

# Technical Memorandum

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## Riverwalk at Downer Place & Galena Boulevard Repair & Replace Options Aurora, Illinois

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HRG Project No. 170711

**Prepared For:**

City of Aurora

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In October of 2016, HR Green completed an inspection and technical memorandum for the City of Aurora for a portion of the Riverwalk located in downtown Aurora along the west bank of the Fox River east channel between Downer Place and Galena Boulevard. The structural framing of the Riverwalk in this area can be separated mainly into two distinct existing conditions along 1.) Paramount Theater, and 2.) Downer Building.

#### Paramount Theater Riverwalk.

The Riverwalk along the Paramount Theatre consists of a concrete deck that varies from 6" to 7" thick overlaid with brick pavers/ drainage layer and membrane system totaling 2.25" to 4" thick. The pavers in the system are 1 ½" thick. During a recent field investigation, the sand layer was found to be completely saturated. The concrete deck is supported on concrete encased steel cantilever beams. The original waterproofing membrane applied over the top of the concrete deck (under the surface pavers and drainage layer) is in unknown condition, but has likely deteriorated to the point where it no longer provides an adequate barrier. Field observations indicate evidence of ponding of water and leakage through the deck. There is an existing expansion joint located within the deck at the Paramount Theatre location, but no other expansion joints were observed. Where the existing Riverwalk meets the existing buildings, an unflashed, caulked construction joint was observed.

#### Downer Building Riverwalk

The Riverwalk along the Downer Building consists of a 3" concrete deck supported on a concrete pan joist system. The concrete joists are supported on concrete encased steel cantilever beams. The thinner deck at the Downer Building combined with observed deterioration of the deck pan joists limits the load capacity of the existing deck at the Downer Building.

At both locations the steel beams cantilever out from existing building structures along the Riverwalk. Overall, the main structural components of the Riverwalk in this area date back to 1915 with some renovations completed in 1977 and 1994.

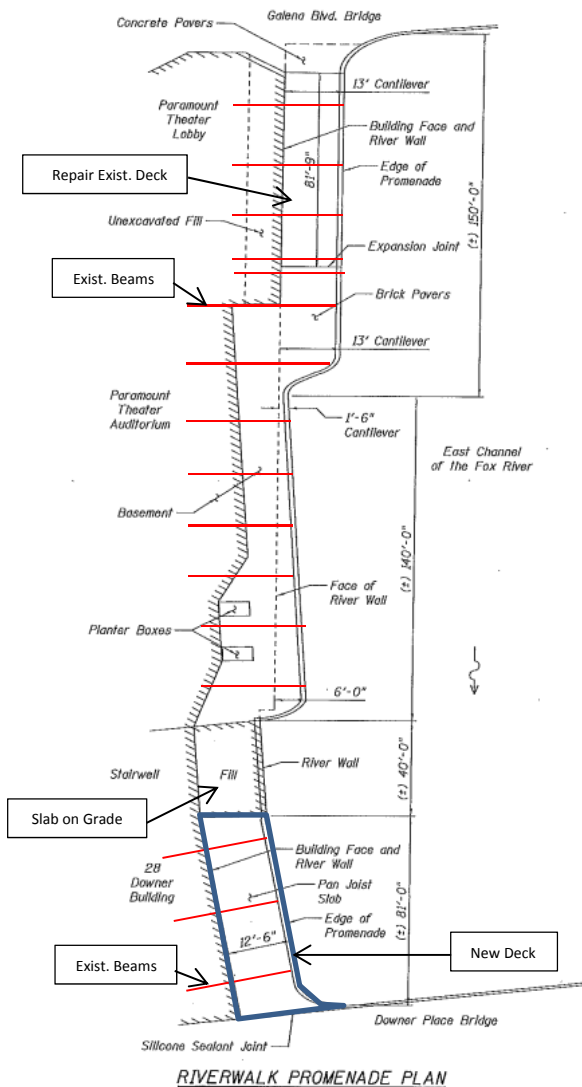
#### Slab on Grade connection

The two sections of Riverwalk are separated by a short length of riverwalk within the Downer Building segment that represents a third structure type consisting of a slab on grade supported on concrete retaining walls.

The original technical memorandum is attached for your reference. The purpose of this technical memorandum is to provide the City of Aurora with further developed repair and/or replacement options including typical concept details and preliminary concept costs for each option.

## Option 1: Repair and Re-Use.

Because the Paramount Theatre and Downer building locations represent two different types of existing deck and framing, the viable repair options at each location differ and are broken into two separate descriptions below.



**Paramount Theatre:** The Paramount Theatre portion of the Riverwalk represents more than 70% of the Riverwalk segment considered for rehabilitation. Repairs would consist of removing all surface material (pavers, drainage layer, & waterproofing membrane) down to the top of the concrete slab and removal and replacement of all unsound concrete in the slab. Existing railing, lighting, planters and benches would be preserved for reinstallation after repairs. Some of the concrete slab repairs may require full depth patches, others locations would require partial depth patching. The concrete encased I-beams would also have all unsound concrete removed. Existing steel exposed by removal of deteriorated concrete would be cleaned and coated (either field painted or cold galvanized) and reinforced in locations where steel section loss due to corrosion warrants it. The existing expansion joint within the deck of the Paramount Theatre location would be rebuilt. The construction joint between the Paramount Theatre building and the Riverwalk would be rebuilt with flashing added. Once repairs are completed, a new walking surface consisting of a lightweight concrete wearing surface with a stamped, stained and sealed finish would be installed over the repaired concrete slab. As an alternative, the existing concrete slab would be modified to reinstall the existing pavers with a drainage system which does not hold water. The repaired Riverwalk would be capable of supporting current AASHTO pedestrian live loads (90 psf) and a 3-Ton

vehicle load limit for small vehicle snow removal equipment. Repair work will necessitate the use of a construction barge in the River. Accessibility to the concrete base of the river wall along the Theatre for repairs (patching of spalled concrete and epoxy crack injection) will depend on water levels.

Preliminary Construction Cost (Stamped concrete) = \$340,000

Preliminary Construction Cost (Pavers with drainage) = \$350,000

Downer Building: Repairs to the existing deck and pan joist system at this location would not improve or restore live load capacity. Therefore, partial reconstruction is recommended consisting of removal of the surface material and the existing deck down to the steel beams cantilevered from the building. Existing railing, lighting, planters and benches would be preserved for reinstallation after repairs. All unsound concrete on the encased cantilever steel beams would be removed and replaced. Spalled concrete would be patched and cracks repaired with epoxy crack injection. Existing steel exposed by removal of deteriorated concrete would be cleaned, coated and reinforced in locations where steel section loss due to corrosion warrants it. The construction joint between Downer Building and Riverwalk would be rebuilt and flashing added. Once repairs to the cantilever steel beams are completed, a new lightweight concrete slab would be installed. The top of the new concrete slab would include a stamped, stained and sealed finish. An alternate would be to add a waterproof membrane and install brick pavers similar to the areas next to the Paramount Theatre. The area with the slab on grade which is currently supported by fill would also receive the brick paver surface. The repaired Riverwalk would be capable of supporting current AASHTO pedestrian loads (90 psf) and a 3-Ton vehicle load limit for small vehicle snow removal equipment. Reconstruction work will necessitate the use of a construction barge in the River. Repairs to river wall foundation that supports the slab on grade portion of the Riverwalk would also be completed (epoxy crack injection and concrete patching).

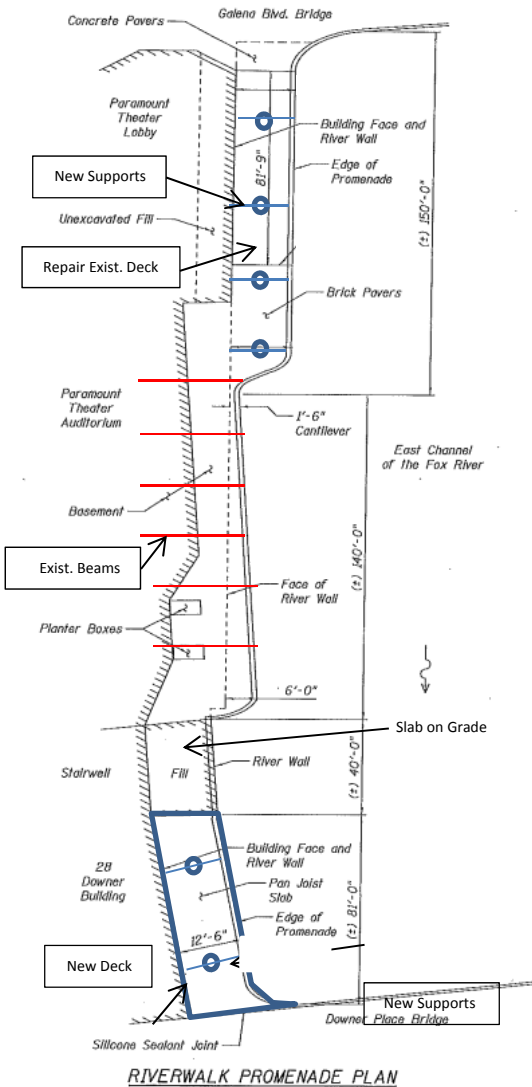
Preliminary Construction Cost (stamped concrete) = \$200,000

Preliminary Construction Cost (brick pavers) = \$220,000

Option 1 Total Preliminary Construction Cost = \$540,000

Option 1 Total Preliminary Construction Cost (with pavers) = \$570,000

## Option 2: Repair and Build New Foundations



This option would include many of the repairs described in Option 1. However, it includes additional framing making the Riverwalk mostly independent of the existing buildings. An independent structural support system offers the following advantages.

1. The Riverwalk's structural integrity becomes independent of the existing building walls, framing and foundations. No future repair needs of the existing buildings will impact the Riverwalk.
2. Likewise, future maintenance on the Riverwalk need not impact the existing buildings (which are considered Historic Buildings).

The difference between this option (Option 2), and the next option (Option 3), is that this option would leave in place the existing Riverwalk support over the Paramount Theatre Auditorium basement as there is not sufficient room to install new column and beam supports in this area and keep the existing Riverwalk alignment.

**Paramount Theatre:** New columns and foundation supports would be added under the existing I-Beams so that these existing beams could have their connection to the existing building structure permanently severed. The finished Riverwalk along the Paramount Theatre would then consist of

repaired beams supported on new columns and foundations independent of the existing buildings, and a repaired deck with a new wearing surface and finishing as described in Option 1. The rehabilitated Riverwalk would be capable of supporting current AASHTO pedestrian loads (90 psf) and a 3-Ton vehicle load limit for small vehicle snow removal equipment. To facilitate the improvements listed in this option, a floating barge in the river and cofferdam(s) would be required. The required cofferdams would also provide the City with an opportunity to incorporate, if desired, utility improvements for the existing sanitary sewer line that runs along building foundations in the river (type of improvements and costs to be determined). While cofferdams are in place, repairs to the concrete base of the river wall along the Theatre can be completed (concrete patching and epoxy crack injection).

Preliminary Construction Cost = \$2,200,000

Downer Building: The existing deck is not considered salvageable for snow removal equipment loads, so once the existing steel cantilever beams passing through the existing building wall are severed, the beams would then be removed and replaced with new steel beams supported on new columns and foundations. The Riverwalk framing along the Downer Building would then consist of all new foundations, columns, and beams. A new normal weight concrete deck would be constructed with a stamped, stained and sealed finish. The replaced Riverwalk along Downer Building would be capable of supporting current AASHTO pedestrian loads (90 psf) and a 5-Ton vehicle load limit for small vehicle snow removal equipment. A cofferdam would be required at each column foundation location for installation of the new foundations. The required cofferdam(s) would also provide the City with an opportunity to incorporate, if desired, utility improvements for the existing sanitary sewer line that runs along building foundations in the river (type of improvements and costs to be determined). Repairs to the river wall foundation that supports the slab on grade portion of the Riverwalk would also be completed (epoxy crack injection and concrete patching).

Preliminary Construction Cost = \$750,000

Option 2 Total Preliminary Construction Cost = \$2,950,000

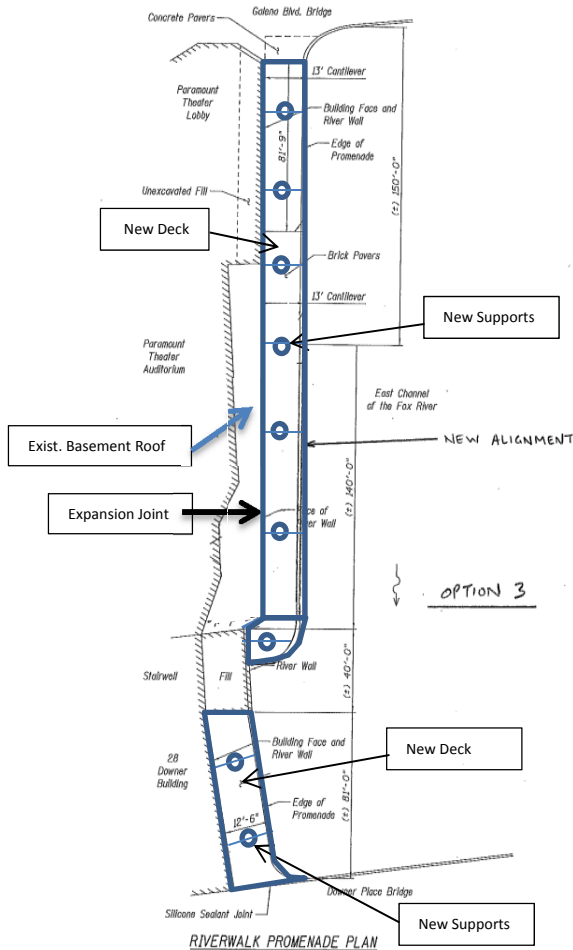
### Option 3: Complete Replacement

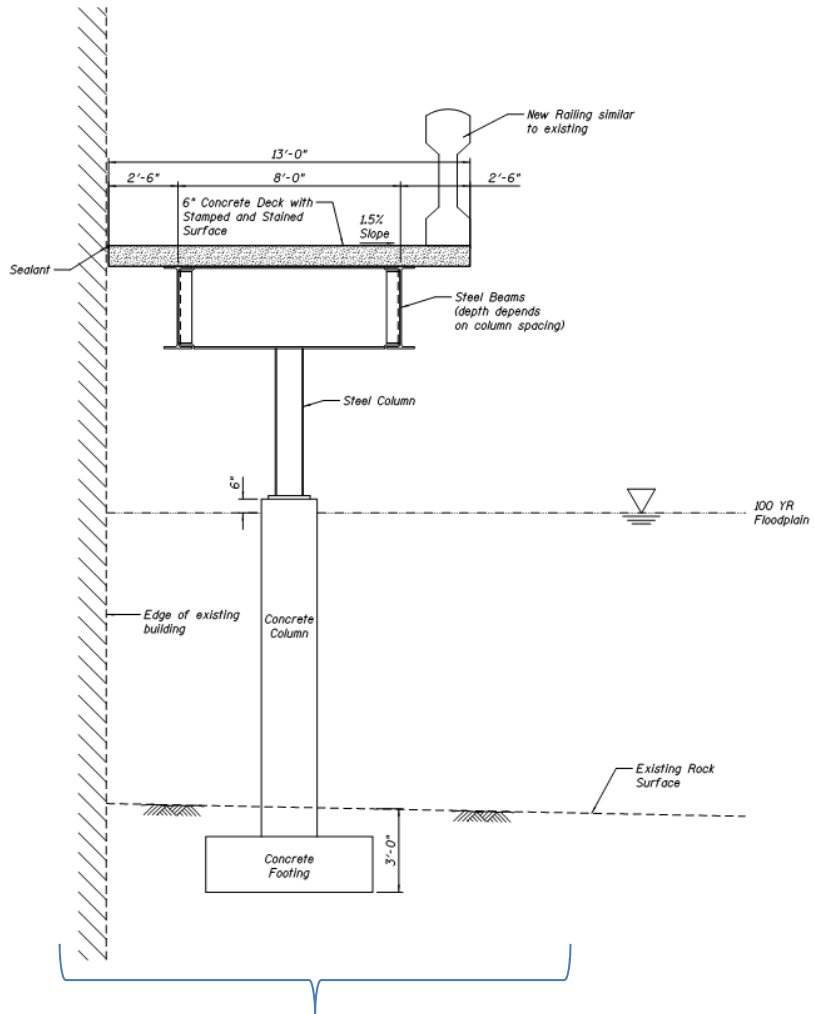
This option would not include repair or reuse any portion of the existing Riverwalk along either the Paramount Theatre or the Downer Building. The existing deck for the entire subject length would be removed.

The existing cantilevered beams would be severed from the connection to the existing buildings and removed, including the portion over the auditorium basement. A new concrete slab with stamped, stained and sealed finish would be supported on new steel beams, columns and foundations everywhere except where existing retaining walls and fill material provide adequate support for a new concrete slab on grade (the short portion located within the Downer Building segment). The new construction along the Auditorium basement would project the Riverwalk there further out over the river and allow for smoothing out the alignment of the Riverwalk to make it more uniform (see plan view image, left). New railings (similar to existing) would be installed since the existing railing layout will not match the improved Riverwalk alignment in this option. Existing lighting, planters & benches can be reused and reinstalled. The existing roof over the Paramount Theatre Auditorium basement would no longer support a portion of the Riverwalk, thus making future maintenance of the building and the Riverwalk independent of each other. A cofferdam would be required at each column foundation location for installation of the new foundations. The required cofferdams would also provide the City with an opportunity to complete repairs

along the base of the river wall in each segment of the Riverwalk. The City would also have the opportunity to incorporate, if desired, improvements to the existing sanitary sewer that runs along the buildings and in the river (type of improvements and costs to be determined).

Option 3 Total Prelim. Constr. Cost = \$3,570,000





Typical Section of Complete Replacement. Applies to all of Riverwalk in Option 3 and to Downer Building location in Option 2. North half of Paramount Theatre Riverwalk in Option 2 would re-use existing deck but add new columns and beams.