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To: David Ford
From: Thomas Page, P.E.
cc: Dave Mercier, Keith Pratt
Date: June 3, 2014
Re: WOLFEBORO – Spray Site Preliminary Field Investigations

UE File No: 1813.00

This memo summarizes preliminary field reconnaissance of the Town parcel in and around the existing spray fields. The work was authorized by Task 2 of the contract dated December 2013 "Final Effluent Disposal Investigations Expanded Alternatives. The purpose was to identify potential areas for drip dispersal and plan for subsurface investigations.

I toured the spray areas on the afternoon of 4/17/2014 with Russ Howe, Operator, followed by full days on 4/24/2014 and 5/5/2014. Potential interferences to drip dispersal that were observed were approximately located using a handheld GPS receiver. Work plans developed under the previous desktop study by UE were updated based on recent findings (see attached work plans)

Field Observations

- Leaves were not yet out, aiding visibility, but travel was often difficult off of existing trails due to vines and other underbrush.
- Wet areas with saturated soils or ponded water limit the use of many areas for subsurface disposal. Several wet areas were documented in previous reports (Hydrogeological Evaluation of Spray Irrigation Facility Wolfeboro, New Hampshire, S W Cole Engineering Inc., June 29, 2006). The wet areas had been thought due to spray application of effluent at a significantly higher rate than is currently used. However, UE's current observations confirmed wet areas in the same locations although spray was not initiated until the beginning of May this year.
- The open area east of the Effluent Storage Pond (ESP) has potential for a drip dispersal zone, near the existing pump stations. The lower wooded section paralleling the road appears too rocky. Concerns with the open field are that the soils consist of fill with unknown properties and there are four "toe drains" that need to be avoided.
- The north section of former Spray Area 3 has a limited area of higher ground with potential for drip zones, but the terrain is uneven and appears to be nearly surrounded with saturated soils.



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- The north section of Spray Area 4, which has been discontinued for spray, is not feasible for drip dispersal due to surface runoff and ponding. Between this area and Spray Area 5 above, the ground is strewn with boulders and water runoff could be heard or seen from Spray Area 5 above.
- In and around the northwest section of Spray Area 5, currently inactive, there appears to be more favorable topography with forest cover where drip zones may be located. However, this area is divided by a stream which appears to flow toward Abenaki Pond below. The area is limited by the ski slope to the north and property lines to the west.
- Above Spray Area 5, to the south, is the highest ground on the Town property. Conditions appear too rocky and uneven for drip installation. Rock outcrops appear numerous. Water pools in a large area along the Spray Area 5 header pipe below, draining either north toward Abenaki Pond or East through Spray Area 4.
- On the north side of the ESP, the Interceptor half-pipe discharges a significant flow through the former Spray Area 3.
- On the slopes above the ESP, to the west, much of the soils appear saturated, with streams running through the woods to the Interceptor above the pond. Further investigation is needed to see if there are areas with enough depth to groundwater to support drip dispersal.
- To the south of the ESP exists some land above Spray Area 2 that is currently un-used. However, conditions appear unfavorable for drip dispersal due to outcrops as well as discharge from the Interceptor and other surface flow. Further investigation is needed to confirm if there are areas to support drip dispersal.
- The final area considered was the former sludge compost area near the WWTF, much of which does not appear feasible for drip dispersal. There is a limited open area with fill of unknown properties where a zone may be potentially sited. Adjacent to the access road is a large hill presumed to be fill and debris. Closer to the WWTF, the terrain is rough and strewn with boulders. The "Internet" ski trail passes through, connecting the trails on the Town site to other trail systems to the south.
- On May 5, 2014 effluent was intermittently sprayed in Areas 2, 4, and 5. UE observed active spray operation in a portion of Zone 4. Spray nozzles appeared to be generally directed to avoid existing ponded areas. The ground surface generally appeared to be satisfactorily accepting effluent. The operator indicated some adjustments in Zone 2 are anticipated.

Potential Drip Dispersal Capacity

Due to the limiting site conditions observed on the Town parcel, the potential number of drip zones is revised downward from up to 27 zones in the previous desktop study to approximately 10 zones. These locations are:

- North of former Spray Area 3 (up to 2 zones)
- Northwest of Spray Area 5 (up to 6 zones)
- Field area above the Spray and RIB pumping stations (1 zone)
- Former sludge drying beds near WWTF (1 zone)

Most of the potential areas are remote from the existing pumping stations and would require long supply/return pipes to be installed.

Based a loading rate of 0.15 gpd/sf to 0.3 gpd/sf and drip zones of approximately 28,800 SF, the potential total capacity is potentially 43,000 to 86,000 GPD (16 to 32 MGal/year). The lower range loading rate is recommended until additional subsurface investigations are completed.

Capacity needs are as follows, assuming the RIBs are discontinued:

	Effluent Flow MGD, average	Effluent Flow MGal/year
WWTF Design Flow	0.6	219
Spray permitted application (note 1)	0.166 (6 months only)	30.4
Additional capacity needed	0.43	189

Note 1: May be possible to increase permitted spray capacity to 47 MGal/year. Refer to Dextember 3, 2012 letter report by UE.

Summary

- Pending further investigations, feasible drip zones appear limited at the existing Town site.
- The remote sites and limited areas would be relatively costly to install.
- Additional properties must be considered to provide sufficient capacity.

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- Review of alternative disposal properties is recommended before further subsurface investigations (test augers, test pits, hydrogeological modeling) are performed at the existing Town site.