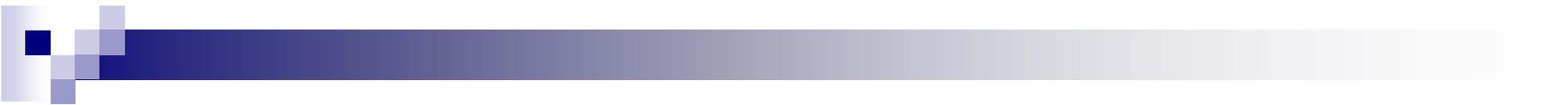


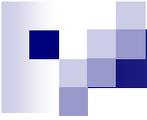
# Review / Update of Water Quality Management Activities

City of Circle Pines



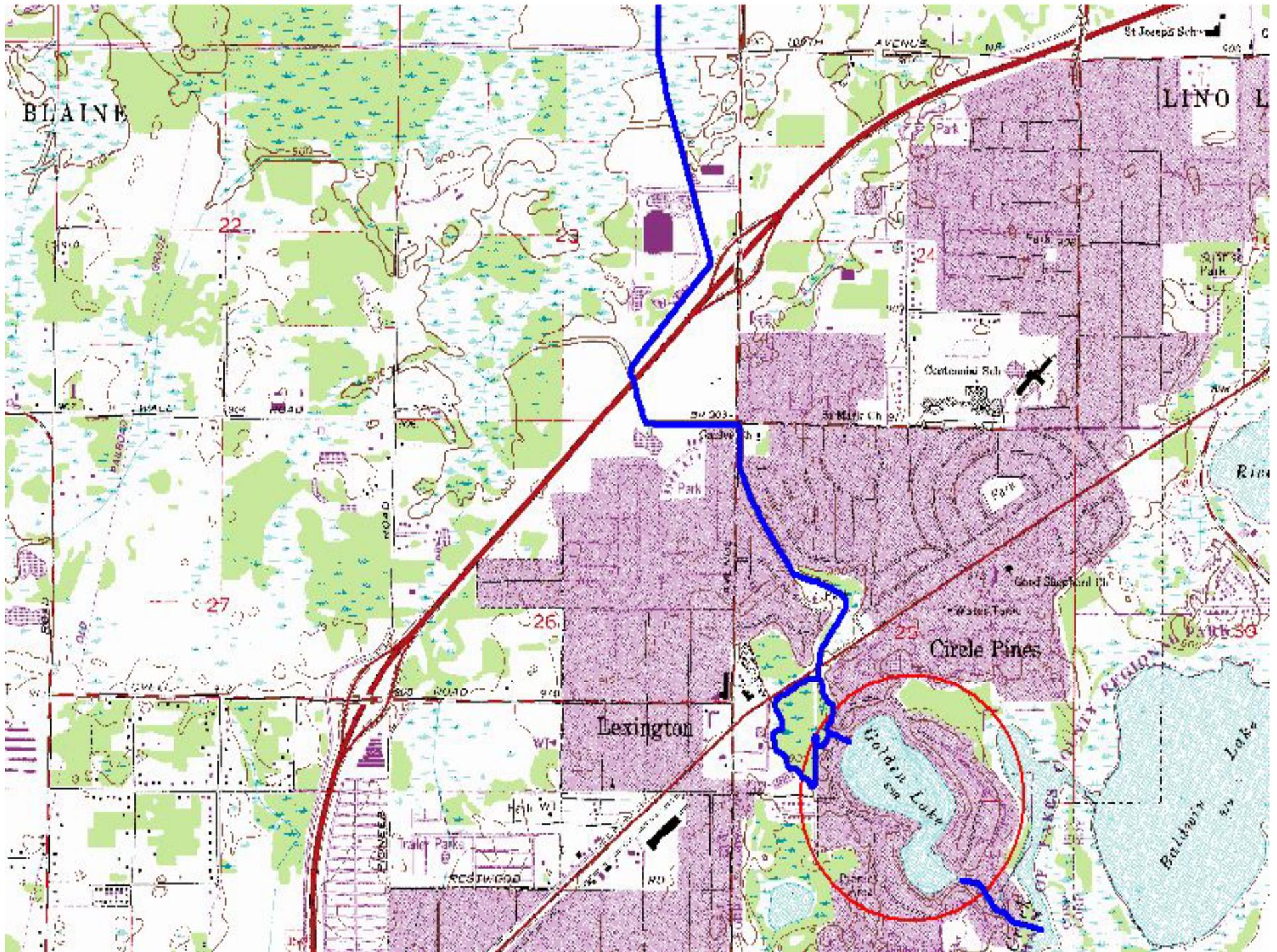
# Introduction/Purpose

- Review background of Golden Lake
- Review history of storm water quality management activities
- Review future potential activities



# Background

- Golden Lake is 57 acres
- Max depth is 25 feet; average depth is 8 feet
- Watershed is 4,400 acres
  - 90% in Blaine
  - 10% in Circle Pines
- Land use is sod farms, wetlands, and commercial areas
- Runoff conveyed to Lake via CD 53-62





# History

- Past studies indicate:

- Lake is classified as hyper-eutrophic
- Lake has high nutrient loadings from CD 53-62
- Lake has nutrient rich substrate causing high internal loadings
- Hypolimnetic aeration system (in-place) reduces internal loadings and assist fishery
- Upstream Best Management Practices (BMP's) have helped reduce pollutants

# Task Force Defined Improvement Goals for Golden Lake

- Task Force created in 2003
- Established specific goals for Golden Lake
  - Improve water quality
    - Want average TSI of 50; max TSI 55
    - TSI now typically exceeds 55 in July, August
  - Manage aquatic plants
  - Manage lake for fishing
- Identified/prioritized projects that could reduce or eliminate problems



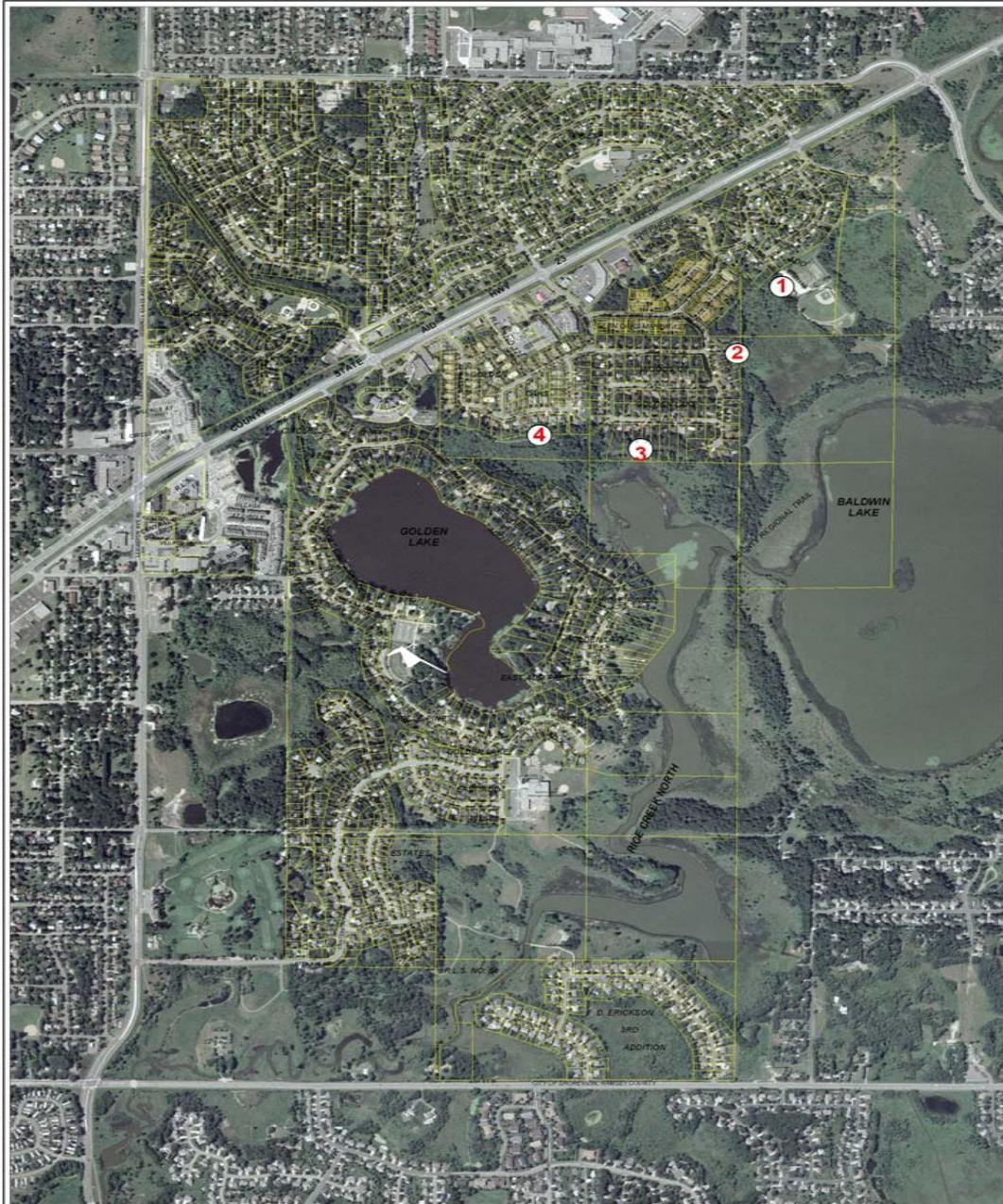
# Projects Completed by City

- Passed phosphorus control ordinance
- Installed and operate hypo-limnetic aeration system since the 1990's.
- Completed fish stocking
- Expanded upstream wetland treatment system



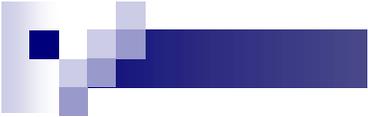
# Projects Completed by City

- Removed sediment at Golden Lake inlet
- Implemented bio-manipulation project
- Completed storm water pond maintenance in four areas



**CITY OF CIRCLE PINES  
POND MAINTENANCE LOCATION MAP**

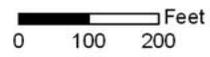


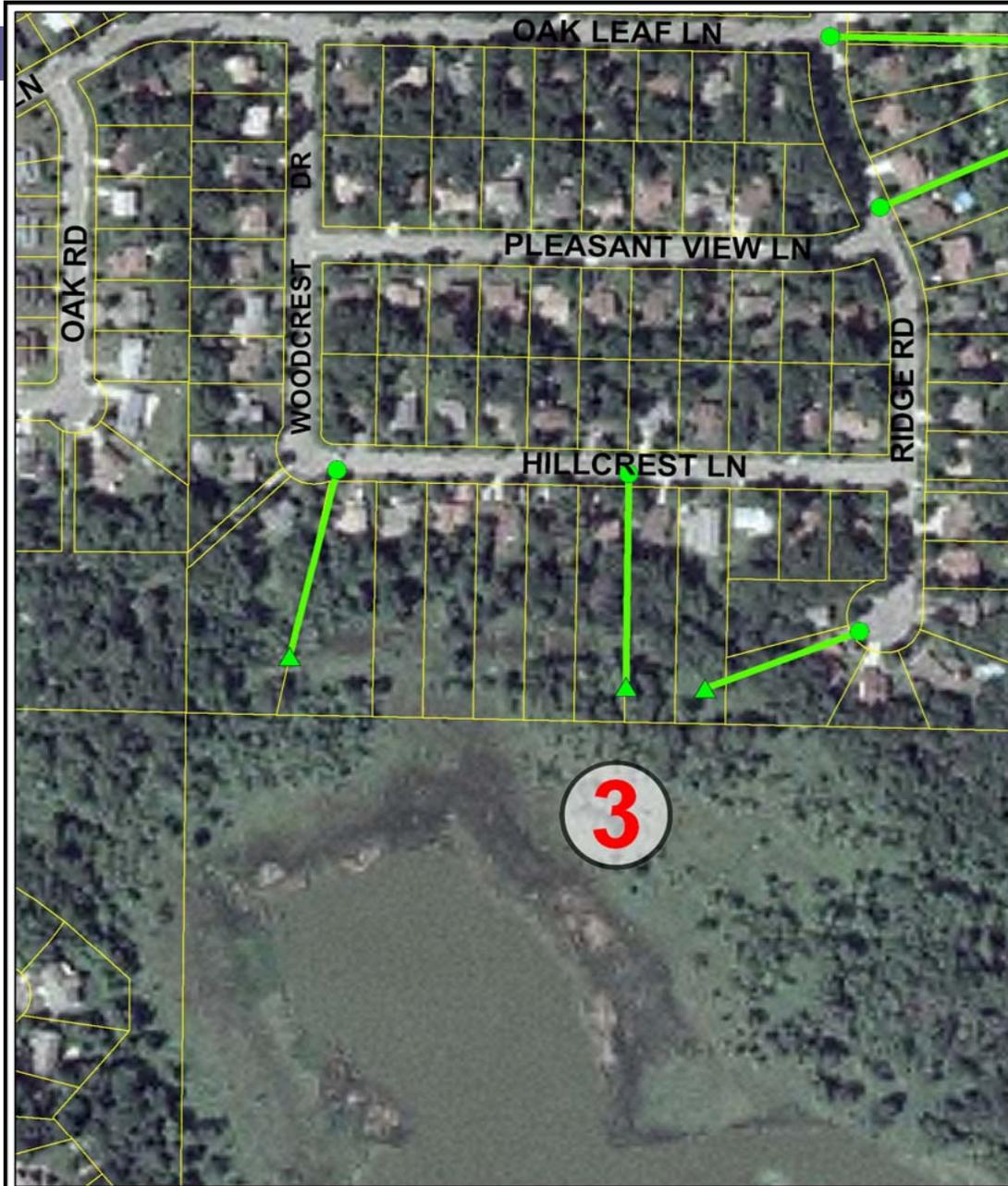


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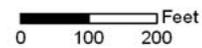


**Ponds 1 & 2  
Pond Maintenance Plan  
City of Circle Pines**



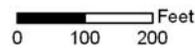


**Pond 3  
Pond Maintenance Plan  
City of Circle Pines**





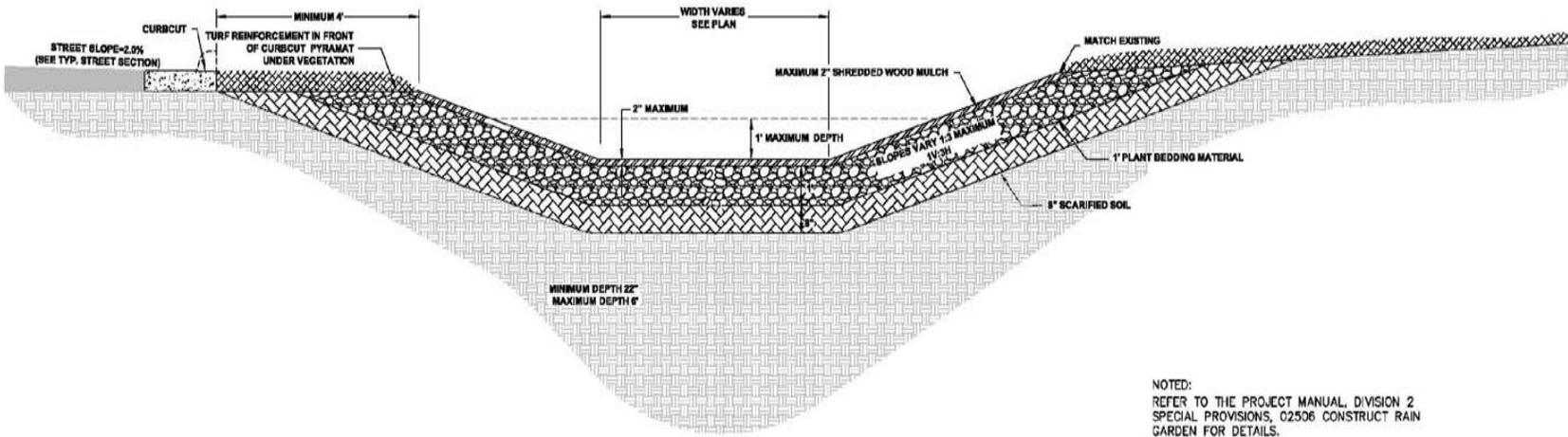
**Pond 4**  
**Pond Maintenance Plan**  
**City of Circle Pines**





# Projects Underway by City

- Construct West Golden Lake Road BMP's
  - Rain garden Construction
  - Underground Infiltration vault.



**POROUS SUBSURFACE SOILS**

NOTED:  
 REFER TO THE PROJECT MANUAL, DIVISION 2  
 SPECIAL PROVISIONS, 02506 CONSTRUCT RAIN  
 GARDEN FOR DETAILS.

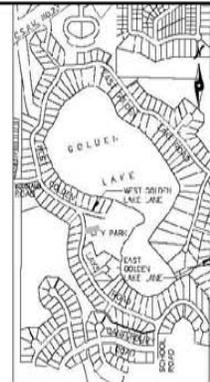
2008 STREET AND UTILITY IMPROVEMENT PROJECT WEST GOLDEN LAKE ROAD CIRCLE PINES, MINNESOTA		DATE: 11/14/06 DRAWN BY: J. M. HARRIS CHECKED BY: J. M. HARRIS PROJECT NO.: 2006-01 SHEET NO.: 61 OF 96
WSB CONSULTING ENGINEERS 701 NORTH WYOMING STREET, SUITE 200 MINNEAPOLIS, MN 55415 WWW.WSBENGINEERS.COM		PROJECT NO.: 2006-01 SHEET NO.: 61 OF 96

K:\01507-14\01507-14-RAIN GARDEN DETAIL.dwg, Layer 01



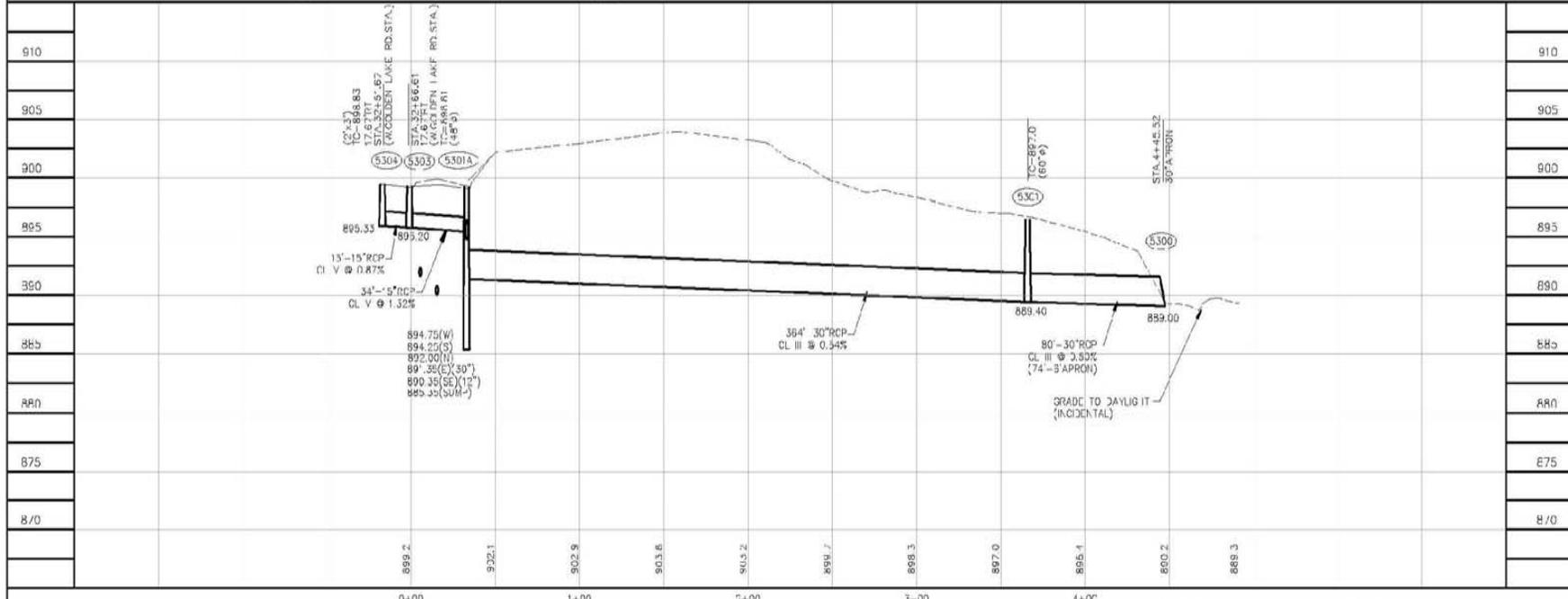


# STORM SEWER



DATE	DESCRIPTION
11/20/14	AS NOTED

APPROVED: *Andrew A. Brouwer*  
 PROJECT MANAGER



**2008 STREET AND UTILITY  
 IMPROVEMENT PROJECT  
 WEST GOLDEN LAKE ROAD**





# Projects Underway by City

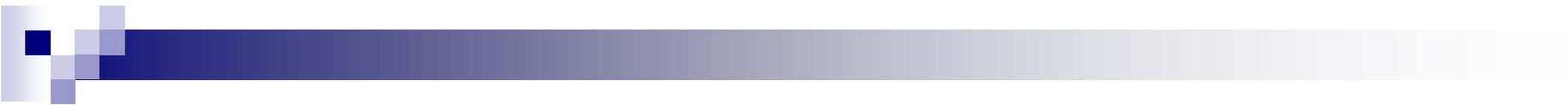
- Implement active treatment demonstration project with City and Watershed District
  - Grant approved, demonstration project to be tested in 2009.





# Future Projects to be Considered

- Drawdown lake level in winter
- Divert storm water inflow
- Construct BMP's upstream of I-35W in Blaine
- Harvest aquatic weeds
- Use herbicide treatment



# Future Projects to be Considered

- Construct hypo-limnetic withdrawal system
- Expand aeration system
- Expand BMP's in watershed
- Undertake additional fish management to improve water clarity.
- Work with DNR to improve fishing in Lake.



# What is in our Future?

- Continue to evaluate options
- Work toward indentifying projects that will improve water quality in a cost effective way.
- Implement Projects as funding becomes available. Continue to Secure Grant money.
- Implement projects required by MPCA and RCWD to address TMDL requirements.