SEATTLE JAPANESE GARDEN

POND RENOVATION PROJECT

WINTER 2013-2014

February 25, 2014 Completion Inspection

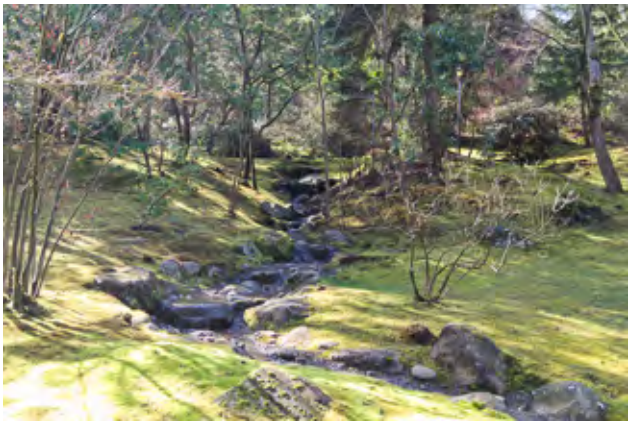
John Fulfold and Turnstone Construction Inc.

Photos and report by Peggy Garber
Japanese Garden Society
2/27/2014

Andy Sheffer, Doug Chritchfield, Lisa Chen and several Parks shops and landscape people joined John Fulfold and Paul Keller from Turnstone Construction Inc. and Steve and Peggy Garber from the Japanese Garden Society on Tuesday, February 25, 2014 for a completion inspection of this winter's Pond Renovation Project by Turnstone. The Japanese Garden Society and Japanese Garden Advisory Council each contributed $25K to the project and Parks provided the remaining $75K for a total expenditure of $125K.

The purpose of this work was to create a system to catch sediment before it reaches the larger pond and at the same time to collect and "develop data and procedures that will assist in the future de-silting of the larger body of water by documenting the process carefully and installing elements of the system and protocols for future use. The proposed pre-filter and replacement of vault lids, as well as changes to the mechanical system … will make pond associated maintenance less time consuming and safer for the garden staff. The new mechanical equipment will have an immediate positive impact on the pond by ensuring more reliable stream operation and hence water circulation and oxygenation. The new Intelliflo pumps will also save on energy costs."
(Quoted from Turnstone's project cover letter of October 7, 2013.)

Stream Beds


February 2014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The upper stream beds having been lined in previous years, the primary task of this part of the project was to remove accumulated sediment from the headwaters just south of the pond, then line that area of the stream with concrete.

Catch Pond or Sump Area

October 2012 - Before

February 2014 - After

Above left shows the stream at the headwaters of the pond in the fall of 2012. Above right the same area after this project renovation. A small waterfall has been restored at the south end of the headwaters which now again contributes to the garden's ambiance with its quiet gurgling sound.

February 2012 - Before

February 2014 - After

Above left shows the deteriorating banks and the catch basin area filled with sediment made worse after a water pipe broke on 26th Avenue above the garden in February 2012, washing much dirt and mud down the hillside and into the garden. Above right is the catch basin on February 25, 2014, after this winter's project's completion.

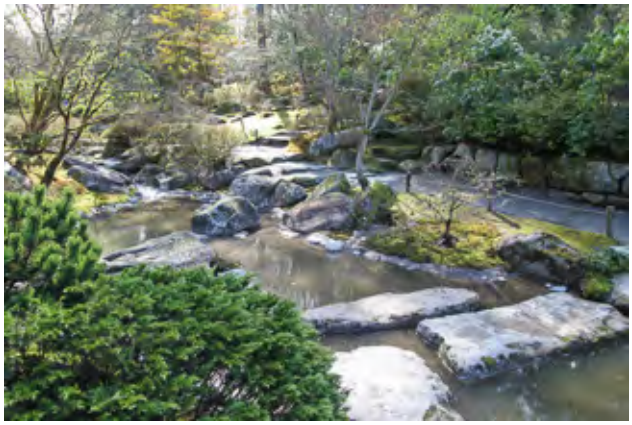
Stream Work in Progress - December 2013

Paul Keller At Work - December 2013

Pond Work in Progress - December 2013

Pond Coffer Dam & Work in Progress - December 2013

February 2014 - After Completion



February 2014 - After Completion

This winter, Turnstone hand dredged the muck from the headwaters area of the pond, working through a number of inches of brown clay down to the native gray clay. While the original plan was to excavate deeper, it became clear that doing so would undermine the soil under the stepping stones. The catch basin is now about 12" deep, with a concrete lined bottom. The purpose of the catch basin is to collect sediment from the streams and the south end of the garden before it enters the pond and to make periodic sediment removal easier. Turnstone lined the pond bottom with high strength, steel reinforced structural concrete coated with a natural colored, stream textured mortar. At the same time, Turnstone repaired and stabilized the banks in the headwaters area.

A small culvert from the roji also drains into this headwaters area. That water is filtered through a French drain system around the tea house. This winter's renovation of the catch basin area has temporarily revealed the outflow of this tea house drainage system, but that will soon disappear again as moss and vegetation grow back to cover the banks of the headwaters.

February 2014

Pond Outflow Drain

The pond outflow passes under the wooden bridge between the wisteria trellis and the east fence, then flows through a weir where debris is filtered by baskets which gardeners access for cleaning by removing three wooden bridge planks.

February 2014

February 2014

February 2014

February 2014

Paul Keller & Filter Basket

Rainfall and runoff from surrounding hillsides significantly supplement the amount of recirculated water in the pond, offsetting evaporation and reducing the need for water from City mains. The downside of this natural runoff, other than making the orchard area rather wetter than is ideal for the trees planted there, is that it carries additional silt and debris into the pond.

Turnstone replaced the old outflow filters with 2 larger filter baskets of finer mesh. The new baskets' larger size increases the filter area and improves water flow into the recirculation vault outside the fence. Gardeners will clean these 2 new filter baskets once each day. The process takes about 10 minutes to remove the bridge planks, pull up and clean the baskets, then put everything back in place.

Steve asked about the consequence of using drains to control the groundwater from the hillside to the west above the garden, as has often been discussed. Paul speculated that water could be filtered and directed into the pond through culverts under the orchard. Steve noted that such a hillside drainage system would help remove the excess ground water in the orchard area and improve the health of its trees, yet still serve as a desirable source of water for the pond.

Outflow / Overflow Vault

Recirculating pond water is filtered again in the 12 foot deep overflow vault located outside the fence along Lake Washington Boulevard before going to the pumps. Excess water suchas after storms spills from this vault through a culvert under Lake Washington Boulevard to Arboretum Creek.

New Vault Covers - 2014

Turnstone replaced the old vault covers with lighter weight lids and the old stainless steel filter screen from the 2003 renovation with a heavy duty, long lived, more easily cleanable, plastic, 5/16th mesh screen. These improvements make cleaning this filter much safer and easier.

Old Mesh Filter from 2003

New Plastic Mesh Filter 2014

Pond Pump System and Mechanical Room

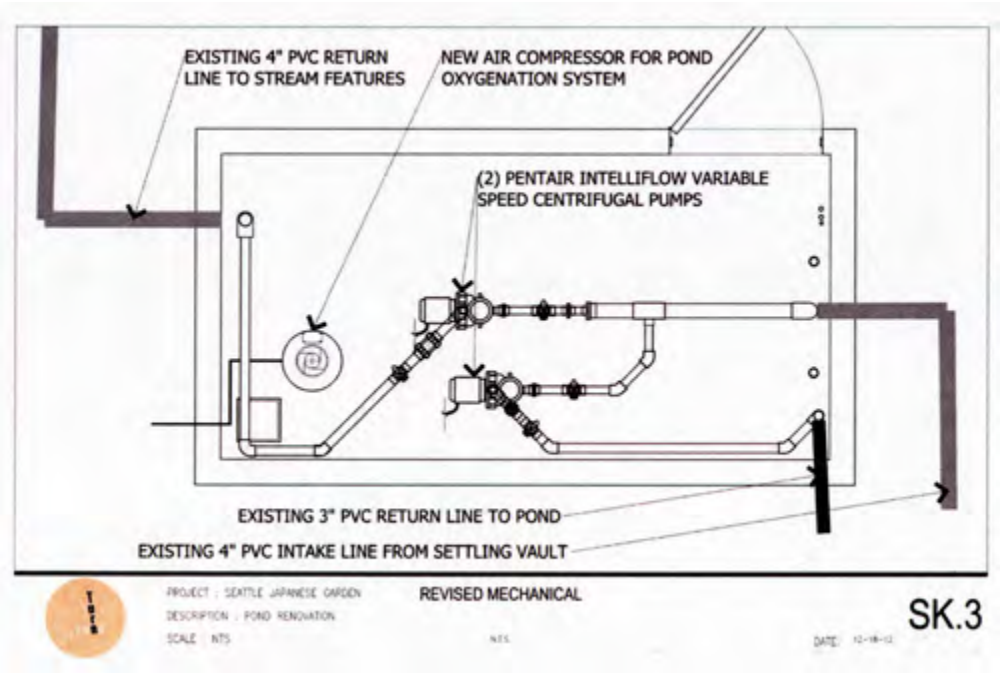
The pumps and controls from the 2003 renovation filled the mechanical room and were more suited to circulating water in swimming pools than in chlorinated ponds. Turnstone replaced the 2 aging and inadequate recirculating pumps plus pipes, valves and controls with a more suitable and efficient system.

Original pumps and Controls from 2003

Original Pumps and Controls from 2003

Original pumps and Controls from 2003

2 New Smaller Improved Pumps - 2014



Intelliflo Pump Installation Schematic - 2014

2 New Intelliflo Pumps - 2014

Additional Cleanable Filters on each Pump - 2014

The new blue pump feeds the waterfall and stream. The smaller new white pump recycles water directly back into the pond for aeration. Each pump has one last filter that can be

easily cleaned. Thus pond water is filtered 3 times before entering the pumps. This filtering system helps to reduce clogging of the pumps, but all filters need to be cleaned on a regular schedule to be most efficient.

Master Water Intake Control - 2014


White Pump Intake Control - 2014

Each pump has its own individual control. An additional master control shown above left monitors the water level in the outflow vault. In the photo the water is 83.6" deep. If the level drops to 55" the control will add city water to the mix. If the level drops below 40", the control will automatically shut off both pumps. Turnstone also installed a small room heater to prevent the pumps from freezing in winter.

With the Winter 2014 Project completed, Turnstone has repaired and stabilized the eroded banks at the pond headwaters and brought this catch pond perimeter back to its original historic location while increasing the flow of stream water into the pond. The newly installed pumps and filtering systems will make pond maintenance much easier for both gardeners and shops. In the process Turnstone has been able to observe and document first hand the existing conditions and hydrology within the garden which will inform future renovation efforts in the main pond.

As the inspection group left the garden, they surveyed the most critical needs for future projects: the eroding banks of the pond's islands between the bridges.


Eroding Island Banks - 2014


Eroding Island Banks - 2014

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2/28/2014