

# Pavement Evaluation Report

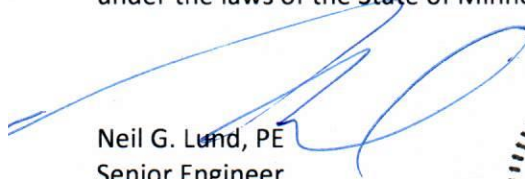
Victoria Ponds Pavement Assessment  
Victoria Ponds Townhome Community  
St. Louis Park, Minnesota

*Prepared for*

## Victoria Ponds Townhome Community

### Professional Certification:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



Neil G. Lund, PE  
Senior Engineer  
License Number: 46212  
June 14, 2019



Project B1903959

Braun Intertec Corporation

June 14, 2019

Project B1903959

Mr. Ken Braun  
Victoria Ponds Townhome Community  
Victoria Way  
St. Louis Park, MN 55426

Re: Pavement Evaluation  
Victoria Ponds Pavement Assessment  
Victoria Ponds Townhome Community  
St. Louis Park, Minnesota

Dear Mr. Braun:

We are pleased to present this Pavement Evaluation Report for the Victoria Ponds Pavement Assessment project.

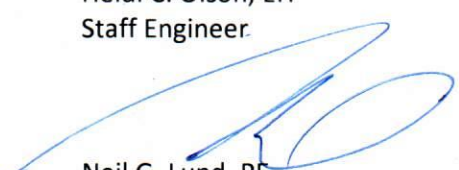
Thank you for making Braun Intertec your pavement consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Heidi Olson at 612.597.6244 (holson@braunintertec.com) or Neil Lund at 952.995.2284 (nlund@braunintertec.com).

Sincerely,

BRAUN INTERTEC CORPORATION

*Cotette Brandenburg for:*

Heidi C. Olson, EIT  
Staff Engineer



Neil G. Lund, PE  
Senior Engineer

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## **A. Introduction**

### **A.1. Project Description**

This Pavement Evaluation Report addresses the existing condition of the streets, driveways, and curb owned by the Victoria Ponds Townhome Community in St. Louis Park, Minnesota. We understand that the residents would like to repair the pavements within the community and create a routine maintenance plan.

### **A.2. Site Conditions and History**

The streets within Victoria Ponds Townhome Community are low-volume residential streets consisting of urban cross-sections with bituminous surfacing and concrete curb and gutter. The driveways are bituminous surfaced. According to the Reserve Advisors Report, the community has about 5,700 square yards of streets, about 3,600 square yards of driveways, and about 7,400 linear feet of concrete curb and gutter.

### **A.3. Purpose**

The purpose of our pavement evaluation was to determine the current pavement surface conditions and provide recommendations for a feasible repair approach and routine maintenance plan for the streets, driveways, and curb owned by the Victoria Ponds Townhome Community in St. Louis Park, Minnesota.

### **A.4. Background Information and Reference Documents**

We reviewed the following information:

- Communications with Mr. Ken Braun about the site and scope of work.
- Meeting with two residents of the townhome community, Mr. Dwight Fellman and Mr. Neil Bentley. The meeting included a walk-through of the community and discussions about construction history and maintenance.
- Full Reserve Study Report dated March 13, 2018 and Repair Forecast for 2018 through 2048 performed by Reserve Advisors, provided by Mr. Fellman.

- Aerial images on Google Earth, dated April 2018.
- Soils data from Web Soil Survey.

We have described our understanding of the proposed construction and site to the extent others reported it to us. Depending on the extent of available information, we may have made assumptions based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, the project team should notify us. New or changed information could require additional evaluation, analyses and/or recommendations.

#### **A.5. Scope of Services**

We performed our scope of services for the project in accordance with our Proposal QTB097050 to Mr. Ken Braun, dated April 12, 2019, and approved on April 22, 2019. The following list describes the tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.
- Performing a visual evaluation of the street, driveway, and curb surface conditions.
- Preparing this report containing a summary of the existing conditions, and our recommendations for the repair approach and design for the pavements owned by Victoria Ponds Townhome Community.

### **B. Visual Evaluation Results**

We performed a visual assessment of the streets and driveway on May 1, 2019, following the PASER rating system developed by the University of Wisconsin. We also performed an assessment of the curb conditions. During the assessment, the surface condition of each roadway, driveways, and curb was evaluated based on the amount of visible distresses. When reviewing distresses, the type, extent, and severity level was used to assign a numerical rating to the streets and driveways. A rating number between 1 and 10 was assigned, with 1 representing a failed pavement surface and 10 representing a new pavement surface in excellent condition.

Generally, paved roads with a surface condition rating of 7 or higher have little to no distresses present and are considered to be in “good” to “excellent” condition. Any cracking that is present is typically low severity, is sealed, and is widely spaced. These roads exhibit the first signs of aging and can be easily maintained with routine maintenance.

Pavements with a rating of 4 to 6 are considered to be in “fair” condition. These pavements typically have longitudinal and transverse cracking that is closely spaced and is showing signs of raveling and crack spalling. Pavement in this range may also exhibit extensive block cracking, patching in fair condition, and slight rutting in the wheelpaths.

“Poor” pavement surfaces have a rating of 3 or lower. Roadways assigned a rating of 3 or lower typically exhibit alligator cracking over more than 25 percent of the surface area and have low spots and potholes in poor condition.

## **B.1. Street Surface Condition**

The street surfaces received a PASER rating of 4, having frequent low to high severity transverse and longitudinal cracks and edge cracks, with some of the cracks sealed. There were localized areas of alligator cracking ranging from moderate to high severity throughout the community. Surface treatment delamination is also present throughout, especially near cracks. Based on conversations with Mr. Fellman, the streets were chip-sealed about 11 years ago. Patching was also common, with several larger patched areas. Mr. Fellman and Mr. Bentley said the larger patches were done 2018, and were performed at the full pavement depth (about 3 to 4 inches) where severe alligator cracking and potholes were present. The figures below show the noted distresses.

**Photo 1. High Severity Transverse Crack Previously Sealed, Victoria Way**



**Photo 2. High Severity Edge Cracking, Victoria Curve**



**Photo 3. Moderate Severity Alligator Cracking and Large Patch, Southeast end of Victoria Curve**



**Photo 4. Chip Seal and Surface Delamination, East Entrance to Community**



## **B.2. Driveway Surface Condition**

The driveways received a PASER rating of 4, having frequent low to moderate severity linear cracks, some developing into alligator cracking, and patching. Patching is especially common near concrete garage slabs and around utilities. Most driveways have settled and are no longer level with the concrete garage slabs and concrete curb. It appears some residents have had their driveways patched to level driveways with the adjacent garage slabs.

**Photo 5. Linear and Alligator Cracks**



**Photo 6. Settlement near Garage Slab**



**Photo 7. Patching at Curb Line and Garage Slab**



### **B.3. Curb Condition**

Some sections of curb are cracked and broken and some areas have settled, resulting in low points and ponding water. Although not common, some sections have faulted. Faulting was typically noted near storm drains and utilities. Most of the exterior perimeter curb was in generally good condition. The interior curb adjacent to the homes and especially at driveways, has more frequent distress and damage.

**Photo 8. Settled Curb with Ponding Water**



**Photo 9. Cracked Exterior Curb**



**Photo 10. Cracked Interior Curb at Driveway**



## **C. Discussion**

### **C.1. Design Details**

#### **C.1.a. Traffic Data**

Traffic information was not available. Given the residential nature of the streets, we anticipate they will not exceed 50,000 equivalent single axle loads (ESALs) over a 20-year period.

#### **C.1.b. Anticipated Grade Changes**

Given the existing structures and curb, we assume grade changes will be minimal. We should be notified if grade changes exceed 1 foot.

#### **C.1.c. Precautions Regarding Changed Information**

We have attempted to describe our understanding of the proposed construction to the extent it was reported to us by others. Depending on the extent of available information, assumptions may have been made based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, we should be notified. New or changed information could require additional evaluation, analyses and/or recommendations.

## **C.2. Concrete Curb Repair and Construction Considerations**

Based on conversations with Mr. Fellman, we understand that the residents are considering either full replacement or spot repairs of the concrete curb in the Victoria Ponds Townhome Community.

Full replacement of the concrete curb would include removing all of the curb in the Victoria Ponds Townhome Community. Because this requires space for the removal process and forms for the new curb, full replacement is often performed when pavements are being reconstructed.

Spot repairs would include removing and replacing sections of curb that are cracked or have settled and are preventing water from flowing properly to storm drains. Spot repairs require cutting out a small portion of the bituminous pavement section to place forms for the concrete. As such, we are performed following pavement removal and before any planned bituminous repairs.

Based on our visual evaluation, there are limited sections of curb that are cracked and settled and will require replacement, but overall the curb is in fair condition and overall have a remaining life on the order of 10 years.

In our opinion, panels exhibiting cracking or settlement should be removed and replaced for spot repair. Photos 9 and 10 above show examples of a cracked panel; Photo 8 shows settlement distress.

A reputable paving contractor can help select the curb sections requiring repair and provide replacement sections that match the existing curb profile, type and grade.

## **C.3. Bituminous Repair Options and Construction Considerations**

Some general options for bituminous repair for the Victoria Ponds Townhome Community are discussed below:

- **Crack and chip sealing:** Crack sealing and chip sealing or other surface treatments are often performed on pavements such as those Victoria Ponds Townhome Community as part of a routine maintenance program. However, this maintenance is not intended to repair areas of pavement showing evidence of structural damage or excessive cracking, and will have diminished effectiveness as pavements age. Typical service life of various preventive/routine maintenance work is about 2 to 5 years

- **Partial-Depth Mill and overlay:** If performed, partial-depth mill and overlay will provide a smooth, uniform surface. However, reflective cracking will inevitably develop within a year or less. The service life and effectiveness of a mill and overlay will also be reduced in pavements with extensive, high-severity cracking or material degradation, which can severely reduce the service life (and therefore cost-effectiveness) of the overlay treatment. Depending on existing conditions, a partial-depth mill and overlay will result in 8 to 14 years additional pavement life.
- **Full-depth Bituminous Removal:** This option involves removing the in-place bituminous section, regrading and compacting the existing aggregate base, followed by placement of a new bituminous section. This would be a less costly option than reconstruction and would help reduce exposure of the subgrade to the destabilizing effects of moisture and traffic. We note that this option requires fine grading and proofrolls to identify areas of soft and weak soils, and there is some risk of additional cost associated with these correction areas that will be unknown beforehand. Depending on the size of the pavement and local regulations, exposing the aggregate base/subgrade may trigger certain permitting and stormwater requirements that will increase project costs. This option normally provides a service life of about 14 to 18 years before additional major repairs are warranted, depending on the extent of correction work performed during construction and the frequency of maintenance.
- **Reconstruction:** This option includes full removal of the existing bituminous and underlying aggregate base materials. Following removal of the pavement layers, the exposed subgrade is regraded and proofrolled, followed by placement of a new pavement section. If performed, this option may provide up to 20 years of service life before additional repairs are warranted, depending on maintenance. It also provides the option to include a granular subbase in order to include drainage, reduce frost-heave severity, and likely further improve pavement service life.

Based on our review of the pavement surfaces of the streets and driveways, the existing conditions at Victoria Ponds are beyond the threshold for routine crack and chip sealing to be beneficial. The streets have significant cracking, with alligator cracking developed in areas, and most driveways have settled to some degree.

Based on the PASER Manual, pavements with a rating of 4 are in need of structural improvement. The manual recommends a structural mill and overlay of 2 inches or greater be performed. Several factors will make this type of repair difficult or may limit its cost-effectiveness:

- Based on conversations with Mr. Fellman and Mr. Bentley, who witnessed the full depth patching performed in 2018, the existing pavement is about 3 to 4 inches thick. Performing a mill and overlay of 2 inches or greater on pavement that is 3 inches thick may not leave a sufficient amount of pavement in place to support the construction traffic, which can complicate construction and result in cost overruns.
- Given the advanced age of the pavements, there is also a risk of poor bituminous material conditions in the subsurface that will be poor for long-term support for new bituminous layers.
- Finally, the relatively frequent cracking will quickly reflect through the overlay and require early and frequent maintenance to maintain the surface in a suitable state for the complex.

It is therefore our opinion that the pavements would benefit from full-depth bituminous removal. Full-depth bituminous removal will allow for regrading and compacting of the existing aggregate base while maintaining grade with the existing curb and structures. It will also eliminate the reflective cracking associated with a partial-depth mill and overlay, which will reduce the need for maintenance over the short term and provide a more attractive, smoother top surface for a longer period of time.

The new bituminous pavements repaired by this method should have a slightly lower service life than those of a fully reconstructed section, though at a much lower initial cost. We note above that this will require the aggregate base and subgrade are properly prepared per our recommendations, and as noted above, there may be some uncertainty prior to performing the work as to the degree of subcutting and rework of the subgrade will be necessary. We recommend requesting a unit rate for correction work and an estimate of total area for these corrections from the bidding contractors in order to budget properly for these contingencies.

We provide recommendations below based on the full-depth bituminous removal option.

## **D. Full-Depth Bituminous Removal Recommendations**

### **D.1. Excavations and Subgrade Preparations**

After stripping of the bituminous pavement section along the streets and driveways, we recommend recompacting the aggregate base to a minimum of 100 percent of the material's standard Proctor maximum dry density (per ASTM D698).

We recommend performing a proofroll over the prepared aggregate base to check for the presence of localized weak spots that require additional correction or stabilization. The proofroll should be performed with a fully loaded tandem axle truck, and should be observed by the geotechnical engineer. Areas that yield or rut more than 1/2 inch due to wheel traffic should be corrected by subcutting and backfilling with additional aggregate base or similar material and recompacting. The depth and type of backfill required will depend on the observed severity of rutting and/or deflection.

## D.2. Design Sections

We recommend that the new bituminous pavement section include the following materials and thicknesses per Table 1.

**Table 1. Recommended Bituminous Pavement Minimum Thickness**

Layer	Thickness (inches)		Specification/Designation
	Streets	Driveways	
Bituminous wear	4 (2 lifts)	3 (2 lifts)	MnDOT Spec. 2360 / SPWEA240C

## D.3. Materials and Compaction

We recommend compacting the exposed aggregate base to meet the requirements of the MnDOT penetration index method Specification 2211. All bituminous mixes should meet the requirements outlined in MnDOT Specification 2360. We recommend tack coat meeting MnDOT Specification 2357 be placed between the lifts and along vertical faces where paving will match adjacent pavement. We recommend Gyratory tests on bituminous mixes to evaluate strength and air voids, and density tests to evaluate compaction.

## **E. Qualifications**

### **E.1. Continuity of Professional Responsibility**

#### **E.1.a. Plan Review**

We based this report on a limited amount of information, and we made a number of assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.

#### **E.1.b. Construction Observations and Testing**

We recommend retaining us to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the borings and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

### **E.2. Use of Report**

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses, and recommendations may not be appropriate for other parties or projects.

### **E.3. Standard of Care**

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.