# CITY OF BLOOMINGTON

# AMENDED SPECIAL MEETING NOTICE

# 109 E. OLIVE

# WEDNESDAY, NOVEMBER 5, 2014 5:30 P.M.

1. Call to Order
2. Roll Call
3. Public Comment
4. Change Order #2R1 for the Pepsi Ice Center Garage, (PICPG), Structural Repairs. (Recommend that Change Order #2R1 to the PICPG structural repair, with Structural Preservation Systems, LLC be approved and the Resolution adopted.) *Council Memorandum with Attachments.*
5. Adjourn.

FOR COUNCIL: November 5, 2014

SUBJECT: Change Order #2R1 for the Pepsi Ice Center Garage, (PICPG), Structural Repairs

**RECOMMENDATION/MOTION:** Recommend that Change Order #2R1 to the PICPG structural repair, with Structural Preservation Systems, LLC be approved and the Resolution adopted.

**STRATEGIC PLAN LINK:** Goal 2. Upgrade City infrastructure and facilities.

**STRATEGIC PLAN SIGNIFICANCE:** Objectives 2c. Well-designed, well-maintained City facilities emphasizing productivity and customer service.

**BACKGROUND:** The City has been working closely with Structural Preservation Systems, LLC, (Structural), for construction services for the needed repairs at the PICPG and Walker Restoration, LLC, (Walker), for professional construction observation services to oversee the work being performed by Structural. It came to staff's attention on October 24, 2014 that there were two (2) issues requiring the attention of the City in terms of change orders:

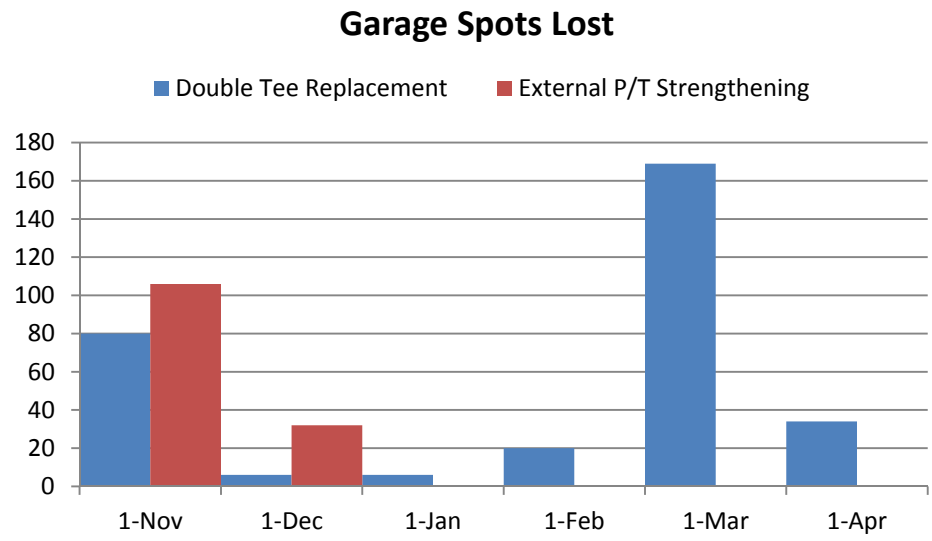
1) Epoxy Injection of cracks found in certain double tees.
2) Change in Methods – From "Double Tee Removal and Replacement" to "External Post-Tensioning in Lieu of Replacing Double Tee".

During the process of preparing the double tees for the carbon Fiber Reinforced Polymer, (FRP), applications, significant cracks were found on the double tees which needed immediate attention. The cracks were made visible only through the sanding and grinding of the double tees.

Before the FRP application could be applied, Structural stated that the cracks needed to be strengthened and sealed with pressurized epoxy ejections. Structural contacted Walker and made them aware of the needed repairs. Walker reviewed the cracks and proposed a method of repairs

and agreed with Structural's assessment. Due to the time sensitive nature of the repairs, Structural moved forward with the repairs in good faith that a change order would be approved. There were 110 locations that epoxy was injected in the exterior columns and 390 locations where epoxy was injected in the double tees. The total cost of the epoxy injections is $39,591.50.

Structural is also proposing a change in methods from a "Double Tee Removal and Replacement" to "External Post Tensioning in Lieu of Replacing Double Tee". The proposed change in method has been reviewed by Walker and recommended as an acceptable alternative. The proposed change in method would significantly shorten the construction schedule for the project, (from April 2015 to December 5, 2014), open more parking stalls for Coliseum and Pepsi Ice Center patrons, eliminate the need for the use of a crane and the temporary closure of Olive St., eliminate the risks associated with demolition, and reduce the cost of the project from $263,741 to $206,109.




The proposed External Post-Tensioning method has been successfully performed by Structural in Wallingford, PA on the Plush Hills Condominium Parking Garage and in Gaithersburg, MD on the Washington Center Parking Facility IV.

**COMMUNITY GROUPS/INTERESTED PERSONS CONTACTED:** Walker Restoration LLC.

**FINANCIAL IMPACT:** Since the total costs of this project are sizeable, unknown, and subject to a potential reimbursement; it is recommended by Finance staff that General Fund balance be utilized in the short term for all related costs until the design and repair of the garage is complete. Once full project costs are known the City can execute a short term debt instrument to reimburse General Fund balance and finance the project until reimbursement can be achieved. The City's General Fund balance is limited and will be further impacted by upcoming year end budget transfers related to FY 2014 and therefore, this financing approach has been recommended.

Respectfully submitted for Council consideration.

Prepared by: Alexander S. McElroy, Asst. to the City Manager

Reviewed by:

Financial & budgetary review by:

Legal review by:

Recommended by:

David A. Hales
City Manager

Attachment 1. Resolution
Attachment 2. Walker Restoration Memo
Attachment 3. Structural Preservation Memo
Attachment 4. Structural Method References
Attachment 5. Proposed Change Order
Attachment 6. Revised Project Gantt Chart
Attachment 7. Conceptual Detail

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Motion: That Change Order #2R1 to the PICPG with Structural Preservation Systems, LLC be approved and the Resolution adopted.

Motion: _____ Seconded by: _____

| | Aye | Nay | Other | | Aye | Nay | Other |
|---|---|---|---|---|---|---|---|
| Alderman Black | | | | Alderman Painter | | | |
| Alderman Fruin | | | | Alderman Sage | | | |
| Alderman Hauman | | | | Alderman Schmidt | | | |
| Alderman Lower | | | | Alderman Stearns | | | |
| Alderman Mwilambwe | | | | | | | |
| | | | | Mayor Renner | | | |

**RESOLUTION NO. 2014 -**

**A RESOLUTION AUTHORIZING A CHANGE ORDER IN THE AMOUNT OF ($18,040.50) IN THE CONTRACT BETWEEN THE CITY OF BLOOMINGTON AND STRUCTURAL PRESERVATION SYSTEMS, LLC**

WHEREAS, the City of Bloomington has previously entered into a contract with Structural Preservation Systems, LLC; and

WHEREAS, for the reasons set forth in a staff report dated November 5, 2014 it was necessary to inject epoxy into cracks found on double tees and change methodology from Double Tee Removal and Replacement to External Post-Tensioning in Lieu of Replacing Double Tee; and

WHEREAS, it is the finding of the City Council that the decision to perform the work described in the November 5, 2014 memo was in the best interest of the citizens of the City of Bloomington.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BLOOMINGTON, ILLINOIS:

That a change order in the amount of ($18,040.50) in the contract between the City of Bloomington and Structural Preservation Systems, LLC be approved.

ADOPTED this 5th day of November, 2014.

APPROVED this ____th day of November, 2014.

APPROVED:

Tari Renner
Mayor

ATTEST:

Tracey Covert
City Clerk

WALKER
RESTORATION CONSULTANTS

850 West Jackson Boulevard
Suite 310
Chicago, IL 60607

Office: 312.633.4260
Fax: 312.633-4262
www.walkerrestoration.com

November 3, 2014

Mr. Jon Johnson
Procurement Manager
City of Bloomington
109 E Olive Street
Bloomington, Illinois 61702

Re: Pepsi Ice Center Parking Deck Repairs
External Post-tensioning in lieu of Replacing Double Tee

Dear Mr. Johnson,

STRUCTURAL has proposed, as an alternative to replacing the damaged double tee, to strengthen the existing double tee in place in a letter dated November 3, 2014. This would be accomplished by widening one tee stem and the addition of additional post-tensioning cables. The other tee stem on the double tee section would be strengthened similar to the remaining tees on the lower level.

STRUCTURAL has identified a number of advantages to this approach:

1. With the external post-tensioning repair, STRUCTURAL anticipates completing these repairs in 5 weeks after receiving the approval. If the receive the approval, they would complete the work by December 20, 2014. The double tee replacement will not be completed until the Spring, so some (approximately 8) parking spaces will remain out of service until that time.

2. This will eliminate the requirement to stage a crane on the areas adjacent to the parking structure, and use other laydown areas in order to stage and remove large sections. This will reduce the impact of the work on the adjacent areas during construction.

3. There will be a cost savings of $57,632 versus the double tee replacement.

I have reviewed the preliminary proposed approach that STRUCTURAL is proposing. There are two general aspects I consider in evaluating the feasibility of a repair approach – the structural safety and the durability or expected life.

The approach proposed by STRUCTURAL, properly designed, is capable of strengthening the double tee so it can support the code-required loads. As part of my services as the Engineer of Record for this project, I will review the design of the

strengthening prepared by STRUCTURAL. The final design will be capable of sustaining the code-required loading for a parking structure.

I initially had some concerns regarding the durability of the double tee strengthened in this manner. The double tee has cracks which are frequent and wide enough that they could lead to premature deterioration of the double. They would allow water to penetrate and which could lead to corrosion. The Pepsi Ice Center Parking Structure is a relatively new structure, and it is important that any strengthening that is implemented has a long service life to match the remaining life of the parking structure. Although there were some initial concerns regarding some of the durability aspects of the approach proposed by STRUCTURAL, they made some adjustments to address these concerns, and I believe that the approach now proposed will meet the durability requirements.

Based on my reviewed of the design and the proposal prepared by STRUCTURAL, I believe that this is a feasible alternative approach to the double tee replacement.

Regards,

WALKER RESTORATION CONSULTANTS

Kyle Stanish, Ph.D., S.E. P.E.
Project Manager

cc:

structural

November 3, 2014

Jon Johnston
City of Bloomington
Finance Department
109 E. Olive Street
P.O. Box 3157
Bloomington, IL 61702-3157

Dear Mr. Johnston:

In part, the current scope of work at the Pepsi Ice Arena garage is to strengthen the stems of the existing double tee concrete members utilizing carbon fiber technology. Currently, a precast double tee section creating a portion of the second floor has experienced overloading, resulting in significant damage. The current repair methodology calls for replacement of the member. This letter serves to propose an alternate repair methodology that provides for reduced risk, less impact to the surrounding area (elimination of crane use), reduced overall construction schedule, provides for equivalent performance life, and lowers the investment cost for this scope of the project.

Based on the original repair methodology, means for replacement of the full double tee will require a crane to lift the new piece into location. Two additional precast double tee sections from the third level will be removed to allow for access. After the three precast sections have been set back in their final locations, a topping slab must be placed and tied into the existing deck due to the saw cuts and demolition performed during the precast replacement process.

The removal of sections of the structure creates impact to the immediately adjacent buildings and the public specifically: shoring setup would remain within the garage as it awaits February remobilization, Olive street is to be closed in the springtime to allow for crane setup, the garage's south half will be shut down while the removal and replacement is completed, additional areas will be closed at the site to allow for delivery, set down and pick of 60' precast sections. There are also impacts to the parking structure itself. There are always risks to a structure when you do demolition. This project specifically there is a risk of possible damage to adjoining pieces during removal. Two currently undamaged pieces would have to be impacted to retrieve the second floor section. Also the continuous topping slab has to be rebuilt to regain its continuity once the pieces are replaced. These are all additional impacts to the structure.

Through discussion with the engineer and information gathered on site, STRUCTURAL's capabilities can provide the city in-place repair and strengthening through an external post tensioning enlargement. We believe this to be an equivalent solution to the existing repair methodology. During our current mobilization we would shore the existing section, repair the double tee's existing cracks, and install two additional external enlargements to supplant the lost structural capacity – all while the precast remains in place. We have performed this successful alternative solution for other projects, minimizing the impact to the structure and surrounding area. Two reference sheets are attached for your review.

Due to this project's sensitive timeframe we have already performed preliminary design efforts for the City of Bloomington and Walker's consideration and approval. From this design we have estimated the

Structural Preservation Systems, LLC
925 Tollgate Road • Elgin, IL 60123 • Phone: 847-429-1648 • Fax: 847-429-9903
**www.structural.net**

cost and schedule required to complete the repair. If approved, the total scope of work for this post-tensioned enlargement would take five weeks to complete, a reduction of approximately 4 months to the overall schedule. In short, if immediately approved our goal is complete the project in its entirety by December 20th. Additionally, the overall cost investment for repair to this double tee would be reduced from $263,741 to $206,109

Thank you for your consideration of this alternative approach. We optimistically look forward to approval of this approach.

Sincerely,

Peter Haupt
Project Manager

CC: Kyle Stanish PE, Walker Restoration Consultants

Enclosures

# Plush Mills Condominium Parking Garage

***Precast Double Tee Strengthening***

**Location** Wallingford, PA, USA

**Responsibility** Design/Build Contractor

**Date Completed** 2009

## Project Description

The flexural capacity of two precast double-tee beams in the parking garage of this condominium building had been severely compromised due to damage to the existing PT cables. Strengthening of the two stems was performed using concrete section enlargement using self-consolidating concrete (SCC) and including mild and PT reinforcement. STRUCTURAL's scope of work included the structural evaluation of the severed double-tee stems, design, detailing, and installation of the new section enlargements, and stressing of new post-tensioned cables.

## Key Persons and Project Roles

**Tarek Alkhrdaji**—Strengthening Design, **Robert St. John**—Project Manager, **Wayne Ritz**—Foreman.

**Placement of Mild Reinforcement and PT Cables**

**Completed Concrete Enlargement of Double-Tee Stems**

# Washingtonian Center Parking Facility IV

***Prestressed Double Tee Stem Repair***

**Location** Gaithersburg, MD, USA

**Responsibility** Strengthening Contractor

**Date Completed** 2012

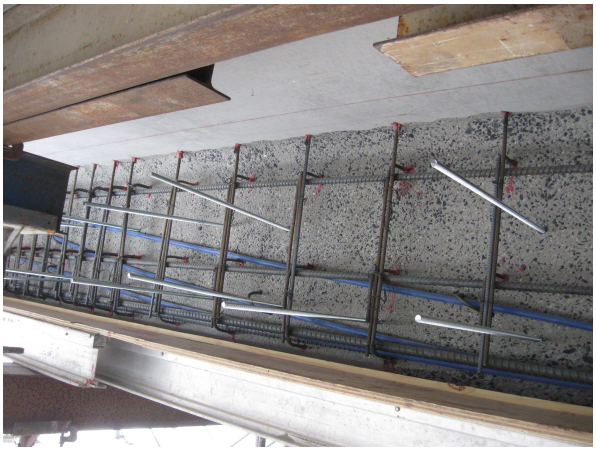
## Project Description

The Washingtonian Center Parking Facility IV is a five-story parking garage that consists of precast double tees (DT) supported by ledger beams. A 60 foot long DT stem was damaged due to impact by a truck traveling in the parking facility. STRUCTURAL's scope of work included the structural evaluation of the damaged DT stem, and the development and implantation of a repair solution. Strengthening of the DT stem was achieved using section enlargement with external post-tensioning. Concrete enlargement was completed using the Form-and-Pump technique with self-consolidating concrete (SCC).

## Key Persons and Project Roles

**Tarek Alkhrdaji & Nestore Galati**—Strengthening Design, **Jerry Jubb**—Project Manager, **Dane Clark**—Superintendent.

**Dapped End at Spandrel Beam**



**Installed Mild Reinforcing Steel and PT Cables**

## CHANGE ORDER FORM

| | | | |
|---|---|---|---|
| **PROJECT:** | **CHANGE ORDER NUMBER: 2R1** | OWNER: | X |
| Pepsi Ice Center Garage | **DATE: 10/31/14** | **ENGINEER:** | X |
| 201 S. Roosevelt Street | | CONTRACTOR: | X |
| Bloomington, IL 60147 | | FIELD: | |
| **TO CONTRACTOR:** | **ENGINEER'S PROJECT NUMBER: 37-7676.10** | OTHER: | |
| Structural Preservation Systems, LLC | **CONTRACT DATE: 9/29/14** | | |
| 925 Tollgate Road | **CONTRACT FOR: Concrete Restoration to Plaza and Garage** | | |
| Elgin, IL 60123 | | | |

**The Contract is changed as follows:**

Change in scope of work to provide all labor, material, supervision, and cleanup for the following:

-Elimination of full double tee removal and replacement from scope of work

-External post-tensioning repair to existing double tee on second level in lieu of full replacement. Repair to be performed to the west stem of the double tee per design drawings and documents, Sheets S7, S8 & S9, created by Structural Technologies, dated 10/28/14. Final signed and sealed shop drawings will be submitted upon change order approval.
FRP will be applied to east stem that does not require external post-tensioning.
Double tee to receive epoxy injection repair to all existing cracks before post-tensioning and FRP is applied.

-Epoxy injection of existing cracks in columns and double tees found to be greater than 0.01" wide. Only cracks that fall within FRP locations will be repaired. Quantity estimated for eleven columns and fifty-eight tee stems. Updated based on Phase 1 findings.

| Description of Work | Est. Quant. | Unit | Unit Price | Scheduled Value |
|---|---|---|---|---|
| | | | | |
| <CREDIT> Double Tee Replacement | -1 | LS | $263,741.00 | -$263,741.00 |
| Double Tee External Strengthening | 1 | LS | $206,109.00 | $206,109.00 |
| Epoxy Injection - Columns (incl. access) | 110 | LF | $81.25 | $8,937.50 |
| Epoxy Injection - Double Tee Stems (incl. scaffolding) | 390 | LF | $78.60 | $30,654.00 |
| | | | | |
| Estimated Total | | | | ($18,040.50) |

| | | |
|---|---|---|
| The original Contract Sum was | $ | 1,098,836.00 |
| Net changes by previously authorized Change Orders | $ | (463,858.00) |
| The Contract Sum prior to this Change Order | $ | 634,978.00 |
| The Contract Sum will be increased by this Change Order in the amount of | $ | (18,040.50) |
| The new Contract Sum including this Change Order will be | $ | 616,937.50 |

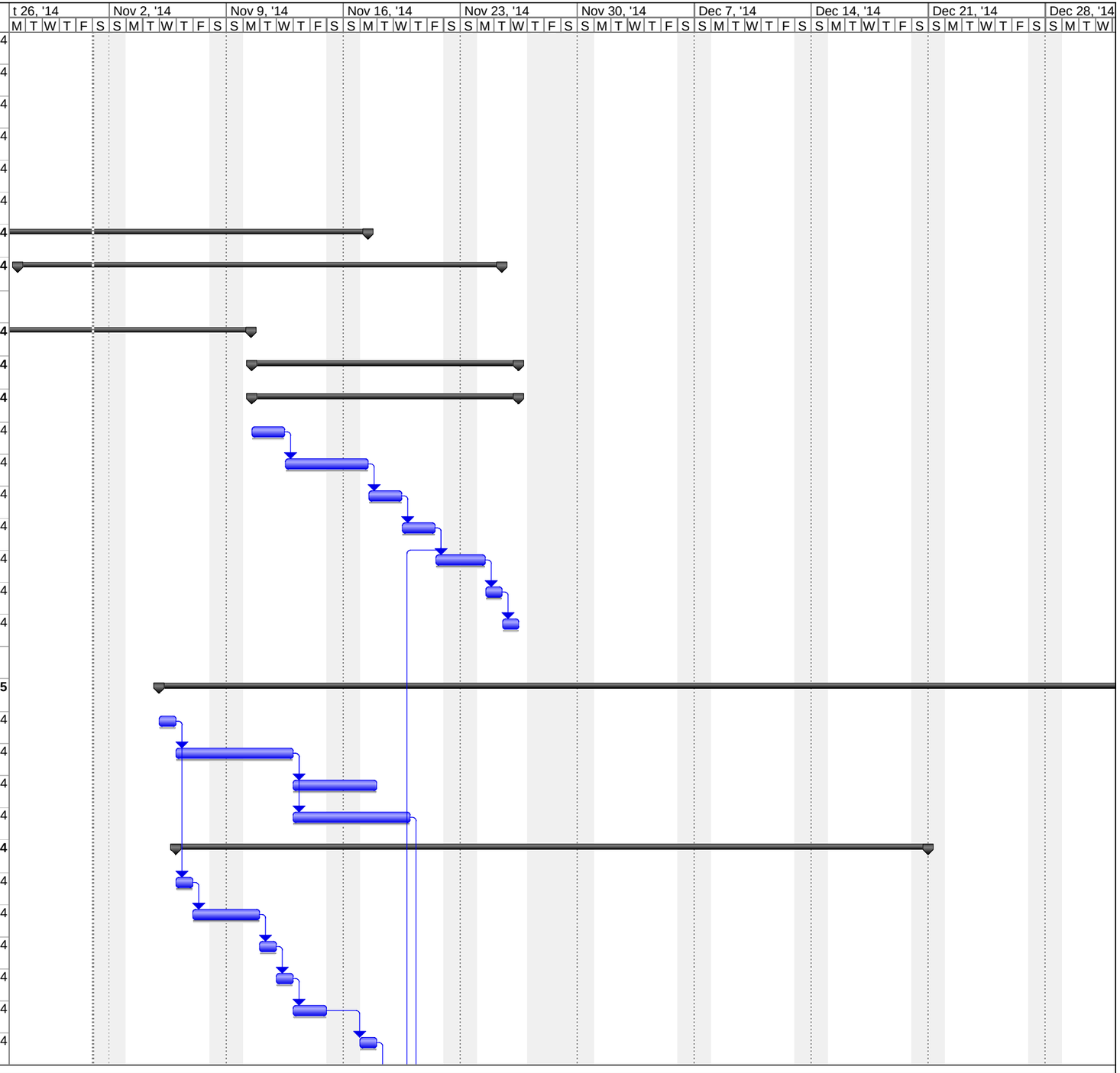
The Contract Time will be changed by: -131 days

The date of Substantial Completion as of the date this Change Order will be December 20, 2014.

**NOT VALID UNTIL SIGNED BY THE ENGINEER, CONTRACTOR AND OWNER**

| | | |
|---|---|---|
| Walker Restoration Consultants | Structural Preservation Systems, LLC | City of Bloomington |
| **ENGINEER** | **CONTRACTOR** | **OWNER** |
| 850 W. Jackson, Suite 310 | | 109 E. Olive Street |
| Chicago, IL 60607 | 925 Tollgate Road, Elgin, IL 60123 | Bloomington, IL 61702 |
| ADDRESS | ADDRESS | ADDRESS |
| SIGNATURE | SIGNATURE | SIGNATURE |
| Kyle Stanish | PETER HAUPT | |
| **Kyle Stanish** | Peter Haupt | **PRINT NAME** |
| Nov. 3, 2014 | 11/3/14 | |
| **DATE** | DATE | **DATE** |

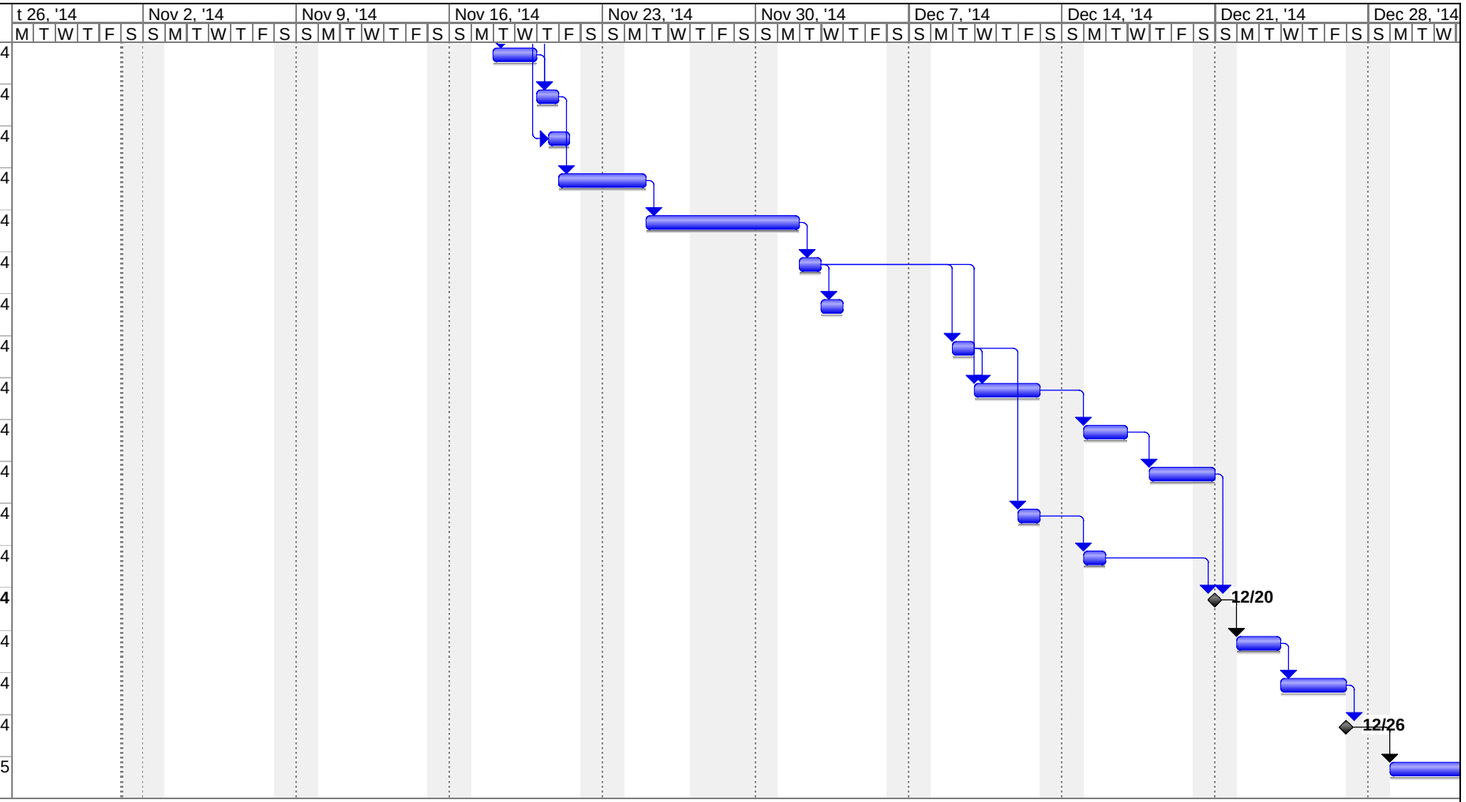
| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 1 | Signed Contract | 0 days | Mon 9/29/14 | Mon 9/29/14 |
| 2 | Submit CFRP Shop Dwgs | 1 day | Wed 10/8/14 | Wed 10/8/14 |
| 3 | Owner/EOR Approval | 1 day | Fri 10/10/14 | Fri 10/10/14 |
| 4 | Order CFRP | 0 days | Fri 10/10/14 | Fri 10/10/14 |
| 5 | Delivery of CFRP materials to site | 7 days | Mon 10/13/14 | Tue 10/21/14 |
| 6 | Receive heaters on site | 0 days | Tue 10/21/14 | Tue 10/21/14 |
| 7 | **CFRP Installation Columns South** | **27.5 days** | **Thu 10/9/14** | **Mon 11/17/14** |
| 24 | **CFRP Installation Columns North** | **21 days** | **Mon 10/27/14** | **Tue 11/25/14** |
| 34 | | | | |
| 35 | **Phase 1 Double T's** | **25.5 days** | **Mon 10/6/14** | **Mon 11/10/14** |
| 46 | **Phase 2 Double T's** | **12 days** | **Mon 11/10/14** | **Wed 11/26/14** |
| 47 | **CFRP Installation Double T's** | **12 days** | **Mon 11/10/14** | **Wed 11/26/14** |
| 48 | Install Containment / Protection | 2 days | Mon 11/10/14 | Wed 11/12/14 |
| 49 | Surface Prep - Sandblast beams | 3 days | Wed 11/12/14 | Mon 11/17/14 |
| 50 | Surface Prep Beams - Vacuum Dust | 2 days | Mon 11/17/14 | Wed 11/19/14 |
| 51 | Double T - CFRP Install, Detail 4.1 | 2 days | Wed 11/19/14 | Fri 11/21/14 |
| 52 | Double T - CFRP Testing | 1 day | Fri 11/21/14 | Mon 11/24/14 |
| 53 | Paint CFRP on beams | 1 day | Mon 11/24/14 | Tue 11/25/14 |
| 54 | Remove Containment / Protection | 1 day | Tue 11/25/14 | Wed 11/26/14 |
| 55 | | | | |
| 56 | **Double T - Post Tensioning** | **46 days** | **Wed 11/5/14** | **Fri 1/9/15** |
| 57 | Owner Approval of Change Order | 1 day | Wed 11/5/14 | Wed 11/5/14 |
| 58 | Submit Signed & Sealed Design Drawings | 5 days | Thu 11/6/14 | Wed 11/12/14 |
| 59 | Engineer Approves Design Drawings | 3 days | Thu 11/13/14 | Mon 11/17/14 |
| 60 | Order Post-tension cables | 5 days | Thu 11/13/14 | Wed 11/19/14 |
| 61 | **Double-T Post Tensioning Build Out** | **30 days** | **Thu 11/6/14** | **Sat 12/20/14** |
| 62 | Set up protection around work zone | 1 day | Thu 11/6/14 | Thu 11/6/14 |
| 63 | Relocate Electric and Plumbing | 2 days | Fri 11/7/14 | Mon 11/10/14 |
| 64 | Install Shoring | 1 day | Tue 11/11/14 | Tue 11/11/14 |
| 65 | Epoxy Inject Cracks | 1 day | Wed 11/12/14 | Wed 11/12/14 |
| 66 | Drill Holes | 2 days | Thu 11/13/14 | Fri 11/14/14 |
| 67 | Surface Preparation of Both Stem (Sponge) | 1 day | Mon 11/17/14 | Mon 11/17/14 |




Project: Pepsi Ice Center Parking Gar
Date: Sat 11/1/14

Task — Progress — Summary — External Tasks — Deadline
Split — Milestone — Project Summary — External Milestone

| ID | Task Name | Duration | Start | Finish |
|---|---|---|---|---|
| 68 | Install rebar | 2 days | Tue 11/18/14 | Wed 11/19/14 |
| 69 | Install tendons & anchors | 1 day | Thu 11/20/14 | Thu 11/20/14 |
| 70 | Apply FRP to East Stem | 1 day | Thu 11/20/14 | Fri 11/21/14 |
| 71 | Construction Formwork | 2 days | Fri 11/21/14 | Mon 11/24/14 |
| 72 | Install Formwork | 3 days | Tue 11/25/14 | Mon 12/1/14 |
| 73 | Pump Concrete | 1 day | Tue 12/2/14 | Tue 12/2/14 |
| 74 | Remove formwork | 1 day | Wed 12/3/14 | Wed 12/3/14 |
| 75 | Tension Tendons | 1 day | Tue 12/9/14 | Tue 12/9/14 |
| 76 | Install corbel enlargement | 3 days | Wed 12/10/14 | Fri 12/12/14 |
| 77 | Place Small End section of buildout at South | 2 days | Mon 12/15/14 | Tue 12/16/14 |
| 78 | remove shoring & Protection | 2 days | Thu 12/18/14 | Sat 12/20/14 |
| 79 | Electric - Reconnect | 1 day | Fri 12/12/14 | Fri 12/12/14 |
| 80 | Plumbing - Reconnect | 1 day | Mon 12/15/14 | Mon 12/15/14 |
| 81 | **Substantial Completion** | **0 days** | **Sat 12/20/14** | **Sat 12/20/14** |
| 82 | Final Punchlist | 2 days | Mon 12/22/14 | Tue 12/23/14 |
| 83 | Permit Close Out | 3 days | Wed 12/24/14 | Fri 12/26/14 |
| 84 | Final Completion | 0 days | Fri 12/26/14 | Fri 12/26/14 |
| 85 | Issue Releases and Collect Retainage | 10 days | Mon 12/29/14 | Fri 1/9/15 |




Project: Pepsi Ice Center Parking Gar
Date: Sat 11/1/14

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

NOTES FOR CONCRETE ENLARGEMENT:

(1) SHORING SHOULD BE PROVIDED DOWN TO SLAB ON GRADE. SHORING TOWERS SHALL HAVE A MINIMUM CAPACITY OF 15 KIPS AND SPACING AT 9 FT O.C. ALONG SPAN OF DOUBLE TEE.

(2) DO NOT DAMAGE EXISTING REINFORCING AND PRESTRESSING STEEL.

(3) ROUGHEN ALL CONCRETE SURFACES TO BE IN CONTACT WITH NEW CONCRETE ENLARGEMENT TO CSP7 (MIN.).

(4) ALL STEEL DOWELS SHALL BE BONDED USING HILTI HIT RE 500 EPOXY ADHESIVE.

(5) CONCRETE SHALL BE PLACED USING THE FORM-AND-PUMP TECHNIQUE.

(6) MINIMUM CONCRETE STRENGTH AT 28 DAYS SHALL BE 6,000 PSI.

(7) MINIMUM CONCRETE COVER SHALL BE 1 1/2".

(8) MILD STEEL REINFORCEMENT SHALL BE GRADE 60 KSI DEFORMED STEEL BARS.

(9) LAP SPLICE FOR #6 BARS SHALL BE 36" (MIN.). LAP SPLICE FOR #8 BARS SHALL BE 48" (MIN.).

(10) EMBEDMENT LENGTH FOR ALL #4 L-DOWEL BARS TO BE INSTALLED INTO THE DOUBLE TEE STEM SHALL BE 4 IN. (MIN.), UNLESS OTHERWISE SPECIFIED. EMBEDMENT LENGTH FOR ALL #4 DOWEL BARS TO BE INSTALLED INTO THE UNDERSIDE OF SLAB SHALL BE 3 1/2 IN., UNLESS OTHERWISE SPECIFIED.

(11) PRESTRESSING STEEL SHALL BE VSL GRADE 270 $\phi$ 0.5", 7-WIRE LOW RELAXATION STRANDS COATED WITH A CORROSION PREVENTATIVE GREASE AND ENCASED IN A CONTINUOUSLY EXTRUDED POLYETHYLENE PLASTIC SHEATHING OF 50 MILS MINIMUM THICKNESS.

(12) STRESSING (LIVE) ENDS: VSL S5N, WEDGES, PROTECTION SLEEVE WITH SEAL AND ADAPTER, GROUND GROMMETS, AND END CAP WITH SEAL SHALL BE USED AT STRESSING ENDS.

(13) FIXED (DEAD) ENDS: VSL ENCAPSULATED, WEDGES, PROTECTION SLEEVE AND ADAPTER, AND END CAP WITH SEAL.

(14) STRESSING MUST NOT COMMENCE UNTIL TEST CYLINDERS, CURED UNDER JOB SITE CONDITIONS, HAVE BEEN TESTED AND INDICATE THAT THE CONCRETE HAS REACHED A MINIMUM STRENGTH OF 3,500 PSI.

(15) ALL POST-TENSIONING STEEL SHALL BE STRESSED BY MEANS OF VSL HYDRAULIC JACKS, EQUIPPED WITH CALIBRATED HYDRAULIC GAUGES. A CALIBRATION CHART SHALL ACCOMPANY EACH JACK AND GAUGE COMBINATION. HYDRAULIC JACKS AND GAUGES ARE CALIBRATED AS UNIT, DO NOT INTERCHANGE.

(16) STRESS TENDONS TO 80% OF ULTIMATE CAPACITY, I.E. 33 KIPS, VERIFY CORRESPONDING GAUGE PRESSURE WITH JACK CALIBRATION CHART.

(17) THEORETICAL ELONGATION (INCH) FOR POST-TENSIONED CABLES IS 4.22 IN (0.081 IN/FT).

(18) RECORDS OF ALL GAUGE PRESSURES AND ELONGATION SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO CUTTING THE TAILS OF THE POST-TENSIONED CABLES.

STRESSING SAFETY GUIDELINES:

(1) THESE STRESSING SAFETY GUIDELINES APPLY TO ALL STRAND AND HIGH STRENGTH BAR TENDONS BUT ARE NOT INTENDED TO BE COMPLETE GUIDELINES ADDRESSING ALL CONSIDERATIONS REQUIRED TO MAINTAIN SAFETY. IT IS THE RESPONSIBILITY OF THE PLACER (THE CONTRACTOR PERFORMING STRESSING OPERATIONS) TO HAVE THE TRAINING AND EXPERIENCE IN ALL EQUIPMENT OPERATIONS AND SAFETY REQUIREMENTS NECESSARY TO PREVENT PROPERTY DAMAGE AND MAINTAIN THE SAFETY OF JOBSITE PERSONNEL AND THE GENERAL PUBLIC.

(2) THE NON-STRESSING END OF DEAD END OF TENDON MAY BE AS HAZARDOUS AS THE STRESSING END. SIMILAR PRECAUTIONS, SUCH AS PLYWOOD BARRIERS, SHOULD BE TAKEN AT BOTH ENDS AS DIRECTED BY THE PLACER.

(3) WEDGES AND WEDGE CAVITIES MUST BE FREE OF CEMENT PASTE, DEBRIS AND CORROSION. THE NOSE OF THE RAM MUST PROPERLY SEAT AGAINST THE ANCHORAGE BEARING SURFACE. THE RAM MUST EXTEND PROPERLY AND NOT CONTACT OBSTRUCTIONS DURING STRESSING.

(4) PROPER THREAD ENGAGEMENT OF HEX NUTS (INCLUDING LIVE AND DEAD ENDS) AND COUPLERS FOR HIGH STRENGTH BAR TENDONS MUST BE VERIFIED PRIOR TO STRESSING.

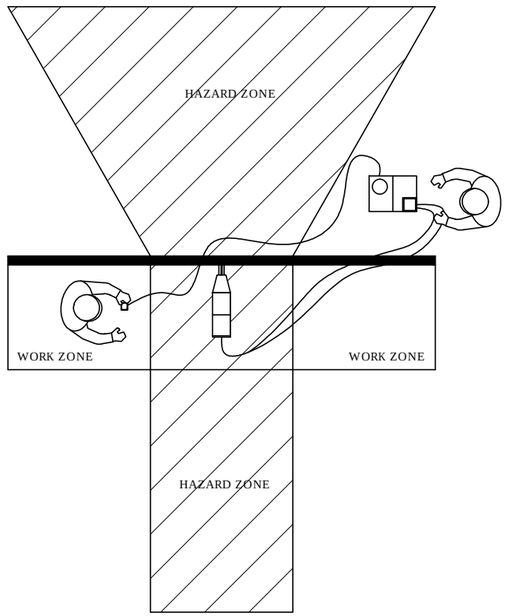
(5) IMMEDIATELY CEASE STRESSING AND REMOVE ALL PERSONNEL FROM THE AREA IF ANY EXISTING CRACK WIDENING, NEW CONCRETE CRACKING, BEARING PLATE MOVEMENT, OR UNUSUAL SOUNDS ARE OBSERVED.

(6) WORK ZONES SHALL BE DEFINED BY THE PLACER AND ONLY ESSENTIAL PERSONNEL SHALL OCCUPY THE WORK ZONES DURING STRESSING OPERATIONS.

(7) HAZARD ZONES SHALL BE DEFINED BY THE PLACER AND ONLY ESSENTIAL PERSONNEL SHALL BE AVOIDED DURING STRESSING OPERATIONS AND FOR A PERIOD OF TIME AFTER COMPLETION OF STRESSING OPERATIONS AS DIRECTED BY THE PLACER.

(8) TOOLS, MATERIALS, AND EQUIPMENT NOT ESSENTIAL TO THE STRESSING OPERATION SHALL BE CLEARED FROM THE WORK AND HAZARD ZONES DURING STRESSING OPERATIONS. STRESSING EQUIPMENT SHALL BE SECURED TO PREVENT FALLING FROM ELEVATED AREAS IN THE EVENT OF A FAILURE.

(9) REFER TO THE "FIELD PROCEDURES MANUAL FOR UNBONDED SINGLE STRAND TENDONS" BY THE POST-TENSIONING INSTITUTE FOR ADDITIONAL GUIDELINES.




STRESSING SAFETY DETAIL

CONCEPTUAL DETAIL- NOT FOR CONSTRUCTION

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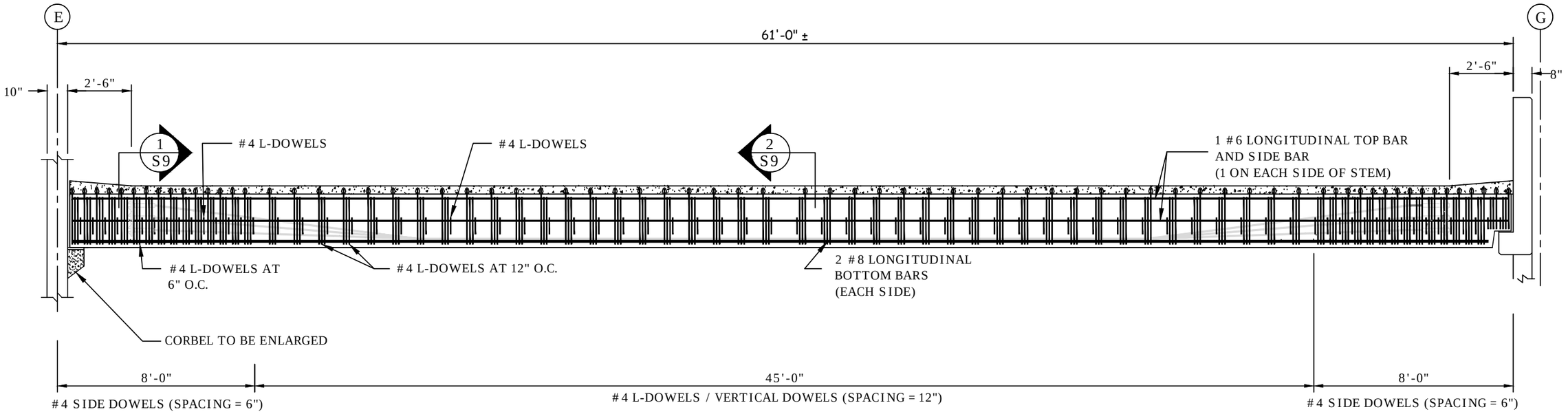
PEPSI ICE CENTER PARKING GARAGE
BLOOMINGTON, ILLINOIS

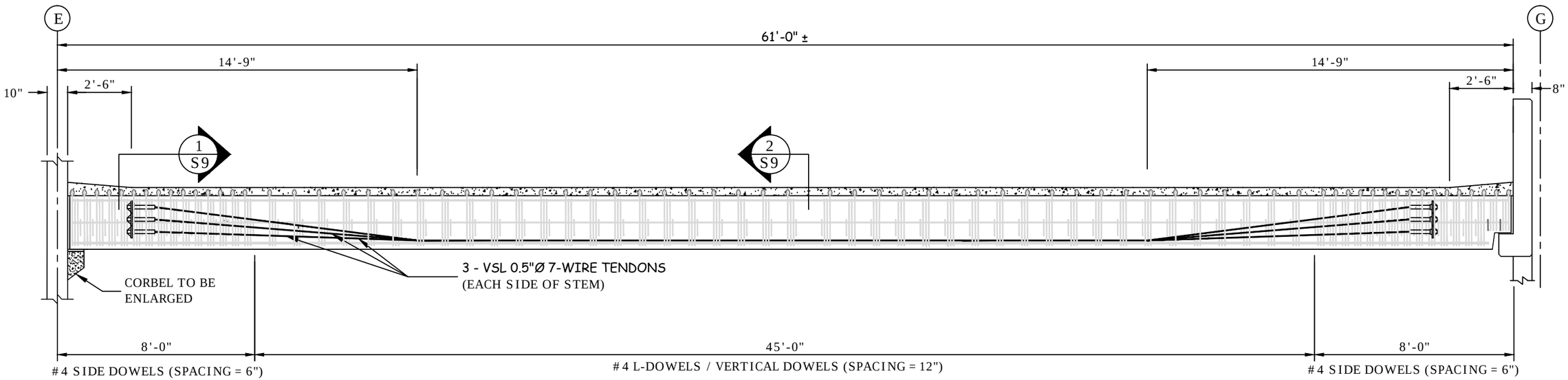
CONCRETE ENLARGEMENT NOTES

JOB NO: 415603

SHEET: S7




ELEVATION: MILD STEEL LAYOUT
(NTS)




ELEVATION: P-T TENDON LAYOUT
(NTS)

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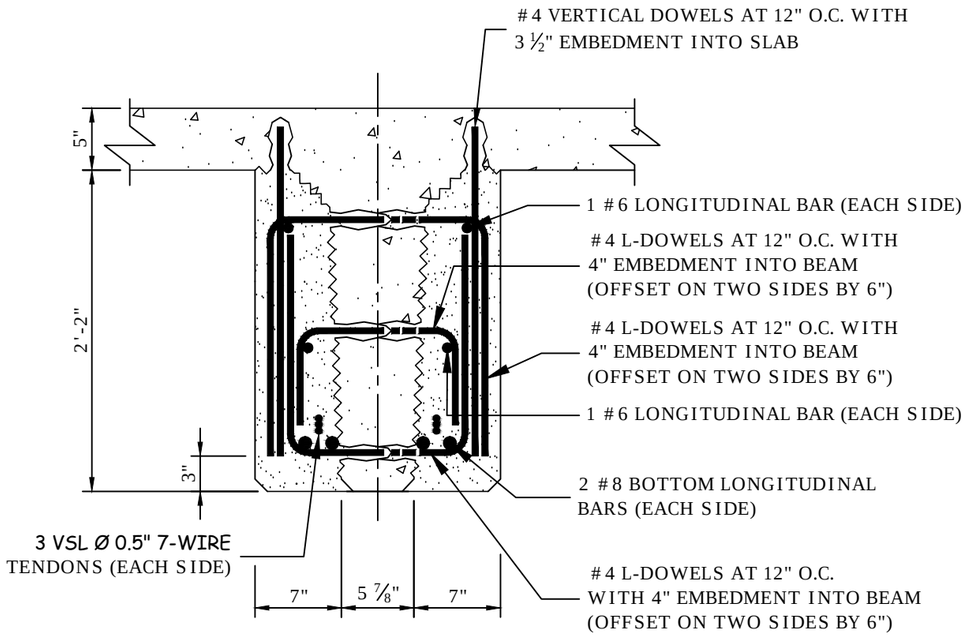
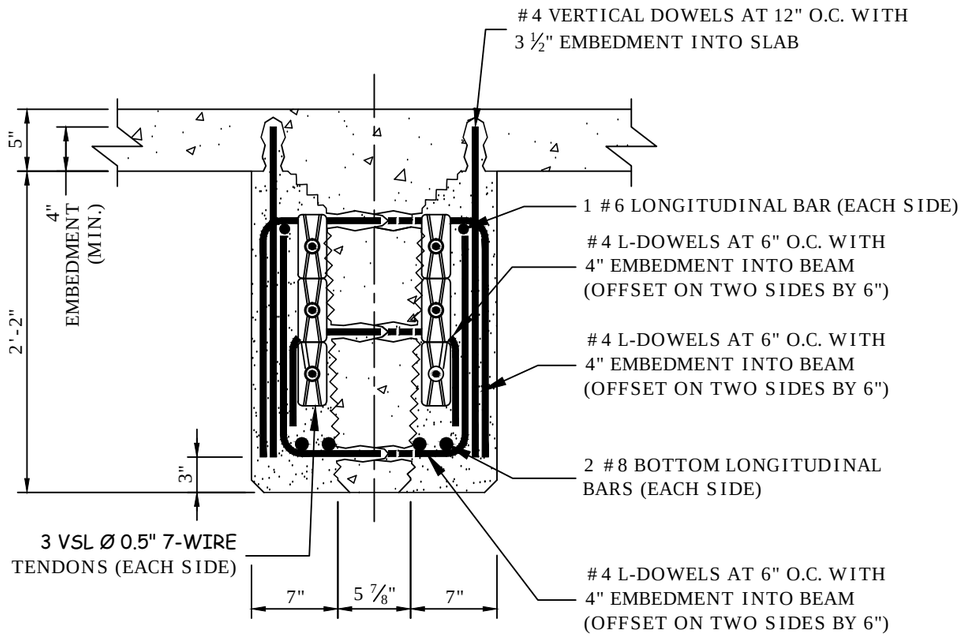
PRECAST DOUBLE TEE STRENGTHENING
SECTION DETAILS

JOB NO: 415603

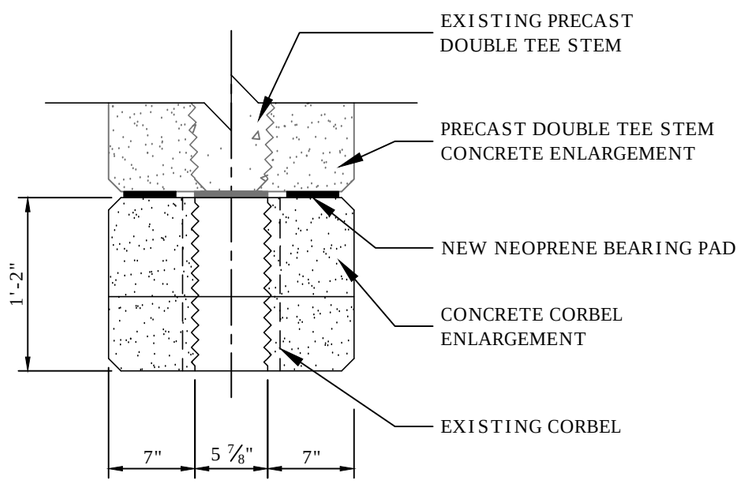
SHEET: S8




1/S9 TYPICAL REINFORCEMENT DETAIL




1/S9 TEE JOIST END ORCEMENT DETAIL




3/S9 CORBEL ENLARGEMENT DETAIL

CONCEPTUAL DETAIL- NOT FOR CONSTRUCTION

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PRECAST DOUBLE TEE STRENGTHENING
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