

GOODYEAR BALLPARK STADIUM
1933 SOUTH BALLPARK WAY
GOODYEAR, ARIZONA

G&A Job No. 6166.1 F

LIMITED FACILITY EVALUATION

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STRUCTURAL, FORENSIC, CIVIL ENGINEERS & SURVEYORS

BACKGROUND & SCOPE

The Goodyear Ballpark is located at 1933 South Baseball Way in Goodyear, Arizona and was built in 2008. It is the spring training baseball facility for the Cleveland Indians and the Cincinnati Reds. The facility is owned by the City of Goodyear and was designed by HOK Sport, Inc.

During the installation of utilities for a concession stand in the Right Field Pavilion, the contractor drilled a hole from the Clubhouse up through the structural floor slab. It was reported that significant amounts of water started running out of the drilled hole. It was estimated that between 200 and 300 gallons of water flowed out of the drilled hole. Corrosion damages were also observed in the Service Level along Column Line F1 on structural steel and metal deck. This damage has prompted the City of Goodyear to have an evaluation of the facility preformed.

As part of the limited facility evaluation for the City of Goodyear, Gervasio & Assoc., Inc. (G&A) was asked to investigate the current structural and waterproofing condition of the Goodyear Ballpark.

Our assignment was limited to:

1. Identifying and documenting areas of visible structural deterioration, where accessible;
2. Identifying and documenting areas of visible water penetration; and
3. Prioritizing identified issues for the Owner to manage repairs and budgeting.

Limited structural calculations were preformed on the outfield guardrail only and no other analysis or testing was preformed.

EXECUTIVE SUMMARY

Based on the results of our investigation, we identified different types of deterioration. The repairs needed can be broken down into categories of how soon we recommend the repairs should be done.

The following should be done before the 2018 spring baseball season:

- The outfield guardrails are dangerous as defined by the building code and should be repaired before any public events are held that utilize the sloped grassed berm seating areas. The guardrail repair drawings and specifications are included in Appendix F. If all of the guardrail repairs cannot be made before public use, an interim guardrail fence should be installed.
- The broken and missing detectable warning tiles at the head of the bowl seating aisles need to be fixed as they create a tripping hazard.

- The repairs of the corroded structural steel and the installation of the deck drains at the Right Field Pavilion are needed to halt the deterioration and water damage to the steel structure of the building.
- The waterproofing/traffic coating on the third floor Observation Deck needs to be repaired to avoid water intrusion into the building.
- The open joint in the CMU wall at the Right Field Pavilion needs to be fixed to control water intrusion into the building.

The following can be postponed until after the 2018 spring baseball season:

- Corrosion of the steel posts at handrails and guardrails, at the steel base plates, at the bolts for bowl seating, and the damaged concrete walls and curbs should be removed and repaired or replaced. Corrosion on structural steel should be removed, repaired, and re-coated with epoxy or a high quality galvanizing coating.
- Silicone sealant should be applied around the perimeter of all steel columns where set into concrete.
- There is corroded metal siding base trim at the second floor suite terrace that needs remediation.

The following can be preformed as part of normal maintenance:

- Exposed cast iron sewer pipe should be monitored for signs of corrosion/leaks and replaced as needed.
- Corroded beam clamps for pipe hangers should be replaced.

There are maintenance issues of broken and exposed outlets and communication devices.

The following observed conditions require further investigation to determine what correction actions may be needed:

- The concrete retaining wall in the outfield along the first base line and the retaining walls on the north side of the field access driveway at the right field pavilion that have been pushed out of plumb. Further investigation of the cause of the movement, the determination of a corrective action, structural analysis, and repair drawings and specification will be needed.
- There is deterioration of the southeast CMU wall at the outfield concession stand building that needs to be repaired.
- There is water intrusion at the northeast wall into the ground keeper's area under the outfield concession stand building.

- The sewer water leak in front of the Right Field Pavilion elevator at the Clubhouse level needs to be repaired (It is reported that this repair has now been done.)
- There are cracks in concrete elements that should be individually evaluated to determine the appropriate repair.
- The stair landings for Stair 2 (3-story stair) at the main building is not constructed per construction drawings. Further structural analysis should be performed to confirm the as-built construction is adequate.

There are conditions that should be monitored but where no action is required

- The sprayed foam roofing systems on the buildings appear to be wearing normally and should not require to be re-coated until the end of their warranty period.
- The galvanized field lighting poles showed no visible sign of corrosion.

INVESTIGATION

During the course of our investigation we performed the following tasks:

1. Ward Hollon, R.A. of G&A performed five (5) site visits on 10/17/17, 11/6/17, 11/19/17, 11/15/17, and 12/7/17 during which the visible conditions were photographed and documented. See Appendix B for photo locations and field notes.
2. Dennis Wipf, P.E. of G&A performed numerous site visits during the investigation and repairs of the water intrusion at the Right Field Pavilion during fall of 2016 and fall and winter of 2017.
3. On 11/16/17, Mr. Hollon interviewed the following of the ballpark staff members selected by the City of Goodyear:
 - Bruce Kessman, General Manager;
 - Scott Dobbins, Superintendent; and
 - Tristin Litherland, Foreman.
4. We reviewed the available original contract construction drawings that pertained to the areas of G&A's observations. The drawings were limited to as-built drawings for structural, architectural, mechanical, electrical, and plumbing drawings and limited number of requests for information (RFIs).

FINDINGS, CONCLUSIONS & RECOMMENDATIONS

Description:

The Goodyear Ballpark is located at 1933 South Baseball Way in Goodyear, Arizona. The facility consists of:

- The playing field with dugouts and pitcher's bullpens;
- The seating bowl with shaded "club" seating;
- The main building behind the seating bowl;
- The right field pavilion and team clubhouses;
- The outfield concession stand;
- Sloped grass berm seating areas and scoreboard; and
- Surrounding landscaping and parking lots. (No observation or investigation was done in the surrounding landscaped areas or parking lots).

The ballpark is enclosed by an 8 ft. high steel wire mesh fence. Access to the facility is through gates at the first base, home plate, third base and center field sides of the ballpark.

Playing Field

The playing field is separated from the seating bowl by a 25 in. high padded steel guardrail. The dugouts are located along the first and third base lines and are constructed of concrete. Concrete retaining walls with sloping tops from 4 ft. to 17 ft. high are used along the first base and third base lines. CMU retaining walls, 10 ft. high, are used around the outfield line and pitcher's bull pens. The bull pens' restrooms are concrete.

Seating Bowl

The seating bowl is cast-in-place concrete risers with individual armchair seats. There are twenty-one (21) aisles which extend from the bottom row of seating to the top of the bowl. There are intermittent steel handrails in the center of each aisle and a tile detectable warning landing at the top of each aisle at the concourse level. There is also shaded "club" cushioned armchair seating for the upper nine rows of seating along the third base line.

Main Building

The main building has a 3-story center structure with 1-story wings on each side. The building structure is load bearing CMU walls and steel bar joists with metal roof deck covered by sprayed polyurethane foam (SPF)

roofing. The first floor is slab-on-grade concrete. The second and third floors are concrete slabs over metal decking on steel bar joists. The 3-story stair and elevator tower has concrete walls with a steel bar joint and metal roof deck. At the concourse level are concession stands, restrooms, a team shop, and ticket booth. Facing the outside of the facility are private development spaces. The second floor contains the press box, six spectator suites with a common canopy covered patio, restrooms, and the administrative offices for the facility. The third floor has a canopy covered observation deck. The canopies are steel framed structures with metal roof deck. The three floors are connected by an elevator and exit stairs.

Right Field Pavilion and Team Clubhouses

The Right Field Pavilion and team clubhouses are behind right field. The lower level has concrete foundation walls and the structure above grade is CMU walls. The lower level floor is slab-in-grade concrete. The upper floor is concrete over metal deck on steel beams. At the concourse level there are three levels of spectator seating. The raised viewing terraces are concrete slabs cast over high density foam blocks. The structural concrete floor slab is covered by a waterproofing membrane with a concrete topping slab. The high density foam blocks are placed on the topping slab. The concrete viewing terraces are covered with a traffic coating. There are also restrooms and stairs and an elevator connecting the two levels. This area is covered by a steel bar joists and metal deck roof with SPF roofing. The upper terrace has a refreshment bar and is covered by a steel framed canopy with a metal roof deck. The two team clubhouses and a batting cage are in the lower level of the pavilion with access to the playing field. There is an access drive to the playing field through a tunnel at the north end of the pavilion. There are concrete retaining walls with sloped tops from 10 ft. to 18 ft. high on each side of the access way.

Outfield Concession Stand

There is a concession stand at center field. The foundation walls are concrete with CMU walls above grade. The lower level floor is slab-on-grade concrete. The upper level floor is a concrete slab over metal deck supported by steel beams. The roof is metal roof deck on steel bar joists with SPF roofing. The upper level contains a concession stand and restrooms. Access is from the opposite side as the playing field. The lower level of the building at the playing field level is the grounds keeper's equipment storage space.

Sloped Grass Berm Seating Areas and Scoreboard

Around the outfield from the third base line to the right field pavilion, there are sloped grass berm seating areas behind the bull pens and on each side of the outfield concession stand. The sloped grade of the seating area is behind 10 ft. high CMU retaining walls. There are steel guardrails on top of the retaining walls. Between the top of the retaining wall and the grass area is a trench drain set in concrete to collect water runoff. At the top of the sloped grass berm seating area behind the bullpens is the scoreboard. The base of the scoreboard is surrounded by a concrete seating patio.

Repair Categories:

G&A has developed six (6) levels of deterioration categories to assist the Owner in prioritizing its repairs as follows. Categories are ranked from most serious (Category 1) to the least serious (Category 6):

- Category 1: Conditions that require immediate repairs.
- Category 2: Conditions that require repairs that can be deferred until after the 2018 spring baseball season.
- Category 3: Conditions that can be deferred until after the 2018 spring baseball season and repaired as part of normal maintenance.
- Category 4: Conditions that are maintenance issues.
- Category 5: Conditions that require further investigation.
- Category 6: Other observations where no action is required.

Category 1 - Conditions That Require Immediate Repairs:

The repairs of the following observed conditions need immediate attention. Some of these repairs are for hazardous conditions that need to be done before the facility is used for the 2018 spring baseball season or other public events. Other repairs are due to original design/construction and maintenance conditions. Deferring these repairs will allow conditions that are causing structural deterioration to continue and accelerate; thereby leading to more expensive repairs in the future.

A. Corroded Steel Guardrail Posts

There are galvanized steel guardrails around the pitcher's bullpens in the left outfield (Photo F17) and the right field grass berm seating area. East of the bullpens and south of the Outfield Concession Stand are sloped grass berm areas for spectator seating. The guardrail is set on top of an approximately 10 ft. high concrete masonry unit (CMU) retaining wall around the bullpens and the right field grass berm seating area. The guardrail posts are welded to bearing plates cast into the top of the CMU wall. The base of the posts set into the CMU wall and the bearing plates have severely corroded. In some locations the post is corroded completely through the thickness of the post pipe wall. Corrosion has caused the steel to expand in volume and has stressed the CMU cap block, causing it to split and lose adhesion to the top of the wall (See Photos F10, F12 & F13).

See Photos in Appendix C.

We conclude this guardrail is dangerous as defined by the building code and could endanger spectators and require repair or an interim solution before the 2018 spring baseball season. Preliminary structural calculations indicate that the guardrail in its current state of deterioration cannot support the Code required lateral loading and could fail if this load is applied by spectators (See calculation in Appendix E.) The City has expressed concern that there is insufficient time for a full repair before the 2018 spring baseball season.

We recommend as an interim solution, that a secondary temporary guardrail fence be installed a few feet back from the existing guardrail at the bull pens and the right field grass berm seating area. For ease of construction, this could be placed along the back edge of the concrete encasement of the trench drains and along the east end of the bullpens and the east side of the right field grass berm seating area. This guardrail should consist of a 42 in. high chain link fence with posts and two pipe rails. Warning signs should be attached to the fence that there be no entry beyond these fences. The ballpark staff also suggested they would have staff in these area during games to monitor that spectators do not go beyond the fence. Construction drawings and structural calculations would be needed for this guardrail fence.

B. Right Field Pavilion Deck Drains

The concrete structural slab at the concourse level is the roof slab of the service level. This slab is covered with a peel and stick waterproofing with a drainage mat over the membrane. Our investigation determined that water intrusion at the Right Field Pavilion had caused corroded areas of the metal deck supporting the Concourse Level structural concrete slab, steel beams supporting the deck, and steel columns and bracing in the Service Level.

The corrosion that is occurring at Right Field Pavilion (Photos A3 & A8) has already been identified in the G&A Report of January 9, 2017 (See Appendix D). Water from storms and from wash down cleaning has seeped through cracks in the waterproofing coating (Photos J7 & J8) on the concrete party decks. This water was trapped in the drainage mat over the waterproofing membrane at the level of the structural concrete slabs. The original design had no provision for drains or an exit path for the trapped water. Water infiltration has been most severe along the steel beam at Column Line F1. This beam supports both the upper and lower structural concrete decks.

It was reported during the interview with the ballpark staff that there was also a concern that irrigation water getting onto the walking deck on the east side of the pavilion was contributing to the water intrusion on the upper structural slab. The construction of the concrete sidewalk in this area is a split slab consisting of, from the bottom up, a structural concrete slab cast on a metal deck, a peel and stick waterproofing membrane, a honeycombed drainage mat to collect any water above the membrane, and a concrete sidewalk topping slab. We observed that the deck drains in the sidewalk included drainage opening at the level of the waterproofing membrane to drain any water from the drainage mat. This drain is known as a promenade drain and is correct for this installation (Photos A35 & A38).

See Photos in Appendix C.

We conclude that the traffic coating on the concrete terraces allowed water to infiltrate the structure. The water was collected in the drainage mat above the waterproofing membrane. The trapped water eventually found some pathways through or around the waterproofing membrane and caused corrosion the structural steel elements in some locations. The hydrostatic pressure of the collected water pushed the water to leak at seams in the membrane and at terminations at the edges of the membrane, especially at the low point over Column Line F1. Deck drains should have been installed at the level of the concrete structural slabs to drain the collected water.

We recommended cutting open the deck along the steel beam at Column Line F1 and adding deck drains. These repairs to provide deck drains for the drainage mat over the waterproofing membrane are already underway (Photos F1 & F38). The corrosion has been removed from the structural steel elements and the bare metal coated with epoxy to prevent future corrosion. These repairs will be complete before the 2018 spring baseball season.

C. Broken/Missing Tile

We observed broken and missing pieces of detectable warning tiles that are set into the slab-on-grade concrete concourse sidewalk at the head of seating bowl aisles. G&A observed broken and missing tile at the head of aisle for Sections 117 & 188, Sections 109 & 110, Sections 103 & 104 (Photo G28), and Sections 101 & 102.

See Photos in Appendix C.

We conclude the broken and missing tiles present a tripping hazard. The cause for the damaged tile could not be determined. Further investigation should be done before repairing/replacing the tiles to determine if the tiles were damaged by abuse or if there is an underlying issue of support or setting bed failure.

We recommend that all broken and missing tiles at the head of the seating aisle be replaced before the 2018 spring baseball season. The tiles at the head of all aisles should be re-examined to verify other tiles do not need to be replaced.

D. Bubble in Waterproofing Coating

We observed an approximately 6 in. round bubble in the waterproofing coating at the third floor Observation Deck. The bubble is just south of the door into the elevator lobby.

See Photo H55 in Appendix C.

We conclude moisture vapor transmission (MVT) pressure under the waterproofing/traffic coating has caused the coating to delaminate from the concrete floor slab collected in the bubble. If this bubble is ruptured, it will create a path for water intrusion into the second floor ceiling. This type of bubble is typically caused when moisture gets between the metal roof deck and the surface applied traffic coating creating enough MVT pressure to blow off the traffic bearing waterproofing. The failure mode in these conditions is on the surface of the concrete. When you remove the bubble there is usually some concrete residue on the underside of the coating and there is usually either standing water under the bubble or discoloration from the moisture.

We recommend this defect in the waterproofing/traffic coating be repaired before the 2018 spring baseball season to avoid water intrusion into the building. The bubble should be removed and the surface of the underlying concrete examined. If there is deterioration of the concrete, the deteriorated

concrete should be removed and repaired before reapplying new waterproofing/traffic coating. Using a moisture mitigation primer on the concrete under the repair can hold off MVT pressure between 20 and 25 pounds per square inch (psi). But it may also alter the path of least resistance through the slab, causing a build up of MVT pressure in another area and another bubble to form. If this continues to happen, the steel roof decking may be “vented” by drilling 1/2 in. holes through the steel decking and just barely into the structural concrete slab. This will create an alternate path of least resistance for the MVT pressure through the structural slab capillaries passing through the steel roof deck and not collecting under the waterproofing /traffic coating.

E. Open Joint in CMU Wall

We observed an open exterior vertical joint in the CMU wall at the northwest corner of the utility chase of the south stair (Stair 4) of the right field pavilion.

See Photo H78 in Appendix C.

We conclude this is an open path for water intrusion within the structural masonry wall into the building and under the concrete terrace slabs. Water intrusion through this joint would not be stopped by the waterproofing membrane systems for the structural slabs.

We recommend this joint be routed out, cleaned and repointed with mortar.

Category 2 - Conditions That Require Repairs After 2018 Spring Baseball Season:

The following described conditions are causing deterioration of structural elements of the facility. The nature of the deterioration does not impose any immediate structural concerns and the expense of the repairs should be about the same whether done before or after the 2018 spring baseball season. These repairs can be postponed until after the 2018 spring baseball season to minimize the progress of the deterioration.

A. Corrosion of Steel Members

We observed corrosion of steel members under several differing conditions:

1. Corroded Posts Set into Concrete

Steel posts set into concrete at the locations described below are corroding. In detail BP-A8-6-1/A of the original Contract Construction Documents (CCD), the steel posts set into concrete were to be set in non-shrink grout and the top of the grout then sealed with sealant that was to protrude 1/4 in. above the concrete and be sloped away from the post to the concrete for drainage. This sealant is lacking at all steel posts. Thereby, water has intruded around the steel posts and caused corrosion at:

- All handrail posts in the spectator bowl seating aisle concrete slabs (Photo G16) and posts for spectator drink rails (Photo F15);
- All posts set into the top of concrete walls. The corrosion has caused the posts to expand and crack the concrete around the post (Photos G6 & G20); and
- All posts for the padded guardrail set in the concrete curb between the infield and the seating bowl. Not only are the posts corroded, but the water infiltration into the curb also corroded the reinforcing steel (rebar) in the curbs and caused the curbs to split (Photos G11 & G26). This condition happens at the curb between the spectator seating and the infield warning track. The entire length of the curb should be examined to determine how much of the curbing and posts should be repaired or replaced.

See Detail BP-A8-6-1/A in Appendix A and Photos in Appendix C.

We conclude water infiltrated around the posts and caused the posts to corrode because sealant was not installed as called for in Detail BP-A8-6-1/A in the CCDs. The moisture also reached the rebar in the walls and curbs and caused more corrosion. The corrosion caused expansion of the steel which stressed the concrete until it cracked.

We recommend the posts be removed, the damaged concrete removed, and the concrete prepared for reinstallation of the post. Repair or replace any deteriorated rebar. The end of the posts should be coated with epoxy, reset into non-shrink grout, painted with exterior grade paint to match the existing color and sheen of the guardrail, and sealant installed around the post.

2. Corroded Base Plates for Posts

We observed that some of the steel base plates for the guardrail posts at the top of the seating bowl are corroded. These plates are embedded in the slab-on-grade concrete sidewalk at the concourse level (Photos G13 & G14 in Appendix C).

We conclude the galvanized coating on the base plates has failed. Water has caused surface corrosion of the base plates.

We recommend the corrosion be removed and a groove routed out in the concrete around the perimeter of the base plate. The bare metal should be coated with epoxy and painted. The groove should be filled with silicone sealant.

3. Corroded Bolts at Seating

We observed the anchor bolts into the slab-on-grade concrete treads at the vertical uprights for the bowl armchair seating are corroded (Photos G12 & G27 in Appendix C).

We conclude that the steel anchor bolts that were used were used to anchor the vertical uprights of the armchair seats are susceptible to corrosion. Continued exposure to storm and wash down water will cause additional corrosion of the anchors. These anchors will eventually fail.

We recommend these anchor bolts be replaced with new steel anchors when the bowl seating is replaced. A longer term solution would be to replace the anchors with stainless steel bolts.

4. Corroded Structural Steel

We observed corrosion at the following structural steel elements:

- Corroded spots on galvanized steel members for trellis canopies at ballpark entries (Photos H20, H21, H7 & H27);
- Corroded galvanized steel beams supporting the second floor deck and braces at third floor observation deck canopy (Photos H32 & H57);
- Corroded bolts at steel beams supporting first floor deck over ground keeper's area at center field concession (Photo H74);
- Corrosion of steel column at scoreboard (Photo H71); and
- Corrosion of steel closure members at the edges of the concrete slab floor slabs on metal floor decking. Corrosion was seen along the edge of the second floor suite patio (Photo H41) and in the ground keepers storage area along the underside of the southwest second floor slab at the center field concession stand (Photo H75).

See Photos in Appendix C.

We conclude the galvanize coatings on the steel members have failed or a corrosion resistant coating was absent. Moisture has reached the steel causing corrosion.

We recommend removing corrosion to bare metal, coating with epoxy or high quality galvanizing coating and repainting.

B. Sealant at Steel Columns

We observed the following steel columns embedded directly into concrete piers and sidewalks:

- Steel columns with a concrete wrap at the column base for the columns that support the main building structure (Photo H24);
- Steel columns in the entry sidewalks for the trellis structures (Photo H22);

- Steel columns in flush piers for the “club” seating canopy structure (Photo H29); and
- Steel columns in contact with the concrete floor at the right field pavilion (Photo J4).

See Photos in Appendix C.

We conclude the CCDs did not address the joint between the steel column and the concrete, either at the concrete wrap around the columns or the columns at the sidewalks, flush piers, or floor slabs. The original design intent was for the galvanized steel and the concrete thickness (cover) over the rebar to protect the steel from moisture. The corroded galvanized steel structural members we observed have corroded spots. The galvanized coatings on the steel members is not reliable protection. Over time moisture will migrate down between the steel columns and the concrete. This can create a potential for deterioration of the steel and/or concrete. This joint should be sealed.

We recommend a bead of silicone sealant be applied around the perimeter of all steel columns set into concrete.

C. Corroded Steel Siding Trim

We observed corroded metal siding base trim at the southeast end of the second floor suite patio deck. (See Photo H40 in Appendix C.)

We conclude the finish on the base trim has failed and moisture from the powered wash down water of the patio deck caused the corrosion of the metal. Wash down water sheeting down the face of the metal wall panels is also trapped and collected in the base trim.

We recommend the corrosion be removed to bare metal and the trim primed and painted. The joint between the bottom of the base trim and the concrete patio should be sealed with silicone sealant. 1/4 in. weep holes should be drilled at 12 in. on center near the bottom edge of the base trim to drain any water that is collected in the base trim. Do not block weep holes with the silicone sealant.

Category 3 - Repairs That Can Be Deferred to Normal Maintenance

These conditions need to be monitored as part of normal facility maintenance and repaired or replaced as needed.

A. Corroded Piping

We observed corroded sewer pipes exposed under the second floor deck at the main building (See Photos H25 & H31 in Appendix C).

We conclude that cast iron sewer pipe is susceptible to corrosion during its service life which eventually leads to cracks in the pipe.

We recommend that the sewer pipes be monitored for signs of corrosion and leaks and be replaced as part of normal maintenance.

B. Corroded Pipe Hangers

We observed corroded beam clamps for pipe hangers at the canopy for the second floor suite patio (See Photo H42 in Appendix C).

We conclude the corroded beam clamps may ultimately fail. Over time the corrosion may also spread to the steel beams of the canopy.

We recommend the existing beam clamps should be replaced with new steel clamps that are painted to match the beam color or with new stainless steel clamps.

Category 4 - Maintenance Issues

We observed damage to many of the weather proofing covers on electrical devices that protrude out of the sidewalks (Photo H23). We also observed open communication boxes (Photo H54).

See Photos in Appendix C.

We conclude, as with all public facilities with crowds, protruding objects and surface mounted devices are always susceptible to damage. These protruding objects can also be trip hazards if they are not protect from pedestrian traffic during public events.

We recommend that the outlets should be periodically inspected and damage covers replace to protect the public and marked with warning cones during public events if not used and obscured by portable concession stands. The covers of communications boxes should be maintained closed unless the devices are being serviced.

Category 5 - Conditions That Require Further Investigation

We observed conditions that need further investigation to determine the appropriate repairs. The investigation, structural analysis, and repair drawings and specifications are beyond the scope of the visual observations of this report.

A. Retaining Walls Pushed Out of Plumb

We observed horizontal displacement at the top of three concrete retaining walls and one CMU retaining wall as follows:

At the concrete retaining wall south of the first base outfield line, the top has moved out about 1 in. to the north (Photos D14 & D18). In addition, sections of the sidewalk behind the wall have also moved

about half of that distance to the north. This movement has torn open the sealant between the sidewalk and the wall and at the first expansion joint in the sidewalk (Photos D16 & D17).

At the concrete walls along the north side of the access drive and tunnel to the field the following was observed (Photo D39.):

- The entire length of the top of the concrete retaining wall along the access drive east of the tunnel has been pushed about two inches out of plumb (Photo D23);
- The top east corner of the concrete retaining wall just past the west side of the tunnel has been pushed about two inches out of plumb (Photos D32 & D38). This does not happen the entire length of the wall and has caused a vertical crack in the wall (Photo D25). The movement has pulled on the CMU retaining wall above it and caused severe cracking of the CMU (Photo D26). The movement has also let the grass area behind the wall to settle (Photo D29). The settlement at the southeast corner of the grass area has settled so much that the sprinkler head has been pulled down and created a pocket behind the wall where irrigation water can freely flow behind the wall, adding to pressure that is moving the wall (Photo D30).
- The CMU retaining wall north of the access tunnel has been displaced, ends are failing by cracking, and the guardrail posts and supports and bearing plate have corroded and cracked off the CMU cap. The expansion joint between the wall and the sidewalk behind the wall has also been torn open (See Photos D27 & D31.) The repair drawings and specifications for the remediation of the guardrail posts are included in Appendix F.

See Photos in Appendix C.

We conclude that further investigation, structural calculations and construction drawings will be needed to resolve the movement of the retaining walls. This is beyond the scope of this report.

We recommend that the landscaping and irrigation sprinkler head be raised to stop water from getting behind the north retaining wall adjacent to the sloped grass berm seating area.

B. Deteriorated CMU Wall

We observed deterioration of the exterior of the first floor CMU wall at the southwest corner of the Outfield Concession Stand. The wall shows significant signs of moisture infiltration above the grass, and in some areas, also extends above the Concession Stand floor slab. Some of this may be due to over spray from adjacent irrigation sprinklers. However, we also observed distress in the epoxy floor coating at the transition from the interior floor slab to this wall. Wash-down of the floor slab in the concession stand could be contributing to water penetrating into this wall. At the west side of this wall, efflorescence (salts deposited from moisture penetrating through the wall, which appear as white deposits on the surface of the wall) extends up approximately 8 ft. above the Concession Stand floor slab on the exterior of the wall. There is a walk-in cooler inside of the Concession Stand in this corner.

See Photos H79 & H80 in Appendix C.

We conclude masonry walls are significantly more susceptible to corrosion related damages due to moisture penetration than concrete walls. Masonry is significantly more porous than concrete, and is capable of absorbing significant amounts of moisture. Both are reinforced with steel rebar, which corrodes in the presence of moisture and chlorides, expanding from 3 to 10 times its original volume, causing cracking, spalling, and deterioration of concrete or masonry elements. Therefore, the source of this moisture should be evaluated, repairs and modifications performed to prevent continued moisture infiltration, and proper protection of the wall to prevent further deterioration. Determination of the exact cause is beyond the scope of this report.

We recommend further investigation should be done to determine the specific cause of the deterioration. The cause should be eliminated and the affected CMU should be removed. Any rebar that has been corroded should be repaired or replaced and the new CMU installed.

C Ground Keeper's Area Under Outfield Concession Stand

It was reported by the ground keeping personnel that significant amounts of water streamed down the wall on the northeast side of their shop periodically. We observed several plumbing sewer drains in that area.

We concluded that the source of this moisture could not be readily determined. The water could be related to leaks in these drains or it could be from the wash-down of the concession floor causing leaks between the floor and the drains.

We recommend further investigation to determine the mechanism of the water intrusion.

D. Water Leak at Elevator

We observed water ponding in front of the service level elevator door at the right field pavilion. The water appears to be seeping up through joints in the floor slab and the water has a sewer smell.

See Photos H76 & H77 in Appendix C.

We conclude the most likely source of the water leak is a forced sewer line in this area that runs from the north end of the building to a sewer line south of the building. The sewer line was videoscoped but the location of a leak could not be determined. As the team locker rooms are near this location, the sewer line should be repaired before the 2018 spring baseball season.

We recommend the concrete floor slab in the area in front of the elevator be cut open to expose the forced sewer line. The sewer line should be examined to find the source of the leak and the sewer line repair. The excavation should be backfilled, compacted and the floor slab replaced. It was reported to us that the contractor has cut open the floor, excavated to the sewer line, found the leak and replace the

damaged piping. The excavation was then filled with fresh, compacted soil and the concrete floor slab replaced.

E. Cracks in Concrete Elements

We observed cracks in concrete elements:

- At the northeast corner of Seating Section 123, there are cracks in the retaining wall (Photo G9);
- At the stairs behind Seating Section 107, in front of the “club” seating, there are cracks in the risers (Photo G22). The stairs at the other end of the aisle in front of the “club” seating should also be examined for cracks;
- At the stairs in the aisle along the east side of Seating Section 101, there are repairs to the concrete risers that have failed (Photo G31); and
- At the sidewalk behind the middle of Seating Section 103, there is a crack in the concrete sidewalk (Photo G29).

See Photos in Appendix C.

We conclude repairs should be made to the observed cracks in the cracks in the concrete walls and slab-on-grade sidewalks. Previous repairs that have failed should be redone

We recommend that each crack in the concrete should be individually evaluated to determine the appropriate repair. The repairs to the stair risers should have the highest priority as they may evolve into trip hazards over time.

F. Stair 2 at Main Building

Per Stair Section BP-A73-1/C in the CCDs, the cantilevered stair runs are to extend from landing to landing. Per Details 15 and 16 on Sheet BP-S1.4, the cantilevered steel support is to support the stair treads and risers. We observed the cantilever steel support was also used to support part of the stair landings.

See Section BP-A73-1/C and Details BP-S1.4/15 & 16 in Appendix A and Photo H66 in Appendix C.

We conclude that the bottom edge of the cantilever is not supported as it is by the stair tread in the stair run. This lack of support may allow the vertical section to bend sideways (cripple) and loose support. We looked for but could not find construction documentation for this change.

We recommend further structural review and calculations be preformed to confirm the as-built construction is adequate.

Category 6 - Other Observations

We observed conditions that should be monitored but should not require any action for several years.

A. Sprayed Polyurethane Foam Roofing

We observed the condition of the sprayed polyurethane foam (SPF) roofing. The service life of this roofing depends on retaining the protective elastomeric coating applied of the polyurethane foam. As the roofing ages, the elastomeric coating gradually wears away. Ultimately a new elastomeric coating needs to be applied before the existing coat wears through. The horizontal roofing surface has sand embedded into it. As the coating wears away, some of the sand particles are release and can wash across the roof. This is not an indication that the elastomeric coating has worn down to a point were is needs to be recoated, but is a natural part of the wear process. The elastomeric coating on the parapet walls showed no sign that the coating is wearing through.

See Photos H43 & H53 in Appendix C.

We conclude that the SPF roofing is nine years old and is about half way through its service life.

We recommend that the roofing be inspected at least twice a year to check on its wear and monitor any physical damage. The elastomeric coating and sand particles should be repaired as needed. A completely new application of the elastomeric coating and sand particles should be done before the end on the service life of the SPF roofing.

B. Field Lighting Poles

We observed the condition of the eight (8) field lighting poles, starting with our designated Pole #1 behind the Right Field Pavilion and continuing counterclockwise around the field to our designated Pole #8 behind the third base line outfield seating (Refer to photo location plan for Sets "K" & "L" in Appendix B). Poles #1, #2, #3, #4, #6 and #7 are galvanized steel poles that are slipped over precast concrete foundation piers. Poles #5 and #8 are galvanized steel poles that are connected to cast in place concrete piers with twelve galvanized anchor bolts. The access panel on each pole was removed and the interior contact of the pole and the concrete was photographed. The poles with the precast concrete foundation piers have small electrical access openings 12 in. to 18 in. above the top of the concrete. A fiber optic camera with a remote viewer was used to observe and photograph the interior base of these poles. The poles with cast in place concrete pier foundations have large electrical access opening that permitted visual observation and photographs to be taken of the interior base of these poles. See Photos K7, L7, K17 & K20 in Appendix C for representative photographs.

We conclude the most likely spot to see evidence of internal corrosion in the light poles would be at the base of the pole where it contacts the concrete support. There was not any visual sign of corrosion at the base of the poles.

We recommend light pole be inspected annually for any sign of corrosion, being particularly observant for any rust colored water seeping out of the pole or at the pole bases during normal maintenance.