

Clearwood Community Association
Yelm, WA

Project #: 10182000091

**Site Evaluation and Recommendation Report
For CCA Tennis Courts**

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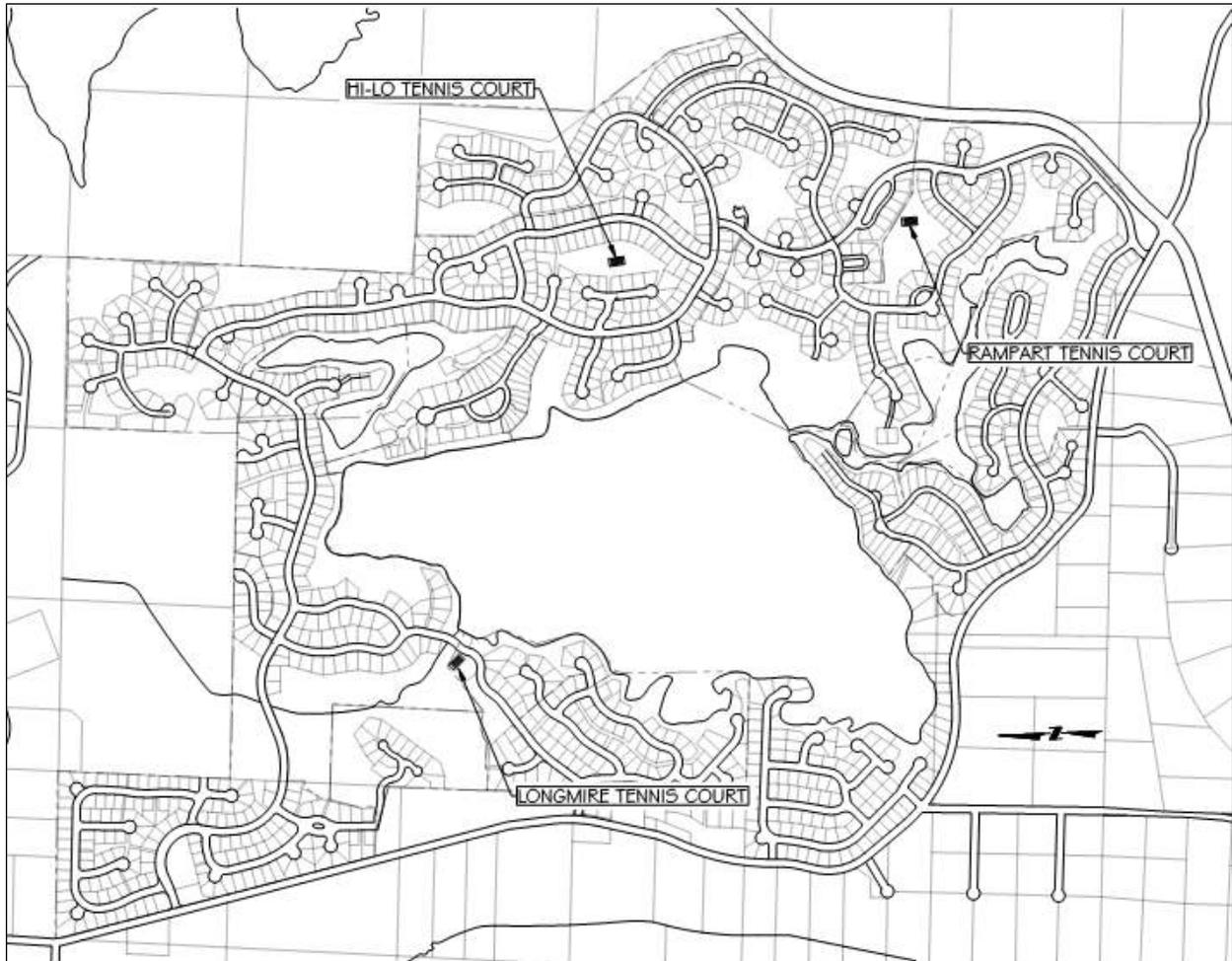
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1.0 INTRODUCTION

Clearwood Community Association (CCA) has three tennis courts within the community. All three tennis courts have issues affecting the usability of the courts by the community. KPFF Consulting Engineers has investigated the sites and presents this report documenting the site conditions as evaluated and providing technical recommendations to help CCA make decisions on repairing, removing, relocating, or repurposing the courts in the future.

The courts are located at Longmire, High-Lo, and Rampart parks within the Clearwood Community Association. See the figure 1 site map identifying locations.

FIGURE 1: SITE MAP



2.0 SITE EVALUATION

KPFF Consulting Engineers performed field site visits to gain an understanding of the issues present at each of the three (3) tennis courts within the Clearwood Community Association (CCA). KPFF analyzed pavement structure, pavement and surrounding area grading, and area drainage, and general site conditions along with available documentation.

The sites were visited during both dry weather and wet weather conditions to better evaluate drainage patterns in the vicinity of the courts and to check for ponding on the pavement surfaces. Landscape and vegetative conditions adjacent to the courts was also noted in relation to observed failures and potential repair/replacement impacts.

Non-destructive excavation at the edges of the courts indicates that the court pavement sections are made up of approximately 2 inches of hot mix asphalt pavement above 2 inches of crushed surfacing gravel.

FIGURE 2: TYPICAL PAVEMENT SECTION PHOTOS



2.1 Longmire

The Longmire tennis court was the only court that had an acrylic top layer. Cracking is prevalent throughout this tennis court and areas of previous block repairs transect the court. Moss, grass, and weeds have taken root inside cracks and failed joints to compound issues. Tennis net posts have pavement upheaval and are leaning toward the center with of the court most likely due to inadequate post foundations and continuous tension of the wire used to support the net pulling the posts inwards.

The existing soils beneath the Longmire tennis court have been previously recorded as peat soils. The northernmost corner of the tennis court is also adjacent to the top of a slope that leads to a stream. Soft soils and sloughing of the slope were observed.

The area directly adjacent to the tennis court is relatively flat with no large trees and drainage away from the court appears adequate in most locations.

FIGURE 3: LONGMIRE PHOTOS



2.2 Hi-Lo

The Hi-Lo tennis court surface is asphalt without a topcoat layer. Large areas of the court had been patched in recent years and transverse cracking was observed. Areas of settlement were also observed consistent with subgrade failure. Both tennis net posts have pavement upheaval and are leaning toward the center with of the court most likely due to inadequate post foundations and continuous tension of the wire used to support the net pulling the posts inwards.

The Hi-Lo court is in a valley, with surrounding terrain at significantly higher elevation than the court itself. Stormwater from the surrounding area naturally flows towards the low point where the tennis court is located. The park area is in a localized low point with no observable stormwater discharge other than infiltration.

FIGURE 4: HI-LO PHOTOS

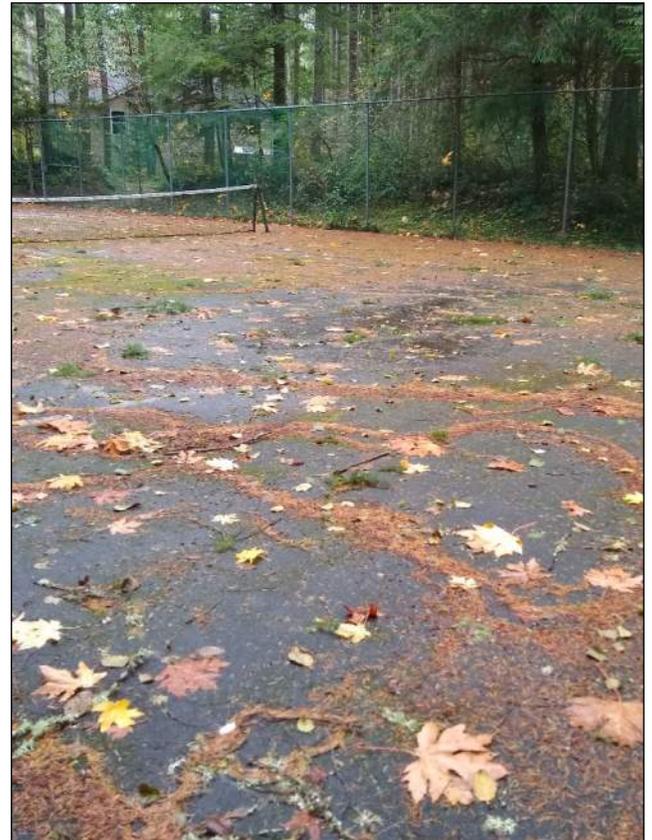
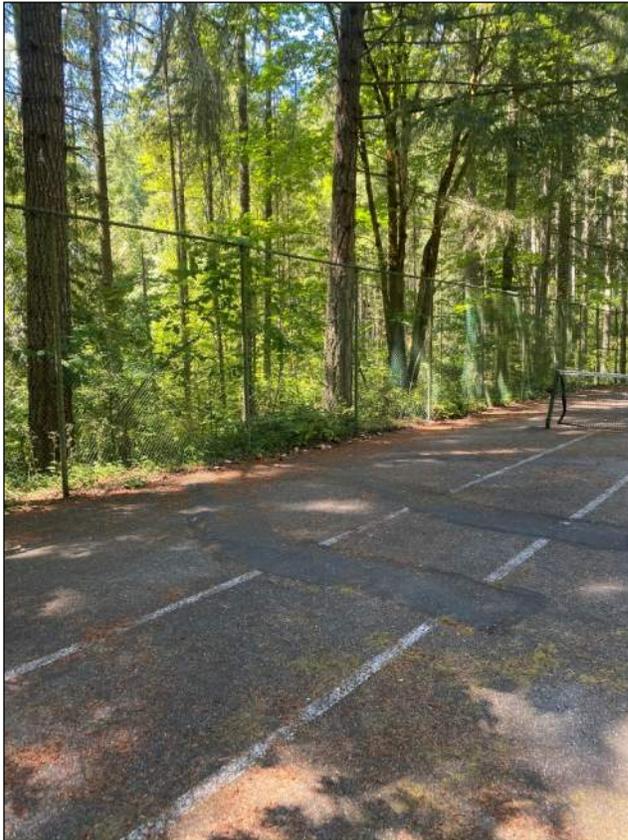


2.3 Rampart

The Rampart tennis court surface is asphalt without a topcoat layer. Poor surface drainage conditions exist at the Rampart court, with observable ponding on the court surface.

Pavement settling due to inadequate subgrade likely contributed to the depressions throughout the pavement surface. Many large trees are in close proximity to the court and tree root upheaval has damaged pavement around the edges of the court surface and accumulation of leaves and fir needles. Both tennis net posts have pavement upheaval and are leaning toward the center with of the court most likely due to inadequate post foundations and continuous tension of the wire used to support the net pulling the posts inwards.

FIGURE 5: RAMPART PICTURES



3.0 RECOMMENDATIONS

3.1 Longmire

The suspected peat soils underlying the Longmire court present potential issues with differential settlement for both the current pavement and future improvements. While the loading on a tennis court is low there is still potential for settlement due to changing hydrologic conditions in the soil. The proximity of the court to the stream slope also imposes increased risk for settlement at this location.

A pavement overlay for this court would not be a good option as the existing pavement section is not substantial enough to resist settlement cracking. Surface cracking and localized settlement would eventually migrate through a new asphalt overlay.

Removal and replacement of the pavement section is an option that can be considered. If replacement is selected for this location, then we recommend removal of the existing pavement completely and over-excavating the native subgrade. After excavating the native subgrade then imported structural fill or crushed rock should be placed to provide a more substantial base course for pavement.

The advantages of this site for a tennis court are the good drainage around the court and the lack of large trees in the vicinity, in addition to the location within the community.

3.2 Hi-Lo

Site drainage is a significant concern for the longevity of future improvements at the Hi-Lo tennis court. This court is in a natural low point for the area with slopes on all sides. No surface water outlet was observed at the site and it appears that runoff directed to this low point infiltrates in the vicinity of the tennis court and beyond the basketball court pavement.

Drainage improvements should be considered as an integral part of future improvements of the court at this location. Directing stormwater away from the courts as much as possible with swales or french drains would reduce the likelihood of saturating the pavement base course.

A pavement overlay is not recommended due to the amount of cracking and pavement distress. Pulverizing in-place and recompacting the existing pavement and subgrade prior to installing a new pavement layer with additional base course is an option that may be more cost effective than a full replacement.

3.3 Rampart

While some subgrade failure was observed, tree root upheaval was the primary cause of pavement failure at the Rampart court. Removal of trees near the court is recommended if this site is improved in the future. This will remove the root upheaval problem and allow for improvement to grades near the court.

There is a lot of topographic relief in the vicinity of the court with some areas draining toward the court and some sloping away. Re-grading slopes adjacent to the court to direct water away from the pavement is also recommended as part of any future improvement.

Pulverizing the existing asphalt layer in-place and recompact the existing pavement and subgrade prior to installing a new pavement layer with additional base course is also an option for this court.

3.4 General Recommendations for All courts

The surface condition at each of the 3 tennis courts would have greater longevity with the utilization of a more substantial pavement section. The current pavement section of approximately 2 inches of asphalt with 2 inches of crushed surfacing is on the lighter side for this type of improvement. If replacement of the courts is desired a thicker pavement section should be utilized.

It is also recommended that at the time of construction of improvements that CCA utilize a knowledgeable construction manager or engineer to observe and verify subgrade compaction and base course compaction during construction. Pavement placement for these types of facilities often do not have as critical of construction observation as roadways. Verifying the compaction and placement is a critical step to insure the best product.

Tennis net posts for all courts are failing. Net posts should be installed with a deeper concrete footing to withstand tension forces on the net cable.

The tennis court pavement surface should be installed with a continuous slope to ensure all stormwater is directed off the court surface. It is recommended that the court be a true plane sloping either from side to side or end to end rather than crowned at the net. A minimum slope of 1% is recommended. The vegetated soil at the perimeter edges of the courts should be sloped at a minimum of 5% away from the pavement edge.

4.0 PRELIMINARY COST INFORMATION

Project costs will ultimately depend on the desired future use and designed improvements determined for the tennis courts. This section provides general budgetary numbers for planning discussions.

4.1 Unit Costs

The following unit construction costs are provided for context and can be applied to each study area. Mobilization and general conditions costs will vary depending on the scope of work.

Table 1 – Unit Costs For Planning

Work Description	Budgetary Unit Cost
Removal of Existing Court Pavement	\$4 / Square Foot
Excavation and Grading	\$15 / Cubic Yard
10' Chain Link Fence Replacement	\$22/ Linear Foot
Asphalt pavement with new base course	\$4.50 / Square Foot
Acrylic Surfacing	\$1.50 / Square Foot
Tennis Net Posts and Footings	\$1,500 / Lump Sum
Pavement Crack sealing	\$3 / Linear Foot
Asphalt Seal Coat	\$0.25 / Square Foot
Tree removal	\$750 / Each
French Drain (for drainage)	\$30 / Linear Foot

4.2 Longmire

Performing minor repairs at the Longmire court may include crack sealing, minor reapplication of acrylic court surfacing, and minor grading. These minor repairs would cost approximately \$5,000 to \$10,000.

A total overhaul option for Longmire includes full demolition of the existing court surface, over-excavation to account for subgrade failures, subgrade replacement, a new asphalt surface, replaced net posts, and a new acrylic top layer. The total overhaul construction cost estimate ranges from approximately \$60,000 - \$80,000. Engineering and construction site inspection services can be estimated at an additional \$8,000.

4.3 Hi-Lo

Performing minor repairs at the Hi-Lo court may include crack sealing, minor asphalt patching, and excavation and regrading of drainage swales in the area surrounding the court to mitigate existing drainage issues. The minor estimate ranges from approximately \$10,000 - \$16,000.

A total overhaul option for Hi-Lo includes full demolition of the existing court surface, over-excavation to account for subgrade failures, subgrade replacement, a new asphalt surface, replaced net posts and footings, and regrading and excavation with the installation of

approximately 300 feet of french drain to intercept storm runoff and improve drainage conditions. The total overhaul estimate ranges from approximately \$70,000 - \$90,000. Engineering and construction site inspection services can be estimated at an additional \$8,000.

4.4 Rampart

Performing minor repairs at the Rampart court could include crack sealing, minor asphalt patching, and the removal of 4 trees nearest the court to prevent further root upheaval of the repaired court surface. The minor estimate ranges from approximately \$9,000 - \$15,000.

A total overhaul option for Rampart includes full demolition of the existing court surface, over-excavation to account for subgrade failures and root upheaval, subgrade replacement, a new asphalt surface, replaced net posts and footings, replaced chain link fence, and the removal of 10 trees nearest the court surface. The total overhaul estimate ranges from approximately \$60,000 - \$80,000. Engineering and construction site inspection services can be estimated at an additional \$8,000.