Item 6A.
BCWMC 1-16-14

MEMO

CITY OF PLYMOUTH

3400 Plymouth Boulevard
Plymouth, MN 55447

DATE: November 12, 2013

TO: Ginny Black, Chair, Bassett Creek Watershed Management Commission

FROM: Derek Asche, Water Resources Manager

SUBJECT: FOUR SEASONS DRAINAGE IMPROVEMENT ALTERNATIVES

The Bassett Creek Watershed Management Commission (Commission) through their current Watershed Management Plan (2004) has set a phosphorus reduction goal of 73 pounds per year for Northwood Lake in New Hope. Additionally, Northwood Lake is listed as an impaired water body by the Minnesota Pollution Control Agency with a total maximum daily load (TMDL) anticipated in the next 10-15 years. May through October phosphorus concentrations in Northwood Lake are generally 2-3 times the State standard as measured through the Citizen Assisted Monitoring Program (CAMP) from 2000-2011 (see attached).

The feasibility study for the Four Seasons Drainage Improvement Project reviewed several alternatives for meeting the 73 pound phosphorus reduction goal with stream restoration and water quality ponding being selected as the most cost effective option (see attached). At their regularly scheduled meetings in September and October, 2013, the Commission requested additional alternatives analysis for the Four Seasons Drainage Improvement Project.

This memo is intended to summarize previous alternatives (Table 1) and to provide cursory analysis of additional alternatives (Table 2). The stream restoration and water quality ponding alternative was considered viable and moved forward to the design process while other alternatives were eliminated from consideration for various reasons. The cursory analysis assumes a project is technically feasible, however, the project may be impractical, un-permittable based on existing rules and regulations, ineffective, or other. Cost estimates provided are based on recent projects in Plymouth with the exception of the stream restoration and water quality ponding alternative currently proposed for which there is an engineers estimate.

Based on the alternatives presented in the feasibility study, the cursory analysis of additional options, and concerns brought fourth by residents in the area, it is recommended the Commission pursue a partnership with future development of the Four Seasons Mall site for construction of an alum injection facility. Should a partnership with future development be unachievable, it is recommended stream restoration and water quality pond be considered in the context of an approved Total Maximum Daily Load Plan.

**Table 1. Alternatives analyzed in the Four Seasons Mall Drainage Improvement Feasibility Study.**

| Alternative | Estimated Cost | Comments |
|---|---|---|
| 1. Pilgrim Park Storm Water Pond | NA | Eliminated from consideration based on high use of this area by residents. |
| 2. Pilgrim Lane Elementary Pond | NA | Eliminated from consideration due to uncertainty with the school and unlikelihood the School Board would allow such a use. |
| 3. 40th Ave. Pond | $400,000[1] | Selected and approved by the Commission for design. |
| 4. Four Seasons Mall Pond | $290,000[2] | Selected and levied for by the Commission, however, would require a partnership with the property owner. |
| 5. Channel Restoration | $620,000[1] | Selected and approved by the Commission for design. |
| 6. Alum Injection Facility | $1,200,000[2] | Feasibility determined this as a viable option to meet the 73 pound reduction goal, however, is was determined to be cost prohibitive when compared to ponding and channel restoration. |
| 7. NB07 Wetland Conversion and Outlet Mod | NA | Eliminated from consideration as cost prohibitive due to limited effectiveness and wetland mitigation costs. |
| 8. Infiltration | NA | Eliminated due to poor soils and limited effectiveness compared to drainage area. |

1. From Engineers Estimate

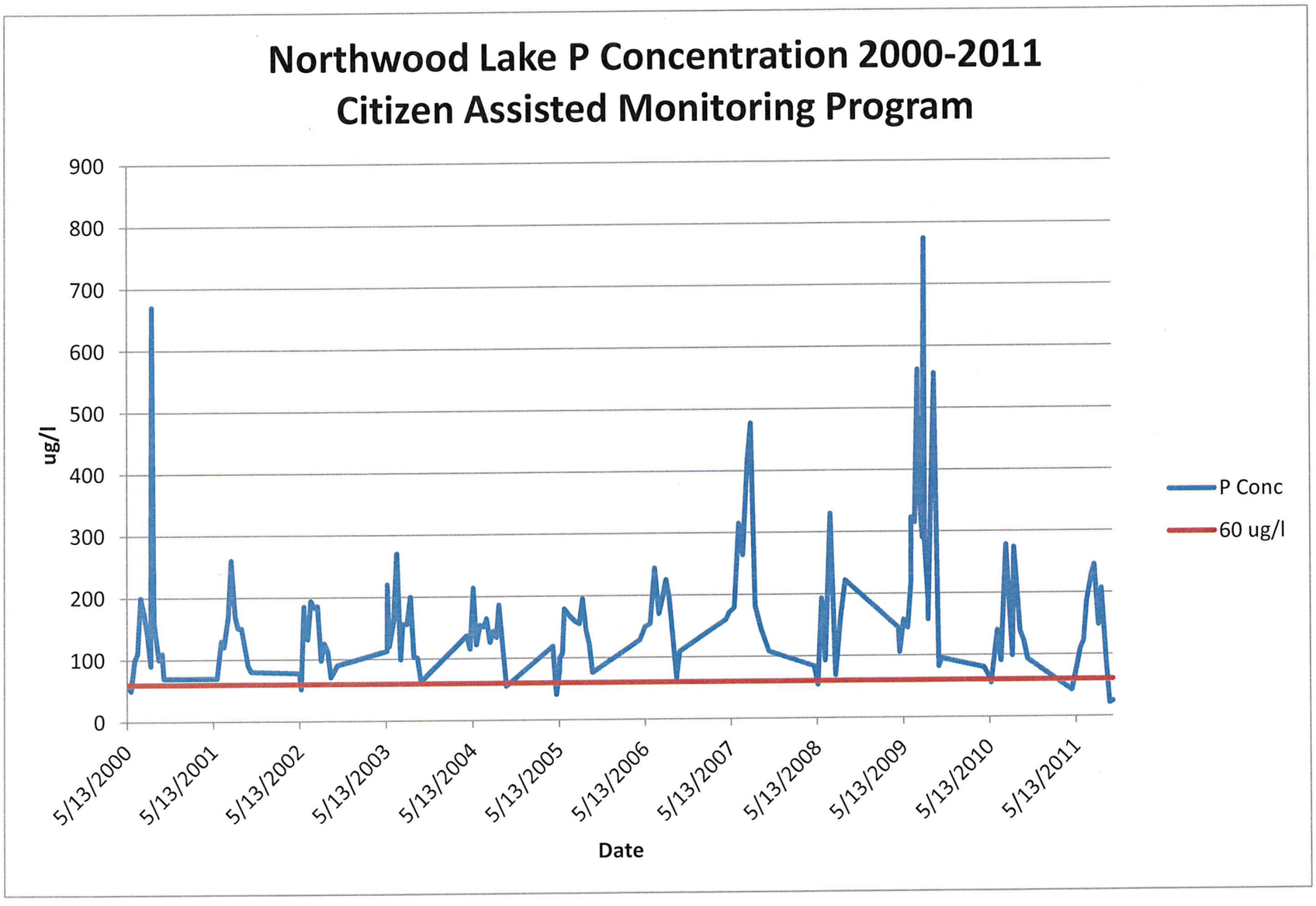
2. From Feasibility Study

**Table 2. Cursory review of Four Seasons Drainage Improvement project alternatives**

| Alternative | Estimated Cost | Comments |
|---|---|---|
| A. Ponding on East Side of Lancaster | $1,344,000 | Assumes 4 acres of wetland impact; 5 foot deep pond; 24,000 cubic yards of excavation ($20/yd); non-contaminated soils; 8 acres of wetland mitigation; 20% eng/admin/cont. Modeling indicates pond would be ineffective due to high volumes. |
| B. Ponding on West Side of Lancaster | $864,000 | Assumes 2.5 acres of wetland impact; 5 foot deep pond; 16,000 cubic yards of excavation ($20/yd); non-contaminated soils; 5 acres of wetland mitigation; 20% eng/admin/cont. Does not include channel restoration; P8 indicates removal of 45 lbs per year. |
| C. Rip Rap 3100 LF of channel | $702,000 | Assumes 500 trees removed at $300 each; does not include water quality pond. Feasibility indicates P removal of 25 pounds per year; 20% eng/admin/cont. |
| D. Storm Sewer 3100 LF | $754,800 | Assumes 500 trees removed at $300 each; does not include water quality pond; similar P removal of channel restoration of 25 pounds per year; 20% eng/admin/cont. |
| E. Water Quality Pond in Green Space | $768,000 | Assumes pond outlet of 925 (5 feet higher than proposed); Assumes pond sized as in feasibility study; Assumes 6 foot deep pond; 32,000 cubic yards of excavation ($20/yd); non-contaminated soils; Feasibility indicates 59 lbs P removal. |

Attachments: Northwood Lake P Concentration 2000-2011
Figure 3.1 Initial Project Identification Inventory
cc: CIM

# Northwood Lake P Concentration 2000-2011
## Citizen Assisted Monitoring Program



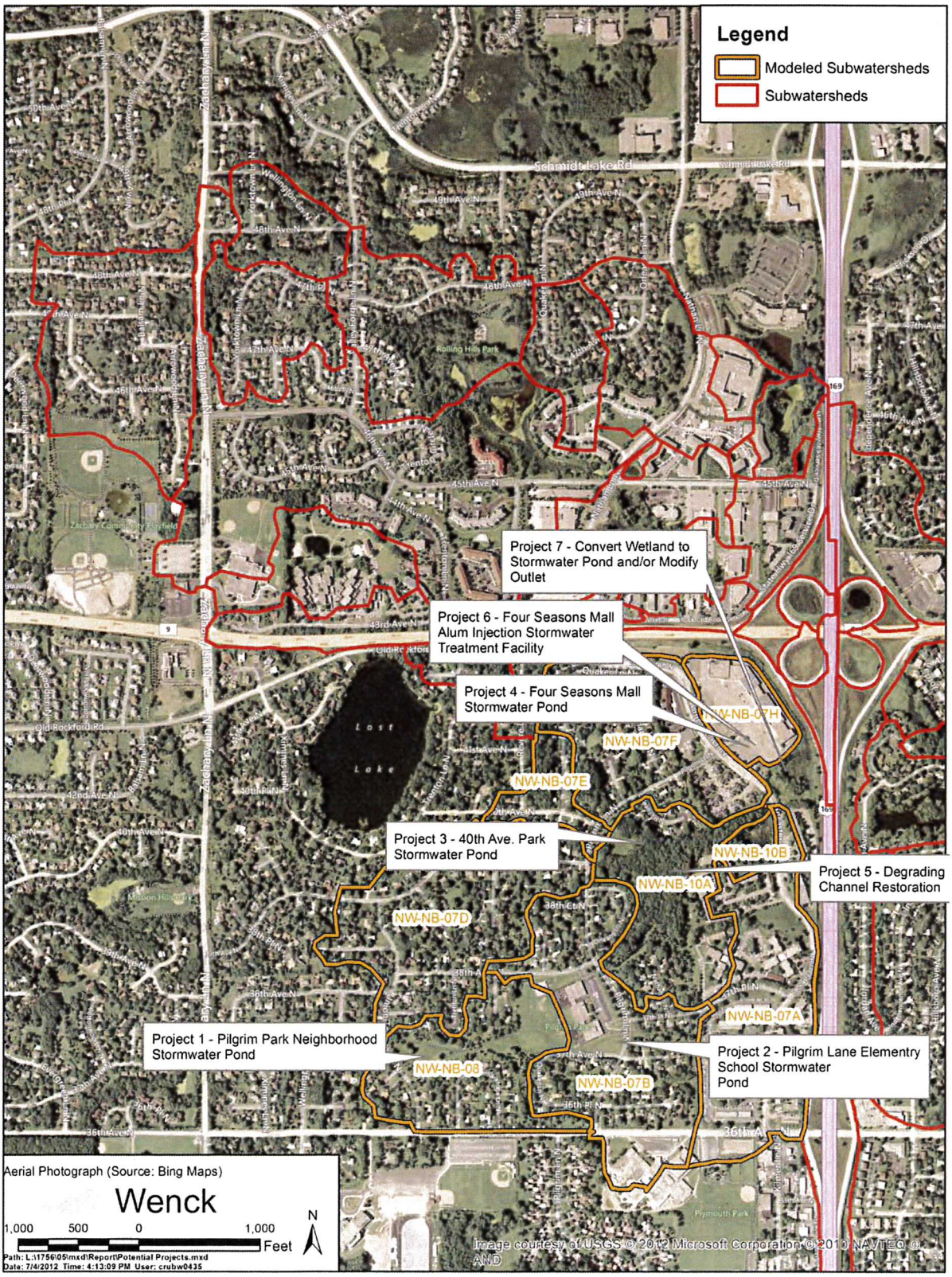



**Figure 3.1. Initial Project Identification Inventory.**