proposed is 1.71 acres of linear development and 11.19 acres of non-linear development, for a total developed impervious area of 12.90 acres. The landscaped/grassed area proposed is 14.73 acres. This totals 27.63 acres of proposed disturbed area.

This project proposes a number of wetponds for stormwater quality treatment. This uncomplicated treatment method is desirable due to the need to control stormwater run-off quickly in storm drain networks so as not to hinder vehicle and pedestrian traffic flow throughout the site. Storm drain networks convey run-off from nearly 100 percent of the proposed impervious surfaces to wetponds.

The proposed developed areas of the site drain to two pond locations; one in the Little Androscoggin River watershed, and one in the Hogan Pond watershed. At both of the pond locations, there are two wetponds proposed in series. This increases pollutant removal. Generally, these ponds are also oversized in permanent pool volume and channel protection volume to accommodate future phases of development.

Ponds i9W and i8W in series are located at the main entrance to the project. They are separated by the main drive and retaining walls. Constraints to storm drain network invert elevations dictate which of the two ponds an area network flows to. At pond i9W, water flows through an opening in the retaining wall into the outlet structure which is recessed behind the wall. Pond i9W outlets to pond i8W through a culvert across the entry drive. At pond i8W, water discharges through the outlet structure and through a culvert connected to the Maine Department of Transportation (MDOT) drainage network. In case of failure in the main pond outlet, the access road to the remaining agricultural fields will act as an emergency spillway. This is proposed to be paved and rip-rap armored on either side to prevent erosion. Normally an underdrained gravel outlet would be designed to treat increases in water temperature prior to discharge. In the case of pond i8W, discharged water will travel through approximately 700 feet of underground pipe and approximately 1,700 feet of overland flow before reaching a natural resource. This is expected to mitigate temperature increase.

Ponds E2W and E1W are located in series mid-way down slope in the direction of

Hogan Pond, near the southern property boundary. Pond E2W is designed as permanent pool volume only due to space and elevation constraints. Therefore water flows in to the pond at permanent pool elevation and flows out at nearly the same elevation with no channel protection or other storage associated. In case of catastrophic failure of the primary outlet structures, pond E2W is designed with an emergency spillway outlet. Pond E1W is designed with sufficient channel protection volume and potential storage volume to cover both ponds. The ponds together as a series are oversized for future development as well for increased phosphorus removal which is discussed in the following *Phosphorus Removal* section. Pond E1W includes an underdrained gravel outlet for treatment of increased water temperature. In case of catastrophic failure of the primary outlet structures, pond E1W is designed with an emergency spillway outlet. Prior to final discharge, both the primary and emergency outlets flow to a stone berm level lip spreader to de-concentrate flow.

Utilizing the ponds described above, the site treatment strategy achieves treatment of 99.5% of new impervious area and 84.6% of new developed area. Some existing impervious and developed areas are also receiving treatment in the wetponds. With these areas included, 104.7% of the site impervious area and 88.4% of the site developed area is treated. This exceeds the 95% and 80% required.

2. Drainage Plans.

   Pre- and Post-Development Drainage Plans are included in the drawing set.

3. Calculations.

   Calculation spreadsheets are provided in this stormwater package. Section 6 summarizes the treatment methods and rates, Section 7 provides BMP sizing calculations, and Section 8 details pond freeboard calculations.

4. Details, Designs, and Specifications. The Plans show necessary design and material specifications for BMP construction.

   a. Ponds. Two sets of wetponds in series to make four ponds total are shown in detail on pond plan and profile sheets.

   b. Underdrained Vegetated (Soil) Filters. Not applicable. No filtration is proposed.

   c. Infiltration Not Applicable. No infiltration areas are proposed.

   d. Buffers. Not applicable. No *stormwater* buffers are proposed.

5. Phosphorus Removal.

A large portion of the site is located in the watershed of Hogan Pond, a water body classified by Maine DEP as a "Lake Most at Risk" of algal bloom due to increasing phosphorus concentrations. The Town of Oxford's share of the allowable yearly phosphorus export to Hogan Pond is 13.82 pounds. Factoring in the expected area of development in the Town of Oxford in the Hogan Pond watershed, one can arrive at a per acre allocation of 0.045 pounds. Since this project includes 76.72 acres in the Hogan Pond watershed, it is allowed 3.44 pounds of new phosphorus export per year.

The first step to reducing the amount of phosphorus export from the site to Hogan Pond was to minimize the amount of development in the watershed. This was done through site grading. The proposed site grading slopes gently from the 65,000 square foot building down to Route 26. This directs run-off from a significant amount of developed area to the Little Androscoggin River watershed, away from the moderately sensitive Hogan Pond watershed.

Run-off from a majority of the developed area in the Hogan Pond watershed that can not be redirected flows to wetponds E2W and E1W. Since these ponds are oversized and arranged in series, they are more efficient in phosphorus removal and achieve a treatment factor of 0.25 (75% pollutant removal). These ponds also treat run-off from a section of the existing Rabbit Valley Road. This is listed in the mitigation credit section of the Phosphorus Export Calculation Worksheets.

Utilizing the treatment methods described above, a pre-treatment export of 7.38 pounds of phosphorus per year is reduced to a post-treatment export of 2.59 pounds per year. This is less than the maximum allowable export (Project Phosphorus Budget) of 3.44 pounds per year. The applicant anticipates using more of this project budget in subsequent phases.

6. Responsible Party for Long-Term Maintenance. Oxford Resort Casino shall be responsible for long term maintenance.

G. Components of the Maintenance Plan: The Maintenance Plan includes the following Objectives:

1. Responsible Party: The Oxford Resort Casino will be the Responsible Party. The Oxford Resort Casino will have a manager in charge of facilities, who will be the contact person.

2. Transfer Mechanism: No transfer mechanism is necessary. The Oxford Resort Casino will be responsible in perpetuity.

3. Facilities to be maintained: As stated above, the Oxford Resort Casino will maintain the wetponds, embankments, ditches, channels, storm drains, culverts, ,

and any other required elements within the project boundaries.

4. Inspection and Maintenance Tasks: The Plan provides details as to the frequency of inspections, and the potential tasks that may be associated with this Plan.

5. Deed Restrictions and Covenants: Not Applicable.

6. Maintenance Log: A description and a sample of a maintenance log is included as part of the Maintenance Plan.

7. Contracts: There are no proposed contracts for third party maintenance for this project. The Casino maintenance staff will provide maintenance.

H. Maintenance by a Homeowner Association: Not Applicable.

I. Maintenance of Facilities by a Municipality: Not Applicable.

J. General Inspection and Maintenance Requirements: A Maintenance Plan for the overall project site, and for the associated stormwater control structures is included as part of this Section.

1. Drainage Easements: No Drainage Easements are proposed.

2. Ditches and Culverts: The Plan includes yearly inspections and maintenance of all culverts and ditches as described.

3. Roadways: The Plan describes the maintenance necessary on the roads, including grading, and shaping the shoulders to promote discharge to the ditch.

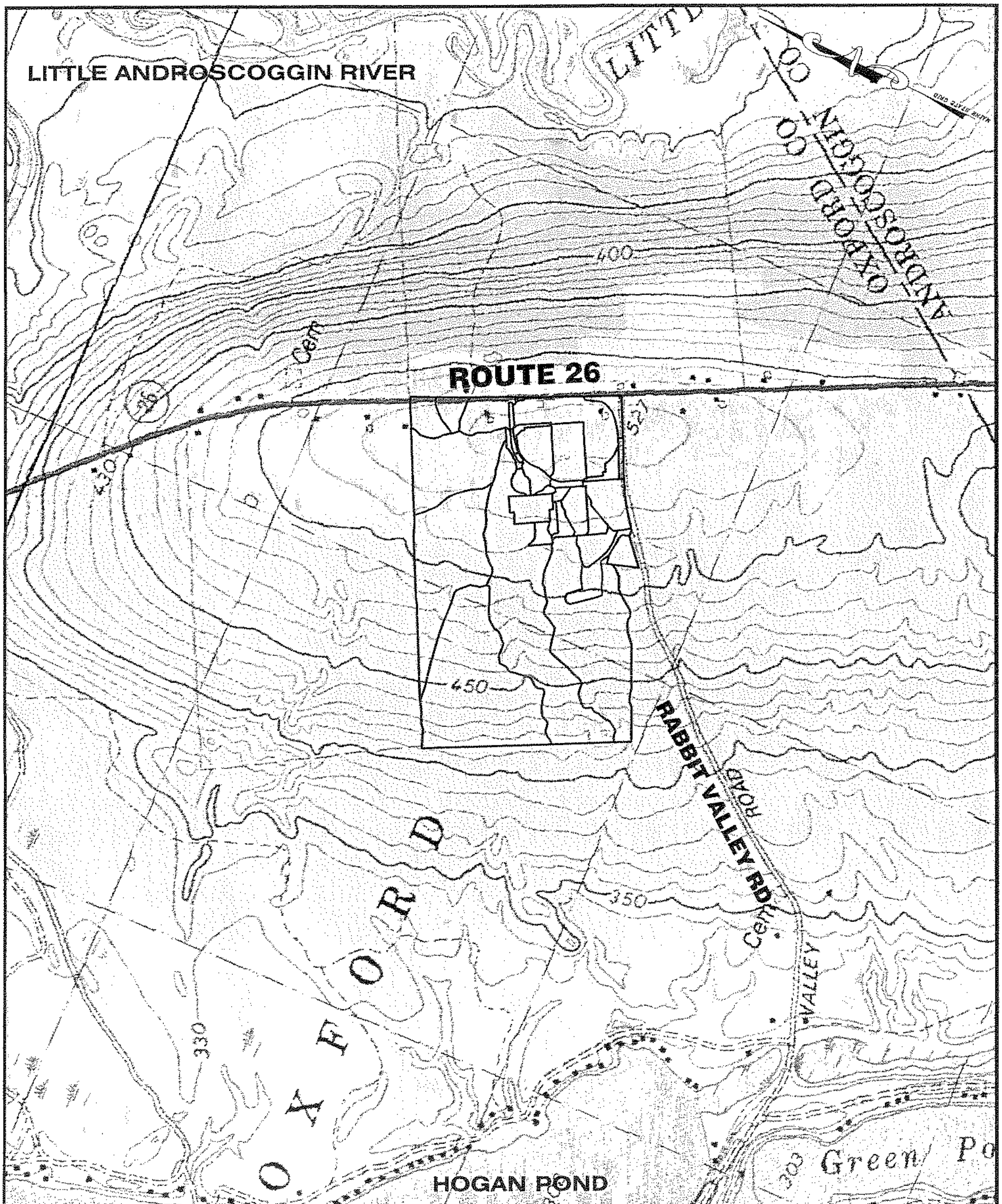
4. Stormwater Wet Pond Facilities: The Plan includes yearly inspections and maintenance to the ponds.

5. Runoff Infiltration Facilities: Not Applicable

6. Proprietary Devices: Not Applicable

7. Buffers: The Plan includes yearly inspections and maintenance of all buffers.

8. Other Practices and measures: The Plan includes other measures that may be necessary to insure the stormwater runoff leaving the project site is of a quality and quantity such that it provides no adverse impact to downstream properties.



PROJECT
OXFORD RESORT CASINO

DRAWING
USGS MAP

SCALE
1" = 1000'

MAIN-LAND DEVELOPMENT CONSULTANTS, INC.
P.O. BOX Q, 42 CHURCH STREET LIVERMORE FALLS, MAINE 04254
PHONE: (207)-897-6752 FAX: (207)-897-5404
WEB PAGE: http://www.main-landdevelopment.com/

MLDC

SECTION 14. BASIC STANDARDS SUBMISSIONS:

A. Narrative:

Generally, the project site has a low to moderate potential for erosion given the slopes over the entire site. The following narrative describes in detail the measures to be utilized to reduce the potential for erosion both during construction, and after construction is complete.

1. Soil Types: The soils on the project site are predominantly glacial tills. These soils have the potential for erosion given the fine soil particles mixed with the larger soil particles and rocks within the till.

2. Existing Erosion Problems: There are no existing erosion problems found within the project site.

3. Critical Areas: The critical areas for this project site will be the steep cut and fill embankments; the road ditches; the inlet and outlet areas of the culverts; and the ponds.

   This project includes a 15 to 20 acre +/- area of bulk earthwork where material will likely be bull-dozed from one side of the site to the other. The contractor must be aware of the danger of large exposed areas and be ready to react to emergency situations, including large un-forecasted rain events (ie. summer thunderstorms). Proper preparation will include minimizing areas that are unstabilized as much as possible; having hay bales, mulchers, and personnel all on site and ready to spread hay mulch; having extra silt fencing and erosion control mix on site and ready to install; and being prepared with equipment and staff to form water bars and sediment basins. During and immediately after the storm event, the contractor will focus on preventing and repairing erosion and sedimentation to the exclusion of work progression.

   With the large open area, dust control may also become an issue. The contractor is responsible for spreading water or other approved binder to control dust migration from the site.

4. Protected Natural Resources: The natural resources on site consist of one unnamed stream and narrow or small spots of forested wetland areas. The project Plans show the locations of these resources. The streams will be protected with 100-foot buffers on either side of the thread of the stream. The wetlands will generally be avoided as much as possible.

5. Erosion Control Measures and Site Stabilization Plan:

   This Plan has been developed to insure that construction activities on this project site utilize sound erosion and sedimentation control measures. These measures will prevent or reduce the potential for the deposition of sediments down stream. The methods of control consist of preventive measures and remedial measures. Preventive measures are aimed at keeping the soils in their present location through mulching and through the reestablishment of vegetation. Remedial measures deal with the trapping and/or filtering of sediment laden stormwater run-off. Both types of measures will be utilized on this project.

The Erosion and Sedimentation Control Plan is best broken down into Temporary Measures, Winter Stabilization, and Permanent Measures.

2. TEMPORARY EROSION CONTROL:

Temporary control measures may consist of sediment filter berms and/or silt fencing; temporary mulching; stone check dams, topsoil stockpiling, and winter stabilization.

A. Sediment Filter Berms:

Sediment Filter Berms are the preferred filtering device, but may not be used in wetland areas. They will be placed down slope of all earth moving activities, where water from these disturbed areas will run off. These berms will be placed along an even contour, at least 24 inches tall and 3 feet wide at the base. Turn the ends of the berm up-grade to avoid runoff flowing around the berm. In areas of high erosion potential, the berm will be backed by hay bales or silt fencing, as shown on the Site Details plans.

B. Silt Fencing:

Silt fencing may be used in place of, or together with, the sediment filter barriers. The silt fencing will also be keyed at least four inches into the ground and placed along an even contour. Turn the ends of the fence up-grade to avoid runoff flowing around the fence. During frozen conditions, furnish and install Sediment Filter Berms in lieu of silt fencing or hay bales since frozen soil prevents the proper installation of hay bales and silt fences.

C. Stone Check dams:

Stone check dams will be placed in the center of the ditches immediately following excavation to provide a means of trapping sediments. (If the ditch has been immediately armored with rip-rap, check dams are not necessary.) The dams will consist of small stone placed across the ditch, with a depression at the top of the dam to allow water over the top of the dam, should it become clogged with sediment. See the specifications on the Site Details sheet for construction details of this measure.

D. Temporary Mulch:

Temporary mulch will be placed on all disturbed areas where seeding or other construction or stabilization activities will not take place for over 14 consecutive days. Temporary mulch will also be placed on all bare soils outside the road base prior to any predicted significant rain event. A significant rain event will be at least ½ inch of rain or more. The mulch may be hay and will be applied at a rate of two bales per 1,000 square feet. Soil must not be visible upon completion of application, regardless of rate of application.

E. Topsoil Stockpiles:

Topsoil, removed as part of the construction, will be stockpiled on site for use in the areas to be re-vegetated. The location of topsoil stockpiles must not be within 100 feet of a defined natural resource (wetland, stream, etc.), or within 75 feet of a run off transport channel (swale or ditch).

Stockpiles will be mulched with hay at two bales per 1,000 square feet. The area down slope from any stockpile areas will be protected by a sediment filter berm or silt fence placed directly below or down gradient from the stockpile. If the stockpile must be left for more than 30 days, the pile will be seeded with rye grass at a rate of two pounds per 1,000 square feet and mulched in accordance with this paragraph.

F. Maintenance of Temporary Measures:

All temporary measures described above will be inspected weekly and before and after every significant storm event (1/2 inch of rain or greater) throughout the construction of the project. Repairs or replacements will be made as necessary. Once the site is stable, all temporary devices such as hay bale barriers and silt fencing will be removed.

3. WINTER STABILIZATION:

The winter construction period is from November 1 through April 15. If the construction site is not stabilized with a combination of pavement, a road gravel base, 75 % mature vegetation cover or riprap by November 15 then the site needs to be protected with over-winter stabilization.

Winter excavation and earthwork shall be completed such that no more than 1 acre of the site is without stabilization at any one time. Limit the exposed area to those areas in which work is expected to be under taken during the following 15 days. Exposed area shall not be so large that it cannot be mulched in one day prior to any snow event.

Areas shall be considered to be denuded until the subbase gravel is installed in roadway areas or the areas of future loam and seed have been loamed and mulched. Hay and straw mulch rate shall be a minimum of 200 lbs./1,000 s.f. (3 tons/acre) and shall be properly anchored.

The contractor must install any added measures which may be necessary to control erosion/sedimentation from the site dependent upon the actual site and weather conditions.

Continuation of earthwork operations on additional areas shall not begin until the exposed soil surface on the area being worked has been stabilized, in order to minimize areas without erosion control protection.

1. Soil Stockpiles

Stockpiles of soil or subsoil will be mulched for over winter protection with hay or straw at twice the normal rate or at 200 lbs/1,000 s.f. (3 tons per acre) or with a four-inch layer of woodwaste erosion control mix. This will be done within 24 hours of stocking and re-established prior to any rainfall or snowfall.

Any new soil stockpile will not be placed (even covered with hay or straw) within 100 feet from any natural resources.

2. Natural Resource Protection

Any areas within 100 feet from any natural resources, if not stabilized with a minimum of 75 % mature vegetation catch, shall be mulched by December 1 and anchored with plastic netting or protected with erosion control mats.

During winter construction, a double line of sediment barriers (i.e. silt fence backed with hay bales or erosion control mix) will be placed between any natural resource and the disturbed area. Silt fencing may not be placed on frozen ground.

Projects crossing the natural resource shall be protected a minimum distance of 100 feet on either side from the resource. Existing projects not stabilized by December 1 shall be protected with the second line of sediment barrier to ensure functionality during the spring thaw and rains.

3. Mulching

Areas shall be considered to be denuded until areas of future loam and seed have been loamed, seeded and mulched. Hay and straw mulch shall be applied at a rate of 200 lb. per 1.000 square feet or 3 tons/acre (twice the normal accepted rate of 75-lbs./1,000 s.f. or 1.5 tons/acre) and shall be properly anchored. Mulch shall not be spread on top of snow. The snow will be removed down to a one-inch depth or less prior to application.

An area shall be considered to have been stabilized when exposed surfaces have been either mulched with straw or hay at a rate of 200 lb. per 1.000 square feet and adequately anchored, such that the ground surface is not visible though the mulch.

Between the dates of November 1 and April 15, all mulch shall be anchored by either peg line, mulch netting, asphalt emulsion chemical, track or wood cellulose fiber. The ground surface shall not be visible though the mulch.

After November 15th, mulch and anchoring of all bare soil shall occur at the end of each final grading work day.

4. Mulching on Slopes and Ditches

Slopes shall not be left exposed for more than 14 days unless fully mulched and anchored with peg and netting or with erosion control mesh. Mulching shall be applied at a rate of 300 lbs/1,000 sq ft on all slopes greater than 8%. Erosion Control mesh shall be used to anchor mulch in all drainage ways and ditches, for slopes exposed to direct winds, and for all other slopes greater that 8 %. Erosion control blanket and check dams (or permanent Rip-Rap) shall be used in lieu of mulch in all drainage ways with slopes of 8 % or more.

A six inch layer of erosion control mix can be used to substitute erosion control blankets on all slopes except ditches.

5. Seeding

Between the dates of October 15 and April 1st, loam or seed will not be required. During periods of above freezing temperatures, finished areas shall be fine graded and either protected with mulch or temporarily seeded and mulched until such time as the final treatment can be applied. (Temporary seeding will be the seed mix shown on the table below.) If the date is after November 1st and if the exposed area has been loamed, final graded with a uniform surface, then the area may be dormant seeded at a rate of 3 times higher than specified for permanent seed and then mulched.

TYPE	% BY WEIGHT	% PURITY	% GERMINATION
Domestic Rye Grass	60	69.75	90
Perennial Rye Grass	20	28.00	85
Aroostook Rye Grass	20	28.00	85

Dormant seeding may be selected to be placed prior to the placement of mulch and fabric netting anchored with staples.

If dormant seeding is used for the site, all disturbed areas shall receive 4" of loam and seed at an application rate of 5lbs/1000 s.f. All areas seeded during the winter will be inspected in the spring for adequate catch. All areas sufficiently vegetated (less than 75 % catch) shall be revegetated by replacing loam, seed and mulch.

If dormant seeding is not used for the site, all disturbed areas shall be revegetated in the spring.

6. Trench Dewatering and Temporary Stream Diversion

Water from construction trench dewatering or temporary stream diversion will pass first through a filter bag or secondary containment structure (e.g. hay bale lined pool) prior to discharge. The discharge site shall be selected to avoid flooding, icing, and sediment discharges to a protected resource. In no case shall the filter bag or containment structure be located within 100 feet of a protected natural resource.

7. Inspection and Monitoring

Maintenance measures shall be applied as needed during the entire construction season. After each rainfall, snow storm or period of thawing and runoff, the site contractor shall perform a visual inspection of all installed erosion control measures and perform repairs as needed to insure their continuous function.

Following the temporary and or final seeding and mulching, the contractor shall in the spring inspect and repair any damages and/ or un-established spots. Established vegetative cover means a minimum of 85 to 90 % of areas vegetated with vigorous growth.

8. Standard for the timely stabilization of ditches and channels

The applicant will construct and stabilize all stone-lined ditches and channels on the site by November 15. The applicant will construct and stabilize all grass-lined ditches and channels on the site by September 15. If the applicant fails to stabilize a ditch or channel to be grass-lined by September 15, then the applicant will take one of the following actions to stabilize the ditch for late fall and winter.

<u>Install a sod lining in the ditch</u> -- The applicant will line the ditch with properly installed sod by October 1. Proper installation includes the applicant pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, watering the sod to promote root growth into the disturbed soil, and anchoring the sod with jute or plastic mesh to prevent the sod strips from sloughing during flow conditions.

<u>Install a stone lining in the ditch</u> --The applicant will line the ditch with stone riprap by November 15, as presented in item 4.B. below. If necessary, the applicant will regrade the ditch prior to placing the stone lining so to prevent the stone lining from reducing the ditch's cross-sectional area.

9. Standard for the timely stabilization of disturbed slopes

The applicant will construct and stabilize stone-covered slopes by November 15. The applicant will seed and mulch all slopes to be vegetated by September 15. The department will consider any area having a grade greater than 15% (10H:1V) to be a slope. If the applicant fails to stabilize any slope to be vegetated by September 15, then the applicant will take one of the following actions to stabilize the slope for late fall and winter.

<u>Stabilize the soil with temporary vegetation and erosion control mats</u> -- By October 1 the applicant will seed the disturbed slope with winter rye at a seeding rate of 3 pounds per 1000 square feet and apply erosion control mats over the mulched slope. The applicant will monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or cover at least 75% of the disturbed slope by November 1, then the applicant will cover the slope with a layer of woodwaste compost as described in item iii of this condition or with stone riprap as described in item iv of this condition.

<u>Stabilize the slope with sod</u> -- The applicant will stabilize the disturbed slope with properly installed sod by October 1. Proper installation includes the applicant pinning the sod onto the slope with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil. The applicant will not use late-season sod installation to stabilize slopes having a grade greater than 33% (3H:1V).

<u>Stabilize the slope with woodwaste compost (erosion control mix)</u> -- The applicant will place a six-inch layer of woodwaste compost on the slope by November 15. Prior to placing the woodwaste compost, the applicant will remove any snow accumulation on the disturbed slope. The applicant will not use woodwaste compost to stabilize slopes having grades greater than 50% (2H:1V) or having groundwater

seeps on the slope face.

Stabilize the slope with stone riprap -- The applicant will place a layer of stone riprap on the slope by November 15, similar to the Stone Lined Ditch in item 3.B below.

10. Standard for the timely stabilization of disturbed soils

By September 15 the applicant will seed and mulch all disturbed soils on areas having a slope less than 15%. If the applicant fails to stabilize these soils by this date, then the applicant will take one of the following actions to stabilize the soil for late fall and winter.

Stabilize the soil with temporary vegetation -- By October 1 the applicant will seed the disturbed soil with winter rye at a seeding rate of 3 pounds per 1000 square feet, lightly mulch the seeded soil with hay or straw at 75 pounds per 1000 square feet, and anchor the mulch with plastic netting. The applicant will monitor growth of the rye over the next 30 days. If the rye fails grow at least three inches or cover at least 75% of the disturbed soil before November 15, then the applicant will mulch the area for over-winter protection as described in item iii of this standard.

Stabilize the soil with sod -- The applicant will stabilize the disturbed soil with properly installed sod by October 1. Proper installation includes the applicant pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil.

Stabilize the soil with mulch -- By November 15 the applicant will mulch the disturbed soil by spreading hay or straw at a rate of at least 150 pounds per 1000 square feet on the area so that no soil is visible through the mulch. Prior to applying the mulch, the applicant will remove any snow accumulation on the disturbed area. Immediately after applying the mulch, the applicant will anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

4. PERMANENT EROSION CONTROL:

Permanent measures will consist of the placement of culverts; the stabilization of inlets and outlets of culverts; the construction of both grass lined and stone lined ditches; and the re-vegetation of all areas outside the traveled way of the road, and those areas designated as stone lined ditches.

A. Culverts:

All culverts have been sized to handle the peak flows generated by a 25-year, 24-hour rain storm. The locations and sizes of the culverts are shown on the Site Plans.

The inlets and outlets of the culverts will be armored with riprap to prevent scouring. This armoring will consist of placing stone possessing a D50 of 6 inches to a depth of 15 inches to the following dimensions: width equal to twice the diameter of the culvert; length equal to three times the diameter of the culvert, unless noted otherwise on the plans.

B. Ditches:

Ditches on the project have been designed based on expected flow rates and velocities for the 25-year, 24-hour storm event and the slope of the ditch. Where water velocities are expected to exceed 3.5 feet per second, the ditch has been designed to be stone lined. Ditches with water velocities of less than 3.5 feet per second have been designed to be grass lined.

Stone Lined Ditches:

Stone lined ditches will first be lined with a non-woven filter fabric, and then lined with riprap possessing a D50 of approximately 6 inches in diameter. This means that approximately half the stones by weight will be smaller than 6 inches and half will be larger. The minimum stone size should be 1 inch with the largest stone being 9 inches in diameter. The depth of stone in the ditch should average 15 inches.

The final shape of the ditch will consist of the following dimensions: a bottom width of two feet; side slopes possessing a 3:1 horizontal to vertical; and a total depth of 2 feet.

In lieu of stone rip-rap, the ditch may be lined with a permanent erosion control blanket, such as North American Green P300 or approved equal.

Grass Lined Ditches:

Grass lined ditches will possess the same final dimensions as the stone lined ditches. The flow area of the ditch will be armored by placing a biodegradable matting or netting (such as American Excelsior Curlex Blanket or equal) in the bottom of the ditch. Placement of this material must take place after seeding. This blanket will be installed according to the manufacturers' recommendations. If there is no mulch material in the blanket, then the netting will be placed over the seed and mulch.

The seeding and mulching of the grass lined ditches will follow the specifications stated below for re-vegetation.

C. Re-vegetation Measures:

All areas to be permanently re-vegetated with grass will first be covered with loam and then fertilized.

Loam will be placed on all areas to be re-vegetated. Loam will be placed to a depth of at least 4 inches. Loam will be the stockpiled topsoil, if possible.

Test the loam samples for nutrients at a proficient testing laboratory (The University of Maine provides this service). Request the testing laboratory to provide a recommended fertilizer mix, with emphasis at reducing the phosphorus component due to the Hogan Pond watershed. The areas with loam will then be fertilized with the recommended commercial fertilizer, applied at the recommended rate. Lime will also be applied at a rate of 50 pounds per 1,000 square feet. Both the lime and the fertilizer will be mixed thoroughly with the soil.

All areas to be re-vegetated with permanent grass are to be seeded with the seed mix shown on the table below. This mixture will be applied at a rate of 2 pounds per 1,000 square feet.

General Lawn Areas	Chewing Fescue "Dignity"	35%
	Pennlawn Creeping Red Fescue	35%
	Perennial Rye "Tourstar" (Nutrite)	30%

Mulch will then be spread on all seeded areas at a rate of two bales per 1,000 square feet. Again, the soil will not be visible through the mulch, regardless of application rate.

Seed and mulch will be placed within five days of final grading of topsoil.

Seeded areas will be inspected after 30 days to determine the success of the seeding. If the ground cover is less than 75%, the seeding will be done a second time.

D. Critical Areas:

Slopes in excess of 15% will require the placement of a biodegradable netting or matting over the mulch and seed (if the netting has no mulch in it). If stabilization is to take place after October 1, slopes over 8% will be treated with the matting.

E. Maintenance of Permanent Measures:

All measures will be inspected weekly and before and after every significant storm event (1/2 inch of rain or greater) during construction, and then at least once annually to insure proper function of each measure. Any damaged areas will be repaired or replaced as necessary. Any ditches or culverts not functioning as designed will be redesigned and reconstructed according to specifications prepared by a Professional Engineer.

In any event, seeding should take place either between May 1 and June 15, or August 15 and September 15.

B. Implementation Schedule:

As stated above, prior to earth moving activities, sediment filter berms, hay bale barriers, and/or silt fencing shall be placed down gradient of these areas to be disturbed. Stone lined ditches shall have the stone placed within seven days of final grading of the ditch. Culvert inlets and outlets shall also be lined with stone within seven days of culvert installation.

Areas to be revegetated will be loamed, seeded and mulched within 7 days of final grading. If this is not possible, then temporary mulch will be placed until permanent seeding can be accomplished.

C. Erosion and Sedimentation Control Plan:

The Erosion Control measures to be utilized in this project are detailed on the Site Grading and Erosion Control Plan sheets. Also, the Site Details sheet shows the installation of the measures described in this Section.

1. Contours:

The Erosion Control Plan shows both the existing and the proposed contours at a 1-foot interval.

2. Plan Elements:

The Site Grading and Erosion Control Plan sheets contain all of the required elements from this Section.

3. Land Cover Types:

The Site Grading and Erosion Control Plan sheets show the proposed cover types and their boundaries.

4. Existing Erosion Problems:

There are no existing erosion problems found within the project site.

5. Critical Areas:

The areas described above as critical areas are all shown on the Site Grading and Erosion Control Plans.

6. Protected Natural Resources:

The stream and wetlands are all shown on the Site Grading and Erosion Control Plans.

7. General Locations:

All of the site elements to be developed for this project are shown on the Site Grading and Erosion Control Plans.

8. Location of Controls:

The locations of sediment filter barriers, ditches, and other elements of the erosion and sedimentation control plan are shown schematically on the Site Grading and Erosion Control Plans.

E. Disturbed Areas:

The Site Grading and Erosion Control Plans show the limit of areas to be disturbed by showing the areas to be developed.

F. Details and Specifications:

As stated above, the Site Grading and Erosion Control Plans and Site Details sheets have been developed to show designs and specification for constructing and/or installing the erosion control measures outlined in this Section.

G. Calculations:

Calculations used to size erosion control structures or measures have been included as part of this Section, or in the Stormwater Control Section of this application.

H. Third Party Inspections:

The applicant anticipates, based on discussions at the pre-application and pre-submission meetings, to utilize the services of a third party inspector. As designated in the Third Party Inspection Program, the applicant submits the following two names to the Department: Joeseph Aloisio and Steve Roberge. The Town of Oxford will also request inspection. The applicant requests that the Town and DEP work together to choose one inspector to serve for both. The applicant will facilitate that discussion.

SECTION 15. GROUNDWATER:

A. Narrative:

1. No portion of the project site is within a Sand and Gravel Aquifer. A copy of the Sand and Gravel Aquifer Map is included as part of this Section.

2. This project plans to use groundwater for its water supply. However, the applicant met with the Oxford Water District on December 15th, 2010; both parties are amenable to extending public water to the site, and are working jointly to formulate a plan to fund and design the extension. That said, an extension is not guaranteed at this time and is not part of this application. Therefore, the project proposal is to use on-site water for water supply. The applicant is working with the Maine Drinking Water Program. If public water becomes available after wells have been drilled, the well water could be used for irrigation purposes.

   An array of drilled bedrock wells are proposed near the center of the site, as far as feasible from wetland areas and abutting wells, and at a grade break where stormwater runoff flows away from the wells. The location of the well array was recommended by Sweet Associates of Falmouth and Goodwin Well & Water of Turner. Supporting documents from Sweet Associates are attached in this section.

   The project will require 22,395 gpd. The water will be drawn from on-site and be discharged on-site via subsurface wastewater disposal fields. See Section 17.

   The applicant proposes to drill a well and perform tests concurrent with the early review process. Well drilling should commence this winter, with the onset of frozen ground for the drilling rig. With successful well data, a more complete supply system can be designed and submitted. The applicant proposes to work with and obtain approval from the Maine Drinking Water Program concurrently with the Department's review process. The applicant had a first meeting with the DWP on December 13, 2010.

   There are several existing wells on site that will be abandoned. All well abandonment work will be performed by a State of Maine licensed Well Driller in conformance with MDEP's "Guidance for Well and Boring Abandonment" dated January 7, 2009 and current State of Maine Well Driller's Rules governing well abandonment.

3. Sources: Wastewater will be disposed on-site. See Section 17.

   This site does not anticipate the use of any hazardous materials or cleaners in quantities that would be greater than normal janitorial use.

Fuel for heating is anticipated to be propane. No underground petroleum fuel tanks are proposed.

A Phase 1 and a Phase 2 Environmental Assessment were performed. Both are attached in this section.

4. Measures to Prevent Degradation: With no anticipated significant pollution source, no special measures to prevent degradation are required.

B. Groundwater Protection Plan: See Measures to Prevent Degradation above. An SPCC plan is included in this section.

C. There is no monitoring proposed as part of this project. The project site is not located over or near a sand and gravel aquifer.

D. Monitoring Well Installation Report: Not Applicable

Mechanic Falls Quadrangle, Maine

Compiled by
Craig D. Neil

Preliminary aquifer boundaries mapped by
Daniel B. Locke

Digital cartography by:
Michael E. Foley

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker
Henry J. Wilson, Jr.

Funding for the preparation of this map was provided in part by the Maine Department of Environmental Protection.

Maine Geological Survey
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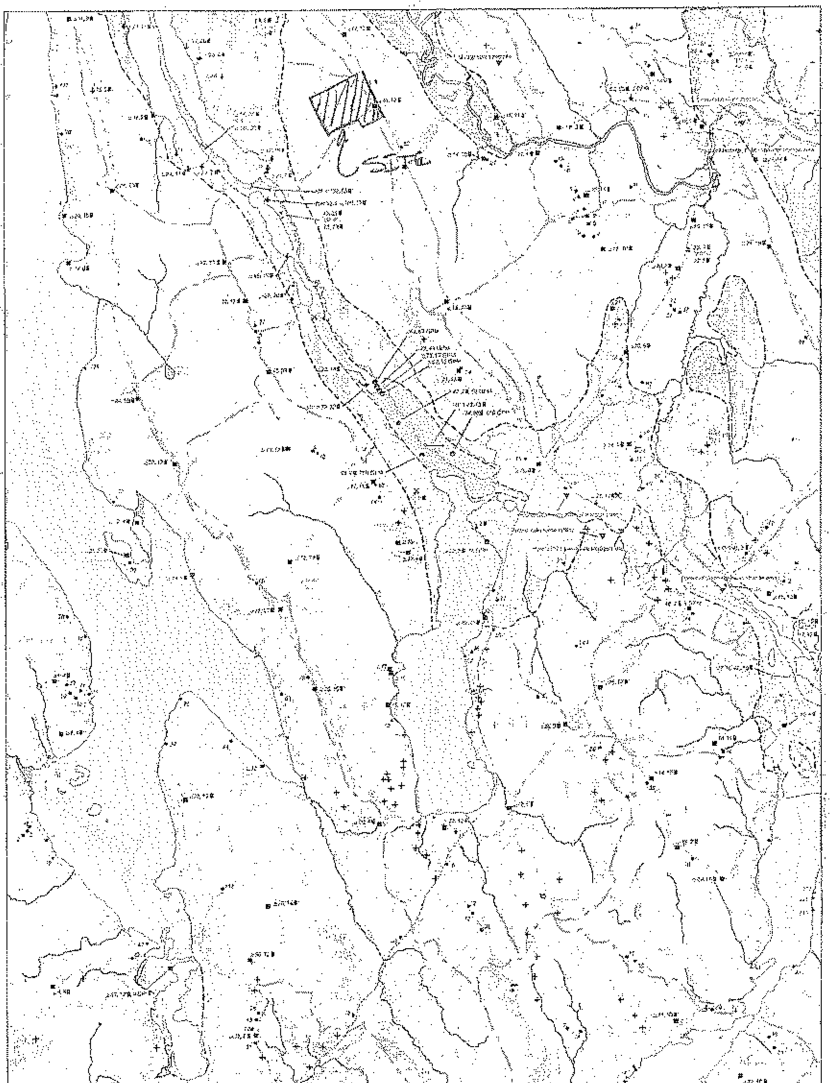
Telephone: [illegible] E-mail: [illegible]
Home page: [illegible]

Open-File No. 98-152
1998

Significant Sand and Gravel Aquifers



[illegible]

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. [illegible]

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. [illegible]

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield. [illegible]

SEISMIC-LINE INFORMATION

[illegible]

GEOLOGIC AND WELL INFORMATION

Depth to bedrock, in feet below land surface

[illegible]

Quarry

Spring

Drilled overburden well

Dug well

[illegible]

Test pit

Drilled bedrock well

[illegible]

Bedrock outcrop

[illegible]

OTHER SOURCES OF INFORMATION

1. [illegible] Maine Geological Survey, Open-File Report [illegible]
2. Locke, D. B., [illegible] Mechanic Falls quadrangle, Maine: Maine Geological Survey, Open-File Map [illegible]
3. [illegible] Maine Geological Survey, Open-File Map [illegible]

1. [illegible] Maine Geological Survey [illegible]
3. Thompson, W. B., [illegible] Maine Geological Survey [illegible]
4. Thompson, W. B., and Borns, H. W., Jr., [illegible] Surficial geologic map of Maine: Maine Geological Survey [illegible]

Oxford Quadrangle, Maine

Compiled by
Craig D. Neil
Preliminary aquifer boundaries mapped by
Daniel B. Locke

Digital cartography by:
Michael E. Foley

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker
Bennett J. Wilson, Jr.

Funding for the preparation of this map was provided in part by the Maine Department of Environmental Protection.

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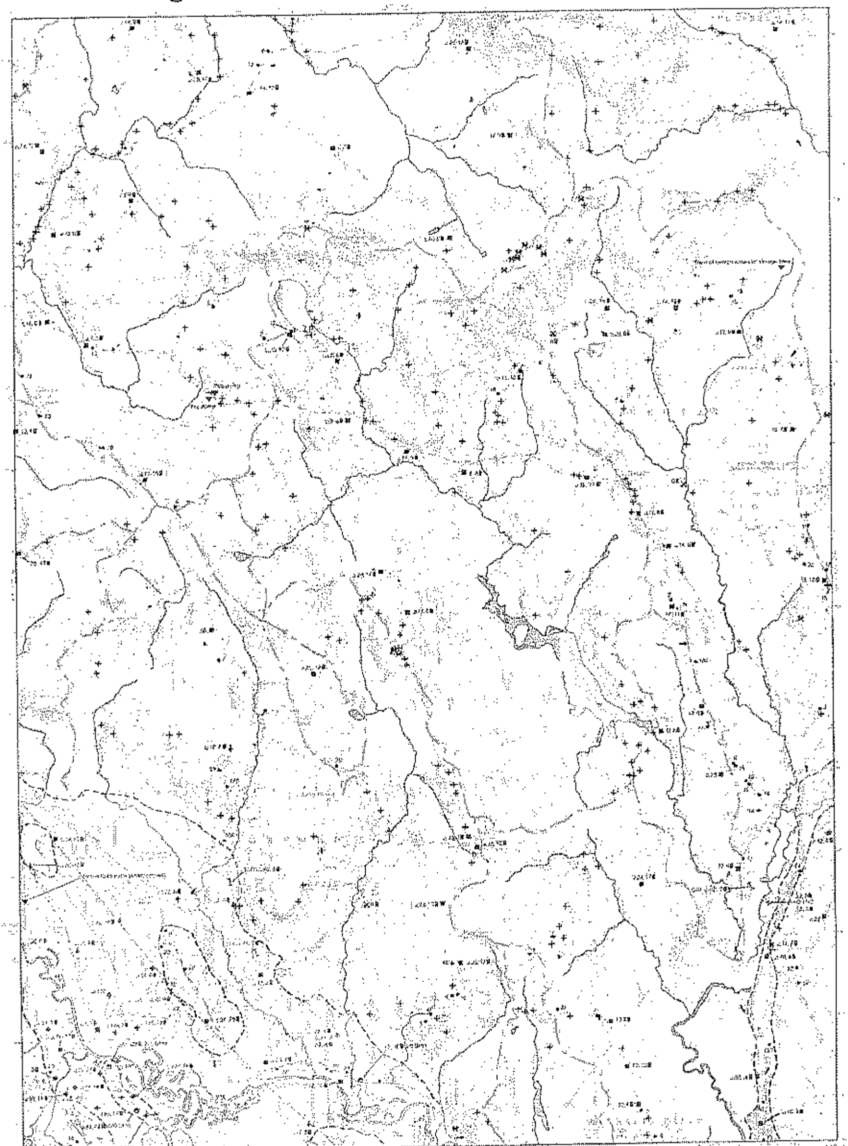
Address: 22 State House Station, Augusta, Maine 04333
Telephone: 207-287-2801 E-mail: mgs@state.me.us
Home page: [illegible]

Open-File No. 98-216
1998

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Williams, J. S., and others, 1987, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Androscoggin, Cumberland, and Oxford Counties, Maine: Maine Geological Survey, Open-File Report 87-1a, scale 1:50,000.

Well inventory data from U.S. Geological Survey Water Site Reports and additional data collected by Maine Geological Survey field geologists during the 1980s and 1990s field seasons.

[illegible]

SCALE 1:24,000

CONTOUR INTERVAL 10 FEET

Topographic base from U.S. Geological Survey Oxford quadrangle, scale 1:24,000. [illegible]

[illegible]

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with sufficient saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield: yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sand, till, and alluvium. Yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield: yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sand, till and alluvium. Yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, moraine, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for selected 12-channel seismic lines are shown in Figure 10 of Open-File Report 87-1a (Williams and others, 1987). Details of 12-channel and single-channel seismic lines are shown on the map of its data.

50	Depth to bedrock in feet below land surface
>80	Depth to bedrock exceeds depth shown (based on calculations)
12	Depth to water level, in feet below land surface
111, 23	Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.
63, 45 / 76, 17	Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface, unless otherwise indicated. Data shown above the line identifier here refer to the northern end of the seismic line.

The 4-letter identifier for a seismic line is an abbreviation for the topographic quadrangle. If the 4-letter identifier for the line is followed by a number (e.g., MAP - 7, MAP - 4), the line is a 12-channel line. If the identifier is followed by a letter (e.g., MAP - F, MAP - B), the line is a single-channel line. Seismic interpretations by C. D. Neil and T. S. Tepper.

GEOLOGIC AND WELL INFORMATION

50	Depth to bedrock, in feet below land surface
>47	Penetration depth of boring, in feet below; is minimum depth to bedrock (used underlying bedrock refusal)
14	Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or shallow hole)
X	Gravel pit
✕	Quarry
40GPM	Yield (flow) of well or spring in gallons per minute (GPM)
	Spring, with general direction of flow
⊕	Drilled overburden well
	Dug well
✦	Observation well (present well if labeled; temporary well if unlabeled)
✧	Test boring (project boring if labeled; temporary boring if unlabeled)
↓	Drive point
⊗	Test pit
•	Drilled bedrock well
∀	Potential point source of ground-water contamination
+	Bedrock outcrop
	Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Williams, J. S., Tepper, D. H., Tolman, A. L., and Thompson, W. B., 1987, Hydrogeology and water quality of significant sand and gravel aquifers in parts of Androscoggin, Cumberland, Oxford and York Counties, Maine: Maine Geological Survey, Open-File Report 87-1a, 121 p.
2. Locke, D. B., and Thompson, W. B., 2001, Surficial materials of the Oxford quadrangle, Maine: Maine Geological Survey, Open-File Map 01-[illegible].
3. Thompson, W. B., 2001, Surficial geology of the Oxford quadrangle, Maine: Maine Geological Survey, Open-File Map 01-[illegible].
4. Caswell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 135 p.
5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. [illegible]
6. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Section 16. Water Supply

This project will use groundwater for water supply purposes. However, the applicant met with the Oxford Water District on December 15th, 2010; both parties are amenable to extending public water to the site, and are working jointly to formulate a plan to fund and design the extension. That said, an extension is not guaranteed at this time and is not part of this application. Therefore, the project proposal is to use on-site water for water supply. The applicant is working with the Maine Drinking Water Program. If public water becomes available after wells have been drilled, the well water could be used for irrigation purposes.

The applicant proposes a number of drilled wells and centralized drinking water supply system sufficient to the estimated need of 22,395 gpd for the first phase, and closer to 60,000 at full build-out.

In preparation for this proposal, the applicant has worked with Sweet Associates from Falmouth and Goodwin Well & Water from North Turner. An area has been identified by Sweet and well locations are shown on the Plans by Main-Land (southeast of the building) where water will most likely be available and impacts to abutting wells and natural resources will be limited. Goodwin has been consulted for well drilling and water system expertise.

This proposal includes drilling multiple wells in the area identified by Sweet Associates. The number and exact location of the wells will depend on each well's sustained yield. The water will be collected via pumps to water cistern and pump house, then delivered to the proposed building. The size of the tank and pumps will also depend on well yield (as well as the as-yet-undecided requirements of the Oxford Fire Department), though a 60,000 +/- gallon cistern seems likely.

The applicant proposes to drill a well and perform tests concurrent with the early review process. Well drilling should commence soon, with the onset of frozen ground for the drilling rigs. With successful well data, a more complete supply system can be designed and submitted. The applicant proposes to work with and obtain approval from the Maine Drinking Water Program concurrently with the Department's review process; our first meeting with DWP was held on December 13th, 2010.

1. No individual wells are planned for this project.

2. Common wells. As described in the narrative above, common wells will supply water for this project.

    a. A hydrogeology report is attached, being performed by Sweet Associates. Note that their report in this section is different from and in addition to their report submitted in Section 17. Sweet provides additional information regarding testing and monitoring to verify insignificant impact to abutters wells.

b. Engineering information of the water distribution system is included in the plans, attached, including main lines and services. The cistern and pump sizing are dependent on the well yield and the Oxford Planning Board. That information will be submitted after the test well has been drilled and appropriately tested according to the requirements of the Maine Drinking Water Program. The water supply and distribution system will be inspected, tested, and routinely maintained by the Oxford Resort Casino.

c. A well installation report will be provided upon well drilling. The first well will be drilled when the ground is frozen enough for the drilling rig: likely later in January or February of 2011.

d. A long-term safe yield determination will be performed as part of the well testing, and submitted after well drilling and testing.

e. An application to the Maine Drinking Water Program will be made with the drilling of the first well to better establish the likelihood of sufficient water supply in the area predicted by Sweet Associates.

Sweet Associates HYDROGEOLOGY • SITE EVALUATIONS
155 GRAY ROAD • FALMOUTH, MAINE 04105 • (207) 797-2110 • FAX: (207) 878-2364 • E-MAIL: SWEET@MAINE.RR.COM

December 10, 2010

GROUNDWATER SUPPLY FEASIBLITY ANALYSIS
OXFORD RESORT
ROUTE 26 & RABBIT VALLEY ROAD - OXFORD, MAINE

INTRODUCTION:

The purpose of this report is to assess whether groundwater from the bedrock aquifer can be used as a primary drinking water source for the Oxford Resort, without significantly affecting existing bedrock drinking water wells in the area. Data used for this investigation includes all geological and water well information available from the Maine Geological Survey.

The proposed first phase of the Oxford Resort will require at least 22,395 gallons of water per day according to the wastewater design flow calculations presented by Main-Land Development Consultants. The proposed water usage for full build out is approximately 65,000 gallons of water per day.

It is important to note that the wastewater design flow calculations do not take into account water usage for landscape or garden irrigation. We strongly recommend landscaping the site with drought tolerant vegetation. Ideally, all non-potable water usage for irrigation will be supplied by water from stormwater detention ponds or rainwater detainment structures.

The following is a brief summary of the geological and hydrogeological information about the site. This information will be used to perform a groundwater supply feasibility analysis.

SURFICIAL AND BEDROCK GEOLOGY:

The site is located on the *U.S.G.S. Mechanic Falls, Maine Quadrangle 7.5 Minute Series*. The locus map included in this report (Appendix A) is adapted from that publication. The *Surficial Geology Map of the Mechanic Falls Quadrangle* (Appendix A) shows that the site is situated on a prominent north-northwest trending glacially-streamlined hill situated between the Little Androscoggin River basin to the north and east and Whitney/Hogan Ponds basin to the west. The top of the hill is at an elevation of 530 feet above mean sea level (MSL). The base of the hill and the edge of the Little Androscoggin River and Hogan Pond basins occurs at an approximate elevation of 350 feet above MSL.

The site is underlain by lodgement till (Pt) that is locally overlain by a thin layer of wind-blown sand (Qe) deposited by the prevailing westerly winds after the late-glacial sea level regressed from the area and exposed fine-grained sandy marine sediments. Surficial materials in the Whitney/Hogan Ponds basin are characterized by a central esker surrounded by glaciofluvial and glaciomarine deposits consisting of sand, silt and gravel delta deposits graded to the late-glacial sea level. Surficial materials in the Little Androscoggin River basin are primarily composed of similar glaciofluvial and glaciomarine deposits that have been reworked in places by the Little Androscoggin River.

The *Significant Sand and Gravel Aquifer Map of the Mechanic Falls Quadrangle* (Appendix A) shows that the site is located between a large Significant Sand and Gravel Aquifer located in the Little Androscoggin River basin and the Whitney/Hogan Ponds basin. Groundwater in the Whitney/Hogan Ponds basin flows north into the Little Androscoggin River basin, where the direction of groundwater flow rotates clockwise and eventually flows southwest within the Little Androscoggin River valley. The Little Androscoggin River basin is mapped as a Significant Sand and Gravel Aquifer with moderate to good potential groundwater yields (generally 10 to 50 gallons per minute). The Whitney/Hogan Ponds basin is mapped as a Significant Sand and Gravel Aquifer with good to excellent potential groundwater yields (generally greater than 50 gallons per minute) in the vicinity of the esker and moderate to good potential groundwater yields (10 to 50 gallons per minute) along the margins of the basin.

The depth to ledge on-site can be estimated using information from nearby wells recorded in the *Maine Geological Survey Water Well Information System* (Appendix A). The depth to bedrock on-site is expected to vary from 25 feet below the ground surface (500 feet above MSL) near Route 26 to greater than 50 feet below the ground surface in the southwestern portion of the site. Approximately 1000 feet northwest of the site, along Route 26 (the topographic high), the depth to bedrock below the ground surface increases to 90 to 100 feet. Approximately 2000 feet southeast of the site, along Route 26, the depth to bedrock below the ground surface increases to 50 to 60 feet.

The *Reconnaissance Bedrock Geology Map of the Poland 15-minute Quadrangle* shows that the site is located in the Sebago Pluton/Batholith. The Sebago Pluton is composed predominately of fine- to medium-grained biotite-bearing granite. Approximately 1 mile east of the site, there is a 2 to 4 mile wide contact zone between the Sebago Pluton and the meta-sedimentary host rock that displays medium-grained to pegmatite textures and abundant tabular meta-sedimentary xenoliths. In this region, the Sebago Pluton displays a foliation (aligned biotite grains) that moderately dips to the northeast and east, roughly concordant with the foliation of meta-sedimentary rocks east of the contact zone. The author of this report also noted a swarm of nearly-vertical mafic dikes in the southeast portion of the mapping area that strike north 40-60 degrees east.

Caswell, Eichler and Hill, Inc. (1990) conducted a photo-lineament analysis of the Sebago Pluton/Batholith in an effort to examine whether linear features on the ground surface can be related to bedrock structures (faults, joints, foliations and lithological contacts). The author specifically noted that special care was taken to avoid including linear glacial features such as drumlins and melt-water channels, which are commonly observed near the proposed development site. A copy of this map and a copy of these lineaments overlain over the existing conditions site plan are presented in Appendix A. Several north-northeast (NNE), west-northwest (WNW) and north-northwest (NNW) lineaments were found on the proposed development site. The lineament orientations are consistent with the orientation of primary (NNE and WNW) and secondary (NNW) conjugate joint sets found in the Sebago Pluton at large.

AQUIFER CHARACTERISTICS AND GROUNDWATER AVAILABILITY:

The site is underlain by two distinct aquifers, an upper overburden aquifer composed of lodgement till and a lower bedrock aquifer composed of fractured granite. During a typical precipitation event, 20% to 35% of the precipitation will infiltrate the pore spaces in the overburden aquifer and the remaining precipitation will run off-site as surface water. Most of the groundwater in the uppermost portion of the overburden aquifer will move slowly downslope until it discharges to the ground surface through a wetland, spring or stream. Typically 5% to 15% of the precipitation falling on the ground surface will filter vertically downwards through the overburden aquifer and recharge the bedrock aquifer. In the following sections we present more detailed information about overburden and bedrock aquifers and use it to assess the feasibility of using the bedrock aquifer as a primary water supply for the development.

Overburden Aquifer Characteristics:

The direction of near-surface groundwater flow on-site is controlled by the presence of a low permeability hardpan that occurs approximately 2 to 3 feet below the ground surface. Data from test borings and monitoring wells completed in the vicinity of the proposed wastewater disposal field reveal that the average hydraulic conductivity of the low permeability hardpan ranges from 0.2 feet per day (ft/day) near the surface to 0.0379 ft/day at depth. The overall thickness of the overburden aquifer on-site is estimated to range from 20 feet along Route 26 to 50 feet in the western portion of the site.

Bedrock Aquifer Characteristics:

The characteristics of the bedrock aquifer on-site can be estimated using information from water wells in the area found in the *Maine Geological Survey Water Well Information System.* Data from 12 bedrock wells within 2000 feet of the site boundary are summarized in the following table.

Well ID No.	Location	Well Depth	Well Yield
78786	Route 26 – North of Site	705 feet	5.5 gpm
78785	Route 26 – North of Site	320 feet	6 gpm
125582	Route 26 – North of Site	140 feet	150 gpm
23043	Route 26 – North of Site	130 feet	5 gpm
102787	Route 26 – South of Site	380 feet	4 gpm
129258	Route 26 – South of Site	360 feet	2.5 gpm
52905	Route 26 – South of Site	300 feet	1 gpm
129289	Route 26/Rabbit Valley Rd	520 feet	3 gpm
102785	477 Rabbit Valley Rd	320 feet	8 gpm
137319	485 Rabbit Valley Rd	380 feet	1.62 gpm
78723	474 Rabbit Valley Rd	400 feet	14 gpm
102614	493 Rabbit Valley Rd	160 feet	20 gpm

The data from existing bedrock wells in the immediate area indicates that there is a potential for encountering a high-yield bedrock fracture at depth, however, most wells have a yield that ranges from 1 to 20 gallons per minute. Excluding one outlier (#125582), the average well depth is 360 feet and the average well yield is 6.5 gallons per minute.

We expect that the only high-yield fractures in the bedrock aquifer will be within 160 feet of the ground surface. This is consistent with the fact that the degree of fracturing and the width of fractures will always decrease with depth.

Bedrock Aquifer Groundwater Budget Analysis:

A simple groundwater budget analysis was conducted to assess the impact of groundwater withdrawal from the bedrock aquifer. We present a simple calculation for bedrock aquifer recharge and compare it to the proposed water usage on-site. Following this analysis we will discuss technical issues regarding the permitting and construction of a water supply well(s) on-site.

Oxford, Maine averages approximately 44-inches of rainfall per year according to the *Soil Survey of Oxford County Area, Maine* (1995). The proposed development has an area of approximately 97.30 acres. Forty-four inches of annual rainfall on 97.30 acres is equivalent to 116,260,396 gallons of water per year. However, only a small percentage of this water will infiltrate into the bedrock fractures beneath the site and recharge the bedrock aquifer. A conservative estimate of 7% of the precipitation is assumed to recharge the bedrock aquifer. Therefore, 7% of 116,260,396 gallons of water (8,138,228 gallons) will recharge the bedrock aquifer beneath the site during an average year.

According to wastewater design flow calculations, the first phase of the Oxford Resort will require 22,395 gallons of water per day or 8,174,175 gallons of water per year. The annual water requirement for the first phase (8,174,175 gallons) is only slightly higher than the estimated annual bedrock recharge (8,138,228 gallons). This result suggests that under ideal conditions, the elevation of the groundwater table in the bedrock aquifer off-site will not be lowered significantly. However, ideal conditions rarely exist in a bedrock aquifer because water is stored in many linear fractures that generally result in preferential groundwater withdrawal along a particular direction(s), rather than uniformly removing water from the bedrock aquifer.

The estimated water supply requirement for full site development is 65,000 gallons of water per day or 23,725,000 gallons of water per year. Based on the calculations shown above, it is unlikely that this amount of water can be withdrawn from the bedrock aquifer without affecting nearby properties. The only possible solution to this issue would be to drill deeply cased wells, which intersect fractures that are hydraulically connected to the sand and gravel aquifer associated with Whitney/Hogan Ponds and the Little Androscoggin River basins. Theoretically, a deeply cased well should greatly increase the volume of water that can be extracted from the bedrock aquifer, thereby causing an insignificant water level drawdown in the bedrock aquifer over an area much larger area than the site itself.

Predicting Impacts to the Bedrock Aquifer:

Hydrogeologists and geotechnical engineers have developed a suite of scientific methods (pump tests and modeling) that can be used to predict the influence of groundwater withdrawal from an aquifer (i.e. the cone of depression). These methods work extremely well in sand and gravel aquifers because the cone of depression can be approximated by assuming radial flow to the well. However, in a fractured bedrock aquifer, the cone of depression cannot be approximated assuming radial flow to the well due to the uncertainty related to the interconnectivity of fractures in the bedrock aquifer. In a bedrock aquifer the cone of depression associated with a well is linear; that is to say that there may be no drawdown east and west of the pump well, but significant drawdown north and south of the well. It is our experience that even with robust pump test results there will always be a significant degree of uncertainty related to the estimated cone of depression.

CONCLUSIONS AND RECOMMENDATIONS:

Based on the results of this groundwater supply feasibility analysis we have the following conclusions and recommendations:

- The proposed groundwater withdrawal from the bedrock aquifer associated with the first phase of development appears to be sustainable (at least 22,395 gallons per day).

- The proposed groundwater withdrawal from the bedrock aquifer associated with the full site development could be sustainable (at least 65,000 gallons per day), provided that the proposed wells can intersect water-bearing factures that are hydraulically connected to the nearby Significant Sand and Gravel Aquifers.

- Given the site conditions and the proposed groundwater withdrawal rates (at least 22,395 gallons per day), it will be difficult to demonstrate that the proposed groundwater withdrawals will not significantly impact the groundwater quantity in nearby bedrock wells. The following two methods can be used to estimate the effects of groundwater withdrawal:

    - The first method is to conduct a pump test on the water supply well(s) and monitor the drawdown in 3 or more bedrock monitoring wells placed along the boundaries of the site near existing drilled wells. Data from the pump test can be used to predict how nearby wells will be affected by the water supply wells.

    - The second method is to test all nearby bedrock wells for groundwater quantity and quality before groundwater withdrawals begin. After 1 year of groundwater withdrawals associated with Phase 1, a second round of well quantity testing can be conducted and the influence of the proposed water supply well(s) on off-site wells can be assessed. Based on previous experience, we recommend conducting at least one round of groundwater quality testing on nearby wells to protect the developer from potential lawsuits related to groundwater quality.

- It is important to note that the State will hold the developer liable for any off-site drilled wells that are rendered unusable by the development.

- We strongly recommend landscaping the site with drought tolerant vegetation. Ideally all non-potable water usage for irrigation will be supplied by water from stormwater detention ponds or rainwater detainment structures.

Stephen B. Marcotte, LSE
Certified Geologist #GE539

STATE OF MAINE
STEPHEN B MARCOTTE GE539 CERTIFIED GEOLOGIST

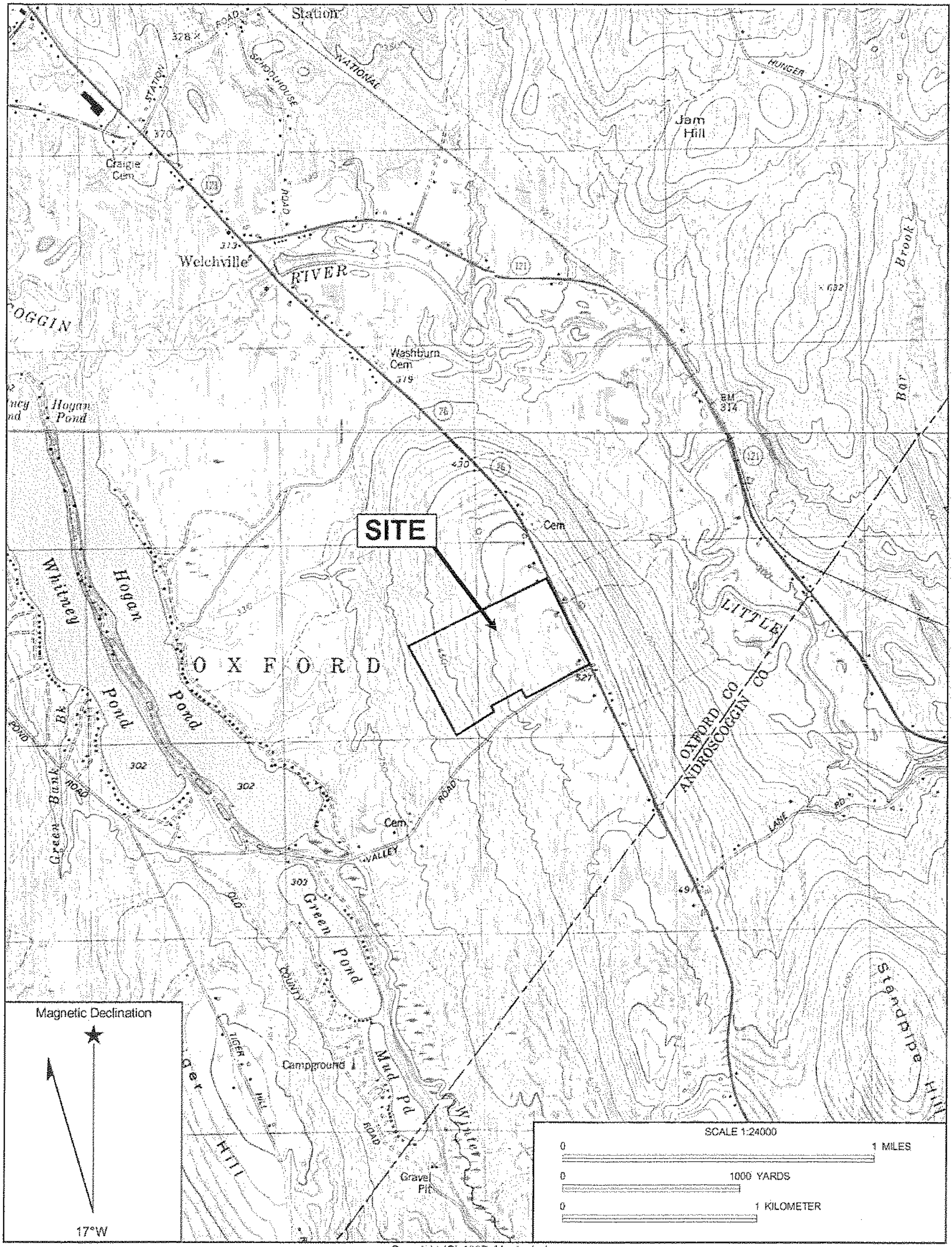
Richard A. Sweet, LSE
Certified Geologist #GE100

STATE OF MAINE
RICHARD A. SWEET 100 CERTIFIED GEOLOGIST

SM/smh

APPENDIX A

Topographic Map, Geological Maps and
Maine Geological Survey Water Well Information System Request


SITE
OXFORD
Welchville
RIVER
Washburn Cem
Craigie Cem
Jam Hill
Hogan Pond
Whitney Pond
Green Pond
Mud Pd
Campground
Gravel Pit
LITTLE
OXFORD CO
ANDROSCOGGIN CO
Standpipe Hill
Bar Brook
Station
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NATIONAL
HUNGER
VALLEY ROAD
LANE RD
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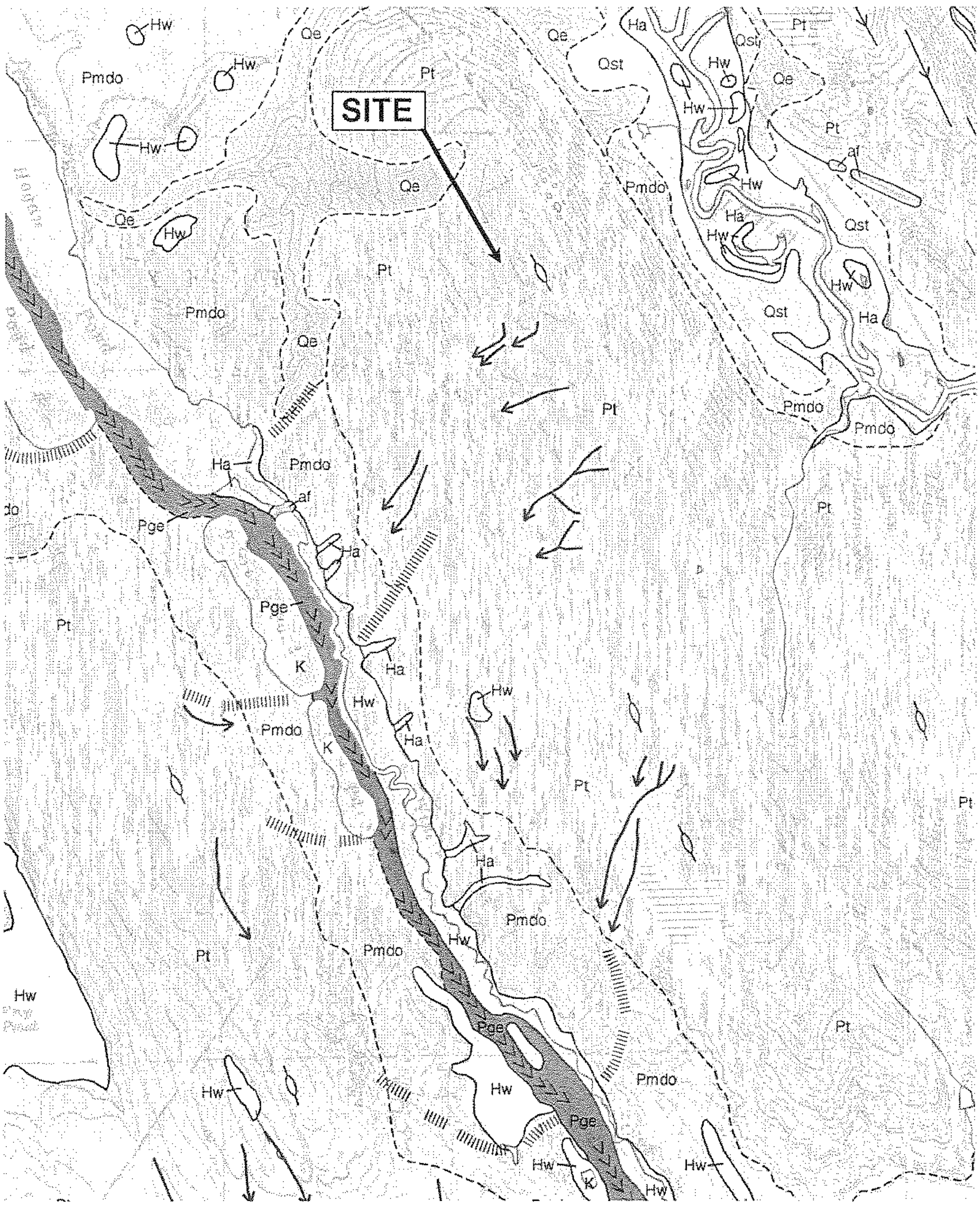

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Surficial Geology
Mechanic Falls Quadrangle
Oxford, Maine

Surficial Geology - Mechanic Falls Quad.
Map Unit and Symbol Descriptions

af

Artificial fill - Man-made. May be composed of sand and gravel, till, quarry waste, or sanitary landfill; includes highway and railroad embankments. This material is mapped only where it can be identified using the topographic contour lines. Minor artificial fill is present in virtually all developed areas of the quadrangle. Thickness of fill varies.

Ha

Stream alluvium (Holocene) - Sand, silt, gravel, and muck in flood plains along present rivers and streams. As much as 3 m (10 ft) thick. Extent of alluvium indicates most areas flooded in the past that may be subject to future flooding. In places, this unit is indistinguishable from, grades into, or is interbedded with freshwater wetlands deposits (Hw), especially in the Little Androscoggin River flood plain.

Hw

Freshwater wetland deposit (Holocene) - Muck, peat, silt, and sand. Generally 0.5 to 3 m (1 to 10 ft) thick. In places, this unit is indistinguishable from, grades into, or is interbedded with stream alluvium (Ha), especially in the Little Androscoggin River flood plain and its larger tributaries.

Qst

Stream terrace deposit (Holocene and Late Pleistocene) - Sand, silt, gravel, and occasional muck on terraces cut into glacial deposits in the Little Androscoggin River valley. These terraces formed in part during late-glacial time as sea level regressed. From 0.5 to 5 m (1 to 15 ft) thick.

Qe

Eolian deposit (Pleistocene) - Fine- to medium-grained, well-sorted sand. Found as small dunes on a variety of older glacial deposits. Deposited after late-glacial sea level regressed from the area and left fine-grained sandy marine sediments exposed to wind erosion and transport before vegetation established itself and anchored the deposits. Most are found blanketing the eastern sides of valleys, which indicates they were deposited by prevailing westerly winds. Some dunes may have been active in postglacial time. Thickness varies from 0.5 to 8 m (1 to 25 ft).

Pmdo

Glaciofluvial and glaciomarine deposits of the Little Androscoggin River valley (Pleistocene) - Sand, silt, gravel, and mud. Consists of delta deposits graded to the contemporary sea. In places, overlain by unmapped thin dune deposits. Thickness varies: 0.5 to 15 m (1 to 50 ft).

Pge

Esker deposits (Pleistocene) - Sand and gravel deposited by glacial meltwater flowing in tunnels within or beneath the ice. As much as 39 m (130 ft) thick. Chevrons indicate direction of stream flow.

Continues on Page 2

Surficial Geology - Mechanic Falls Quad.
Map Unit and Symbol Descriptions

Pt — **Till** (Pleistocene) - Light- to dark-gray, nonsorted to poorly sorted mixture of clay, silt, sand, pebbles, cobbles, and boulders; a predominantly sandy diamicton containing some gravel. Generally underlies most other deposits. Thickness varies and generally is less than 6 m (20 ft), but is probably more than 30 m (100 ft) under many drumlins and streamlined hills. Many streamlined hills in this area are bedrock-cored.

Bedrock exposures. Not all individual outcrops are shown on the map. Gray dots indicate individual outcrops; ruled pattern indicates areas of abundant exposures and areas where surficial deposits are generally less than 3 m (10 ft) thick. Mapped in part from aerial photography, soil surveys (Hedstrom, 1974; McEwen, 1970; and Wilkinson, 1995), and previous geologic maps (Hanley, 1959; Prescott, 1968).

Contact - Boundary between map units. Dashed where approximate.

Channel eroded by glacial meltwater or meteoric water flow over outwash or till deposit. Arrow indicates direction of flow.

Drumlin or other glacially streamlined hill. Symbol is parallel to direction of glacial ice movement.

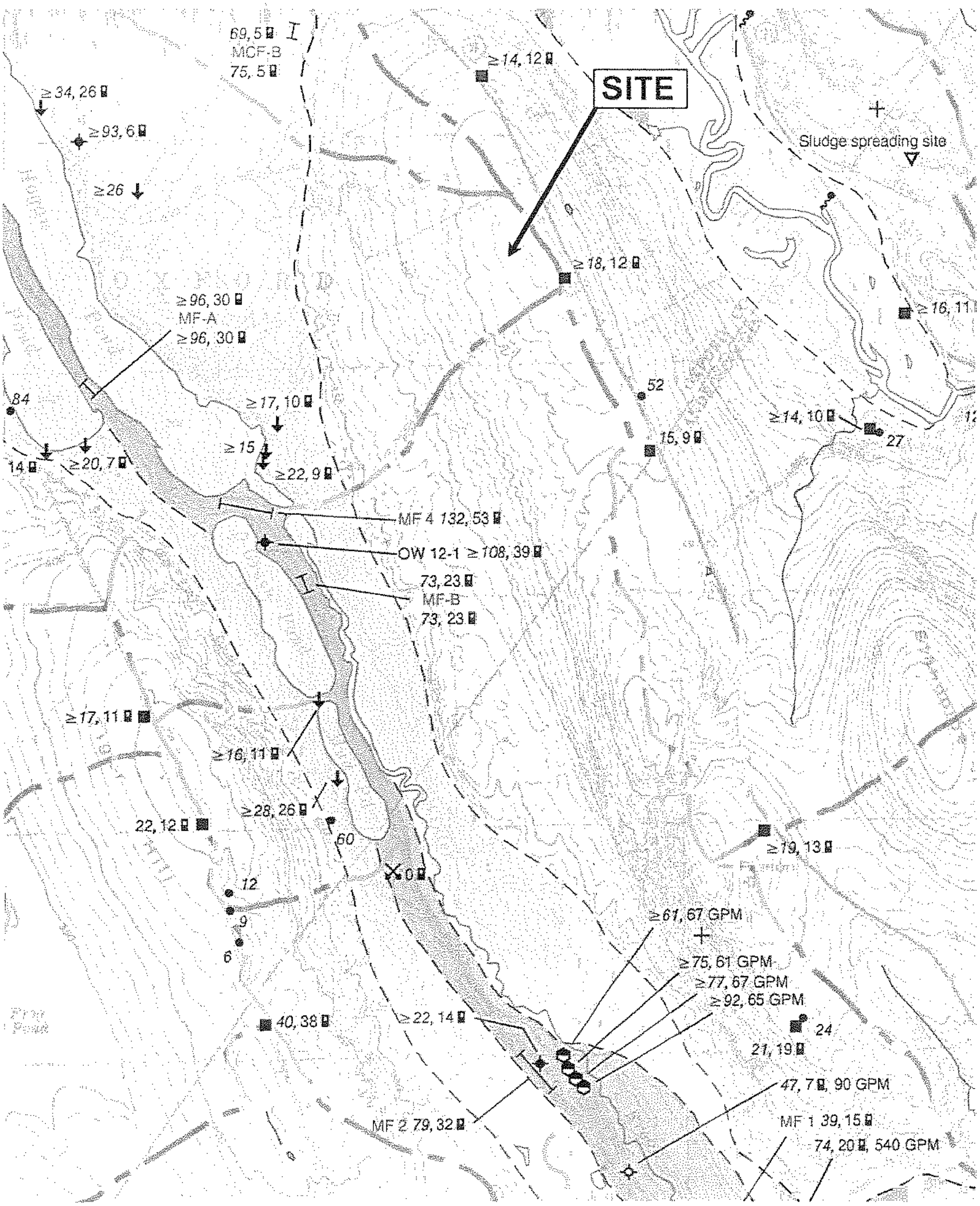
Area of many large boulders.

Inferred approximate ice-frontal position at time of deposition of meltwater deposits.

>>>>> Esker crest - Chevrons point in direction of glacial meltwater flow.

K — Kettle hole - Depression left by melting of glacial ice.

Fluted till surface - Symbol shows axis of a long narrow ridge carved in till by flow of glacial ice.



Significant Sand & Gravel Aquifers
Mechanic Falls Quadrangle
Oxford, Maine

Significant Sand & Gravel Aquifer Map Unit and Symbol Descriptions

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

Drilled overburden well — Drilled bedrock well — Quarry

Dug well — Driven point — Test pit — Bedrock outcrop

50 Depth to bedrock, in feet below land surface

≥13 Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal

6 Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line)

Gravel pit (overburden thickness noted in feet, e.g. 5-12')

4 GPM Yield (flow) of well or spring in gallons per minute (GPM)

Spring, with general direction of flow

Observation well (project well if labeled; nonproject well if unlabeled)

Test boring (project boring if labeled; nonproject boring if unlabeled)

Potential point source of ground-water contamination

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

MAP-7 ***131*, 23** Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

***69*, 12**
MAP-E
72, 12
Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refers to the northern end of the seismic line.

JOHN ELIAS BALDACCI
GOVERNOR

STATE OF MAINE
DEPARTMENT OF CONSERVATION
22 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0022

ELISA TOWNSEND
COMMISSIONER

November 15, 2010

Stephen B. Marcotte
Sweet Associates
155 Gray Road
Falmouth, Maine 04105

Stephen,

Enclosed is the information you requested on bedrock wells in the vicinity of Route 26, Oxford, Maine. A brief explanation: We have provided you with well information only on wells close to your project area.

The attached map shows bedrock wells in our database that we have **located**, either through a visit to town offices to match our well ownership information with property tax records or using E911addresses. This is a total of 43 wells in the area you indicated in your letter. The enclosed table lists the well depth, casing length, yield, etc. for these wells.

Maine Geological Survey - Water Well Information Database Monday, November 15, 2010

	Lastname	Location	Type	Drill date	Depth	Casing	Yield	Overburden	Map	Lot
23043	WING	241 MAIN STREET, ROUTE 26	BD	4/23/1985	130	101	5	-99	R02	0003
52905	THERRIAULT	ROUTE 26, MAIN STREET, PIGEON HILL	BD	11/1/1990	300	61	1	52	R2	0013
69357	BERNIER	ROUTE 26, WELCHVILLE	BD	4/1/1996	475	110	2.25	108	U32	005-A
64149	CUMMINGS	DALE CUMMINGS LOT, RT. 26	BD	9/20/1994	704	110	1.5	102	U32	6
71734	MILES	15 OLD QUARRY ROAD, ROUTE 121	BD	10/30/1995	240	40	15	26	R02	023-000
82365	LASHINS AUTO	331 MECHANIC FALLS ROAD, ROUTE 121	BD	10/28/1998	180	127	50	115	R02	024-0
78723	FRANKLIN	474 RABBIT VALLEY ROAD	BD	9/24/1997	400	81	14	70	R03	028-00A
82324	DUNN MEMORIAL FOUNDATION	HOGAN POND ROAD	BD	5/14/1998	800	100	4	86	U27	24
88750	BOUCHARD	HOGAN POND LANE	BD	7/29/1999	512	118	0.5	106	U27	018
83828	KEENAN	182 HOGAN POND LANE	BD	12/4/1998	400	100	2.25	93	U29	015-000
91073	MUNSON	HOGAN POND LANE	BD	12/14/1999	512	112	0.9	96	U29	017-000
69398	PARSONS	RABBIT VALLEY ROAD	BD	11/1/1996	80	65	96	62	U24	001-00F
65580	PERKINS	OLD COUNTY ROAD	BD	2/24/1995	145	58	6	47	U-24	001-00C
78785	WHITTEMORE	225 MAIN STREET	BD	9/9/1999	320	114	6	94		
65711	MARSH	MECHANIC FALLS ROAD	BD	4/27/1995	340	35	1.5	24	R02	029-000
69368	BELANGER	LANE ROAD	BD	6/3/1996	260	41	4	31	9	12
108455	BELANGER	110 LANE ROAD	BD	5/14/2003	280	54	3.5	38	M9	11
108323	GODDARD	181 LANE ROAD	BD	12/3/2002	245	56	60	51	*	*
102728	LOWE	144 HOGAN POND LANE	GR	3/7/2002	91	91	100	-999	U 28	14
99218	BRDBURY	244 MAIN ST	BD	9/17/2001	330	108	3	95		
121424	DUFAULT	299 MECHANIC FALLS ROAD	GR	12/16/2004	109	109	50	-999		
115381	SPILLER	31 ROWE LANE	GR	7/27/2004	109	109	54	-999	U24	006
91459	CARON	32 PENLEY LANE	BD	12/4/2000	530	86	20	80		
94043	JOHNSON	379 MAIN STREET	BD	7/25/2000	500	105	3	90		
102787	LEEMAN	46 MAIN STREET	BD	9/11/2002	380	121	4	-999		
102785	BEDARD	477 RABBITT VALLEY ROAD	BD	9/1/2002	320	61	8	44		
102614	PRESSEY	493 RABBIT VALLEY ROAD	BD	1/25/2002	160	80	20	64		
78786	CREST HOME FARMS-ICE CRM	MAIN STREET	BD	9/2/1999	705	114	5.5	92		
125582	GOUPIL	PENLEY LANE	BD	9/26/2005	140	121	150	110		
118325	ANDERSON	54 HOGAN POND LANE	BD	7/7/2004	404	103	2	97		

STATE OF MAINE
DEPARTMENT OF CONSERVATION
22 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0022

JOHN ELIAS BALDACCI
GOVERNOR

ELISA TOWNSEND
COMMISSIONER

117989	DACUHA	124 HOGAN POND LN	BD	5/11/2004	280	97	3	95		
101212	REGO, JR.	166 HOGAN POND LANE	BD	5/14/2002	130	115	60	114	U29	009
114258	WILSON	36 DUNN LANE	BD	5/18/2004	122	101	100	90	U-23	14
144861	TERRILL	136 HOGAN POND ROAD	BD	8/26/2010	400	110	35	100	U28	L11
119424	SAWYER	182 LANE ROAD	BD	10/4/2004	260	90	100	78	6	9-1
129289	THURLOW	103 MAIN STREET	BD	9/5/2007	520	40	3	24		
121496	DONOVAN	154 HOGAN POND LANE	GR	11/1/2005	93	93	30	-999	U28	017
137319	NUGENT	485 RABBIT VALLEY RD	BD	10/12/2007	380	60	1.62	50		
143877	CUSHMAN	29 TIGER HILL ROAD	BD	9/18/2009	505	130	2	11		
143911	LION LANE, LOT # 9		BD	6/26/2009	460	150	5	142		
134047	EMERY	26 BOLSTER LANE	BD	5/9/2007	360	108	4	99	U30	013
129258	MARTIN	50 BENNETT LANE	BD	11/28/2006	360	80	2.5	66	R-3	32-4
143587	PERKINS	24 DIFFIN ROAD	BD	9/17/2009	300	121	30	85	R-3	47-3

Values of -999, -99, or -99.99 indicate no information was provided by the driller
This listing is not comprehensive; there are certainly other wells in the area for which we have no information.

The hydrologic information on the wells listed is as provided by the drillers - it has not been field checked. Also, our database is ***not*** comprehensive; ***there are certainly other wells in the area for which we have no information.***

If you have any questions, please feel free to contact me.

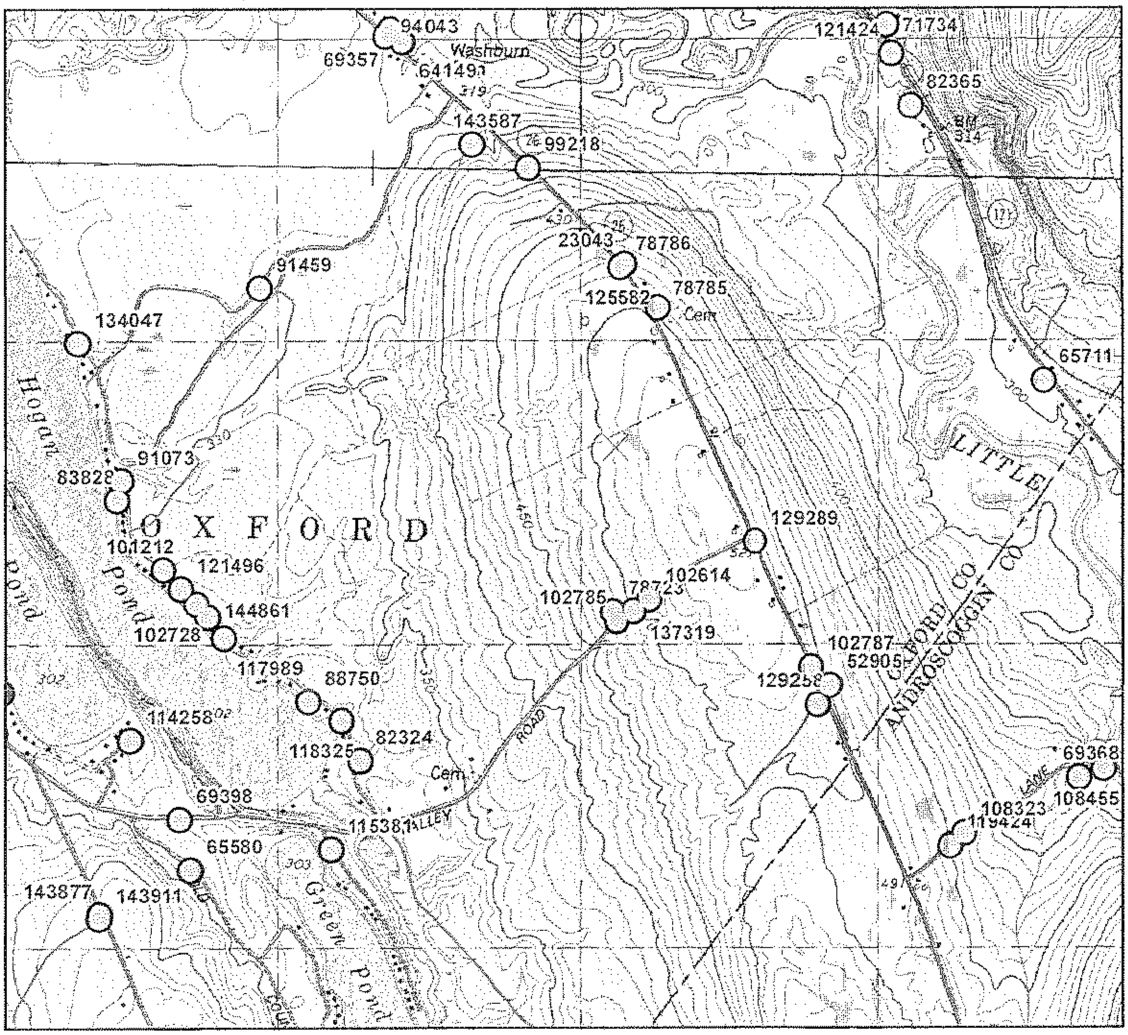
Sincerely,

Robert Johnston
Senior Geologist

MAINE GEOLOGICAL SURVEY
ROBERT G. MARVINNEY, DIRECTOR AND STATE GEOLOGIST

PHONE: (207) 287-2801
FAX: (207)287-2353
TTY: (207) 287-2213

Well locations and ids -
Pigeon Hill, Route 26, Oxford, Maine



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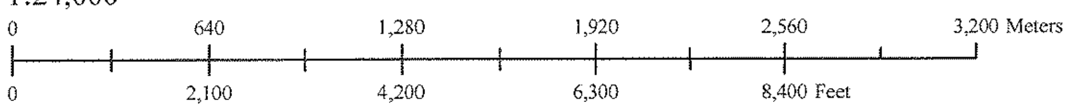
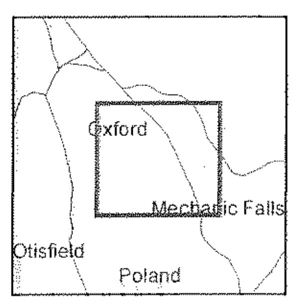
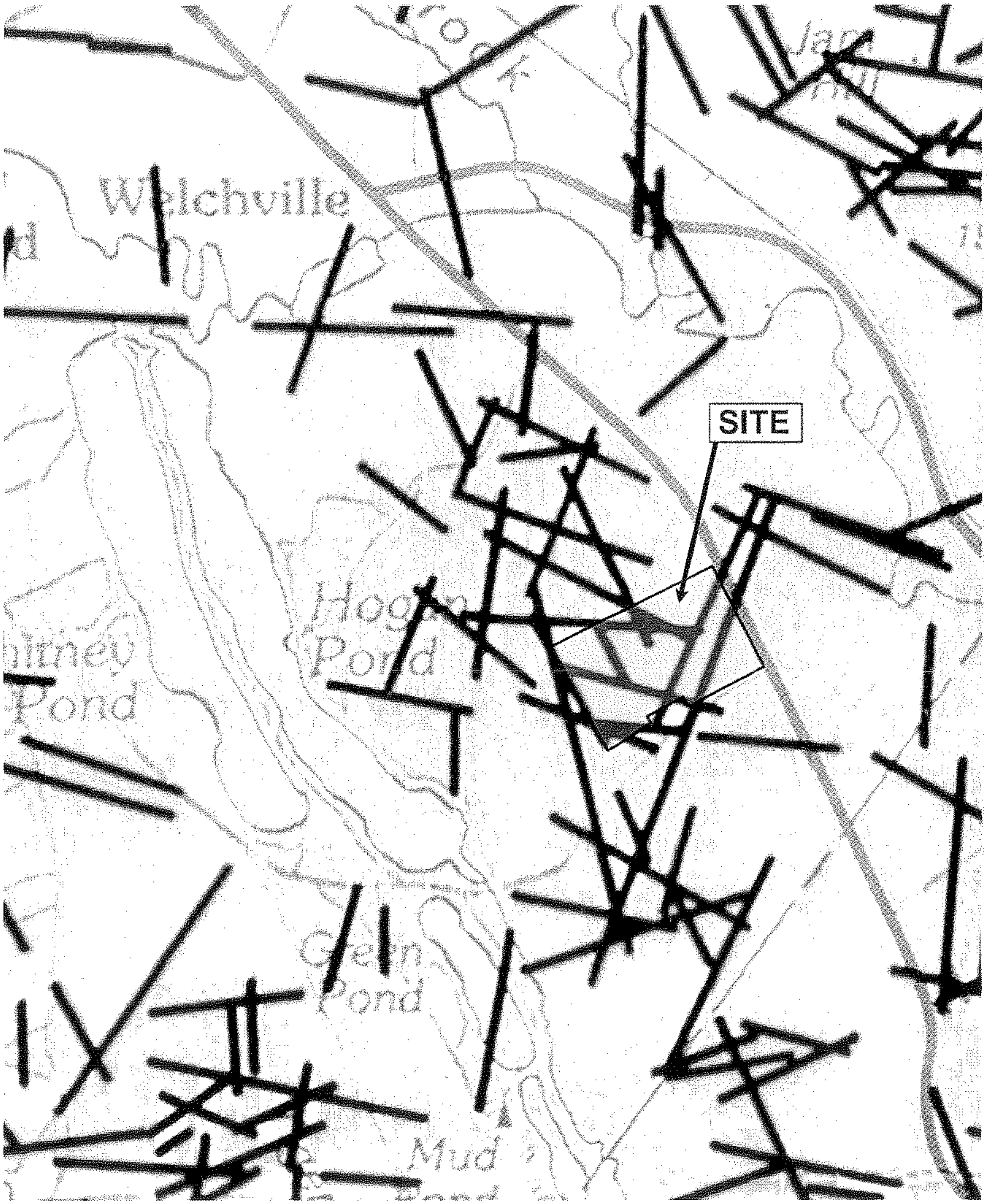


Locus map



Data from the Maine Geological Survey Water Well Information System
Map prepared by the Maine Geological Survey Hydrogeology Division



1:25,000 scale **1 inch = 2083 feet**	**Photo-Linear Summary Sebago Batholith (Lewiston Sheet)** **Open File No. 90-25a**

Sweet Associates
HYDROGEOLOGY · SITE EVALUATIONS
155 GRAY ROAD · FALMOUTH, MAINE 04105 · (207) 797-2110 · FAX: (207) 878-2364 · E-MAIL: SWEET@MAINE.RR.COM

December 17, 2010

GROUNDWATER SUPPLY FEASIBILITY TESTING PROTOCOL
OXFORD RESORT
ROUTE 26 & RABBIT VALLEY ROAD - OXFORD, MAINE

INTRODUCTION:

The purpose of this report is to present a testing protocol that will be used to estimate/mitigate the impacts to the bedrock aquifer caused by a proposed water supply well(s) serving the Oxford Resort. The proposed first phase of the Oxford Resort will require at least 22,395 gallons of water per day, according to the wastewater design flow calculations presented by Main-Land Development Consultants. The proposed water usage for full site build out of the Oxford Resort is approximately 65,000 gallons of water per day.

Due to the nature of the fractured bedrock aquifer and the proposed groundwater withdrawal rates, substantial testing will be required to demonstrate that the proposed water supply well(s) will not significantly impact the quantity and quality of water in nearby bedrock wells. To address this issue, we propose using the following on-site and off-site testing methods to estimate the impact of the proposed groundwater withdrawal on the bedrock aquifer.

ON-SITE TESTING METHODS (PUMP TEST):

Pump tests are used to determine the hydraulic properties of an aquifer, such as hydraulic conductivity, storage and transmissivity. These properties determine how easily water moves through the aquifer and how much water is stored in the aquifer. A pump test consists of pumping a well at a certain rate and recording the drawdown (decline) of the water level in the pumping well and in nearby observation wells over a certain time period (at least 3 days). The observed change in water levels in the wells can be used to calculate the hydraulic properties of the aquifer.

We propose conducting a 3 to 5 day pump test on-site. Data from the pump test will be used to determine the hydraulic properties of the bedrock aquifer and forward modeling will be used to estimate the water level drawdown caused by the proposed groundwater withdrawal. While there will still be a degree of uncertainty related to the extrapolation of data from a pump test in a bedrock aquifer, the pump test results will provide valuable data that can be used to mitigate/assess the impacts to the bedrock aquifer off-site.

OFF-SITE TESTING METHODS (WELL SURVEY):

In order to fully characterize the impact of the proposed water supply well(s) on the bedrock aquifer and provide a maximum level of protection for all existing bedrock wells in the area, we propose testing all bedrock wells within 2000 feet of the proposed water supply well(s) for well yield (quantity) and well water quality. The initial round of off-site testing will be conducted prior to general usage of the proposed water supply well(s). The location of the proposed water supply well(s) and 33 off-site bedrock wells to be surveyed are shown on the *Bedrock Water Well Survey Map* presented in Appendix A. It was assumed that all of the 33 properties are served by bedrock wells; properties with dug wells will not be included in this investigation. Each bedrock well owner will receive a copy of the report that will include a narrative, a copy of the laboratory report and a discussion of the test results.

The yield of each off-site bedrock well will be determined by pumping the wells for 30 to 60 minutes and measuring the rate of water level rise in the well once the pump is turned off. Well water levels will be measured using a sonic water level meter to eliminate any chance of well contamination (i.e. bacteria). Groundwater quality samples will be collected shortly before the yield test is completed. Samples will be analyzed for common elements (iron, chloride, etc.) and naturally-occurring groundwater contaminants (arsenic, radon, etc.) that are typically found in groundwater from a granitic bedrock aquifer. A full list of the proposed analytical parameters and the National Primary/Secondary Drinking Water Standards for each parameter is presented in Appendix A.

The purpose of conducting off-site bedrock well water quality testing is primarily to protect the developer and well owners from potential lawsuits related to changes in groundwater quality. Low concentrations of naturally-occurring groundwater contaminants (e.g. uranium, lead, radon and arsenic) are expected to be present in groundwater from a granitic bedrock aquifer. In the recent past, these groundwater contaminants were not commonly included in well water quality tests completed during real-estate transactions or after new well construction. Today, these parameters are commonly included in well water quality tests and experience indicates that many property owners will find out that their well needs a water treatment system during a real-estate transaction. Obtaining pre-development data on off-site bedrock well water quality will provide valuable information to the well owner and also provide a baseline for comparison in the future.

Provided that the results of on-site and off-site testing are favorable, the first phase of the project will be constructed. Following one full year of water usage on-site, a second round of off-site water well yield tests will be completed during a similar time of year to assess changes in well yield. Little or no change in off-site well yield will be considered favorable for the expansion of groundwater withdrawals to accommodate full site build out. Whereas significant changes in well yield will not be favorable for the expansion of groundwater withdrawals to accommodate full site build out.

CONCLUSIONS:

We conclude that the proposed on-site and off-site bedrock well testing will provide the level of detail necessary to estimate the impact to the bedrock aquifer caused by the proposed water supply well(s) serving the Oxford Resort. The proposed second round of off-site well yield (quantity) testing will provide essential data that can be used to verify/quantify the impact of the first phase of development (22,395 gallons of water per day) and predict the effects of full site build out (65,000 gallons of water per day).

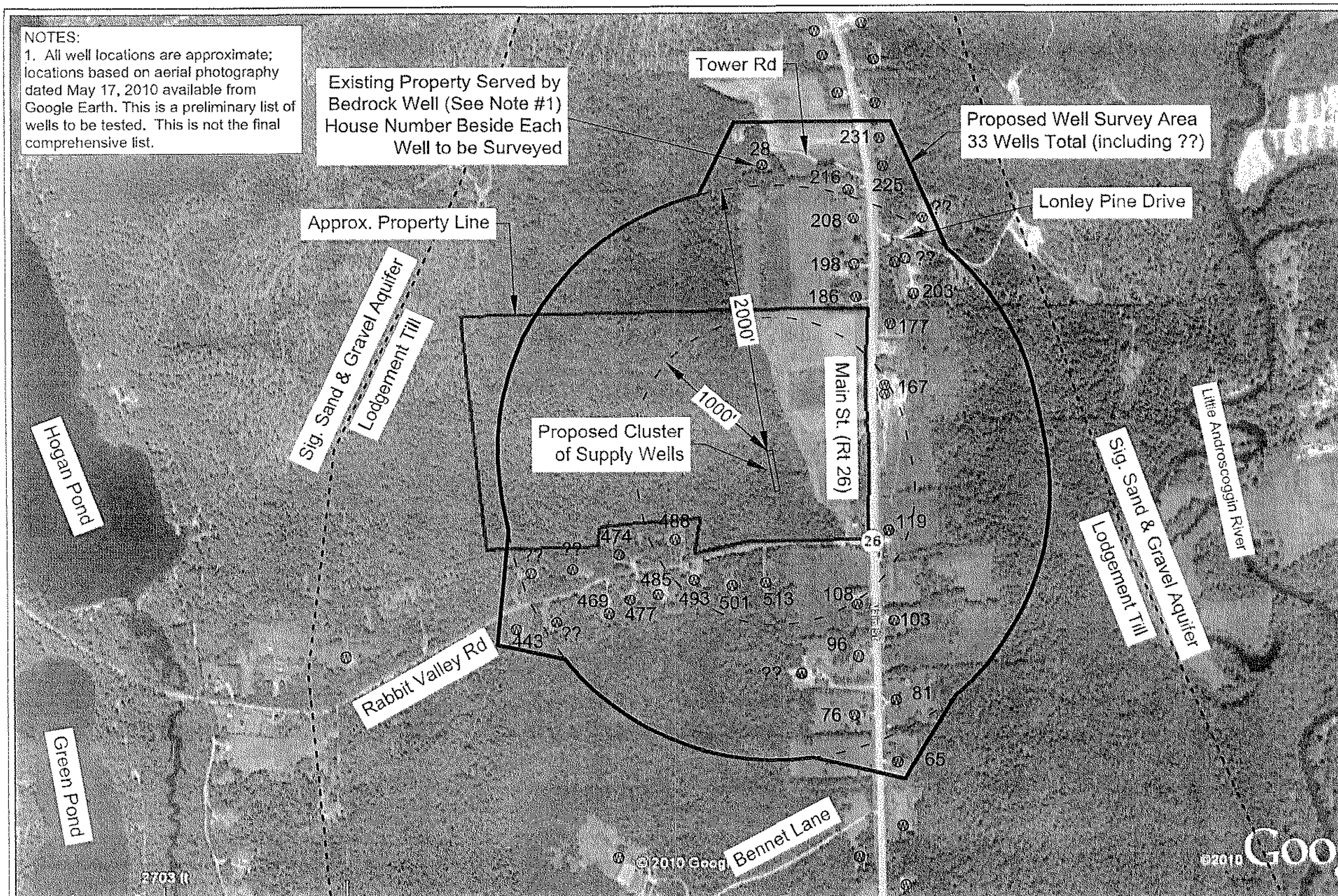
Stephen B. Marcotte, LSE
Certified Geologist #GE539

Richard A. Sweet, LSE
Certified Geologist #GE100

SM/smh

APPENDIX A

Bedrock Water Well Survey Map &
Proposed Well Water Quality Testing Parameters



0 1000' 2000' SCALE: 1" = 1000'	Bedrock Water Well Survey Map	Oxford Resort Rt 26 & Rabbit Valley Rd Oxford, Maine	SWEET ASSOCIATES 155 Gray Road - Falmouth, ME Phone: (207) 797-2110

Proposed Well Water Quality Sampling Parameters
Oxford Resort
Route 26 & Rabbit Valley Road - Oxford, Maine

Parameters	MCL	NSDWR
Arsenic (mg/L)	0.01	
Copper (mg/L)	1.3	1
Hardness (mg/L)**		
Iron (mg/L)		0.3
Lead (mg/L)	0.015	
Manganese (mg/L)		0.05
Sodium (mg/L)**		
Uranium (mg/L)	0.03	
Zinc (mg/L)		5
Chloride (mg/L)		250
Nitrate-Nitrogen (mg/L)	10	
Nitrite-Nitrogen (mg/L)	1	
Total Fluoride (mg/L)		2
pH (Laboratory)		6.5-8.5
Radon (pCi/L)**		

mg/L = milligrams per Liter (or parts per million, ppm)

ug/L = micrograms per Liter (or parts per billion, ppb)

mL = milliliter

MCL = National Drinking Water Maximum Contaminant Level

NSDWR = National Secondary Drinking Water Regulations

pCi/L = picoCuries per Liter

NTU = Nephelometric Turbidity Units

U = Less than the Laboratory Detection Limit

N/A = Not Applicable

BOLD = Result exceeds MCL or NSDWR

** - The EPA does not regulate non-community drinking water systems for this parameter

SECTION 17. WASTEWATER DISPOSAL:

A. On-Site Disposal Systems: This project contemplates the construction of an on-site wastewater disposal system, to be installed down gradient of the developed portion of the project site.

1. Site Plan: The applicant has prepared overall Site Plans of the entire project. To address the concerns of this Section of the application, the applicant has developed two Plans detailing the on-site wastewater disposal system – Plans C7.1, C7.2, and C7.3. These Plans show all of the required details of the site, including two-foot contours (both existing and proposed), test pit locations and elevations, fill extensions, and actual leachfield details.

2. Soil Conditions Summary: As part of Section 11, the applicant has prepared a full list of all subsurface explorations. The results of these explorations are found on Form E. The test pits used to size the leachfields are included on the enclosed HHE-200 form, included in this Section.

3. Logs of Subsurface Explorations: As part of Section 11, the applicant has prepared the logs for the subsurface investigations, on Form F. The test pits used to size the leachfields are included on the enclosed HHE-200 form, included in this Section.

4. Additional Subsurface Explorations: The enclosed HHE-200 Form includes the logs for the additional test pits that were excavated and evaluated within and near the proposed leachfields.

    a. Soil Condition AIII – no test pits with this condition were identified within or near the leachfields.

    b. Soil with Profile 8 or 9 – no test pits with these conditions were identified within or near the leachfields.

    c. Soil Condition D – no test pits with these conditions were identified within the leachfields. Test Pit 111, near Leachfield B was a 3-D soil, with a limiting factor of 13 inches.

    d. Disposal Field Length of 60 feet or longer: The applicant has provided a total of 12 test pits within or near the proposed leachfields designed for this project, as well as a High Intensity Soil Map of the site.

5. 3-Bedroom Design – Not Applicable

6. Larger Disposal Systems: This system design will be submitted to DHHS as an Engineered Subsurface Wastewater Disposal System, for their review and approval.

a. System Design Details: The determination of the flow rate for this system was based upon anticipated uses within the Resort facility. The design flows for the restaurant portion of the project were taken from Table 501.2 of the Maine Subsurface Wastewater Disposal Rules. The flow rate for the Casino portion of the site was based on an interpolation of flow rates generated at Hollywood Slots in Bangor.

According to the Bangor Water District, Hollywood Slots used 4,355,000 cubic feet of water in their highest quarter over the last five quarters. This equates to an average daily flow of 36,278 gallons per day.

Hollywood Slots contains a hotel with a total of 152 rooms; a restaurant approved for 404 seats; and a conference center with 195 seats. Based on Table 501.2, the design flow from this facility, not including the gaming portion of the site, would be as follows:

Hotel – 152 x 100 gpd/room = 15,200 gallons per day
Restaurant – 404 x 30 gpd/seat = 12,120 gallons per day
Conference Center – 195 x 2 gpd/seat = 390 gallons per day

Total Flow without Casino = 27,710 gallons per day

Subtracting this flow from the average daily flow of the largest quarter equals 36278 – 27,710 = 8,568 gallons per day attributable to the Casino. There are 1,000 slot machines, resulting in a flow of 8.57 gallons per day per seat at a slot machine.

The applicant rounded this number up to 10 gallons per day per seat at a slot machine or table game. For this project, there are a total of 992 seats. Therefore, the flow attributable to the **Casino is 9,920 gallons per day**.

The calculations for the restaurant can be found in the enclosed spreadsheet for the project. The flow attributable to the **restaurant 9,850 gallons per day.**

The applicant has also included 100 employees into the design flow, and an employee dining area with 75 seats, though this number has not been backed out of the Hollywood Slots flow rate. Therefore, the applicant believes this is, in effect, a safety factor for the overall flow rate. At **175 employees**, the flow rate is 175 x 15 gpd per employee, which equals **2,625 gallons per day.**

Total design flow to the leachfield is 22,395 gallons per day.

Because this system will utilize an Advanced Wastewater Treatment System, no adjustment has been made for the restaurant flows.

The applicant has chosen to design Geotextile Sand Filter units for this project. The leachfield will be constructed in two beds at basically the same elevation across the slope. Each bed will contain 18 rows of GSF units, with 48 units per row. These rows will be installed with two feet of separation between each row. The resulting dimension of each bed will be 192 feet long and 88 feet wide. The two beds will be separated by 10 feet, along the contour.

b. The applicant has prepared Plans of the leachfields, Plans C7.2 and C7.3 that provide the design and construction details of these two leachfields. These Plans also show the fill extensions, the piping methodology, and the elevation reference point. Plan C7.1 shows the locations and sizes of the septic tanks and external grease trap, as well as the location for the Advanced Waste Treatment system.

The applicant has designed the septic tanks to handle 150% of the design flow, and has designed an external grease trap for the kitchen waste from the restaurant.

The septic tank capacity is required to be 33,592 gallons. The applicant is proposing to install two tanks in series, the first being a 16,000 gallon tank, followed by an 18,000 gallon tank.

The external grease trap for the site has been designed based upon equation 912.3 of the Maine Subsurface Wastewater Disposal Rules. Again, because this overall system is designed with Advanced Wastewater Treatment, the grease trap was designed without much conservatism. The external grease trap is proposed to be an 8,000 gallon grease trap.

c. Cross Sections: Also on Plan sheets C7.1, C7.2 and C7.3 are the profile for the sewer line, and the cross sections of the two proposed leachfields, providing all of the required information regarding elevations of the system on a row by row basis, as well as fill extension details, all tied to the elevations of the site, and the elevation reference point.

d. Test Pit Data: The test pits dug within or near the leachfields have been shown on the Plan view of the system, and the logs for these test pits have been included with the HHE-200 form submitted as part of this Section. The ground elevations of each of these test pits are also provided.

e. Mounding Analysis: Sweet Associates of Falmouth has prepared a report entitled Wastewater Mounding and Transmission Analysis as required by the Maine Subsurface Wastewater Disposal Rules. This report is included as part of this Section.

B. Nitrate-nitrogen impact assessment: Sweet Associates of Falmouth has prepared a report entitled Nitrate-Nitrogen Impact Assessment for this septic system. This assessment showed the clear need for an Advanced Wastewater Treatment System to reduce the concentration of nitrate-nitrogen in wastewater to 10 mg/L in order to maintain a concentration of less than 10 mg/L nitrate-nitrogen in groundwater at the down-gradient property line of the project parcel. Please see the Sweet report for the details of their assessment and conclusions.

C. Municipal Facility: This project will not utilize the municipal wastewater system. The closest system to this site is miles away.

D. Wastewater Discharge Information: There are no plans for any wastewater discharge associated with this project.

E. Storage or Treatment Lagoons: Not Applicable

Sweet Associates
155 GRAY ROAD · FALMOUTH, MAINE 04105 · (207) 797-2110 · FAX: (207) 878-2364 · E-MAIL: SWEET@MAINE.RR.COM

December 10, 2010

HYDROGEOLOGICAL INVESTIGATIONS & WASTEWATER MOUNDING AND TRANSMISSION ANALYSIS OXFORD RESORT ROUTE 26 & RABBIT VALLEY ROAD - OXFORD, MAINE

INTRODUCTION:

The purpose of this investigation is to determine the extent of mounding and wastewater effluent movement beneath a proposed engineered subsurface wastewater disposal field serving the first phase of the Oxford Resort. Data used for this study includes a preliminary septic system design and soil test pit logs provided by Main-Land Development Consultants, Inc. As part of this investigation, Sweet Associates installed four monitoring wells to determine the depth to bedrock below the ground surface and estimate the hydraulic properties of the aquifer receiving the wastewater.

SUBSURFACE WASTEWATER DISPOSAL SYSTEM:

The first phase of site development will be served by a 22,395 gallons per day (gpd) subsurface wastewater disposal system. The proposed subsurface wastewater disposal field consists of 1,728 B43 Eljen In-drain Geotextile Sand Filter modules arranged in two sub-fields of 18 rows x 48 units with 2 feet of separation between rows (88 feet by 192 feet). The two sub-fields are approximately arranged along the same elevation contour and separated by 10 feet along the contour. The total footprint of the disposal field is 88 feet by 394 feet (34,672 square feet).

Strictly based on the total number of Eljen In-drain units, the maximum potential design flow of the disposal field is 25,135 gpd. The maximum potential design flow is used for all calculations to accommodate the design flow associated with any changes in use or minor expansions. The uniform infiltration rate of 25,135 gpd over an 88 foot by 394 foot area is 0.0969 feet per day. The average ground surface slope beneath the disposal field is 6.5% based on existing grade contours shown on the disposal field design.

HYDROGEOLOGICAL SETTING AND ON-SITE TESTING:

The site is located on the *U.S.G.S. Mechanic Falls, Maine Quadrangle 7.5 Minute Series*. The locus map included in this report (Appendix A) is adapted from that publication. The *Surficial Geology Map of the Mechanic Falls Quadrangle* shows that the site is situated on a prominent north-northwest trending glacially-streamlined hill situated between the Little Androscoggin River basin to the north and east and Whitney/Hogan Ponds basin to the west. The site is underlain by lodgement till that is locally overlain by a thin layer of wind-blown sand deposited by the prevailing westerly winds after the late-glacial sea level regressed from the area and exposed fine-grained sandy marine sediments. The *Significant Sand and Gravel Aquifer Map* *of the Mechanic Falls Quadrangle* shows that the site is located between a large Significant Sand and Gravel Aquifer located in the Little Androscoggin River basin and the Whitney/Hogan Ponds basin.

The direction of near-surface groundwater flow on-site is controlled by the presence of a low permeability hardpan that occurs approximately 2 feet below the ground surface according to soil test pit logs. On sites underlain by lodgement till, the direction of near-surface groundwater flow can be inferred based on the topographic contours and surface drainage patterns. We conclude that the direction of near-surface groundwater flow near the disposal field is downslope southwest towards Hogan Pond.

Data from the Oxford County Soil Survey indicates that hydraulic conductivity of the topsoil ranges from 1.2 to 4 feet per day and the hydraulic conductivity of the near-surface hardpan ranges from 0.12 to 1.2 feet per day. Further testing on-site was completed to determine the actual hydraulic conductivity of the most limiting factor (hardpan), as described below.

Four 2-inch diameter monitoring wells were installed on-site to determine the depth to bedrock below the ground surface and estimate the hydraulic properties of the aquifer receiving the wastewater. The existing grade and top of well casings were surveyed by Main-land Development Consultants. Monitoring well construction logs are presented in Appendix A. Monitoring wells were installed in one deep test boring (MW-1D) and three shallow test borings (MW-1S, MW-2 and MW-3). Monitoring well MW-1D was installed in a 47.67 foot deep borehole drilled to establish a rough depth to bedrock; bedrock was not encountered and is assumed to be at a depth of 50 feet below the ground surface. All monitoring wells were screened and sealed with bentonite within the lodgement till hardpan in an effort to characterize the hydraulic conductivity of hardpan. Since the wells are not screened across the water table, they are not suitable for constructing a groundwater contour map. Rising head and/or falling head slug tests were completed on all wells.

Slug test results were analyzed with Aquifer Test v3.5 using the Hvorslev method. Slug test analysis reports are presented in Appendix A. The result of each slug test and the screened interval tested is presented in the following table.

Monitoring Well ID	**Top of Filter Sand & Bottom of Bentonite Seal (Depth Below the Ground Surface)**	**Bottom of Well Screen (Depth Below the Ground Surface)**	**Average Hydraulic Conductivity (Hvorslev)**
MW-1D	35.67 feet	47.67 feet	0.0379 ft/day
MW-1S	6.67 feet	18.67 feet	0.142 ft/day
MW-2	2.84 feet	14.84 feet	0.191 ft/day
MW-3	1.84 feet	18.84 feet	0.240 ft/day

Slug test results indicate that the average hydraulic conductivity of the near-surface hardpan (0.142 to 0.240 ft/day) is significantly less than the average hydraulic conductivity of the topsoil (1.2 - 4.0 ft/day) and the hydraulic conductivity of the hardpan significantly decreases with depth to a value of 0.0379 ft/day. These for average hydraulic conductivity values will be used to estimate the vertical hydraulic conductivity of the surficial materials on-site, as discussed in the next section.

WASTEWATER MOUNDING AND TRANSMISSION ANALYSIS:

Groundwater mounding is anticipated to occur beneath the proposed disposal field due to the presence of a low hydraulic conductivity layer (lodgement till) beneath the disposal field. The following analysis is a 3-step approach used to estimate the height of a groundwater mound beneath a wastewater disposal field on a sloping site and estimate the size of a fill extension to prevent wastewater breakout. The first step is to use an analytical model (Khan *et al.* 1976) to estimate the geometry of a groundwater mound assuming that the ground surface below the disposal field is level. The second step is to evaluate the analytical modeling results using Darcy's law. The third step is to use the analytical modeling results to determine the appropriate downslope fill extension length.

Step 1 - Analytical Model:

Khan *et al.* (1976) presents an analytical model that can be used to estimate the extent of groundwater mounding on a low hydraulic conductivity layer in the vadose zone below a wastewater disposal field. The conceptual model and a spreadsheet with all calculations is presented in Appendix B. Khan *et al.* (1976) used the following assumptions to simplify the model:

- The conceptual model is for a two-dimensional vertical cross-section with a disposal area (W). The half width (w) is assumed to be much smaller than the length of the disposal area (if the half width is not much smaller than the length of the disposal area, then the model will provide a more conservative estimate of mounding).

- The low hydraulic conductivity layer (K_2) and high hydraulic conductivity layer (K_1) interface is the sole cause of mounding (the seasonal high water table is below the interface).

- The soil in each hydraulic conductivity layer is homogeneous and isotropic. $K_1 > K_2$. The K_1/K_2 interface is horizontal.

- The infiltration rate of wastewater (q') is greater than the vertical hydraulic conductivity of the lower layer (K_2). Infiltration is assumed to be constant.

The following equations, based on the conceptual model illustrated in Appendix A, were used to calculate the estimated maximum height of the groundwater mound and the distance from the center of the disposal field where groundwater mounding becomes negligible (the required extent of fill material downgradient from the disposal field to contain the mounded groundwater).

The height of the mound, H (ft), is calculated by:

$$H = w\left[\frac{K_2}{K_1}\left(\frac{q'}{K_2} - 1\right)\left(\frac{q'}{K_2} - \frac{x^2}{w^2}\right)\right]^{1/2}$$

where,

w	=	½ width of the disposal area (ft),
q'	=	uniform recharge rate into the disposal area (ft/day),
K_1	=	hydraulic conductivity of the upper soil layer (ft/day),
K_2	=	hydraulic conductivity of the lower soil layer (ft/day),
x	=	distance from center of disposal field (ft).

The maximum height of the mound, H_{max} (ft), is calculated by setting the distance from the center of the disposal field (x) to zero.

The uniform recharge rate, (q'), is estimated to be 0.0969 ft/day based on the estimated total flow of 25,135 gpd over an 88 foot by 394 foot area. Hydraulic conductivity K_1, the engineered sand fill below and around the disposal field, is assigned a value of 50 ft/day.

The hydraulic conductivity of the low conductivity layer (K_2) was estimated by calculating an equivalent hydraulic conductivity of three layers: 2 feet of topsoil overlying; 13 feet of moderate permeability hard pan (0.142 ft/day) overlying; 35 feet of low permeability hardpan (0.0379 ft/day). An equivalent hydraulic conductivity for three layers with different hydraulic conductivities can be calculated by use of the following equation:

$$Keq = \frac{\sum_{i=1}^{n} Ki \times di}{\sum_{i=1}^{n} di}$$

where,

Keq	=	equivalent hydraulic conductivity (ft/day)
Ki	=	hydraulic conductivity layer *i* (ft/day)
di	=	thickness of layer *i* (ft)

The equivalent hydraulic conductivity calculations are presented on the spreadsheet in Appendix B. The equivalent hydraulic conductivity, *Keq*, is 0.10345 ft/day. As a general rule of thumb, the vertical hydraulic conductivity of is one-half of the average hydraulic conductivity (as estimated by the slug tests). The vertical hydraulic conductivity (K_2) was assigned a value of 0.05 ft/day. Based on the values of the abovementioned parameters, the maximum height of the mound above the K_2 layer at the center of the disposal field (H_{max}) is 1.88 feet.

Step 2 - Validate Analytical Model Results:

The low conductivity layer beneath the disposal field is sloping, which violates an assumption of the analytical model. Darcy's law will be used to examine whether the calculated mound height from the analytical model is appropriate. Darcy's law is expressed as:

$$Q = K\,i\,A$$

where,

Q	=	flow of water (cubic feet per day)
i	=	hydraulic gradient (unitless) - in this case the ground surface slope
A	=	cross section area (square feet)

Given a design flow of 25,135 gpd (3360.06 ft^3/day), a hydraulic conductivity of 50 ft/day and a hydraulic gradient of 6.5%, the required cross-sectional area of sand fill (flow window) below the downslope edge of the disposal field is 1033.9 ft^2. It is assumed that the length of the flow window, parallel to elevation contours, is the disposal field length (394 feet) plus 30 feet beyond the disposal field footprint, or a total of 454 feet (394 ft + 30 ft + 30 ft). The estimated maximum height of the groundwater mound at the downslope margin of the disposal field is 2.28 feet. This result is consistent with the results of analytical modeling since the analytical model tends to have a lower mound height because it also considers the vertical infiltration rate of the low conductivity layer (K_2). However since, all of the wastewater will drain downslope we believe that the mound height calculated using Darcy's law is more appropriate on a sloping site. The maximum groundwater mound height above existing grade at the downslope margin of the disposal field is 2.28 feet.

Step 3 - Estimate Length of Downslope Fill Extension:

The length of the fill extension required to prevent the possibility of wastewater breakout on nearby side slopes can be determined by rearranging and solving the Khan *et al.* (1976) equations for a distance where the height of the mound is zero (Poeter *et al.*, 2005):

$$L = w * (q'/K_2)\ ,$$

where,

L	=	length of fill extension required from center of disposal field (ft),
w	=	½ width of the disposal area (ft)
q'	=	uniform recharge rate into the disposal area (ft/day),
K_2	=	hydraulic conductivity of the lower soil layer (ft/day).

L is calculated to be 85.28 feet long. This results in a 41.28 foot long fill extension from the edge of the disposal field. This calculation method assumes that the low conductivity layer is level and wastewater will infiltrate evenly throughout a 41.28 foot fill extension around the disposal field. However, this assumption is not valid, since the low conductivity layer below the disposal field is sloping and nearly all of the wastewater will be absorbed by the low conductivity layer within the side-slope and downslope fill extensions.

A 41.28 foot fill extension around the disposal field would have an area of 79,819 ft^2, as calculated using computer aided drafting software (CAD). In order to prevent wastewater breakout, the infiltrative area immediately beside, below and downslope of the disposal field must be at least 79,819 ft^2. Provided that the final design fill extensions meet this requirement and wastewater flows are evenly distributed across the disposal field footprint then there should be little or no risk of wastewater breakout.

EVALUATION OF THE SEPTIC SYSTEM DESIGN:

The results of this mounding and transmission analysis can be applied to the proposed disposal field using average ground surface elevations along the upslope and downslope margins of the disposal field footprint. Six existing grade elevations were calculated using existing grade contours on the site plan, as shown on the *Mounding and Transmission Analysis Site Plan* presented in Appendix B. The average ground surface along the upslope and downslope margins of the disposal field are 476.6 feet and 470.9 feet, respectively. The height of the groundwater mound above the average existing grade along the upslope margin of the disposal field is assumed to be at the elevation of the seasonal high water table, which is more than 15 inches below existing grade. The height of the groundwater mound above the average existing grade along the downslope margin of the disposal field is assumed to be 2.28 feet above the average existing grade.

The elevation of each of the 18 rows of the disposal field were calculated based on the abovementioned groundwater mound heights and the required 1 foot separation from the top of the groundwater mound. The proposed rows elevations and a schematic representation of the 79,819 ft^2 infiltrative area required is presented on the *Mounding and Transmission Analysis Site Plan* in Appendix B.

In order to limit the effects of the Spring high water table on-site, we require the installation of a curtain drain and a surface water diversion swale along the upslope margin of the disposal field as schematically shown on the *Mounding and Transmission Analysis Site Plan* in Appendix B.

In order to slow down the water from moving too quickly through the downslope fill extensions we developed the following septic system fill specifications, as schematically shown on the *Mounding and Transmission Analysis Site Plan* proposed fill specification note. Fill below the disposal field and along the upslope and sideslope margins of field shall be have a hydraulic conductivity of 50 ft/day. The first 50 feet of the downslope fill extension shall have a hydraulic conductivity of 50 ft/day and the remaining 50 feet of the fill extension shall have a hydraulic conductivity of 20 ft/day. Using the Hazen approximation (Hazen 1911), a specified fill gradation table was developed to aid in the selection of appropriate backfill materials for the proposed 50 ft/day and 20 ft/day sand (Appendix B)

CONCLUSIONS:

According to the assumptions and parameters used in this mounding and transmission analysis the proposed disposal field will provide adequate treatment to the wastewater provided that the following conditions are met.

- The subsurface wastewater disposal field rows must be set at the elevations shown on the *Mounding and Transmission Analysis Site Plan*. These row elevations will maintain the minimum 1 foot separation distance between the top of the groundwater mound and the base of the Eljen In-drain system sand, as required by the Maine Subsurface Wastewater Disposal Rules.

- The two different specified backfills for the disposal field must meet the gradation specification presented in this report. The placement of these two specified backfill materials must be installed as schematically shown on the *Mounding and Transmission Analysis Site Plan* proposed fill specification note.

- A five foot deep curtain drain and a surface water diversion swale must be constructed upslope of the disposal field as schematically shown on the *Mounding and Transmission Analysis Site Plan*.

- The fill extensions must have an infiltrative area of 79,819 ft^2, as schematically shown on the *Mounding and Transmission Analysis Site Plan*.

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REFERENCES

Hazen, A. "Discussion of 'Dams on sand foundations' by A. C. Koenig." Transactions of the American Society of Civil Engineers. Volume 73, pgs. 199–203. 1911.

Khan, M.Y., *et al.*, 1976, "Shapes of Steady State Perched Groundwater Mounds," *Water Resources Research*, 12(3), 429-436.

Poeter, E., *et al.*, 2005, *Guidance for Evaluation of Potential Groundwater Mounding Associated with Cluster and High-Density Wastewater Soil Absorption Systems*, International Groundwater Modeling Center of Colorado School of Mines, Golden Colorado, p. 3-5 to 3-8.

U.S.D.A. Soil Conservation Service in cooperation with Maine Agricultural Experimentation Station and Maine Soil and Water Conservation Commission, Soil Survey of Oxford County Area, Issued March 1995.

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December 10, 2010

NITRATE-NITROGEN IMPACT ASSESSMENT
OXFORD CASINO RESORT
ROUTE 26 – OXFORD, MAINE

INTRODUCTION:

This purpose of this study is to characterize the hydrogeology of the site and assess the impact to groundwater quality caused by on-site subsurface wastewater disposal. The site is located on the southwest side of Route 26, immediately north of Rabbit Valley Road, Oxford. Site development will occur in two or more phases. The first phase involves a casino and restaurant and future phases will include an expanded casino and a hotel. Data used for this project includes a preliminary plan set, high intensity soil survey completed by Main-Land Development Consultants, Inc. (Main-Land) and available geological publications.

Information regarding the effects of this development on groundwater quantity are presented in a separate report by Sweet Associates entitled *"Groundwater Supply Feasibility Analysis,"* dated December 2010. Four test borings were completed on this site to obtain more detailed information about the depth to bedrock and the hydraulic properties of an overburden aquifer; this information is summarized in this report and detailed information can be found in a report by Sweet Associates entitled "*Hydrogeological Investigations and Wastewater Mounding and Transmission Analysis,*" dated December 2010.

SUBSURFACE WASTEWATER DISPOSAL SYSTEM:

The first phase of site development will be served by a subsurface wastewater disposal system with a design flow of 22,395 gallons per day, as shown on the site plan in Appendix A. The proposed subsurface wastewater disposal field consists of 1,728 B43 Eljen In-Drain Geotextile Sand Filter modules arranged in two sub-fields of 18 rows by 48 units with 2 feet of separation between rows (88 feet by 192 feet). The two sub-fields are approximately arranged along the same elevation contour and separated by 10 feet along the contour. The total footprint of the disposal field is 88 feet by 394 feet (34,672 square feet).

Strictly based on the total number of Eljen In-Drain units, the maximum potential design flow of the disposal field is 25,135 gallons per day. The maximum potential design flow is used for all calculations to accommodate the design flow associated with any changes in use or minor expansions.

GEOLOGICAL AND HYDROGEOLOGICAL SETTING:

The site is located on the *U.S.G.S. Mechanic Falls, Maine Quadrangle 7.5 Minute Series*. The locus map included in this report (Appendix A) is adapted from that publication. The *Surficial Geology Map of the Mechanic Falls Quadrangle* (Appendix A) shows that the site is situated on a prominent north-northwest trending glacially-streamlined hill situated between the Little Androscoggin River basin to the north and east and Whitney/Hogan Ponds basin to the west. The top of the hill is at an elevation of 530 feet above mean sea level (MSL). The base of the hill and the beginning of the Little Androscoggin River and Hogan Pond basins occurs at an approximate elevation of 350 feet above MSL.

The site is underlain by lodgement till that is locally overlain by a thin layer of wind-blown sand deposited by the prevailing westerly winds after the late-glacial sea level regressed from the area and exposed fine-grained sandy marine sediments in the basins to wind erosion. Surficial materials in the Whitney/Hogan Ponds basin are characterized by a central esker surrounded by glaciofluvial and glaciomarine deposits consisting of sand, silt and gravel delta deposits graded to the late-glacial sea level. Surficial materials in the Little Androscoggin River basin are primarily composed of similar glaciofluvial and glaciomarine deposits that have been reworked in places by the Little Androscoggin River. The *Significant Sand and Gravel Aquifer Map of the Mechanic Falls Quadrangle* (Appendix A) shows that the site is located between a large Significant Sand and Gravel Aquifer located in the Little Androscoggin River basin and the Whitney/Hogan Ponds basin.

The soils in the vicinity of the proposed subsurface wastewater disposal area on-site are classified as Becket fine sandy loam, Skerry fine sandy loam and Colonel fine sandy loam according to the high-intensity soil survey completed by Main-Land. The depth to the seasonal high groundwater table on-site is at least 15-inches below the ground surface. The depth to the hydraulically restrictive layer ranges from 2 to 3 feet below the ground surface.

The hydraulic conductivity of the fine sandy loam topsoil ranges from 1.2 to 4 feet per day (ft/day) based on values listed in the *Oxford County Soil Survey*. The average hydraulic conductivity of the low permeability hardpan ranges from 0.2 ft/day near the surface to 0.0379 ft/day at depth, according to slug tests completed on monitoring wells constructed in the vicinity of the proposed wastewater disposal area. The estimated overall thickness of the overburden aquifer on-site ranges from 20 feet along Route 26 to 50 feet in the western portion of the site.

The direction of near-surface groundwater flow is west and downslope towards Hogan Pond. The average ground surface slope upslope and downslope of the disposal field is 6.5%, based on existing grade contours shown on the site plan. The hydraulic gradient is considered to be half of the average topographic gradient upslope and downslope of the disposal field. The disposal field is located approximately 880 feet from the down-gradient property line.

GROUNDWATER CONTAMINATION POTENTIAL FROM SEPTIC SYTEMS:

It is assumed that the worst potential for contamination is the nitrate-nitrogen (NO_3-N) released from wastewater disposal fields. NO_3-N is known to cause methemoglobinemia in infants and is a suspected cause of stomach cancer. The average NO_3-N concentration value of untreated septic tank effluent entering a disposal field is assumed to be 40 mg/L. The Federal and State Drinking Water Limit for

NO_3-N in public water supplies is 10 mg/L. In the Town of Oxford, the concentration of NO_3-N in groundwater at the property boundary cannot exceed 10 mg/L.

The background concentration of NO_3-N in groundwater on-site was determined as part of this assessment. Groundwater samples were collected from four monitoring wells (MW-1D, MW-1S, MW-2 and MW-3) that were installed to characterize the hydraulic conductivity of the overburden aquifer near the proposed wastewater disposal area. The sample collected from monitoring well MW-1D represents deep groundwater in the overburden aquifer (35.67 to 47.67 feet below the ground surface). Samples collected from monitoring wells MW-1S, MW-2 and MW-3 represents shallow groundwater in the overburden aquifer (1.84 to 18.84 feet below the ground surface). Samples were collected shortly after each well was developed using a submersible pump. All groundwater samples contained a concentration of less than 0.05 mg/L NO_3-N (Katahdin Analytical Services, Appendix A). The background concentration of NO_3-N in groundwater is considered to be insignificant (0.0 mg/L) for following groundwater quality impact analysis.

The primary mechanism of NO_3-N concentration reduction is through dilution in groundwater and surface water. An analytical model (Baetsle 1979; Chang, *et al.* 1998) was used to calculate a maximum disposal field design flow that will not increase the concentration of NO_3-N above 10 mg/L at the downgradient property boundary. The proposed 25,135 gallons per day (gpd) disposal field serving the first phase of development is approximately 880 feet from the downgradient property boundary. If the wastewater contains 40 mg/L NO_3-N (untreated wastewater), the maximum design flow is 5,500 gpd. If the wastewater contains 20 mg/L NO_3-N (traditional advance wastewater pre-treatment), the maximum design flow is 11,000 gpd. The results of groundwater contaminant modeling indicate that the proposed 25,135 gallons per day septic system must have an advanced wastewater pre-treatment system capable of reducing the concentration of NO_3-N in wastewater to less than 10 mg/L.

CONCLUSIONS:

Based on the results of groundwater contaminant modeling, the proposed wastewater disposal field serving the first phase of this development will require an advanced wastewater pre-treatment system capable of reducing the concentration of nitrate-nitrogen (NO_3-N) in wastewater to less than 10 mg/L. Advanced wastewater pre-treatment systems manufactured by Aeration Systems, SeptiTech or AquaPoint are locally available.

We conclude that if the wastewater entering the subsurface wastewater disposal field contains less than 10 mg/L nitrate-nitrogen then the concentration of nitrate-nitrogen in groundwater at the downgradient property line will be less than 10 mg/L.

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REFERENCES

Baetsle, L. H., 1969, *Migration of Radionuclides in Porous Media*, Progress in Nuclear Energy, Series XII, Health Physics, A.M.F. Duhamel (ed.), Pergamon Press, Elmsford, N.Y. pp.707-730.

Chang, Tan-yuch, Winkley, W., Montgomery, J., *Utilizing Baetsle's Equation to Model the Fate and Transport of MTBE in Groundwater*, Proceedings of the Petroleum Hydrocarbons and Organic Chemicals in Ground Water Prevention, Detection, and Remediation Conference, 1998, Houston, TX.

Maine Geological Survey, Mechanic Falls Quadrangle, Maine, Significant Sand and Gravel Aquifers.

Maine Geological Survey, Mechanic Falls Quadrangle, Maine, Surficial Geology.

Maine Geological Survey, Mechanic Falls Quadrangle, Maine, Surficial Materials.

United States Geological Survey, Mechanic Falls (Maine) 7.5' Quadrangles 1:24,000, Topographic Map.

SECTION 21. AIR EMISSIONS:

A potential source of air emissions is the generation of dust during the actual construction process. Erosion Control practices will be employed to combat dust.

The building heating system will emit some air pollution, but less than the 10,000,000 Btu threshold requiring a license. The facility currently plans on propane for heating fuel.

Attachment 1

Wetlands Delineation Report

Oxford Resort Casino
Rt. 26 and Rabbit Valley Road
Oxford, Maine

Introduction

Oxford Resort Casino is a development proposed for location on an approximately 97.3-acre parcel located on Rt. 26 and Rabbit Valley Road in Oxford, Maine (see attached location maps). Among other environmental studies, a wetland identification and delineation study was conducted on this property by Timothy Gallant of Main-Land Development Consultants, Inc. and by Kenneth Stratton of Stratton Associates. Given the size of the parcel, the delineation process took several days, beginning on August 5, 2010 and concluded with a final field review on November 7, 2010. This final review was made by Kenneth Stratton to re-examine and verify the delineation work once leaves were off the trees and ground vegetation, especially heavy fern growth, had died back for the season. The micro-topography and subtle changes in ground conditions were more obvious and therefore more accurately determined in the late fall period. Photos 10 and 11 (attached), taken in the same area, illustrate this point. In addition, soil conditions were closely examined by means of numerous back-hoe test pits supplemented with borings made with a screw-type hand auger.

The wetland identification and delineation was completed in accordance with the ***1987 Federal Manual for Identifying and Delineating Jurisdictional Wetlands***. The boundaries of all located wetlands were flagged at intervals of 20 to 30 feet, on average, and the flagged points were located by GPS readings. For all delineated wetlands, the three required indicators - presence of hydrophytic vegetation, hydric soil conditions, and hydrologic connections - were observed and noted. A total of 12 separate wetland areas, labeled from "A" to "L", were found and delineated. The wetlands range in size from 2.7 acres for wetland A to 0.04 acres for wetland F, and they are all shown on a plan of the total parcel prepared by Main-Land Development Consultants, Inc.

During the periods of field work on this parcel, Stratton and Gallant looked for possible vernal pool sites. Given that most of the field work was conducted mainly in late summer when ground water levels were down, reliance was made on identifying the topographic characteristics for a vernal pool, mainly depressions on the landscape which showed some indication of having standing water. No such areas were found. Even in the late fall period following days of heavy rain, no pools of standing water, having characteristics that might suggest a vernal pool, were found.

General Characteristics of Project Lands

As a basis for understanding the character of the identified wetlands on this subject property, it is important to begin with an overall view of topographic and soil conditions. Oxford Resort Casino is proposed for location at the top of Pigeon Hill, and therefore is positioned at the top of that watershed area. The project site does not receive waters from any other upslope source. Next, the topography of this property is mainly that of a mostly smooth, gently sloping land surface. The highest portion of this tract is along Rt. 26 and falls away gently toward the west as shown on the topographic map in the application.

Next, the underlying soils have formed in deep, sandy loam to loamy sand basal glacial till. For the most part, the upper portion of these soils is quite permeable, allowing for good drainage. A high intensity soil survey completed by Darryl Brown of Main-Land Development Consultants, Inc. provides a detailed picture of the soil series found on project lands. Among other soils, Brown identified and mapped the Brayton soil series, a poorly drained soil with hydric conditions. All identified wetlands are found on the Brayton soils.

Wetlands were found in those areas where the otherwise gently sloping land surface becomes flatter and drainage (both surface and subsurface) is slower. Water levels are higher in the soils of such locations, especially during wet periods in the spring and fall seasons.

In terms of vegetative cover, the approximately upper 25% of the parcel has been cleared and actively farmed for many years. A wide variety of crops are produced - a clear indication of the high quality of soils and drainage conditions. The westerly portion of the land is fully forested, primarily with mature and near mature stands of white pine, oak, beech, and hemlock. Upland areas around the wetlands are mostly comprised of these forest species.

Identified Wetlands

Wetland A. This wetland is the largest (2.7 acres) of the 12 identified and was probably the most difficult one to classify as a wetland. Not because of a lack of key indicators, but because of the history of land use in and around the delineated bounds. The former owner of the property provided verbal information about past digging and land shaping efforts to enhance drainage from the agricultural fields. While there is evidence of pre-existing wetland conditions, site work done in the past by the farmer changed the character of that area such that it resembles a long drainage swale receiving surface runoff from upslope fields to the east and providing a drainage path for such waters toward the north. Even with that work having been done, there is no stream channel within this wetland. Obviously, the final decision was to recognize the wetland indicators and map the drainage line as a wetland. Wetland A has four distinct sections which are labeled as north, south, east and west. Each will be discussed separately beginning with A-South.

<u>A-South</u>. 0.28 acres in size. A-South is a forested wetland (Photo 1), with eastern hemlock being the predominant species. There are a few, scattered white pine, balsam fir and red maple trees. Because of a dense canopy, there is little in the way of an understory and ground vegetation. For ground vegetation, there are several species of ferns including the ostrich, sensitive and New York ferns (Photo 2). A-South runs from the point where a field road crosses the wetland, southward to Rabbit Valley Road. This section allows for drainage toward the south.

<u>A-East</u>. 0.85 acres in size. A-East is positioned between open fields to the east and forests on the west side. As shown in Photos 3 and 4, this section of wetland A has been periodically subjected to harvesting activities and the easterly side has lines of stones taken from the agricultural fields. Species harvested (based on an examination of stumps and sprouts) include ash, quaking aspen, and oak. Developing ground cover includes sensitive fern and spotted jewelweed. Drainage from this section moves toward the north. A-East runs from the field road crossing mentioned above, northward to the point where open fields border both sides of the wetland, a point where another field road (Photo 5) crosses the wetland to access both a large field and forest land to the west.

<u>A-North</u>. 0.51 acres in size. This section is the most northerly portion of wetland A, with fields on both sides (Photos 6, 7 and 8). Like A-East, this section also shows the results of periodic management. Harvested tree species include ash, oak, quaking aspen and emerging ground cover includes wetland grasses, sensitive fern and spotted jewelweed. In fact, spotted jewelweed has developed very dense growth in the northerly half of this section (Photo 8). In spite of the somewhat long run represented by sections A-East and A-North, there is still no stream channel within the wetland at the point where is crosses the project property line to the north. Again, the lack of a frequent and heavy runoff of drainage waters is likely due to the position of wetland A high in the watershed. There is just enough wetness in the soil in these sections to create hydric conditions.

<u>A-West</u>. 1.06 acres. Wetland A-West extends well into the interior of the parcel and is a forested wetland characterized by pit and mound micro topography (Photos 9, 10 and 11). The predominant overstory species are oak, quaking aspen and red maple. As Photo 11 shows, there is occasional balsam fir and shrub growth in the understory. Ground cover (Photos 9 and 10) is sparse in some locations, but heavy in others with a variety of fern species, mainly the sensitive, New York, and royal ferns.

Wetland B. 1.15 acres in size. The configuration of wetland B is very much like wetland A-South, East and North. It is a long, narrow wetland located within the landscape where the land surface flattens into a terrace-like shape. Both surface and subsurface flow of water is slowed, allowing a build-up of water in the soil profile and the creation of hydric conditions. The land surface has a pit and mound micro-topography (Photos 12 and 13). This is a forested (mostly softwood species) wetland with trees of varying ages. Species include hemlock, balsam fir, white pine, yellow birch, gray birch and, infrequently, white birch. They form a dense canopy, allowing very little light onto the forest floor for growth of shrubs or herbaceous species. Wetland B begins at Rabbit Valley Road on the south side of the parcel and extends northward halfway across the property.

Wetland C. 1.635 acres in total size. This area is similar to wetland A in that it has three distinctly different sections which should be described and discussed separately.

C-East. 0.48 acres. C-East closely resembles A-West. It is a forested wetland composed of an open stand of quaking aspen, oak, ash, maple and the occasional yellow birch and hemlock. There is an amount of shrub growth - witch hazel - along the wetland boundaries (Photo 14). Pit and mound micro-topography characterizes this area, and while being fairly flat, does have an overall slope downward to the west. Ground cover includes the same variety of fern growth found in A-West.

C-North. 0.77 acres. This section of wetland is a somewhat open and forested wetland (Photo 15) that has the same characteristics as does C-East. The primary differentiating feature with this wetland is that surface drainage moves northerly and westerly to the north property line of the project tract. Wetland C overlaps a small drainage divide, with surface runoff moving northwesterly (wetland C-North) and westerly (wetland C-West).

C-West. 0.385 acres. Wetland C-West begins at a small watershed divide and runs southerly for a short distance before turning to the west, making up a drainage line which leads to wetland D (Photo 16). The upper portion of C-West has pit and mound topography and species composition similar to C-East. But, as the wetland runs westerly and the slope increases, coniferous species - hemlock, balsam fir with some white pine - become the predominant forest cover. Witch hazel shrub growth decreases as does the amount of herbaceous ground cover. For the first time within the property bounds of this project, a small stream develops and is found at the very end of this wetland section.

Wetland D. 0.385 acres in size. The upper (easterly) section of this wetland is a spot where the stream drainageway broadens, and growth of witch hazel begins again. In addition to a cover of ferns, there is also a growth of moss, especially sphagnum, over the ground surface. This part of wetland D looks like the area in Photo 15, but with the addition of the mosses. The westerly side of the wetland is that of a narrow stream valley with the coniferous growth again becoming the predominant forest cover.

Wetlands E, F, G and H. Four small wetlands which total 0.49 acres in size. Photo 17 is a view within wetland E and it typifies the site/wetland characteristics of all four of these small wetlands, the smallest (wetland F) being 0.04 acres in size. Each one is located in a landscape position where the slope westward flattens, allowing subsurface water to accumulate within the soil. As can be seen in Photo F, they have pit and mound topography and the vegetation (immature maple, yellow birch, ash) changes from coniferous species in the surrounding upland. While existing as separate wetlands, they do form a pattern or "drainage chain" moving downslope and westward. Unlike some portions of wetland D, these wetlands lack the moss growth but do have an array of ferns as in wetland C.

Wetlands I, J, K and L. A second group of four similar wetlands, each one small in size, but together totaling 0.69 acres. These wetlands are found in that portion of the landscape where slopes have become somewhat steeper and more pronounced drainage valleys have begun to form. Still, the only stream present is that flowing through wetland D. Each of the four wetlands is a forested wetland within heavy, mature stands of hemlock and white pine. There is little growth in the understory of these stands and virtually no ground cover. The one exception is a small area (about 800 square feet) within wetland L, and that pocket supports a growth of cattails.

Summary of Delineation

The wetland investigation which was conducted on the 97.3-acre project land of Oxford Resort Casino did result in the identification and delineation of 12 separate wetland areas. With the exception of portions of wetlands A-East and A-North, these wetlands are all forested wetlands. Each identified wetland does contain the three important and key indicators for wetland establishment: hydrophytic vegetation, hydric soils and a hydrologic connection. All together, these 12 wetlands total 7.055 acres or about 7.25 percent of the total parcel. The wetlands are shown on a plan of the Resort property, and attached photos provide a depiction of conditions within those wetlands.

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December 13, 2010

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KENNETH G. STRATTON
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Timothy Gallant, PLS 2434
December 13, 2010

Photo 1. View south to Rabbit Valley Rd. across wetland A-South. 8-22-10

Photo 2. Fertile fronds of the Ostrich fern in wetland A-South. 11-19-10

Photo 3. View north along wetland A-East. Open field to the right. 11-7-10

Photo 4. View south across wetland A-East. Open field to left. 11-19-10

Photo 5. Field road crossing wetland A-North. View to east. 8-22-10

Photo 6. View to north along wetland A-North from field road. Fields on both sides. 11-7-10


Photo 7. View to northerly property along wetland A-north to property line. 11-19-10


Photo 8. View south along wetland A-North from north property line. Note Spotted Jewelweed. 8-22-10

Photo 9. View easterly from within wetland A-West toward open field. 8-16-10

Photo 10. General view within wetland A-West. 8-22-10

Photo 11. General view within wetland A-West without leaf cover. Note pit and mound topography. 11-19-10

Photo 12. View to SE across central portion of wetland B. Pit and mound topography. 11-19-10

Photo 13. View to NE across central portion of wetland B. Pit and mound topography 11-19-10

Photo 14. General view within wetland C-East. Pit and mound topography. 8-16-10

Photo 15. View northerly and downslope in wetland C-North. Witch hazel shrubs. 8-16-10

Photo 16. View to SW into wetland C-West. Beginning of drainage line leading to wetland D.
8-16-10

Photo 17. General view of wetland E. Wetlands F, G and H are similar. 8-16-10

STREAM

Wetland Function-Value Evaluation Form

Wetland I.D. D
Latitude 44°06'50.56" Longitude 70°27'01.54"
Prepared by: KGS Date 12/10/10
Wetland Impact:
Type None Area —
Evaluation based on:
Office ____ Field ✓
Corps manual wetland delineation completed? Y ✓ N ____

Total area of wetland 0.38 Ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Woodlot Distance to nearest roadway or other development 800'

Dominant wetland systems present PFO6Bn Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? Yes If not, where does the wetland lie in the drainage basin? —

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	✓		2,4,6,7,12,13	✓	wetland of special significance
Floodflow Alteration	✓		3,5,9,13		Functions limited by small area of wetland
Fish and Shellfish Habitat		✓	Not Applicable		Watercourse does not support fish
Sediment/Toxicant Retention	✓		1,2,6,10,13	✓	Functions limited by small area of wetland
Nutrient Removal	✓		3,4		Small, narrow wetland along watercourse
Production Export		✓	Not Applicable		Species not high food producers
Sediment/Shoreline Stabilization	✓		2,3,4,7,14	✓	Function limited by small extent of wetland
Wildlife Habitat	✓		1,2,3,4,5,7,8		Function very limited by small size
Recreation		✓	Not Applicable		Small size of wetland; no public access
Educational/Scientific Value		✓	Not Applicable		No unique/special features present
Uniqueness/Heritage		✓	Not Applicable		No special features present
Visual Quality/Aesthetics		✓	Not Applicable		Very small area within woodlot
ES Endangered Species Habitat		✓	Not Applicable		None present
Other					

Notes:

* Refer to backup list of numbered considerations.

ALTERNATIVES ANALYSIS

Oxford Resort Casino

Route 26, Oxford, Maine

Revised February 22nd, 2011

INTRODUCTION:

BB Development LLC is proposing the construction of a Resort Casino that will house a restaurant and casino on land located on the northwest corner of Rabbit Valley Road, and Route 26 in Oxford. The applicants for this project went through an exhaustive search of properties along the Route 26 corridor in the Town of Oxford before landing on the project site.

Site Location:

The location for the Oxford Resort Casino was limited by the wording of the referendum and current state law. Specifically: the Oxford Resort Casino must be in Oxford County, at least 100 miles from another casino, within 30 miles of a Level I or Level II trauma center, within 15 miles of the main office of a county sheriff, within 25 miles of the main office of a State Police field troop (Gray), within 30 miles of an interchange of the interstate highway system (Gray), within 10 miles of a fire station, and within ½ mile of a state highway. The above distances are measured along the road, not direct horizontal distance.

The Oxford Resort Casino must also be situated on 50 acres minimum. The project scope at full build out calls for 2000 +/- parking spaces, large buildings, and 3 acres of septic field. Most of the 50 acres needs to be relatively flat and buildable.

The above stipulations thus limit the location of the Oxford Resort Casino to southern Norway, southern South Paris, or the Town of Oxford. Given the development levels on the major road corridors already present in southern Norway and South Paris, a suitable 50 acre site wasn't found. Therefore, the site search focused in the Town of Oxford.

Suitable sites have other criteria as well. The Town of Oxford has zoning which effectively limits this type of development to along Route 26. The town does not have public sewer capability at this time. Many locations in Oxford are on gravel aquifers, have very shallow groundwater, or other soils restrictions that make larger-scale septic systems problematic. Therefore, good soils are a necessity. Lastly, the 50 acre minimum may be statutory, but is also a matter of practicality; 100 acres is preferred due to the scope of the project.

The applicant then considered over a dozen properties. Many were discarded due to small size. Others simply were not available for sale at a fair market price. Finally, the selection process was narrowed down to three sites.

One site is located just south of Welchville Junction – the intersection of Route 121 and Route 26. The project site has ample frontage on Route 26, and has frontage on the Little Androscoggin River. Site topography on the upland portions of the project contains steep slopes that would require significant earth moving activities, but the location (so close to the two major routes) warranted additional investigations. Upon closer examination of the site, the presence of a significant amount of floodplain wetlands, along with forested wetlands outside the floodplain, created environmental hurdles that the applicant believed would be difficult to overcome. This site also contained one area that was a potential significant vernal pool.

The second site is located in this same general region along Route 26 and was further investigated. By location, this was the favored site, and had already been used for commercial endeavors. However, floodplain wetlands and forested wetlands predominated the undeveloped portions of the site which would be needed for this project. Also, soil conditions did not prove favorable for the installation of a significant subsurface wastewater disposal system.

The exact locations of the alternate sites that have been investigated have not been disclosed to protect the land owners of these parcels.

The third site was chosen for this application.

The proposed location is in southern Oxford, on Route 26 and Rabbit Valley Road. The proposed site is at an intersection, making access into the project site very favorable. The site contains 97.3 acres of moderate to flat slopes and has excellent soil characteristics. A significant portion of the site to be developed is in existing farmed fields, making site impacts significantly less than working a fully wooded site. Also, the main wetland impact on site is a wetland with low functions and values, given their location at the edge of the farmed fields, and given their vegetative condition.

Real estate and particularly commercial real estate is all about location. The proposed project site is the ideal location for the activity proposed. It provides easy access on a major State route. It provides views to the western mountains and to the Presidential Range. It requires only limited wetland impacts, with most of those impacts taking place in wetlands that have already been altered by past farming practice.

Avoidance/Minimization:

AVOIDANCE:

Initial site designs by the project architect, drawn without knowledge of the wetlands within the site clearly show that, in the initial design phase of this project, the wetlands closest to Route 26 and Rabbit Valley Road (Wetland A) would have essentially been removed. Once the wetlands were delineated, major adjustments to the site design were made to avoid wetlands to the fullest extent practicable.

The building and the parking areas were moved from the center of the project site to the extreme southerly side of the property. This modification to the site design eliminated wetlands impacts to Wetland-A-North and Wetland-A-West.

Also, as part of the effort to avoid wetland impacts, a proposed employee parking area was eliminated completely from the westerly portion of the proposed developed area. This eliminated impacts to the southerly portion of Wetland-B.

Even with these significant site plan changes, wetland impacts proved to be unavoidable.

MINIMIZATION:

The applicant has employed a number of techniques to minimize the wetland impacts on the site. First, the applicant has incorporated an armored slope condition in the locations adjacent to the proposed building, to keep the fill extension from the building foundation out of the adjacent wetland (Wetland-A-West). This same technique has also been used on the road fill section adjacent to the wetlands (also Wetland-A-West), to reduce the overall footprint of fill within the wetland areas. These slopes have been designed at a 2:1, horizontal to vertical slope, intended to limit the size of the footprint of fill in the wetland.

The applicant also restructured the collection and treatment of stormwater, and altered the design of the retention ponds to eliminate or reduce wetlands impacts.

Initial site designs would have required the impact of approximately 2.25 acres of wetlands. The application presented as part of this package has approximately 42,430 square feet of wetlands impacts. These avoidance and minimization techniques resulted in a reduction of 1.27 acres of wetland impacts.

Please note, once again, that future areas are not part of this permit, but shown only for reference. Future impacts are anticipated, and will be applied for at that time.