SOUTHEAST KENTUCKY COMMUNITY AND TECHNICAL COLLEGE

Whitesburg Campus – Bridge Repairs
470-C9DX STRUCT

Prepared by:
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BROWN + KUBICAN
STRUCTURAL ENGINEERS PSC

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TABLE OF CONTENTS

BROWN + KUBICAN
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Lexington • Louisville

January 9, 2020

Mr. Frank Phillips
Division of Engineering and Contract Administration
Bush Building, 1st Floor
403 Wrapping Street
Frankfort, KY 40601

RE: Southeast Kentucky Community and Technical College
Whitesburg Campus – Bridge Repairs
2 Long Ave.
Whitesburg, KY 41858
B+K Project Number: 19204
KY job #: 470 – C9DX STRUCT

Pursuant to your request, we have performed the structural condition survey and investigation into deterioration of the steel pedestrian bridge referenced above. Our work included site observation of the pedway, review of available construction documents, structural condition survey of the pedway in place, limited analysis of the pedway to consider adequacy of the deteriorated truss bottom chords, and this report with recommendations for repair with opinion of probable cost. Preparation of construction documents (drawings and specifications) is not included in our current scope. Our observation was performed on December 12, 2019 by this project engineer and Joe Moore, Senior Technician from S&ME Inc.

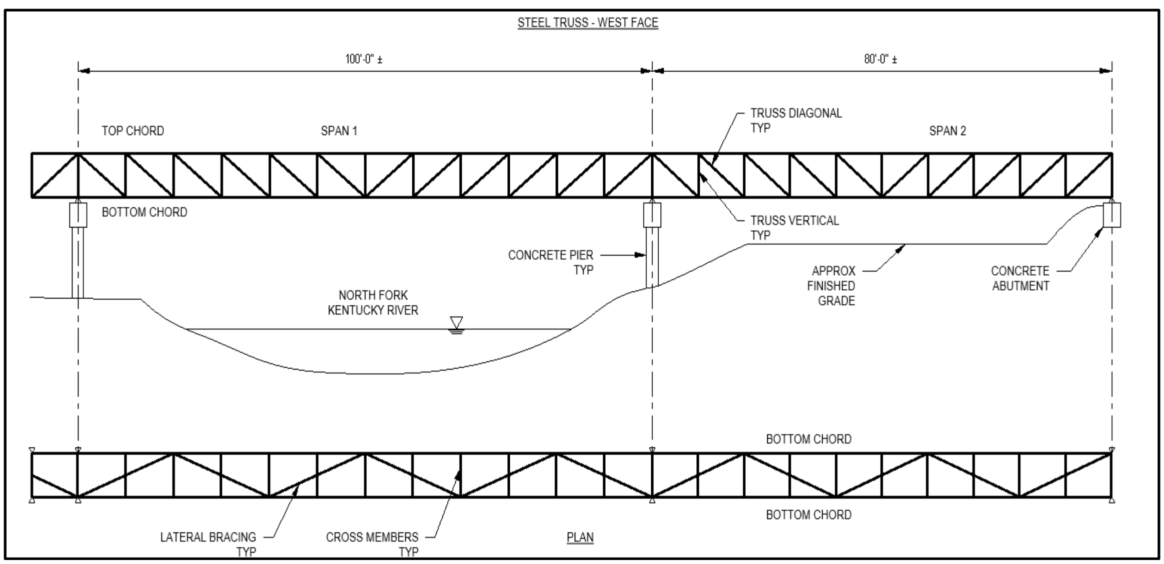

Image 1: Bridge Diagram

Our investigation was visual for the extent of the pedway and raised landing located at the North end. Visual observation was performed from the ground and a 60-foot boom lift to determine the condition of the existing members. Bridge dimensions, member sizes, and layout was determined while on site utilizing a 25-foot and 100-foot measuring tape. S&ME Inc.'s scope was to operate the lift and help determine the existing member thickness and amount of deterioration. The 60-foot boom lift was provided by Sunbelt Rentals and operated by S&ME Inc. Ultrasonic testing is typically used to determine the thickness of existing steel, but was not available at the time of our site visit. Additionally, due to some of the advanced deterioration of the existing steel members ultrasonic testing would have yielded inaccurate results. In lieu of ultrasonic testing, selective demolition was performed by S&ME Inc. to determine the existing member thickness. Approximately 3/8" diameter holes were drilled into the existing members. Markers on the drill bit were used to approximate the thickness of the steel. Member deterioration was also approximated by visual inspection based on the severity of member deterioration.

Image 2: Delamination Removed from Cross Member

While on site we performed a visual inspection of the exterior raised landing of the Mason Academic Building attaching to the North end of the bridge. The visual inspection was done using the 60' boom lift to access the underside of the landing.

Material sampling and testing was not performed to determine the member properties for the pedestrian bridge or raised landing. An analysis was performed on the bridge in both its assumed original state and its current state. Results from the analysis are discussed within this report and were used to make recommendations for remediation.

<u>Executive Summary:</u>

We believe the steel bridge structure is in moderate to poor structural condition. The bridge shows moderate to significant corrosion and delamination of the bottom chords, cross members, lateral bracing, and steel deck. **The deterioration of the bottom chords are resulting in a high percentage of section loss of the members. A sign should be posted on the bridge reading "25 pounds per square foot or 50 people, evenly spread along its length maximum load". Remediation for the bridge should performed immediately before further deterioration occurs.** Afterwards, regular maintenance should be conducted to maintain the bridge and prevent further deterioration of the steel members.

See the following report for analysis, observations, remediation recommendations for repair, and a cost opinion.

<u>Structure Description</u>

Existing construction documents were made available to us for the Belinda Mason Academic/Technical Building by DCT Design Group, Ltd. and Bradford Walton Structural Engineer, dated July 15, 2002. Shop drawings of the existing pedway bridge were not provided. Shop drawings of the existing pedway would have provided the member sizes, layout, and material properties. Without these shop drawings, member size and layout was determined in the field and material properties were assumed based on time of construction.

The existing pedestrian bridge is a two-span steel pratt truss between the Mason Academic Building and the Hogg Allied Health Center. The truss has HSS8x8 top and bottom chords, HSS5x5 verticals and HSS3x3 diagonals. Each truss is connected together with HSS6x4 cross members and HSS3x3 lateral bracing below the concrete slab on deck to provide lateral buckling stability. The bridge has an open top with tabs welded to the vertical members for the attachment of a roof. The existing drawings call for the roof to be an alternate; no roof was installed at the time of our inspection. All steel tube members are welded together all around. Steel guardrails are constructed using channels and rounds steel rods for the entire length of the pedway. All steel has a weathering finish. Weathering steel is installed as “raw” steel and allowed to rust. The rust performs a protective coating to the elements. The bridge is spliced with bolted splice plates at two locations, the mid span of each span.

Image 3: Bridge East Elevation

The walking surface is exposed concrete with no apparent sealer or traffic membrane. The concrete surface has a broom finish with sawn construction joints at ~7’-6” on center with no sealer in the joints. The walking surface is constructed with 2 1/2” concrete over non-composite 1 1/2” galvanized metal deck (4” total thickness). The bridge spans between concrete abutments and piers with no apparent sealer applied to their surface. The Southeast span (~80’-0”) is over a parking lot and the Northwest span (~100’-0”) is over the North Fork Kentucky River. The height to the underside of the bridge ranges from ~7’-6” at the Southeast span and ~17’-9” at the Northwest span. Photographs of the bridge and its components were taken, some of which are included herein.

Image 4: Bridge Walking Surface

The raised landing at the North end of the bridge is constructed of a concrete walking surface that appears to be unsealed. The walking surface is constructed with a 2 ½" concrete slab over 1 ½" composite painted metal deck (4" total thickness) spanning between wide flange steel beams. The steel beams are supported by steel columns wrapped in masonry piers and the building. A steel handrail is attached to the edge angle around the perimeter of the raised landing. The foundation system of the landing is concrete drilled piers. All steel, including the underside of the steel deck, is painted.

Image 5: Raised Landing

Observed deficiencies:
We observed the following structural deficiencies:

Item 001: Truss Bottom Chords
The truss bottom chords are in moderate to poor condition. The truss bottom chords have consistent mild delamination on the underside of the tube for the full length of the bridge on both chords. Localized corrosion resulting in significant loss of section was found in the West bottom chord of both span 1 (North span) and span 2 (South span). In span 1 of the west bottom chord holes through the section are located on the outside face and on top of the tube. Holes range from 1" to 3" diameter spaced approximately 8 inches on center over a length of approximately 40 feet. Span 2 has holes approximately 1 inch in diameter spaced at 12 inches on center over 15 feet. The spacing of the holes is random, the above spacing is approximate. Weep holes are not present in the bottom chords, resulting in water to be retained in the closed section. Approximately 5" of water and ice was retained in the bottom chord at the time of our site visit.

We believe this is caused by the improper drainage of the walking surface above. The salt/water combination is draining onto the top of the steel bottom chords and causing the chords to rapidly deteriorate. Also, the bridge generally slopes to the west side of the deck, causing the water to drain to the West chord more than the East chord.

Image 6: Span 1, West Bottom Chord Deterioration

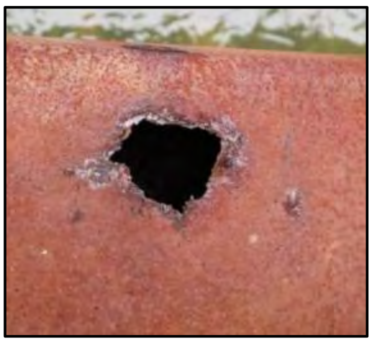

Image 7: Close-up of Holes through Bottom Chord

Image 8:Underside of Bottom Chord Delamination

Item 002: Bridge Cross Members
The condition of the cross members are consistently corroded and delaminating at both ends where they connect to the trusses. The bridge is spliced in two locations and has three end bearing conditions. Each end bearing condition and splice is experiencing infiltration of water through the slab joint and significant corrosion of the cross members.

We believe this is due to the bridge improperly draining over the edge of the walking surface and corroding the end of the cross members. The lack of joint sealants at the splice and bearing locations is causing extra water to corrode the members below these locations.

Image 9: Cross Member Corrosion

Item 003: Lateral Bracing
In general, the condition of the lateral braces below the deck are fair. The lateral brace members are corroding on all sides of the section at the ends connected to the cross members. Deterioration is currently localized to the surface of the members, deterioration has yet to greatly impact the welded connections.

We believe this is caused by the lack of joint sealant in the concrete slab on deck sawn joints. Water is infiltrating through the sawn joints and corroding the ends of the lateral braces.

Image 10: Lateral Bracing Corrosion

Item 004: Concrete Slab Over Steel Deck
The concrete slab over the steel deck is in fair condition. All bearing locations of the galvanized steel deck are experiencing corrosion. Bearing locations include the ends, intermediate supports, and all edge conditions at the perimeter. All locations are experiencing moderate to severe corrosion with some localized areas experiencing full loss of the steel deck.

We believe the deck is corroding at these locations due to the interaction between the galvanized steel and weathering steel. Galvanized steel rapidly deteriorates when in contact with weathering steel. The weathering steel protective rust coating constantly corrodes the galvanized coating until it is gone and the steel below deteriorates. Another cause is the lack of a traffic membrane allowing water to infiltrate through the sawn joints and corroding the steel deck.

This issue cannot be resolved without full replacement of the concrete slab on deck.

Image 11: Underside of Deck Corrosion

Image 12: Weathering Steel/Galvanized Deck Interaction

Item 005: Concrete Abutments/Piers
Overall, the concrete piers and abutments are in good condition. A few locations are experiencing delamination of the concrete and exposed corroded rebar. The south pier between spans 1 and 2 has an exposed section of reinforcement the full width of the Pier. Further exposure to the elements will result in additional loss of concrete and reinforcement section.

We believe this is a result of inadequate cover for the reinforcement, leading to accelerated corrosion of the reinforcement.

Image 13: Concrete Pier Spall

Item 006: Bolted Splice Connections
The condition of the bolts at the chord splices were not able to be inspected. Each splice has external cover plates with bolts that thread to an interior nut. Some surface rust was seen at the interior of the chord splice. We are concerned that the bolts are experiencing section loss and severe loss of bearing against the chord walls.

We believe this is caused by the lack of weep holes in the bottom chord, leading to the bottom chords collecting water.

Image 14: Bottom Chord Splice Corrosion

Structural Analysis
To determine the condition of the bridge we analyzed the bridge in a 3D analysis program after the member size and layout was measured in the field. The bridge was first evaluated in its intended design state. The loads used were calculated using the self-weight of the members measured and the following super-imposed dead load and live load:

Dead load: self-weight of concrete deck + self-weight of covering = 65 PSF.
Posted Live Load: 85 PSF.
Wind Load: As prescribed in ASCE 7-10.
Max total load deflection: L/240
Max Live load deflection: L/360

Based on the results of our analysis, the major members appear to be adequate to support the design loads when analyzed under its original condition. No analysis of connections was performed.

We then evaluated the bridge in its current state, taking into account its section loss. The section loss was estimated based on selective demolition performed in the field to determine the remaining thickness of critical members and estimates of section loss based on visual inspection. The areas where corrosion had resulted in holes in the members were used to determine weakest location of the bottom chords.

The bridge is not adequate to support the design loads required above in its current state. The live load should be reduced to 25 PSF or 50 people, evenly spread along its length.

Remediation
The current condition of the bridge is not sustainable to keep the bridge operational for its intended lifespan. Prior to remediation efforts, the bridge shall be posted with a "25 pounds per square foot or 50 people maximum load" sign. The following elements of the bridge shall be replaced or repaired based on our visual observation and analysis. Remediation should be performed immediately.

1. The East and West bottom chords shall be replaced for the full length of the bridge. The existing bottom chords do not have weep holes to allow for water to drain out of the closed member section. In the new bottom chords, provide 1/4" diameter weep holes centered in the bottom of the section at 48" on center.
    - Bottom chord replacement quantity: 360 linear feet.
    - Weep hole quantity: 100 holes.
2. All cross members located at splices and bearing locations shall be replaced.
    - Cross member replacement quantity: 64 linear feet.
3. All cross members not located at splices or bearing locations shall be blast cleaned and painted with a rust-inhibitive paint.
    - Blast cleaning quantity: 240 square feet.
    - Rust-inhibitive painting: 240 square feet.
4. Where lateral bracing is showing surface corrosion and light delamination, blast clean and paint with rust-inhibitive paint.
    - Blast cleaning quantity: 200 square feet.
    - Rust-inhibitive painting: 200 square feet.
5. The existing concrete slab over metal deck shall be removed and replaced. A penetrating concrete sealer shall be used on the new concrete slab and all joints shall be properly sealed to prevent water infiltration. The following are options for replacement:
    - 4" formed and reinforced concrete structural slab.
    - Corrosion resistant grating. Grating will allow the bridge to drain water and reduce the risk of corrosion of the members below the walking surface.
        - Slab replacement quantity: 1600 square feet.
        - Slab sealer quantity: 1600 square feet.
        - Joint sealant quantity: 50 linear feet.
6. During our site observation, destructive testing was required to determine the member size and amount of section loss. Holes drilled into the existing members to remain shall be patched with weld filler material

- Destructive testing holes to be patched: 15 locations.

7. Exposed rebar in the abutments and piers shall be repaired. Sawcut around the perimeter of the exposed rebar, undercut concrete to ¾" behind reinforcement, blast clean, prime, and apply repair mortar.
    - Abutment patching quantity: 5 locations
8. Due to the use of de-icing salts, future corrosion after repair is likely. To reduce the risk of corrosion, it is recommended to blast clean the bridge, rust-inhibitive paint it, and provide a top coat of paint. Below are options for the amount of area to blast clean and paint
    - Blast clean and paint entire bridge
        - Quantity of blast clean and paint: 4,700 square feet.
    - Blast clean and paint all steel below the finished walking surface. It is important to note that if this option is chosen, the transition from painted steel to weathering steel will likely experience accelerated corrosion and delamination of the protective paint. Regular maintenance will be required.
        - Quantity of blast clean and paint: 800 square feet.
9. To prevent water from draining over the edges of the bridge, provide a steel toe-kick and drains to drain the walking surface.
    - Toe-kick quantity: 400 linear feet.
    - Walking surface drains quantity: 6 locations.
10. The original construction documents planned for a covering over the bridge. It is recommended to provide this covering once all remediation items have been completed. The covering will protect the walking surface from excessive snow buildup which will in turn reduce the amount of de-icing salts used.
    - Covering quantity: 1 lump sum
11. Due to the likelihood of the bolts corroding at the splices, we recommend reinforcing each splice.
    - Splice reinforcement quantity: 8 locations.
12. In lieu of remediation, a full superstructure replacement is an option. The concrete abutments and piers would remain.

<u>Landing at North end of Bridge:</u>

While on site we performed a visual observation of the landing attached to the Mason Academic Building, below are our observations.

Image 15:North Raised Landing

The condition of the landing is fair. The steel beams are showing mild section loss due to corrosion of the top and bottom flanges around the perimeter of the landing. Some localized corrosion was observed at the underside of the deck and at bearing conditions resulting in approximate 90% section loss of the steel deck. The edge angle is experiencing surface rust where it is in contact with the beam top flange.

We believe the corrosion of the underside of the raised landing is due to no galvanizing used on the steel, no special detailing for exterior exposure, no sealant on the concrete slab, and concealed/trapped structure against the building with no weathering protection.

Image 16: North Landing Underside Corrosion

Image 17: Beam Corrosion at Building Intersection

There is no immediate structural concern for the landing, though corrosion will likely continue without corrective action. It is our recommendation to remove the existing concrete slab on deck, blast clean all structural steel and paint with a rust-inhibitive primer and top paint. The slab on deck should be replaced with a formed slab and be sealed to prevent further water infiltration.

Blast cleaning quantity: 1200 square feet.
Rust-inhibitive paint quantity: 1200 square feet.
Top coat quantity: 1200 square feet.
Concrete slab replacement quantity: 450 square feet.
Penetrating concrete sealer quantity: 450 square feet.

Summary:

In summary, we believe that there are two root causes to the bridge deterioration discussed below:

- Use of de-icing salts
    - De-icing salts have been used on the bridge to provide a safe walking path for pedestrians. The salt, mixed with melted snow and ice improperly drains onto the weathering steel and is causing excessive corrosion.
- Bridge detailing
    - Improper drainage of the walking surface:
        - The walking surface drains the salt/water combination onto the bottom chords below.
        - The construction joints in the slab on grade are actively leaching the salt/water combination onto the steel cross members below.
        - Drip edges are not provided, allowing the water to drip from the bottom of the steel members and causing corrosion and delamination.
        - The bridge generally slopes to the West side, leading more water to drain over the West side of the bridge and deteriorate the West side faster.
        - Lack of drainage holes on underside of closed sections.
    - The galvanized deck is in contact with the weathering steel
        - Constant contact with the weathering steel has caused the galvanized steel to deteriorate and lose its galvanized coating.

We have considered both repair and replacement of the bridge superstructure. The existing bridge was not detailed for serviceability and maintenance. Although the repair option for remediation will address the symptoms and current deterioration, accelerated deterioration of the bridge due to poor detailing will likely continue and shorten the intended lifespan of the bridge. **Considering the cost to adequately repair is comparable to full replacement, we recommend a full replacement of the superstructure with one that is properly detailed for serviceability.**

Maintenance and repairs:

The use of de-icing salts to date have accelerated the deterioration of the steel structure. We were asked to determine whether the type of salt used had a greater effect than other salts. All de-icing products containing chlorides are corrosive. The salt brands being used per the maintenance staff are Traction MELT CI and White Fever Ice Melter, both salt brands being used on the bridge contain chlorides and are corrosive to the steel. The weathering steel is especially susceptible to the de-icing salts since it is constantly exposed raw steel.

Image 18: De-icing Salts

The use of de-icing salts and exposure to the elements will continue to deteriorate the pedestrian bridge and landing, even after replacement or remediation efforts are complete. Pressure wash cleaning should be performed each Spring to remove salts. It is the owner's responsibility to perform regular cleaning and maintenance on the protective paint coating and traffic membrane.

<u>Opinion of probable cost:</u>
Our opinion of probable cost, attached, was prepared utilizing measured quantities and unit prices obtained from experience with past and current repair projects and R.S. Means Building Construction Costs. The costs presented are accurate to the best of our ability, but they are not guaranteed to be true or exact.

The above quantities represent estimates within the confines of the pedestrian bridge and raised landing. They do not include site structures or walkways (beyond pedestrian bridge). Brown & Kubican, PSC makes no representation concerning the estimated quantities and cost figures made in connection with specifications or drawings other than that all figures are estimates only and Brown & Kubican, PSC shall not be responsible for fluctuations in cost figures.

The cost opinion included the cost of each repair with markup for overhead and profit and general conditions. It also includes costs for a design contingency and construction contingency. Our fee for this initial investigation is not included in the cost opinion.

The total cost of the two options are listed below.

Bridge Remediation: $602,319
Bridge Replacement: $609,452

If you have any questions regarding this report, or if we can be any further assistance, please call.

Sincerely,

Michael S. Crossley, PE
Project Engineer

STATE OF KENTUCKY
MICHAEL S. CROSSLEY II
33985
LICENSED
PROFESSIONAL ENGINEER
©BROWN + KUBICAN, PSC

Dan Kubican PE

Dan Kubican, PE
Reviewing Principal

STATE OF KENTUCKY
DAN KUBICAN JR.
20712
LICENSED
PROFESSIONAL ENGINEER
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Attachments:
Cost Opinion
Additional Photographs

Brown + Kubican, PSC Structural Opinion of Probable Cost					
	Project :	SKCTC Pedway			
	Prepared By:	Mikey Crossley		Date:	1/9/2020
Item Number	Item	Quantity	Unit Cost	Unit	Cost
	GENERAL CONDITIONS				
	Mobilization	1	$ 15,000.00	Each	$ 15,000.00
	Project Management	1	$ 15,000.00	Each	$ 15,000.00
	General Conditions	4	$ 10,000.00	/month	$ 40,000.00
	Shoring Engineering	1	$ 15,000.00	Each	$ 15,000.00
	Shoring/Removal	1	$ 30,000.00	Each	$ 30,000.00
	Crane Rental	3	$ 42,000.00	/month	$ 126,000.00
					$ -
	SKCTC PEDWAY				$ -
1	Bottom Chord Replacement	360	$ 200.00	LF	$ 72,000.00
2	Cross Member Replacement				$ -
	Existing Member Removal	64	$ 30.00	LF	$ 1,920.00
	Member Replacement	64	$ 50.00	LF	$ 3,200.00
3	Cross member Clean/Paint	240	$ 10.00	sq. ft.	$ 2,400.00
4	Lateral Bracing Clean/Paint	200	$ 10.00	sq. ft.	$ 2,000.00
5	Concrete Slab Replacement				$ -
	Existing Slab Demo	1600	$ 4.00	sq. ft.	$ 6,400.00
	Existing Slab Disposal	1600	$ 4.00	sq. ft.	$ 6,400.00
	4" Formed Concrete Slab	1600	$ 20.00	sq. ft.	$ 32,000.00
	Joint Filling	50	$ 75.00	LF	$ 3,750.00
	Traffic Membrane	1600	$ 8.00	sq. ft.	$ 12,800.00
	OR				$ -
	Painted Steel Grating	1600	$ 35.00	sq. ft.	$ 56,000.00
6	Destructive Testing Patching/Grinding	15	$ 100.00	Each	$ 1,500.00
7	Exposed Rebar Patching	5	$ 1,000.00	Each	$ 5,000.00
8	Remaining Steel Clean/Paint	800	$ 10.00	sq. ft.	$ 8,000.00
	OR				$ -
	Blast Clean/Paint Entire Bridge	4700	$ 10.00	sq. ft.	$ 47,000.00
9	Toe-kick	400	$ 20.00	LF	$ 8,000.00
	Walking Surface Drains	6	$ 1,000.00	Each	$ 6,000.00
10	Bridge Covering	1	$ 40,000.00	Each	$ 40,000.00
11	Splice Reinforcement	8	$ 1,000.00	Each	$ 8,000.00
				SUBTOTAL	$ 459,370.00
	SKCTC NORTH LANDING				
	Structural Steel Clean/Paint	1200	$ 10.00	sq. ft.	$ 12,000.00
	Deck Demolition	450	$ 4.00	sq. ft.	$ 1,800.00
	4" Formed Concrete Slab	450	$ 20.00	sq. ft.	$ 9,000.00
	Traffic Membrane	450	$ 8.00	sq. ft.	$ 3,600.00
	Concrete Joint Sealer	50	$ 75.00	LF	$ 3,750.00
				SUBTOTAL	$ 30,150.00
	Note: Highlighted Cells are optional and not included in total cost.				
				Total Cost	$ 489,520.00
	General Contactor Overhead and Profit (10%)				$ 48,952.00
	Estimated Construction Cost				$ 538,472.00
	Special Inspections				$ 10,000.00
	Design Contingency (10%)				$ 53,847.20
				Total Project Cost	$ 602,319.20

Brown + Kubican, PSC Structural Opinion of Probable Cost					
	Project :	SKCTC Pedway			
	Prepared By:	Mikey Crossley		Date:	1/9/2020
Item Number	Item	Quantity	Unit Cost	Unit	Cost
	GENERAL CONDITIONS				
	Mobilization	1	$ 15,000.00	Each	$ 15,000.00
	Project Management	1	$ 15,000.00	Each	$ 15,000.00
	General Conditions	4	$ 10,000.00	/month	$ 40,000.00
	Bridge Removal	1	$ 20,000.00	Each	$ 20,000.00
	Bridge Disposal	1	$ 10,000.00	Each	$ 10,000.00
	Crane Rental	2	$ 42,000.00	/month	$ 84,000.00
					$ -
	SKCTC PEDWAY				$ -
1	Bridge Replacement	1	$ 252,000.00	Each	$ 252,000.00
	Bridge Installation	1	$ 10,000.00	Each	$ 10,000.00
5	Concrete Slab Replacement				$ -
	Existing Slab Demo	1600	$ 4.00	sq. ft.	$ 6,400.00
	Existing Slab Disposal	1600	$ 4.00	sq. ft.	$ 6,400.00
	4" Formed Concrete Slab	1600	$ 20.00	sq. ft.	$ 32,000.00
	Joint Filling	50	$ 75.00	LF	$ 3,750.00
	Traffic Membrane	1600	$ 8.00	sq. ft.	$ 12,800.00
	OR				$ -
	Painted Steel Grating	1600	$ 23.00	sq. ft.	$ 36,800.00
7	Exposed Rebar Patching	5	$ 1,000.00	Each	$ 5,000.00
10	Bridge Covering	1	$ 40,000.00	Each	$ 40,000.00
				SUBTOTAL	$ 499,550.00
	SKCTC NORTH LANDING				
	Structural Steel Clean/Paint	1200	$ 10.00	sq. ft.	$ 12,000.00
	Deck Demolition	450	$ 4.00	sq. ft.	$ 1,800.00
	4" Formed Concrete Slab	450	$ 20.00	sq. ft.	$ 9,000.00
	Penetrating Concrete Sealer	450	$ 1.50	sq. ft.	$ 675.00
	Concrete Joint Sealer	50	$ 75.00	LF	$ 3,750.00
				SUBTOTAL	$ 27,225.00
	Note: Highlighted Cells are optional and not included in total cost.				
				Total Cost	$ 526,775.00
	General Contactor Overhead and Profit (10%)				$ 52,677.50
	Special Inspections				$ 10,000.00
	Design/management Contingency				$ 20,000.00
				Total Project Cost	$ 609,452.50