REPORT OF
PAVEMENT EVALUATION

YOUR PROJECT
Your Project’s Address
Your Project’s City and State

Your Project Identification

Prepared for
Your Company
[Report Date]

Your Company
Your Company’s Address

Attention:  Client

Subject:  Report of Pavement Evaluation
Your Facility
Your Facility’s Address
HCI Project No. 99-000000

Gentlemen:

Hunt Consulting, Inc. (HCI) is pleased to present the attached report of a pavement evaluation at [Your Facility] in [Your Facility’s Address]. The attached report presents our understanding of the project, our observations, and our recommendations. The Appendix of this report presents an Area and Local Vicinity Map, a Pavement Defect Plan, a Core Summary, a Project Cost Summary, and photographs of the conditions present. Drawing Sheets PD-1 through PD-3 are also attached. These drawings present the drawings, details and specifications for pavement repair.

The work was authorized by Mr. [Client] and was performed in general accordance with the contract between [Client] and HCI dated [Contract Date].

We appreciate the opportunity to provide you with this service. Please contact us with any questions you may have.

Sincerely,

Hunt Consulting, Inc.

Jeffrey A. Hunt, P.E.
President
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Figure 2 Pavement Defect Plan
Table 1 Core Summary
Table 2 Project Cost Summary
Photographs 1 through 26
Sheet PD-1 Pavement Repair Plan
Sheet PD-2 Striping Plan
Sheet PD-3 Technical Specifications and Details
1 PROJECT OVERVIEW

The following provides an overview of our findings. Details of our evaluations and recommendations are included in the sections that follow. We have generally followed the criteria and terminology of the “Distress Identifications Manual for Long-Term Pavement Performance Studies”, Document SHRP-TLPP/FR-90-001 of the Strategic Highway Research Program of the National Research Council for identifying the types and levels of pavement distress.

The pavement at this facility is generally in fair to poor condition and a major rehabilitation program is recommended. Pavement deterioration is generally related to the age of the pavement, inadequate repairs, and thickness inadequacies for current traffic. The most extensive, visible deterioration was in the drive lanes the rear of the store where deliveries occur and the area east of the front building entrance.

2 PURPOSE

The purpose of this evaluation was to obtain data and information to assess the overall condition of the pavement, define specific areas of distress, and develop recommendations for repair and maintenance. The sections that follow present a project overview, our understanding of the project, our observations, and our conclusions.

3 PROJECT INFORMATION

The referenced site is located at [Your Facility’s Address]. An Area and Local Vicinity Map is presented in Figure 1 of the Appendix of this report.

Based on information provided, the pavement at this facility is the original construction completed in 1968.

The pavement area evaluated at this store currently consists of approximately 37,950 square yards of asphaltic concrete.

We were provided with Drawings Sheets titled [Data Reference], last dated February 16, 1968 for use in preparing this report.

4 SCOPE OF SERVICES

Our work was completed in general accordance with [Client’s Requirements] included in our contract with [Client] dated [Contract Date].

5 OBSERVATIONS

Mr. Jeffrey A. Hunt of Hunt Consulting, Inc. visually inspected conditions in the paved areas and adjoining areas on [Site Visit Date]. Observations were recorded as written
notes and photographs. Representative photographs of these evaluations are included in the Appendix of this report.

All storm drainage structures were observed and noted in the same manner.

5.1 Pavement Condition

The asphaltic concrete pavement at this facility is considered in generally fair to poor condition.

The pavement areas leading from the north and south entrances to the rear of the store and the parking areas east of the building were generally in the worst condition. The majority of this area exhibited medium to high severity pavement distress. Types of pavement distresses include alligator (fatigue) cracking (Reference Photographs 3, 4, 6, 7, 11, 14, 19, 20, 22, 23, 25 and 26), longitudinal cracking (Reference Photographs 6, 11), edge cracking (Reference Photographs 18 and 20), and potholes and depressions (Reference Photographs 3, 4, 5, and 23).

The remaining portions of the pavement exhibited low to medium severity distress including longitudinal and block cracking (Reference Photographs 8, 9, 10, 12, 15, 16 and 17) and some depressions from utility repairs (Reference Photographs 8 and 13). The majority of the longitudinal and block cracks in this area were filled with vegetative growth.

The general areas of pavement distress and repairs are presented in Figure 2, Pavement Defect Plan presented in the Appendix of this report.

5.2 Drainage

The following presents drainage conditions observed at this project.

5.2.1 East (Front) Pavement Area

Drainage on the east (front) side of the building is toward four catch basins near the center of the pavement area.

There were three nominal two feet by three feet square catch basins that appear to be original construction and one nominal two-foot diameter catch basin.

The catch basins were free of debris, however, the grating for one of the catch basins was damaged and the area around the drains was generally depressed. This depression may indicate inadequacies in the under-drain system.

In general the east pavement area appeared to have adequate drainage except at one small depression where ponding was noted (Reference Photograph 5).
5.2.2 North Pavement Area

Drainage in the north pavement area is toward a shallow drainage ditch at the north and west pavement edges.

Drainage from the roof surface was through downspouts that discharge onto the pavement surface. Portions of the downspouts were missing resulting in water free fall. This condition has resulted in substantial erosion and deterioration of the building’s exterior masonry wall and erosion of the pavement surface (Reference Photograph 24).

There was evidence of ponded water adjacent to the north side of the building.

5.2.3 West Pavement Area

Drainage in the west (rear) pavement area is generally to the west pavement edge and a drainage swale containing two inlets. A slot drain is present at the base of the loading dock ramp. Silt and debris is present in the drain, however, the drain appeared to be functioning adequately at the time of our site visit.

A plastic drainage pipe discharges onto the pavement surface at one location. Application of an asphalt overlay will require modification of the pipe to accommodate a higher grade.

5.2.4 South Pavement Area

Drainage in the south pavement area is toward a shallow drainage ditch at the south pavement edge. The drainage ditch empties into an inlet drain. The inlet drain was lined with corrugated metal and was covered with a wood skid. Some debris was present in the inlet. Erosion was noted around the drain inlet (Reference Photograph 18).

5.3 Patching

Numerous isolated patches have been applied with asphaltic materials. The majority of the repairs have been performed in the higher traffic areas that access the rear of the store from the north and south entrances on the east side of the property.

Repairs appeared to vary in age with some repairs being applied over previous repairs. Repair methods included saw cutting and replacing sections of asphalt, filling potholes and "skim patching" (Reference Photographs 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 23, 25 and 26).

Many of the patches were deteriorated at the edges or exhibited spalling.

5.4 Traffic Usage

Traffic usage observed at the time of our site visit consisted of passenger car traffic, tractor trailer and van traffic. [Site Contact], store manager, indicated that approximately four
semi-tractor trailers and four vans or garbage trucks per day access the rear of the store from the north and south entrances on the east side of the property.

[Site Contact] also indicated that there approximately 1500 customers per day.

We noted that numerous containers and semi-tractor trailers were parked at the south end of the east pavement area and adjacent to the building on the west pavement area.

5.5 Pavement Age

Based on information provided, the pavement was installed at the time of construction in 1968.

5.6 Curbs

Concrete curbs are present at sidewalks adjacent to the east side of the building. Concrete vehicle wheel stops border the south and north pavement edges. Asphalt curbs border the majority of the east pavement edge. Concrete curbs are present at the east parking entrances and at traffic islands. Many of the concrete wheel stops are dislodged or damaged and the majority are substantially deteriorated (Reference Photographs 2, 16, 18 and 25). Curbs at the sidewalk are generally in good condition and portions appear to have been replaced during recent modifications. Curbs at the sidewalk extend approximately six inches above the pavement surface.

5.7 Sidewalks and Slabs

Concrete sidewalks are present adjacent to the building on the east (front) side of the building. Concrete sidewalks are in good to poor condition. Some sections of the sidewalk have recently been replaced. There are three concrete handicap accessible ramps that extend into the pavement area and up the curb that appear to have been installed during recent renovations.

Concrete slabs are present at the west (rear) side of the building beneath a loading dock canopy and within a fenced enclosure on the south side of the building at the Garden Center. The slabs are in good to fair condition.

There is a concrete loading dock ramp at the rear of the store. The slab is in fair condition exhibiting some surface spalling.

There is one slab present on the west side of the building that is utilized for a trash compactor pad. These slabs are in poor condition exhibiting substantial spalling and exposed reinforcing steel.
5.8 Other Conditions

We also noted that several of the light posts in the east pavement area appeared to lean (Reference Photograph 17).

6 EXPLORATIONS AND TESTS

The pavement was cored at three select locations. Core locations are presented on Figure 2 in the Appendix of this report. Pavement and base course thickness were measured at each location. The moisture condition of the base course and subgrade was noted. A hand auger boring was advanced into the subgrade to obtain samples of underlying soils and for visual classification.

Measurements and observations at each core location are presented in Table 1, Core Summary, in the Appendix of this report.

7 CONCLUSIONS

In our opinion, distresses in the asphaltic concrete pavement areas have resulted from:

- Aging and weathering (estimated 30 years old)
- Inadequate repairs
- Inadequate pavement and base course thickness in drive lanes for long term pavement performance under current traffic conditions
- Inadequate under drain conditions at catch basin inlets.

Except at areas of severe alligator (fatigue) cracking and potholes, the distress appears to be generally isolated to the asphaltic concrete. The fatigue cracking does not appear to have resulted from or contributed to excessively weakened conditions in the base course or subgrade materials.

8 RECOMMENDATIONS

The sections that follow present alternatives for 5-year and 10-year repair service design lives. We have considered the use of an overlay drive lanes to the rear of the building. However, base course thickness data obtained from cores, and pavement thickness and condition require an overlay thickness approaching the curb height at the sidewalk and would most likely significantly affect drainage patterns. Therefore, we have limited our recommendations to milling the asphalt prior to application of an overlay in access lanes to the rear of the building.

The heavy-duty area assumes that the majority of semi-tractor trailer traffic will continue to enter at the north entrance and leave at the southeast exit. The heavy duty area at the south side of the property has been widened to accommodate turning radius of semi-tractor trailers and the tendency of these vehicles to travel both east-bound lanes when parked cars are not present.
Based on traffic and loading patterns observed and reported we have separated the pavement into two areas as follows:

- **Regular Duty**: Pavement areas exposed to passenger car traffic and parking.
- **Heavy Duty**: Pavement areas exposed to delivery truck and passenger car traffic and container storage.

Our recommendations for five and ten-year repair design alternatives is presented in the sections that follow. An opinion of costs for these alternatives is presented in Table 2, *Project Cost Summary* of the Appendix.

### 8.1 Five Year Repair Design Life

In our opinion, repairs for a 5-year repair design life should include full-depth repair at highly distressed areas and potholes, filling cracks to minimize reflective cracking and application of an overlay as follows:

- **Regular Duty Pavement Areas**: 1.5 inches

  Repair of the pavement in the "Heavy Duty Repair Area" should include milling or complete removal of the existing asphalt pavement to a depth of two inches. Since cores indicate a two-inch pavement thickness in some locations, the aggregate base course will most likely be exposed in some areas after milling. The exposed aggregate base course should be proof-rolled and any yielding areas removed and replaced with appropriate materials. The prepared surfaces should be overlain with an application of the following thickness of pavement consisting of binder and wearing course.

- **Heavy Duty Pavement Area**: 3.5 inches

  In addition, concrete wheel stops should be replaced and utilities such as manholes and catch basins should be raised. Also, the catch basins should be repaired to provide adequate drainage of the aggregate base course and appropriate inlet covers. Since available drawings indicate a somewhat different catch basin construction than was observed in the field. Some modification of the design may be required once the area around the catch basin is exposed.

  A more detailed description of each repair is presented in Sections 8.4 and 8.5. Drawings, details and technical specifications for these repairs are presented in Sheets PD-1 through PD-3 attached to this report.

### 8.2 Ten Year Repair Design Life

In our opinion, repairs for a 10-year repair design life should include full-depth repair at highly distressed areas and potholes, filling cracks to minimize reflective cracking and application of an overlay as follows:
Repair of the pavement in the "Heavy Duty Repair Area" should include milling or complete removal of the existing asphalt pavement and a portion of the base course to a depth of 3-1/2 inches. Cores indicate that the maximum depth of pavement is 3-1/2 inches. In the event that the asphalt thickness is greater in some areas, over-excavation of the areas and replacement to the desired grade with suitable compacted aggregate base course will be required. The exposed aggregate base course should be proof-rolled and any yielding areas removed and replaced with appropriate materials. The prepared surfaces should be overlain with an application of the following thickness of pavement consisting of binder and wearing course.

**Heavy Duty Pavement Area** 5.5 inches

In addition concrete wheel stops should be replaced and utilities such as manholes and catch basins should be raised. Also, the catch basins should be repaired to provide adequate drainage of the aggregate base course and appropriate inlet covers. Since available drawings indicate a somewhat different catch basin construction than was observed in the field. Some modification of the design may be required once the area around the catch basin is exposed.

A more detailed description of each repair is presented in Sections 8.4 and 8.5. Drawings, details and technical specifications for these repairs are presented in Sheets PD-1 through PD-3 attached to this report.

### 8.3 Concrete Replacement-Area

1. Remove the existing trash compactor and shoot.
2. Remove Portland Cement Concrete and soil subgrade in the areas labeled as “Concrete Replacement Area” on the attached Sheet PD-1, *Pavement Evaluation* as necessary to achieve a minimum depth of 10-inches below the existing surface.
3. Proof roll the exposed subgrade and undercut and replace any soft or wet areas and any areas judged to deflect excessively. Replace with approved, aggregate base material in maximum eight-inch thick compacted lifts.
4. Separate existing concrete surfaces with ½ inch thick asphalt impregnated joint filler.
5. Install anchor embeds to match existing conditions and compactor manufacturer's current requirements.
6. Place and 4-inch thick compacted layer of aggregate base course material.
7. Place a 6-inch thick layer of un-reinforced concrete complying with the following:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Requirement</th>
</tr>
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<tbody>
<tr>
<td>Compressive Strength (28-day)</td>
<td>4,000 psi</td>
</tr>
<tr>
<td>Air Entrained</td>
<td>3 to 5 percent</td>
</tr>
<tr>
<td>Slump</td>
<td>3 to 5 inches</td>
</tr>
</tbody>
</table>

8. Install sawed contraction joints on maximum 12 feet centers or as soon as concrete can be cut without raveling.


8.4 Full Depth Repair Areas

1. Full depth repairs will not be required in the Heavy Duty Repair Area.
2. Mark the areas to be removed at least one foot outside the distressed area. The outline should be rectangular with two sides at right angles to the direction of traffic.
3. Excavate the pavement. Remove the aggregate base and subgrade at locations shown on drawing as necessary to reach a firm support. The faces of the excavation should be straight, vertical and solid.
4. Trim and compact exposed base to establish firm foundation.
5. Apply a tack coat to the exposed areas.
6. Install new asphaltic concrete binder and wearing courses to match binder and wearing course grades specified in the repair areas.

8.5 Crack Repair

1. Clean cracks using high-pressure air and brooming. Hand excavating equipment may be necessary to remove collected silt and vegetation.
2. Apply hot rubberized asphalt crack sealant beginning from the bottom of the crack with an injection wand. Cracks wider than ½ inch may be sealed with a compacted sand and asphalt mixture.
APPENDIX

FIGURES AND PHOTOGRAPHS
FIGURE 1
Area and Local Vicinity Map
[Your Project’s Identification and Address]
Source: Delorme, Street Atlas USA Version 5.0
Scale: None
LEGEND
- POTHOLE OR DIPRESSION
- BLOCK LONGITUDINAL CRACKING
- ALLIGATOR (PANIC) CRACKING
- REPAIR AREA
- PHOTO LOCATION AND DIRECTION
- ➥ CONE LOCATION
- ➤ LIGHT POST
- ➡ CATCH BASIN
- ➤ MANHOLE
- ➤ RAILROAD

Note:
DIMENSIONS AND LOCATIONS ARE APPROXIMATE AND MAY HAVE BEEN INCREASED OR DECREASED FOR LEGIBILITY OR PERSPECTIVE. ALL ITEMS MAY NOT HAVE BEEN SHOWN. DIMENSIONS WERE FIELD DETERMINED BY PASSING.
<table>
<thead>
<tr>
<th>Core No.</th>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC-1</td>
<td>0 to 3-1/2 inches</td>
<td>Asphalt (1-3/4 inch wearing course)</td>
</tr>
<tr>
<td>PC-1</td>
<td>3-1/2 to 9-1/2 inches</td>
<td>Crushed stone</td>
</tr>
<tr>
<td>PC-1</td>
<td>9-1/2 to 12 inches</td>
<td>Brown and gray clay with gravel</td>
</tr>
<tr>
<td></td>
<td>(Core terminated at 12 inches-refusal)</td>
<td></td>
</tr>
<tr>
<td>PC-2</td>
<td>0 to 2 inches</td>
<td>Asphalt</td>
</tr>
<tr>
<td>PC-2</td>
<td>2 to 12 inches</td>
<td>Crushed stone</td>
</tr>
<tr>
<td>PC-2</td>
<td>12 to 15-1/2 inches</td>
<td>Brown, gray and black clay with gravel trending to gray-green clay</td>
</tr>
<tr>
<td></td>
<td>(Core terminated at 15-1/2 inches)</td>
<td></td>
</tr>
<tr>
<td>PC-3</td>
<td>0 to 2 inches</td>
<td>Asphalt</td>
</tr>
<tr>
<td>PC-3</td>
<td>2 to 8 inches</td>
<td>Crushed stone</td>
</tr>
<tr>
<td>PC-3</td>
<td>8 to 12 inches</td>
<td>Gray and black sandy clay with gravel and glass fragment (fill)</td>
</tr>
<tr>
<td></td>
<td>(Core terminated at 12 inches)</td>
<td></td>
</tr>
</tbody>
</table>
PHOTOGRAPH 1
[Your Project] building identification looking southwest.

PHOTOGRAPH 2
View of north entrance drive and repairs.
PHOTOGRAPH 3
View of high severity alligator (fatigue) cracking, depression and repairs in east pavement area.

PHOTOGRAPH 4
View of alligator cracking, repairs and depression at catch basin inlet.
PHOTOGRAPH 5
View of depression and ponding water.

PHOTOGRAPH 6
View of high severity alligator cracking, depression and longitudinal cracking at drive lane east of building looking south.
PHOTOGRAPH 7
View of high severity alligator cracking and repairs along drive lane.

PHOTOGRAPH 8
View of block cracking and depression at trench repair between light posts.
PHOTOGRAPH 9
Block cracking and faded striping in eastern portion of east pavement area looking south.

PHOTOGRAPH 10
View of repair (right) and high severity alligator cracking in drive lane.
PHOTOGRAPH 11
View of high severity alligator cracking, longitudinal cracking and repairs present at south side of east pavement area.

PHOTOGRAPH 12
View of block cracking and repair in drive lane.
PHOTOGRAPH 13
View of depression at utility trench repair between light posts.

PHOTOGRAPH 14
Alligator cracking at south portion of east pavement area in the vicinity of the south entrance.
PHOTOGRAPH 15
Repairs and alligator cracking at south entrance of east pavement area.

PHOTOGRAPH 16
Block cracking with vegetation in cracks at south edge of east pavement area.
PHOTOGRAPH 17
Block cracking at south portion of east pavement area looking north. Note also that light poles are skewed substantially.

PHOTOGRAPH 18
Dislodged concrete wheel stops at south end of east pavement area. Note alligator and edge cracking. Note also wooden skid covering inadequate storm drain opening.
PHOTOGRAPH 19
High severity alligator (fatigue) cracking at south pavement area. Note repair at right.

PHOTOGRAPH 20
High severity alligator cracking and edge cracking at west pavement area (rear of building). Note semi-tractor trailer's front wheels are in the grassy area.
PHOTOGRAPH 21
Damaged ballard at fire hydrant at west edge of pavement and rear of building. Note also edge cracking.

PHOTOGRAPH 22
High severity alligator (fatigue) cracking near trash compactor at west (rear) pavement area. Note concrete pad for trash compactor is extensively deteriorated.
PHOTOGRAPH 23
High severity alligator (fatigue) cracking, potholes and numerous repairs at north pavement area.

PHOTOGRAPH 24
Wall deterioration at inadequate downspout at rear of building (condition present at several locations).
PHOTOGRAPH 25
View of north pavement area looking west. Note potholes, repairs, alligator cracking and dislodged and deteriorated concrete wheel stops.

PHOTOGRAPH 26
View of high severity alligator cracking and repairs in drive lane at north end of east pavement area looking east.