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Memorandum

To: Ken Schwartz
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Date: August 21, 2002

Project No.: 0815700

From: Colleen Collins
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Re: Symmes Hospital - Preliminary
Infrastructure and Soil Conditions
Assessment

INFRASTRUCTURE AND SOIL CONDITIONS ASSESSMENT

This memorandum summarizes the findings of a preliminary infrastructure assessment of the Symmes Hospital site, including a review of existing utility infrastructure services for the site and general existing soil conditions, as well as general design constraints and implications. The following areas have been outlined:

- Water Supply
- Sanitary Sewer
- Storm Drain
- Gas Service
- Electric Service
- Telephone
- Existing Soil Conditions and Bedrock
- Wetlands

Utility analysis is based on plans and information received from the Town of Arlington and from Sodexho Marriott, as well as anecdotal information. The following information was reviewed:

- *Symmes Topographical Survey of Existing Site* prepared by Shepley Bulfinch Richardson and Abbott, dated July 12, 1982
- *New Sewer & Related Work Nurse's Home to Summer Street* prepared by Kendall, Taylor & Co., Inc., dated July 31, 1974
- *Utilities Underground Plan* prepared by Shooshanian Engineering Associates, dated July 12, 1982, revised January 10, 1983
- *Topographic Plan of Land Belonging to Symmes Hospital* prepared by Norwood Engineering Co, Inc., dated May 14, 1990
- *Sewer Plan & Profile of Hospital Road* prepared by James M. Keane, Town Engineer, dated December 17, 1930
- *Plan & Profile of Storm Drain in Hospital Road* prepared by James M. Keane, Town Engineer, dated March 10, 1938

- *Board of Survey Plan & Profile of Hospital Road* prepared by James M. Keane, Town Engineer, dated June 1947
- Town Plans showing water, sanitary sewer and storm drain locations (Plate XII)
- *Wetland and Floodplain Overlay to Zoning Map: Town of Arlington* adopted April 1998.

An initial assessment of the site, based upon a review of the data provided, indicates that utility infrastructure in the area of the site appears adequate for the existing uses.

Wetlands

According to the *Town of Arlington Wetland and Floodplain Overlay Map*, there are no wetlands on the site and it is outside the floodplain.

Water Supply

Water service is provided by the municipal system and is a closed loop system. Water service in Arlington is provided by the Massachusetts Water Resources Authority (MWRA). There is a 6-inch water line that was installed in 1910 that runs from Summer Street up the abandoned Hospital Road¹ through the parking lot that provides service to the Nurse's building, and continues on to the main hospital buildings. There is also an 8-inch line that runs from Woodside Lane and appears to have been installed in 1963. There is a 1,000 gallons-per-minute (GPM) fire pump located in the north wing, which was added on in the early 1980s.

According to Ron Santosuosso, Town Engineer, there have not been water main breaks on the site. Fred Lamburn, Facilities Manager at the site, does not believe there have been issues with the water service. However, the integrity of the pipes should be investigated to determine if they are tuberculated, given their age. Future development may require that the pipes be replaced to offer a greater design life.

Current water usage based on meter readings received from the Town is approximately 360 gallons per day (gpd). Water usage calculated for the Hospital as it operated prior to 1999 is approximately 83,325 gpd. There is no hydrant flow data available.

Sanitary Sewer

The sanitary sewer from the site connects to the municipal system in Summer Street, at the intersection of Grove Street. The 12-inch line runs down the abandoned hospital road, which has since become overgrown. There is a possibility that roots and brush in the area may have penetrated the pipes. Plans dated May 14, 1990 show slopes for the existing sewer line to be as steep as 25 percent in some areas. Existing capacity of the pipes is approximately 5.8 million gallons per day. Sewage generation calculated for the hospital as it operated prior to 1999 is approximately 75,760 gpd. There is sufficient capacity in the sewer pipes for existing uses.

No sewer backups were identified during conversations with the town.

¹ The abandoned Hospital Road ran adjacent to the east end of the property frontage on Summer Street, traversed the site running west, and then traversed back east in the area of the existing lower parking lot to reach the top of the hill in the same alignment as the current Hospital Road.

Storm Drain

Stormwater is collected in catch basins located in each of the parking areas and along each of the two site entrances/exits. The existing storm drain in Hospital Road is reinforced concrete pipe. The pipes in parking areas are cast iron and reinforced concrete.

The upper parking area drains to Woodside Lane; the main parking area, the parking area associated with the Nurse's Building and Hospital Road drain to Summer Street. Both storm drain lines eventually discharge to Mill Brook via a 12-foot by 4-foot reinforced concrete culvert.

Capacity of the existing pipes in Hospital Road appears inadequate for the amount of impervious area on the site contributing to storm water runoff. Existing flow to this system from all the impervious area is approximately 22 cubic feet per second (cfs) for the 25-year design storm, and is based on a preliminary analysis using the rational method. The existing drain line in Hospital Road can carry approximately 12 cfs. This indicates that flows for larger storms bypass catch basin inlets and may run overland to the adjacent wooded area or down the roadway towards Summer Street. Overland flow may cause erosion. There is a small gully along the side of Hospital Road that appears to have formed from water running overland at high velocities.

Comments from neighbors indicate that Summer Street between Brattle Street and Hospital Road sees a "torrent" of water running down from Brattle Street, and that the flow of water running into Brattle Street from the driveway at 145 Brattle Street has been attributed to runoff from the Symmes site. Neighbors also indicate water seeping into their basements. It is unclear whether this is a result of groundwater conditions or overland flow. Snow melting may also contribute to the problem if the snow is piled along the edges of the site.

While no flooding on the site has been identified, downstream flooding along portions of Mill Brook have been identified by the Town. Flooding in Mill Brook has not been attributed to the Symmes site.

Capacity of the existing pipes draining to Woodside Lane appears inadequate to convey the contributing flows for a 25-year storm. Existing flows are approximately 18 cfs, based on a preliminary analysis using the rational method; the existing 12-inch pipes are undersized to carry the existing flow.

Gas Service

Gas service to the site is provided by Keyspan. A 2-inch high-pressure gas service runs up the abandoned Hospital Road from the gas line in Summer Street. When a development program is established for the site, gas lines should be evaluated for adequacy. The path the gas line takes has not been maintained; there may be issues with roots penetrating the pipe.

Electric Service

Electric service to the site is provided by Nstar via overhead wires. According to the *Property Condition & Engineering Assessment of Symmes Hospital* prepared by TWB Associates, dated September 28, 2001, electrical service to the main building is rated at 4,000 amps at 120/208 volts, 3 phase, 4 wire; the Nurse's Building is supplied by overhead wires rated at 400 amps, 120/208 volts, 3 phase, 4 wire. The report states that the electrical service is adequate for the current uses of the building. Conversations with Alan McClellan, Director of the Department of Planning and Community Development, indicate that there are no significant power outages on the site. Fred Lamburn, Facilities Manager at the site now, indicated that the lights flicker once in awhile but they don't experience many power outages. He believes they have used the emergency generator two or three times in the past two years. Arlington as a community has experienced power outages during past summer months.

Nstar has prepared a report titled *Arlington Reliability Enhancement*, dated August 12, 2002, which outlines the proposed upgrading of the entire Arlington electric service distribution lines. Future plans include converting existing 4 kV circuits to 13.8kV, and installing new 13.8kV distribution circuits. Complete upgrade in the Town should be finished by April 2004. The upgrades do not include individual properties. Upgrade of the Symmes Site should be coordinated with Nstar.

Telephone

Telephone service is provided by Verizon.

Existing Soil Conditions and Bedrock

The Town of Arlington is located within the Mystic River Watershed. As indicated on the USGS Surficial Geology Map bedrock is located at or near the surface throughout much of the basin. Most areas of bedrock throughout the Town of Arlington are overlain by glacial till deposits.

The Soil Conservation Service (SCS) Interim Soil Survey for Middlesex County indicates that existing soil on the site is rock outcrop – Hollis complex, which is exposed bedrock and somewhat excessively drained, shallow, nearly level to very steep Hollis soils. According to the SCS, these areas are generally made up of 55 percent rock outcrop, 40 percent Hollis soils and five percent other soils.

Bedrock outcrops are prevalent throughout the Symmes Hospital site and the depth to bedrock is very shallow as indicated by the Surficial Geology Map and Interim Soil Survey Map.

Summary of Issues

Elements that could possibly complicate design and construction for redevelopment of the Symmes Hospital site are listed below:

- **Bedrock:** Bedrock is prominent on the site, which prohibits infiltration of stormwater and presents the potential need for blasting, depending on proposed development plans.
- **Steep slopes:** Existing slopes are steep, including the cross slopes in the existing parking lots. Stormwater management for steep slopes and general construction will have to be designed to avoid areas with steep slopes. Areas of excessive slopes may be considered less desirable for construction due to the premium associated with construction. However, the feasibility of the use would need to be analyzed.
- Existing sanitary service, gas service and a portion of the water service are located in an unmaintained section of the site that could result in brush and roots penetrating the pipes.
- **Storm drainage:** Existing pipes are under capacity for the existing use. Proposed development that will result in a net increase in impervious area will most likely require land set aside for detention. Impacts may be reduced by “green” building practices that have been suggested by some members of the community.

Recommendations

The observations above are based on preliminary analysis and are representative of existing conditions only. In order to fully understand possible issues in relation to viable reuse options we recommend that the following information be gathered:

- Geotechnical information (borings, etc.).
- Hydrant flow data.
- Additional information on area wide storm drainage/flooding.
- Pipe materials and sizes for water, storm drain and sanitary sewer.

Conclusions

The site is currently serviced with sufficient utility capacity to provide for a 150-bed hospital and residential living space for approximately 25 nursing students. The demand required by most non-hospital uses can be supplied by the existing infrastructure.