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Civil Engineering
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Newton North High School
Schematic Design Narrative: Site Utilities
December 16, 2005 Updated June 2, 2006

JNEI Project #5482

PART 1: INTRODUCTION

1.0 Purpose

The purpose of this narrative is to identify existing site utility issues and generally describe the proposed utility infrastructure for the new Newton North High School.

1.1 Basis for Report

Judith Nitsch Engineering, Inc. (JNEI) has prepared this narrative to describe the existing and conceptual proposed site and utility conditions at the Newton North High School site. This narrative is based on JNEI's review of available plans provided by the City of Newton and Gund Partnership, and a meeting with the city engineers, public works, and school officials to discuss site-planning issues regarding the existing utilities.

1.2 Site Description

Public right-of-ways surround the existing 28-acre +/- school building site on all four sides. It is bounded on the East by Walnut Street, on the West by Lowell Ave, on the South by Hull Street, and on the North by Elm Ave. The site topography is mostly flat; however there is a large grade change from Hull Street down to the football fields where the football stadium sits. The bleachers allow spectators to go from the field level up to Hull Street. The rest of the site is composed of athletic fields, parking lots, and sidewalks.

PART 2: EXISTING CONDITIONS

2.1 Sewer

The existing sewer infrastructure from the school building enters the city sanitary system on Elm Road and Lowell Ave. The sanitary system is fed by gravity and the City Engineer stated that there are no known sanitary system issues in the area. Therefore there should be no problems connecting into the municipal system when the new school is built.

2.2 Water and Fire Protection

The campus' domestic water supply is currently served by the municipal water system. The City Engineer stated that there are no issues with the municipal water system in the area and there should be adequate water pressure for fire protection for the new school building. However, hydrant flow tests should be conducted to verify that there is sufficient water pressure in the area. This should in no way affect the program planning.

2.3 Drainage

Currently there is a closed drainage system on site, which collects Stormwater runoff in a series of catch basins located around the campus. The underground piping system conveys the collected runoff to a large box culvert (approx 8'x10') that runs underground from Hull Street and under the southeastern corner of the site and exits the site under Walnut Street. The City Engineer stated that this culvert is a major conveyance of Stormwater for a large portion of the city. The City engineer also indicated that the culvert has surcharged in the past but it appears the surcharge was not because of lack of capacity but rather because of maintenance issues. The trash grate that is attached to the upper portion of the culvert before it goes under Hull Street gets blocked with debris and the water surcharges up and over Hull Street. The Public Works Department routinely maintains the trash grate during large storm events. Based on the large drainage basin that contributes to the flow in the culvert JNEI recommends limiting proposed work near or to the box culvert except for connecting new drain lines, preferably at existing connections, to the box culvert. JNEI recommends that box culvert be video inspected to determine the existing condition of the culvert.

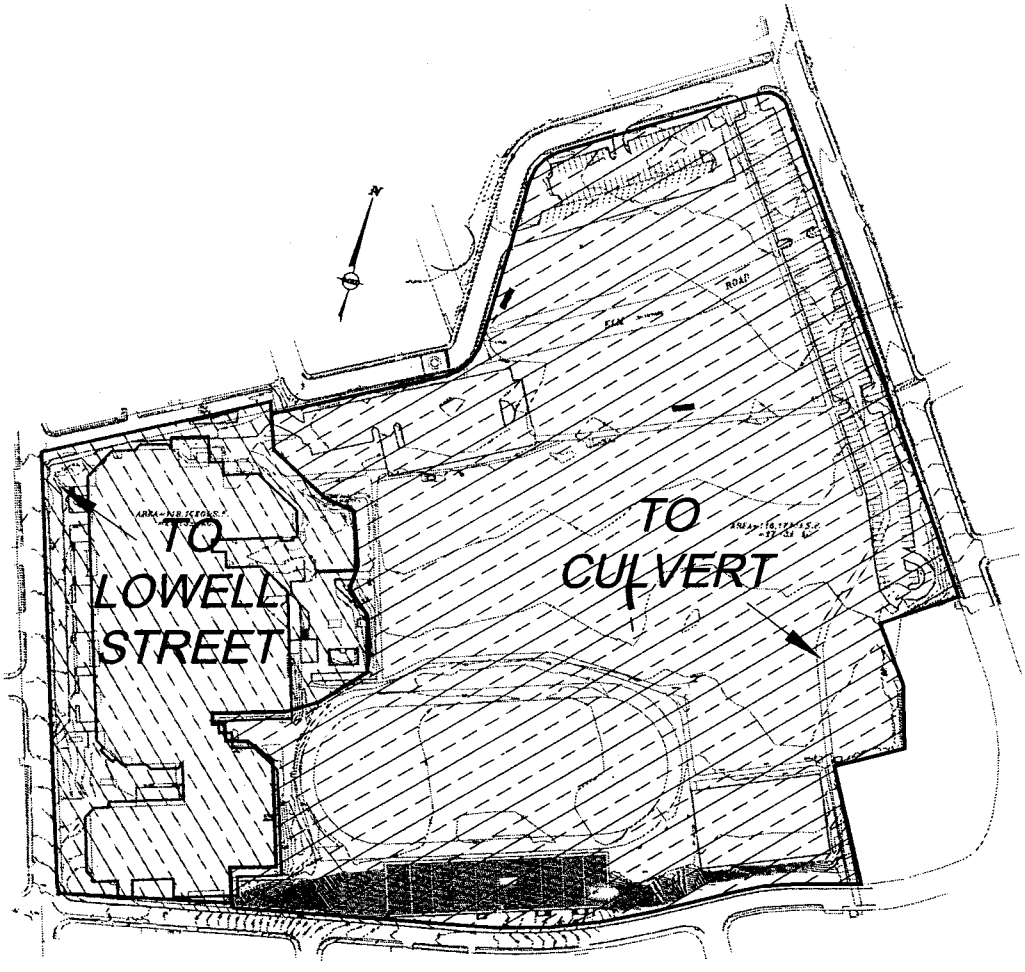
The following are the approximate invert elevations of the closed drainage system in the streets surrounding the campus:

Walnut Street	60.0' – 55.0'
Lowell Avenue	68.0' – 56.0'
Hull Street	89.0' – 72.0'
Elm Road	58.0' – 54.0'

The elevations in Hull Street make connection to that drainage system not feasible however the other three roads surrounding the site seem to offer similar elevation options and appear to be a better option than Hull Street.

The existing building and immediate area surrounding the building appears to discharge to the 48-inch drain in Lowell Street while the remaining site discharges to the culvert. The limits of the on-site watersheds are approximate because not all the locations of the roof drains and discharges from the closed drainage system behind the school are indicated on the survey.

Figure 1: Approximately Existing Drainage Areas



2.4 Natural Gas

There is natural gas service located in the streets surrounding the site: including 12-inch and 8-inch mains in Lowell Street, 4-inch main in Elm Road, 12-inch main in Walnut Street, and a 4-inch main in Hull Street. It appears that access to a natural gas supply should not be an issue; follow up will be needed to determine the capacity of the various lines.

2.5 Wetlands

There are no wetland resource areas located on site. The wetland resource area associated with the stream that runs through the large culvert ends at the point where the stream enters the culvert (because the culvert is greater than 200-feet in length). Therefore there should be no programmatic limitations due to wetland or riverfront resource areas.

PART 3: PROPOSED SCHEMATIC UTILITIES

3.1 Sewer

The phasing of the project will require utility services to connect to Walnut Street or Elm Road. The sanitary main on Hull Street is not practical because of the elevation of Hull Street. The existing sanitary sewer service off Lowell Street will be maintained until the new high school is operational. Once the proposed high school is operating the existing sanitary sewer service to Lowell Street will be abandoned. The proposed sanitary sewer service for the new high school will connect to the existing sewer main in Walnut Street. There may be a need for a small ejector pump for floor drainage in the basement; this issue will be investigated in more detail as the design progresses.

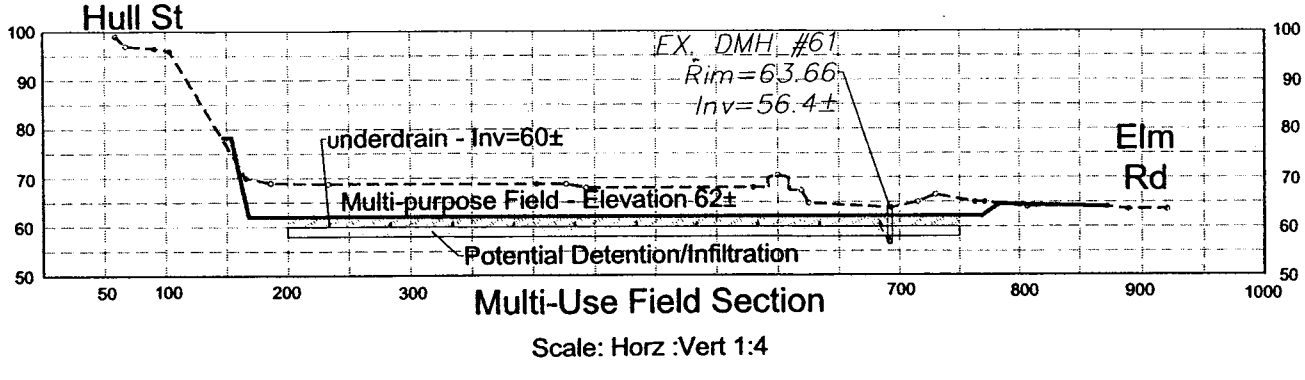
3.2 Water and Fire Protection

The phasing of the project will require utility services to connect to Walnut Street or Elm Road. The new high school will connect to the existing water main in Walnut Street.

3.3 Drainage

The proposed project will result in a small decrease in impervious area as indicated. The project will take advantage of the potential recharge/detention opportunity of the proposed multi-use field to improve the drainage condition on the site and introduce recharge to the site.

Figure 2: Schematic Section of Multi-Use Field



JNEI is going to take a conservative approach and not include exfiltration component in the drainage calculations.

A: Closed Drainage System

A new closed drainage (catch basin to manhole) system will replace the existing system entirely. New catch basins will have four-foot sumps to meet the Department of Environmental Protection's (DEP) Stormwater Policy standard for catch basins.

B: Detention Basins/Infiltration Systems

The main detention area is proposed under the multi-use field. At this time, no other underground or surface detention basins are proposed. See Figure 3 for the approximate proposed drainage areas.

C: Water Re-Use/Rainwater Harvesting

Three or more cisterns are proposed to collect roof runoff to be re-used as toilet flushing water. The cisterns will be 10,000 gallon to 30,000-gallon pre-cast concrete tanks. The cisterns will be economically sized based on demand, watershed area, and reliability. The cisterns will collect stormwater in all storms; however, they are sized for small storms not flood conditions. As a result, the cisterns only have a minimal impact during flood events.

D: DEP Stormwater Policy

The existing drainage system on the site does not meet the Stormwater Policy. The proposed stormwater management system will meet the Stormwater Policy's nine standards, including water quality, recharge, and erosion control requirements.

3.4 Natural Gas

The phasing of the project will require utility services to connect to Walnut Street or Elm Road. The new high school will connect to the existing gas main in Walnut Street.

3.5 Electrical/Telephone/Communications

The phasing of the project will require utility services to connect to Walnut Street or Elm Road. The new high school will connect to the existing electrical, telephone, and communication mains in Walnut Street.

PART 4: SUMMARY

Based on the available information there should be no significant existing utility issues that affect the planning of the new school program on the Newton North High School Site other than avoiding any major reconstruction of the existing box culvert that runs through the southeastern portion of the site.

The proposed utility design will result in an improvement to the existing stormwater management system and provide the other required utility services to the new high school while the existing high school is maintained during construction.