



Memorandum

To: Calvin Bonenberger, Town Administrator

*From: Rachel Kirkham, P.E.
David Stewart, P.E., BCEE*

Date: February 2, 2012

Subject: Rising Sun Water System - Evaluation of Groundwater Recharge Land & Well Development to Augment Supply

The Town of Rising Sun was presented with the opportunity to acquire additional land outside of the town limits to increase the land available for groundwater recharge. CDM Smith was asked to determine the impact that the additional parcels would have on augmenting the Town's water supply, and the findings are summarized herein.

Groundwater Recharge Potential of County Parcels

Five parcels were identified for possible incorporation into the town, which will be referred to as Parcels 32, 111, 112, 351, and 699. Parcel 32 is located south of town, while the other four parcels are located to the west of town. Figure 1 depicts the parcels in relation to the town's drainage area, as designated by the Maryland Department of Environment (MDE).

CDM Smith corresponded with Cindy Latham of MDE to determine how the identified parcels would impact the town's current water supply. Parcel 32 is the only parcel located within the town's existing drainage area. This parcel could be utilized to augment the water supply of the existing wells with an additional 28,497 gallons per day (gpd). However, based on information provided by the town this would not be feasible without expansion of the existing water supply system.

The other four parcels are located in a separate drainage area to the west of the town's drainage area. In order to benefit from the four parcels outside of the town's existing drainage area, the town would need to develop additional wells within this area of the watershed. Those four parcels would provide a total of 145,975 gpd of groundwater recharge assuming they remain undeveloped.

Table 1 shows the size of each parcel, the potential groundwater recharge from each parcel, and whether or not the parcel is located within the town's water supply drainage area. The groundwater recharge estimates are based on undeveloped land with minimal impervious area. If

the parcels are developed the recharge estimates would be reduced substantially. So for the purpose of this evaluation it is assumed that the parcels will not be developed.

Table 1: Groundwater Recharge Potential of Identified Parcels

Parcel Number	Area (acres)	Groundwater Recharge Estimate (gpd)	Located in Town's Current Water Supply Drainage Area
32	94.3	28,497	Yes
111	226.8	68,511	No
112	206.1	62,248	No
351	32.6	9,843	No
699	17.8	5,373	No
Total	577.6	174,472	

Existing & Future Water Supply

The town currently has five water supply wells with a permitted annual average groundwater withdrawal of 260,000 gpd.

The town has been evaluating alternatives to increase its water supply capacity to match the capacity of the town's new 500,000 gpd Wastewater Treatment Plant. The town's water allocation would need to be increased to 550,000 gpd on an average daily flow basis. This will require development of additional wells, development of a surface water source, or connection to another water system, in order to provide the additional 290,000 gpd.

Additional Recharge Land

One of the water supply development options would be for the town to acquire additional land for groundwater recharge and develop new wells. The town would need to increase its recharge land by approximately 967 acres to support appropriation of 290,000 gpd of groundwater withdrawal capacity. In addition to the parcels discussed earlier, the town would need to acquire another 390 acres of undeveloped land to provide adequate recharge land. Assuming the town could obtain the land or rights to the water recharge attached to the land for \$10,000 per acre, a total of \$3.9 million would be required. This does not include the original five parcels that were offered for purchase.

Well Development Cost

Assuming that each new well would yield an average of 50,000 gpd, based on performance of the town's existing wells, the town would need to develop a minimum of six additional wells. For the purpose of this evaluation, it is assumed that six new wells would be developed as well as the Legion Well.

The cost to develop each well is estimated to be \$2.1 million. The work required to develop each well includes performing well exploration, siting, drilling, capacity and water quality testing, hydro reporting, appropriation permitting, well house design and construction, and extending water main to connect to the town's water system. The cost breakdown for each well is provided in Table 2. For the six new wells the total cost would be \$12.6 million. The well house design and construction for the Legion Well is estimated to be another \$600,000.

Table 2: Well Development Cost Summary

Task	Cost
Exploration	\$16,000
Well Siting	\$10,000
Well Drilling & Testing	\$116,000
Hydro Report & Appropriation Permitting	\$20,000
Well House & Water Main Design	\$110,000
Well House Construction	\$530,000
Well House Construction Management & Inspection	\$53,000
Water Main Construction (<i>assumed 5,000 LF on average</i>)	\$750,000
Water Main Construction Management & Inspection	\$75,000
Contingency (25%)	\$420,000
Well Development Cost (per well)	\$2,100,000

Well Development Schedule

The Legion Well could be designed, constructed, and brought online in about 18 months. However, based upon the following timetable, it will take about four years to identify, design, and construct the new wells.

- Well Exploration: 6 months
- Well Siting: 6 months
- Well Drilling & Testing, Hydro Report, & Appropriation Permitting: 12 months
- Well House & Water Main Design and Permitting: 9 months
- Well House & Water Main Construction & Start of Service: 15 months

It is unlikely that the town would construct more than a few wells simultaneously, so for planning purposes it is assumed that were the town to pursue this course of water supply capacity expansion, three new wells would be developed by 2016. The remaining three new wells could be developed by 2018.

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Summary

Based upon the high capital cost to acquire additional land and develop multiple new wells and the long schedule for well development, augmenting the additional groundwater supply with more recharge land and wells is not a practical solution to expand the town's water supply capacity especially when matched with the urgency of the demand for additional supply.

cc: J. Gullo

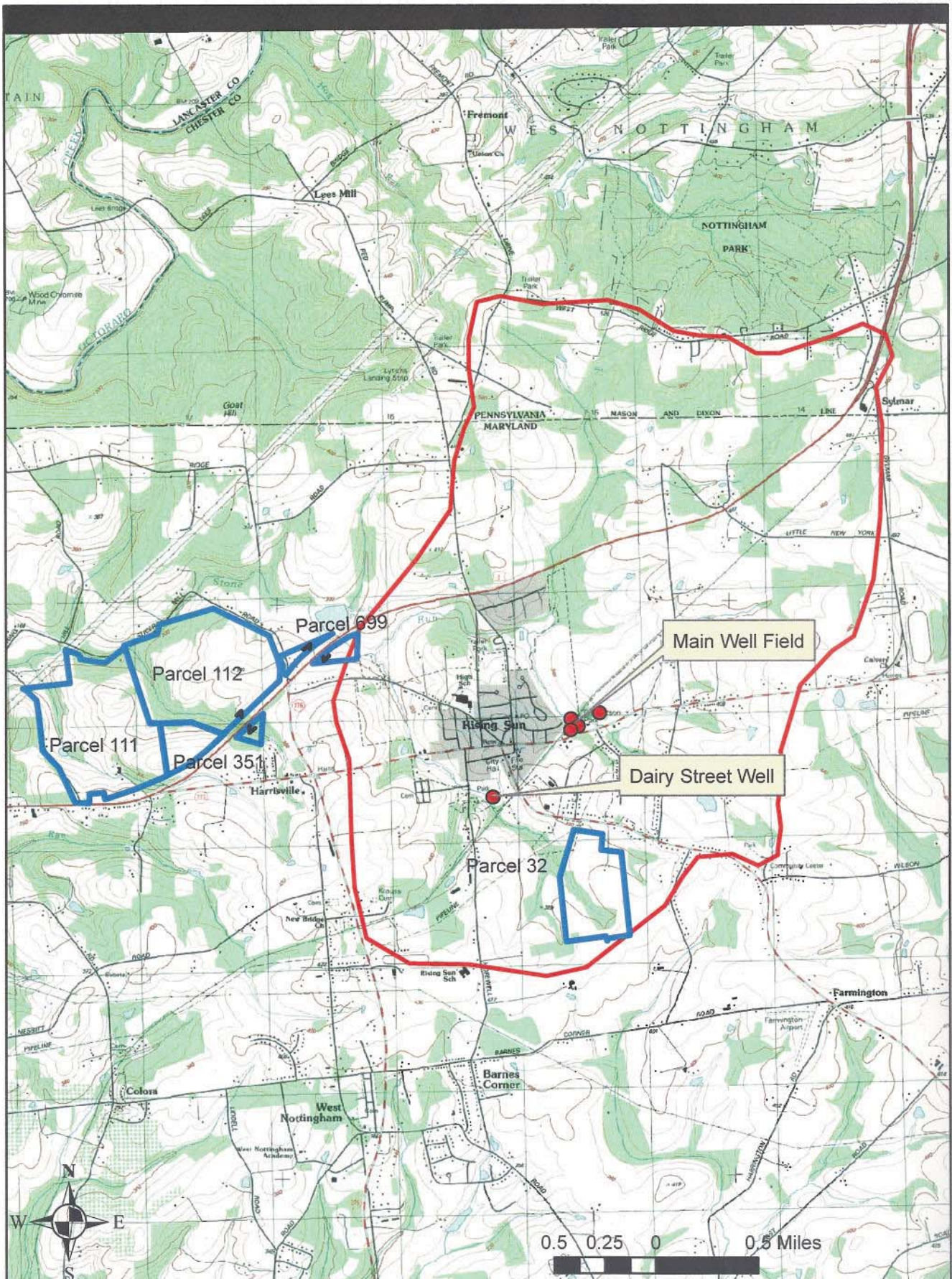


Figure 1: Rising Sun Drainage Area