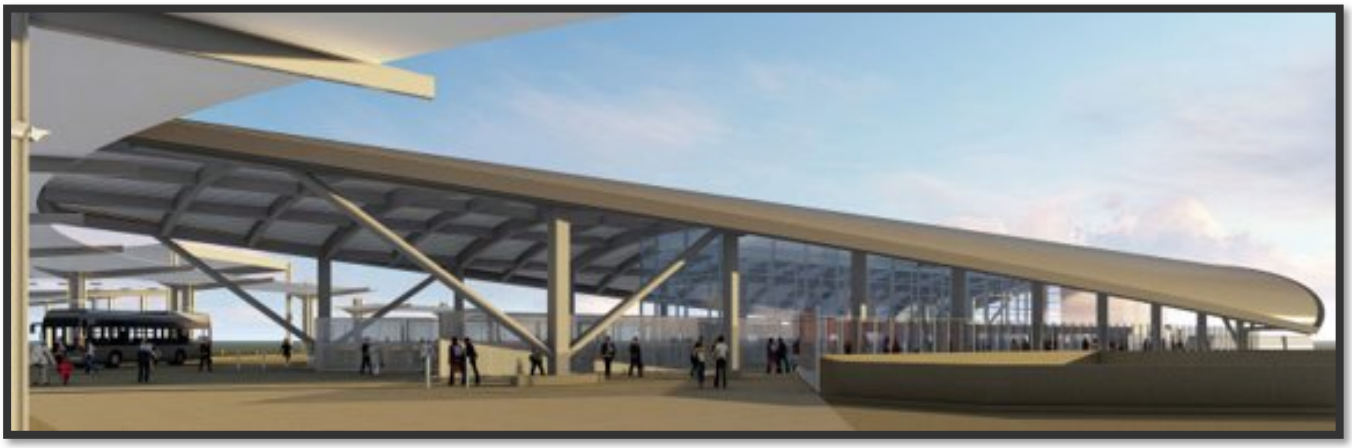
REGION 6
ROCKY MOUNTAIN REGION
AK. AZ. CO. ID. MT. NV. NM. UT. WY

REGION 7
FAR WEST REGION
CA. HI. OR. WA

~ 35th Annual ~

REGION 7- Commercial Competition

February 9TH-12TH, 2022



PHX Sky Train Stage 2

PROBLEM STATEMENT

PHOENIX, AZ

HENSEL PHELPS
Plan. Build. Manage.

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PROBLEM SPONSOR

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Plan. Build. Manage.

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www.henselphelps.com

I. COMMERCIAL DIVISION TIMETABLE

THURSDAY, FEBRARY 10TH

Opening Conference / Distribute Problem / Establish Presentation Order ..... 6:00 AM
First Progress Meeting / RFI's Due ..... 10:00 AM
Lunch Delivered to Rooms ..... +/-12:00 PM
Second Progress Meeting / Question Session ..... 2:00 PM
Subcontractor Interviews (10 min. / team) ..... 2:30 – 7:00 PM
Dinner Delivered to Rooms ..... +/-5:30 PM
Proposals Due ..... 10:00 PM

FRIDAY, FEBRUARY 11TH

Interview Materials Due (all teams) ..... 6:45 AM
Interviews Start ..... 7:00 AM
Team Activities ..... 5:45 PM
Project Debriefing ..... 6:30 PM

SATURDAY, FEBRUARY 12TH

Career Fair ..... 8:00 AM -12:00 PM
Awards Ceremony ..... 11:00 AM

II. PREFACE

WELCOME to the 2021 ASC Student Virtual Competition. All participants are to be commended for the personal time and commitment made in preparing for and participating in this competition during a PANDEMIC. The construction industry has noted these sacrifices and the premier student population that is competing this year. This is evident in the quantity and quality of companies committed to the competition and Career Fair.

The student competition is designed to challenge each team in different facets of the construction industry. Each team's estimating, scheduling, organization, leadership, productivity, and communication skills will be tested and enhanced while participating in this competition.

The competition will present each participant with construction industry exposure that may not otherwise be experienced until after working in the industry. It is Hensel Phelps' desire to present each team member with real life situations through this competition. Some of these "experiences" may seem uncomfortable and/or appear to contain no logic. Be aware the real world is very often not kind, fair, or logical! The construction industry will present situations where people are less than pleasant, and pressure is applied to the extreme, but it will also provide great feelings of accomplishment and team camaraderie. Some questions, both in real life and in this competition, may have multiple answers and some questions may have no correct answer. The superior level of the student competitors attending the competition should embrace these challenges and recognize the value of these lessons.

The judges in the presentation portion of this competition may seem to "put you through the wringer" with tough questions and references to deficiencies in your written response. Although it is human nature to "take it personal," please understand that these lessons are for the good of your development and excellence. It is not the intent of the judges to frustrate and alienate you, yet the spirit of competition places a duty on the judges to ask the hard questions that will allow team rankings to occur. At the end of the competition each team member should reflect on the knowledge and experience gained, and hopefully the judges can become mentors and friends to you.

As a driven team member, realize that all teams have come to the competition with the main goal of WINNING! However, with so many competitors, also realize that there can only be one winner announced. As an intelligent, driven, and committed individual, you should recognize the vast knowledge, industry exposure, and experience gained in competing and finishing this problem. This is the real reason all teams and individuals are competing. Yes, it is true, every person competing is a winner, regardless of the final overall placement. Make sure you, and your team, understand this; it does make a difference!

Determination of the Winner is based on a uniform grading scale for the written portion of the competition coupled with the oral presentation, judged by a seasoned multi-member judge panel. The combination of these two components, in the scoring ratios listed, determines the overall team placement. Overall team placements will not be posted, but feedback will be provided after the competition.

Congratulations for participating and Good Luck!

III. PROJECT INFORMATION (Kyle Nelson)

The PHX Sky Train Stage 2 project is the second and final phase of the automated train system at PHX Sky Harbor International airport in Phoenix, Arizona (PHX). Owned and operated by the City of Phoenix, the Sky Train brings local residents and visitors to and from PHX with stations and stops at various terminals, parking lots and transportation stations along its path. Several years ago, Hensel Phelps was selected as the Construction Manager at Risk (CMAR) to deliver Stage 1 of the Sky Train system which now brings airport users from a station at 44th St. and Washington St. through the East Economy Parking Lot into the east side of Terminal 3. Stage 2 of the Sky Train is the much-anticipated extension of the Sky Train System that will connect to the existing Rental Car Center (RCC) 2.5 miles west of the airport. Current transportation to the RCC is managed though a shuttle bus system that, during peak travel seasons, can exceed 30 minutes. Upon completion passengers at all the airport's primary terminals will have free automated train access to the RCC.

The 2.5-mile system will tie-in to the existing Sky Train station at Terminal 3 and travel west to the RCC. Along the way the track or "guideway" (as referenced in the Documents) will travel above grade, on-grade and below-grade. In addition, the Stage 2 scope will include a new station at 24th St. that will act as a ground transportation hub as well as a new station that ties into the existing RCC structure and acts as the most western stop of the Sky Trains system.

To facilitate the extension that travels through and around airport and non-airport property, significant underground utility relocations are required. A new underground electrical feed will be required to provide a redundant power feed to the systems as well three separate propulsion power buildings. There will also be a robust civil package that changes roadways and the overall traffic flow on the west side of the airport.

The City of Phoenix values commitment to small business enterprises (SBE) and will have requirements associated with SBE involvement along with sustainability requirements.

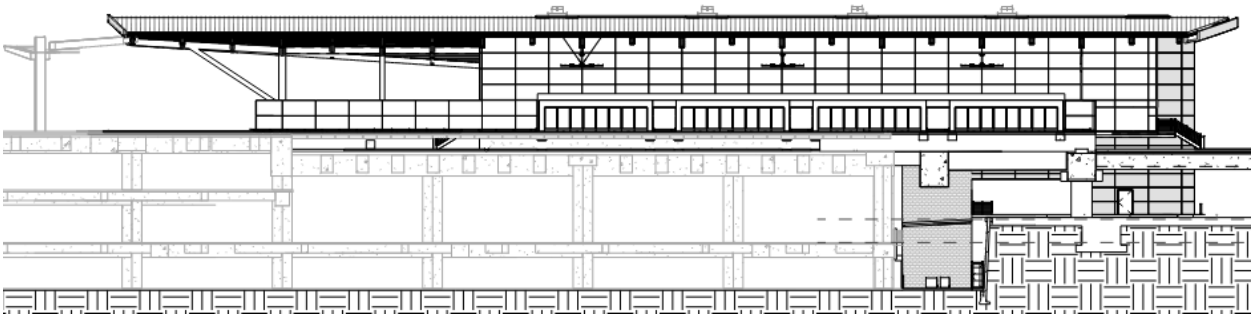
This large-scale aviation project will be a CMAR delivery with a best value selection. The CMAR's ability to coordinate and plan with various entities will be of utmost importance. The City of Phoenix (CoP) is the project owner and valued client; additionally, the owner's train vendor Bombardier (BT) is an important entity who is involved with acceptance and turnover of all project scope. Upon acceptance of completed scopes, BT will buildout the actual train rail system on the constructed guideway and subsequently test and operate the Sky Train system. Significant coordination efforts will also be required to properly interact and minimize impacts to airport air and land operations, security, existing shuttle transportation, vendors, and adjacent business as well as the existing Rental Car Center that must remain operational with bus shuttle access 24/7 365 days a year.

IV. Problem Scenario (Wade Chance)

Hensel Phelps has been awarded Stage 2 of the Sky Train based on a best value selection by the City of Phoenix and is excited to play a key role in completing the vision of the Sky Train at Sky Harbor Airport! To manage the large scale of the project, the executive team has split the staff into four smaller “project teams.” Each team consists of the typical project staffing that you are used to seeing on any Hensel Phelps project, including Field Engineers, Office Engineers, Project Engineers, Area Superintendents, Project Managers and Project Superintendents. The teams are split up by project scope and area. The four teams are the RCC Station, 24th Street Station, Elevated Guideway and Civil. The RCC and 24th Street teams are responsible for each respective station and associated site work. The Elevated Guideway team is responsible for all the elevated guideway that traverses between the stations. Additionally, the Civil team is responsible for the guideway that traverses between elevated guideway sections which includes below grade guideway, on-grade guideway along with all the civil road realignments.

Your team has been assigned to the RCC Station. This scope includes the sitework within the Rental Car Center operation, infrastructure that supports the RCC station as well as the construction of the station itself. Throughout the duration of the project your team will be asked to assist some of the other project teams that are working on other sections of Sky Train Stage 2. Your team has helped establish the budget but now is the time to update and submit your final GMP for the RCC station along with some select self-work opportunities.

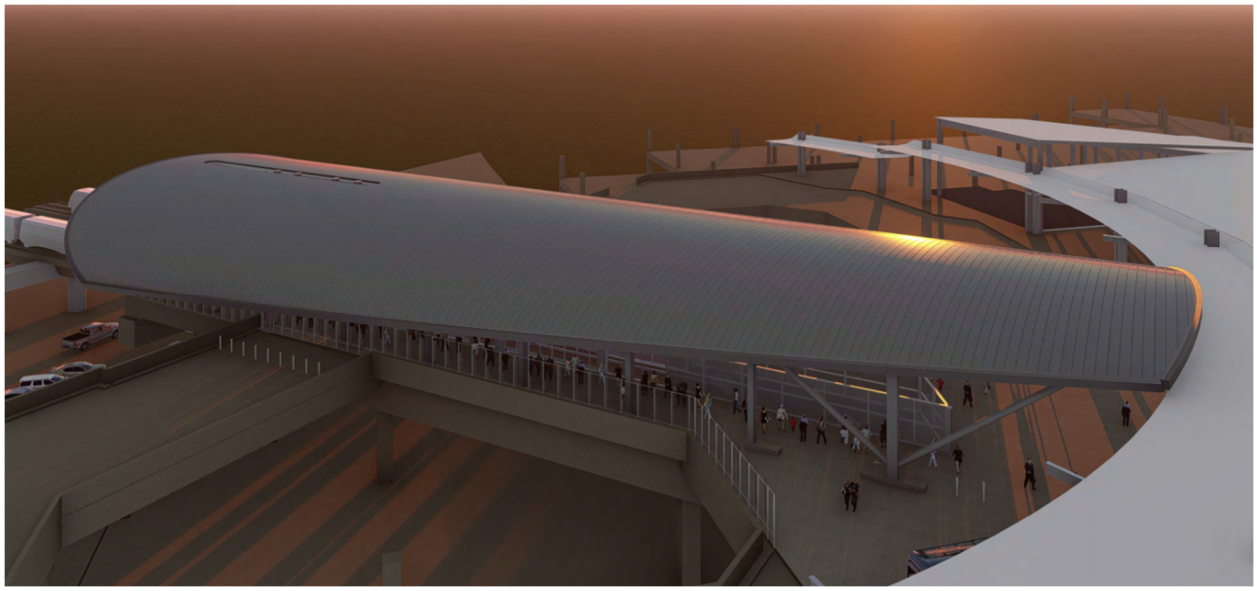
The RCC (Rental Car Center) Station is a distinctive structure that includes some unique challenges that must be worked through during construction. The new train station will be built partially on the existing Rental Car Center structure completed in 2006. The original Rental Car Center was designed and built with provisions in place to accept the new Sky Train Station. The new station begins within the existing visitor parking lot and spans over “The Canyon” (an area between the visitor parking lot and the existing structure with an elevation change of minus 22’ below grade). The retaining wall that holds the parking lot back from the existing structure is a CMU Mechanically Stabilized Earth (MSE) wall. The MSE wall was designed to resist the force of the ground and not much more. It was not designed to resist construction loading with things like forklifts, cranes, concrete shoring and/or form work. The balance of the station is built on top the existing structure.

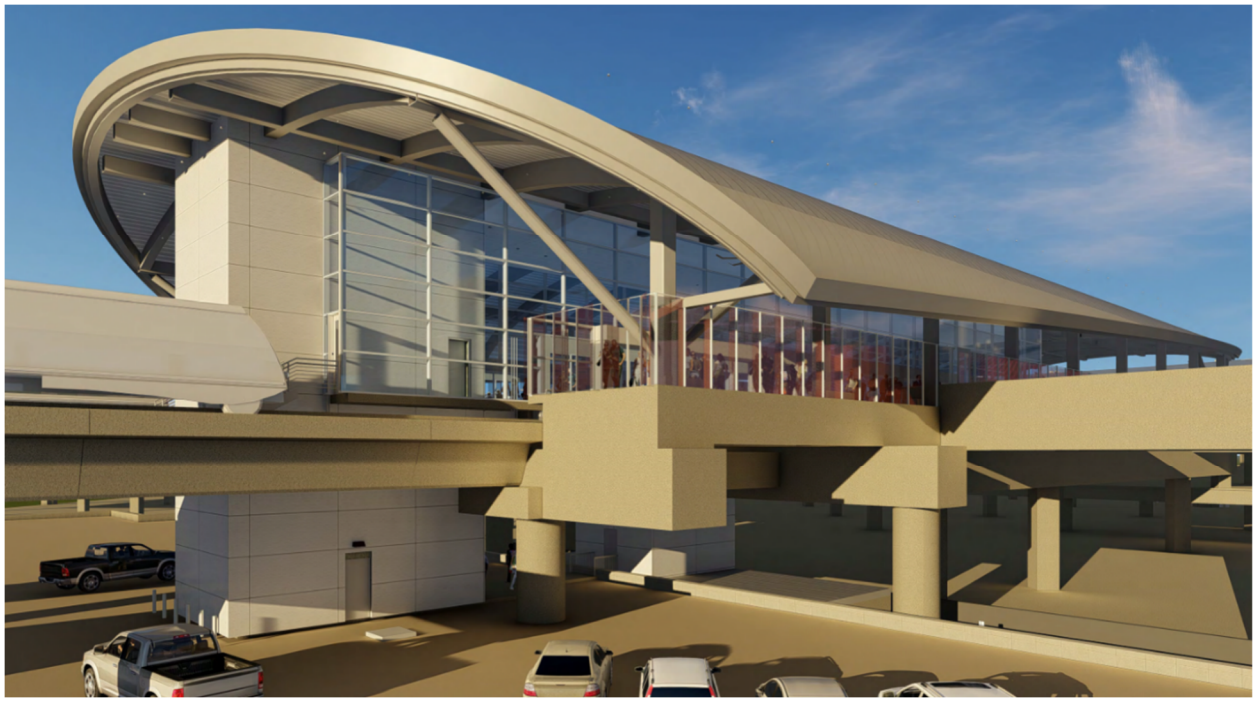


The new RCC Station is built in the middle of the existing Rental Car Center bus drop off area. This is where current airport passengers are transported to and from the Rental Car Center to the airport terminals. These buses operate uninterrupted 24/7/365 with peak levels of 180 buses per hour; construction activities cannot at any point stop the service of this vital airport operation. The bus route necks down at the entrance to the RCC site which means the bus route circumvents the entire site. Aside from the physical challenge the

bus logistics create, the bus route provides a bird's eye view of your site to thousands of curious spectators daily.

The new RCC Station is located less than a mile from the end of runway 7L and in the direct flightpath of arriving and departing aircraft. When it comes to commercial aircraft approaching, a mile is not a long distance from the runway. This adds to the logistical complexities of the site, limiting the height of high-profile equipment, for example drill rigs and cranes.





Your team is working through the Preconstruction and Design phase of the project and has completed the first milestone, Construction Start. Major components of the design and buyout are complete, and you have reached the point of inflection where critical decisions need to be made. Hensel Phelps prides ourselves on our ability to drive the project schedule through phasing and minimizing any impact to ongoing airport operations and this project may be a prime opportunity to utilize our skills. It is imperative that our team evaluate and understand the risks so that it can all be communicated to not only upper management, but airport operations as well.

Upper Management has requested a Third Point meeting to review the status of design, buyout, and remaining project risks. The review meeting will be your team's opportunity to present the current project strategy, overall risk mitigation measures and report back on the financial strength of the project. Your written overview is due by **10:00 PM tonight**, and you will be asked to present your findings during the Third Point meeting tomorrow. Interim progress meetings are scheduled for 10:00 AM and 2:00 PM today (Thursday, February 10th).

Any questions should be delivered, in writing, on the Request for Information form (RFI) to the senior management team at the 10:00 AM meeting. Response to these RFI's will be provided before the 2:00 PM meeting. The RFI form has been provided in the Supplemental Information (X.0.3). The 2:00 PM meeting will be for verbal questions and answers only.

Please note that some of the written questions occur later or earlier than the Third Point meeting, at some future or past point in the project. Consider these a "Time Warp" and answer them with that understanding. This is to challenge the team on the full realm of construction issues.

For the oral presentation on Friday, all teams shall include students representing the company's Project Manager, Superintendent, Estimator and Scheduler; other roles will be at the team's discretion. The 30-minute presentation should allow for 20 minutes of team presentation and 10 minutes of questions and answers. Your presentation should focus on the following topics: Cost, Schedule, Site Utilization, Construction Planning, Quality and Safety. Creativity and innovation are encouraged, **shallow marketing pitches are not.**

V. PROBLEM OUTLINE

Structure and tab your documentation according to the following outline. Include only the information requested in **Section VI. Submission Requirements.**

VI. SUBMISSION REQUIREMENTS:

Please note that some of the following questions do not fit into the time frame of the Problem Scenario described earlier (i.e. they occur earlier or later in the construction phase), consider these a "Time Warp" and answer them with that understanding.

0.1 EARLY DELIVERABLE - BIOGRAPHIES

Although this item has past, as a requirement of the Pre-Problem Statement, your team's final score may reflect a small point deduction if you failed to comply with this item in a timely and professional manner.

0.2 QUALITY OF SUBMITTED PROPOSAL

The appearance and organization of proposals is important in the construction industry as it is often our first opportunity to interact with a new Owner and/or impress the upper management in our company. We want them to see the professional image we are trying to portray and be able to find and understand the information we are presenting. Points will be awarded in this section based upon the appearance and organization of your team's submitted response to the following problems.

0.3 TIMELINESS OF PROPOSAL

Unless stated otherwise, one electronic copies of your proposal are due at **10:00 PM** as per the Timetable in Section I. A ½ point penalty will be deducted from the team's score for each minute the proposal is turned in late.

1. FINANCIAL STATUS REPORT (FSR)

Written by Lissette Flores

The City of Phoenix (CoP) has requested a meeting to review the GMP proposal (Guaranteed Maximum Price) for the Rental Car Center (RCC) and the recent design developments on the Taxiway U&V. Upper Management has tasked you to provide this update and present it during the internal Third Point meeting prior to their review with CoP. This is the perfect opportunity for you, the Project Manager, because you were part of the team that compiled the original budget. Using the Financial Status Report (FSR) spreadsheet, consolidate all project costs, update the completed purchasing of the project and project the final contract price that will be presented to the Owner in the GMP proposal.

PART A – Financial Status Report

Use the FSR spreadsheet included in Section X.1.1 Tab A to fill out your analysis for each purchased package or revised budget on the project. This management tool compares the final purchased value of each subsystem to the budget estimate. The FSR breaks down the estimate into the subsystems that aligns exactly to the actual bids taken. These will be the actual dollar amounts you will purchase each subcontracted scope of work and will provide the final GMP amount for submission to the Owner as compared to the budget developed upon completion of the design documents. Use the values given in Section X.1.1 along the final amounts you come up with in Section 3 (Estimate), Section 4 (General Conditions), and Section 5 (Tab Analysis) to complete the FSR. This will represent the full scope of the project financials.

PART B – Contingency

CMAR contingency is typically carried on a project for buyout risks and general construction issues. Owner contingency is carried to cover cost of growth and used at the discretion of the City. The City requested that the Owner Contingency is reduced because the design is further along. However, at this juncture, your team needs to determine what the contingency value should be for this GMP proposal (RCC and Taxiway U&V). Using FSR spreadsheet (X.1.1 Tab B) input a percentage between 0% and 5% in Column D to provide a risk analysis summary and justify the contingency requested. In addition, utilize the values from Tab A and enter them in Column C.

You will need to populate your new proposed contingency percentage within the FSR spreadsheet. In addition, prepare a narrative explaining the risks that you chose and justify the contingency you are including since this will be negotiated with the Owner.

PART C – Prime Contract

Use the provided excerpt of the Prime Contract (X.1.2) to answer the following questions:

1. Per the Prime Contract what are the requirements the City has set forth prior to HP using the Contingency.
2. What happens if a subcontracted amount is less than the amount approved in the GMP?
3. What funds cover any change to the Work that came as an Owner Change and affects schedule and cost?
4. What is to happen to the balance of dollars left over on the CMAR Contingency and who is in control of them?

PART D – GMP Summary

Use Tab C on the FSR Spreadsheet (X.1.1 Tab C) to complete your GMP Summary which will be the information provided to the Owner for the GMP proposal.

Populate the yellow cells in Tab C to obtain the final Contract Price.

FSR Deliverables:

1. Submit one electronic copy in native format (Excel) of FSR (X.1.1).
2. Submit one electronic copy of narratives for Parts B & C.

2. ESTIMATE

Written by Kelly McCandless & Jeff Schelling

(Time warp to Taxiway U&V)

After your team is awarded the project and final documents are published, it has been determined that Hensel Phelps will be self-performing concrete at Taxiway U&V. The civil team approaches you as the estimator to assist with the self-work estimate to validate the cost of these scopes and to ensure that they still work with the original bid.

As an experience Lead Estimator who has estimated many profitable self-work scopes, you have been assigned specific items to estimate which will help determine a final price and manage costs. As Hensel Phelps is self-performing this work, it is more critical to have an accurate estimate for these areas. Self-work can provide an opportunity to save on costs and to make profit on self-work fee, but it also risks becoming a burden to the project if the estimate is inaccurate. You will be required to determine what fee to use on self-work concrete as well.

PART A – Taxiway U&V

The concrete construction of Taxiway U&V, which spans between Abutment 3 and 4 is comprised of many distinguished scopes that need to be estimated accurately. You will be in charge of estimating concrete, control and expansion joints, cure, equipment, finishing, formwork, labor and reinforcing costs for the following items:

- Abutments: 2, 3 & 4
- Abutment Walls
- Anchor Slabs
- Approach Slabs
- Pier Columns
- Pier Caps
- Foundations
- On-Grade Guideway
- Retaining Walls: 5, 6, 7, 8, 9, 11,13,17
- Topping Slab

Use the drawings provided in Supplemental Information X.2.5 to quantify the value for the above listed scopes and use the Estimate Spreadsheet (X.2.1) to formulate your estimate. The spreadsheet has been formulated for your use in compiling data, all teams will use the same format. Please fill in the quantities and concrete fee on this spreadsheet.

Supplemental Information:

- Concrete Estimate Spreadsheet (X.2.1) - This spreadsheet has been formulated for your use in compiling data, all teams will use the same format. Only yellow cells are editable.
- Cost Data Sheet (X.2.2) – Resource for labor, material, and equipment unit costs
- Reinforcing Weight Data (X.2.3) - Resource for calculating rebar quantities in relation to concrete quantities

Clarifications and Exclusions:

In order to keep all teams' estimates consistent, please follow the guidelines below:

- Do NOT modify the Estimate Spreadsheet.
- Do NOT include additional material to account for concrete waste.
- Do NOT include additional material or labor to account for patching of exposed concrete.

- Do NOT provide any other concrete components other than the items listed above
- Do NOT include items that are noted as for future build out
- Only input values into highlighted cells
- Not all drawings are to scales listed on sheet; be sure to validate prior to use
- No additional drawings are required to complete this estimate
- Assume all formwork is purchased new, and is not reused
- Assume only tops of slabs and top of wall requires finishing, and cure

Estimate Part A Deliverable:

1. Submit one electronic copy in native format (Excel) of your Concrete Estimate.

PART B – Placement Sequencing

While completing the estimate, the lead estimator works with the superintendent to develop a cost-effective plan to execute the work. As Superintendent, you are tasked with creating a pour sequence plan to help the civil team complete this work in an efficient manner. Assume that you can place a maximum of 100 LF of wall and five (5) columns per pour day. Using the pour plan sequence template provided in X.2.4, illustrate your concrete placement plan for the following specific scopes of work:

- Columns
- Walls

Supplemental Information:

- Pour Plan Sequence Template (X.2.4) - This template has been provided to keep all teams using the same diagrams for sequencing their work.

Clarifications and Exclusions:

In order to keep all teams' estimates consistent, please follow the guidelines below

- Do NOT complete the placement sequence plan on a drawing other than the template
- No additional drawings are required to complete this phase plan
- Only include the walls and columns shown on X.2.4
- This plan should reflect the quantities and durations used in your estimate.
- Assume all footings are already placed.
- All W9, W11 and W13 walls must be placed prior to placing any columns.
- Walls with varying thicknesses cannot be placed monolithically.
- Wall placements must terminate at a construction or expansion joint as shown in plan.
- Assume you will only have one placement crew.
- Assume the North walls, and columns must be placed prior to beginning placing the South walls.

Estimate Part B Deliverable:

1. Submit one electronic copy in native format (Excel) of your Concrete Phasing Plan (X.2.4).

3. GENERAL CONDITIONS

Written by Marvin Perez

General Conditions (GC's) are real construction costs that are not immediately quantifiable by the untrained eye and are associated with on-site management, supervision, and contract administration. GC's are the costs incurred during a construction project that typically are not directly related with labor or materials for construction, but are integral to the success, efficiency, and safety of the project. GC's are a critical component to risk and cost management and afford the contractor the ability to forecast costs, staffing, and project needs.

General Conditions have been assembled by the estimating team for the PHX Sky Train project. However, upper management has decided that it would be best to separate the project teams separately by project scope and area. Your team has been tasked with developing the GCs and Staffing Plan for the RCC Station.

Please Note:

- General Conditions include all the operating costs and expenses for your on-site salaried supervision.
- Project Executives are to be carried by District overhead and not included in GCs.
- Home-office overhead is not included in GCs.
- Supervisory staff positions should be allocated to the project as the team sees fit to complete the work and closeout.
- Upper Management expects staff to put in place at least $200,000 in work.
- All General Conditions associated with direct work such as subcontracts and specific costs of work are carried within the specific scope budget; therefore, those costs are not to be included in the overall General Conditions breakdown.
- The project shall budget for two interns over the summer.
- Reference Schedule Section 5 for Notice to Proceed and Substantial Completion information.
- Permit Fees are carried by the Owner
- Contractor's Fee is not carried within the General Conditions
- Bonding and Insurance Fees are not carried within the General Conditions
- Typically, the total general conditions value equates to about 5% - 15% of the total contract value.
- Assume that all Superintendents receive a truck.
- Assume that all Project Managers, QC Managers, Safety Managers and Project Engineers receive a car allowance.

PART A – Staffing Plan & General Conditions Base Contract

Prepare a Staffing Plan and a detailed General Conditions estimate projecting all costs from Notice To Proceed through Final Completion for the RCC Station. Create this Staffing Plan using the matrix found in Section X.3.2. Each staff member's total dedicated duration on the project should be included on the form to accurately project staffing costs as these durations are pulled to the GC estimate.

Use the General Conditions Template provided in Section X.3.1 to calculate the overall RCC Station GC Value. As you determine the costs and units for each GC item, be mindful that items may be comprised of labor, material, equipment, or any combination of all three. Use your best judgment, team experience or available resources to determine these breakdowns. Your team will be tasked with making sure that the RCC Station GCs fall within the overall Project GC Bid Value.

As you complete the Staffing Plan spreadsheet take note of your assumptions and justifications for staffing recommendations that you feel require justification. Grading will be based on logic and reasoning of your staffing recommendations. Any pertinent information to justify your matrix should be written in the assumptions and justifications section of the spreadsheet.

General Conditions Part A Deliverables:

1. Submit an electronic copy in native format (Excel) of your Staffing Plan (X.3.2).
2. Submit an electronic copy in native format (Excel) of your General Conditions matrix (X.3.1).

PART B – General Conditions Expenditure

During a recent cost review meeting, your operations manager notices that the RCC project has expended 60% of the RCC GC's budget. The project schedule on the other hand displays that your team is only 50% complete with the construction phase of work, you are asked if the team foresees a GC budget overrun.

Your task is to provide a response to your operations manager explaining if there will be an overrun. If you expect there to be an overrun explain how your team plans on mitigating the cost. Or, if there will not be an overrun, provide your reasoning.

General Conditions Part B Deliverables:

1. Submit an electronic copy with a brief narrative (250 or less words in total) of your response to the Operations Manager.

4. PROPOSAL SUMMARY (TAB ANALYSIS)

Written by Isiah Clark

You are a Project Engineer and you have been assigned to help the Project Manager and Estimator complete the evaluation of the next phase of procurement while your field team continues to push forward. This is your first CM at Risk construction project, and the Project Manager has asked you and your team of Office Engineers to evaluate pricing of the recently released exterior skin bid package. Your team's responsibilities will include the Curtainwall, Metal Panels, Roofing, and Feature Art Wall scopes of work. When evaluating these proposals keep in mind that the proposal summary is the most important part of a bidding project.

The Project Manager and the Senior Estimator in charge of procurement have created proposal summaries or "bid tabs" with check questions to determine if the subcontractor has captured the entire scope per plans and specifications. These bid tabs are what you will use to easily compare proposals in an easy-to-read format. The "Scope Desired" column has an assigned budget the estimator and project manager have filled in to illustrate what they feel is a complete scope and estimated value. Keep in mind that plugged numbers in this column are the estimator and project manager's educated guess of the scope value based on historical data and subcontractor values, they may vary from the actual proposals.

At this stage, it is important to distinguish which bidders have included all applicable scope items and to determine the true cost of each scope of work. It is imperative to understand which proposals are incomplete (i.e. missing scope items) and if there are any scopes accounted for twice (e.g. items included in multiple proposal summaries; double up on cost for the same scope of work, etc.).

Review the proposals submitted by the subcontractors and choose your subcontractor wisely to ensure you have captured a complete scope instead of being deceived by the lowest bidder. It is encouraged that all teams round values to the nearest $1,000 to allow for quick summation of the Tabs.

Remember: It is your job to compare complete scopes to determine the correct value to carry. If a subcontractor has not included a certain cost/scope use Blue Numbers (Plug Numbers). Blue Numbers are values derived by your estimating team or through breakout numbers provided by other subcontractors that did capture the scope and provided a breakout number. Red Numbers (Negative Plug Numbers) can be used for the opposite of a Blue Number that a sub included too much scope/cost and should be deducted from that subcontractor as that scope/cost would be on a different bid tab.

You will be allowed to briefly interview each subcontractor "by phone" to ask general scope questions not already included in their proposals or to clarify inclusions or exclusions within their proposals. Subcontractor representatives will be available in the Presentation Room at the time assigned this afternoon. Each trade will be represented by a separate member of the Hensel Phelps team, giving you the opportunity to interview multiple subcontractors at once. You will be allotted ten (10) minutes to conduct your interviews. Please note that this is intended to be a realistic exercise. Your subcontractors may be rude or evasive; this is not an attempt to frustrate the team, but rather to represent the very real difficulties encountered in real time buyout situations.

The following contract requirements must be considered:

- Company Policy requires bonding on all subcontractors with subcontract values over $50,000.
- The prime contract requires we meet Small Business Requirements of 10%. One of the qualifications to be considered as a small business is that the business be certified in

the City of Phoenix. Note that as whole, the project is currently tracking at 15%, and we will only need to award one of the scopes in the exterior skin bid package to a small business to stay above the agreed upon 10%.

- Ownership has asked that all confirmed pricing be held for 90 days.

Included in Section X.4.1 are the subcontractor proposals for each scope of work requested for review by your Project Manager and Senior Estimator. Carefully read through each proposal and fill in the values for each line item on the Bid Tabs provided in Section X.4.2 using blue and red numbers where necessary to assure a complete scope. Once you have completed your review sum up the total value and select a subcontractor by circling the complete value for the required scope of work.

Proposal Summary Deliverables:

1. Submit an electronic copy in (Excel) of each proposal summary for Part A with selected subcontractors total value circled.
2. Submit one electronic copy with a brief narrative for each of the (4) scopes (1000 or less words in total) explaining why the subcontractor for each scope was chosen.

5. SCHEDULE

Written by Alina Vo & Jevin Pharis

(Time warp to procurement phase prior to the initial CPM submission.)

The Construction Schedule serves as the "road map" as to how you are planning to build your project. It assures adequate planning, scheduling, and reporting during execution of all construction activities so they may be prosecuted in an orderly and expeditious manner, within the Contract Time and the Milestones stipulated by the Contract. The contract schedule also assures coordination of the work between the Contractor and the various subcontractors. It also assists in detecting problems for the purpose of taking corrective action and to provide a mechanism or tool for determining and monitoring such actions.

As the Project Superintendent you have been tasked to develop a schedule that accurately reflects your plan for building the project. Using the drawings and specifications provided you are to submit a proposed Detail Design/Construction Schedule in CPM format for your review with management. The schedule is to effectively communicate your plan. In turn, your schedule presentation, written and oral, will be comprised of:

1. Building a CPM Schedule to support a Rental Car Center Station (RCC) final completion of a maximum of 39 months from Notice to Proceed.
2. Identifying the Critical path and justifying it.
3. Incorporating key milestones.

The following criteria explains the background information and requirements of the CPM schedule your team will present.

PART A – Construction Schedule

General CPM Schedule Criteria:

a. Presentation Criteria:
   i. Column Format:
      1. At a minimum show the following columns to the left of the timescale (Gantt Chart): Activity ID, Activity Description, Original Duration, Early Start, Early Finish, and Total Float (see Figure "A" example below).:

Figure A:

Activity ID	Activity Name	Original Duration	Total Float	Early Start	Early Finish
Phoenix Sky Train Stage 2 - Reno 2022		0	0		
Milestones		0	0		
Pre-Construction		0	0		
Mobilization		0	0		
Construction		0	0		

   i. Activity count: No less than 500 and no more than 1000 activities.
   ii. There should be a continuous logic flow of critical path activities from the Notice to Proceed through to Final Project Completion.
   iii. Organize your activities so they are easy to read, grouped intuitively and follow proper sequence to present a nice schedule "flow."

b. Work Breakdown Structure (WBS):

In order to maintain flow and composition, schedules are typically organized by a WBS. The WBS is the outline of a schedule, and acts as an umbrella to capture the theme or specific nature of an

activity set. A WBS can contain multiple layers and subsets to aid in the organization of the activities, or it can be simply based on the structure and complexity of the schedule.

The following (i.- ix.) is the base WBS provided by your Project Superintendent. There are Maximum Working Days (MWD) shown after certain WBS for assistance, which you are not required to match to the exact day; but they serve as a duration guide. Each WBS should contain a breakdown of activities which will demonstrate your knowledge of the entire project. The Main WBS subcategories have been provided to assist in building your schedule, you will need to further detail the WBS as necessary and most importantly incorporate the activities required to show the full flow of work from start to finish.

i. Milestones (Constrained Dates)
   a. Contract Award – 4/12/2020
   b. Notice to Proceed Preliminary – 9/15/2020
   c. Notice to Proceed Construction Document Development & Construction to Substantial Completion – 1/16/2021 (727 days)
   d. Bombardier RCC Shared Access Date – 6/9/2023
   e. Bombardier RCC Section 00 Turnover Date – 9/15/2023

Bombardier RCC Section 00 - Shared Access & Turnover Date

Table 4.2-1 Schedule of Availability Dates

Revised July 26, 2020

Section #	WB Stationing	Description	Shared Access Date for 1/1/18 Data Date Schedule	Shared Access Description	Turnover Date for 1/1/18 Data Date Schedule	Turnover Description
00	11+83.39 to 14+07.57	Rental Car Center Station	6/9/2023	ATC Room Access (conditioned); Edge of Platform Available, Door Install Available, All but GW work that would impede overhead work along GW (ex. No plinths, pedestals, etc.)	9/15/2023	All work can be performed pm the GW, HP punchlist items only, working around BT Contractor.

   f. Substantial Completion – 10/10/2023
   g. Project Completion – 12/30/2023

ii. Preconstruction
   a. Subcontracts-Submittals-FAB
      i. Subcontracts
      ii. Submittals Preparation & Review
      iii. Material Procurement & Fabrication

iii. Mobilization
   a. Construction Trailer Set Up
   b. Site Set Up

iv. Early Site Work
   a. Relocate cacti
   b. Demolition – Clear and Grub
   c. Temporary Parking Lot on north side of bus ramp
   d. Grading – Excavation – Caissons – Asphalt
   e. Micro Piles / Drilled Shafts
   f. Site Utilities
   g. MSE Wall

v. Building Structure
   a. Structural Concrete
   b. Structural Steel
   c. Pourback between Existing and New Structure at Gridlines 1 – 3 (Note: Pourback has a 56-day cure time)

d. Existing and New Roof Structure at Area C (Note: Shoring to be erected within a 6-hour window)
e. Stairs / Stair Core
f. Exterior Skin
    i. Glazed Curtain Wall Systems
    ii. North Elevation
    iii. East Elevation
    iv. South Elevation
    v. West Elevation
    vi. Roof
g. Interior Buildout
h. Art Wall at Deboarding Platform
i. Site Improvements

vi. Start-up & Commissioning CPM Schedule Body Breakdown

c. Milestones:

i. Contract Award Notice to Proceed Design Development – This milestone marks the date that the project has been awarded and the owner has issued a contract to begin design. This will be the date utilized for the start of the contractual durations.

ii. Notice to Proceed Construction Documents & Construction - The NTP Construction Documents & Construction marks the date in which the second contract with the owner has been issued. This contract acknowledges the acceptance of the design intent and allows Hensel Phelps to begin developing the construction documents for permitting as well as actual work on the project such as buyout, preconstruction, and mobilization for construction.

iii. Substantial Completion – Defined as “the building can be used for its intended purpose.” To satisfy this requirement, all construction activities shall be substantially complete, the building systems must be energized and operational.

iv. Final Completion – Designates the date that trainings, close out documentation, and final billings (Subcontractor and Owner) have been completed and submitted to the Owner.

v. Calendar

1. Rain Days. (45 WD)
2. Holidays: The following is a list of holidays. No work is to be performed during these dates.
    a. New Year’s Day
    b. Martin Luther King Day
    c. Presidents’ Day
    d. Memorial Day
    e. Independence Day
    f. Labor Day
    g. Veteran’s Day
    h. Thanksgiving Day (and day following)
    i. Christmas Eve Day
    j. Christmas Day
    k. New Year’s Eve Day

3. Soft Moratoriums: The following is a list of soft moratorium days. No underground work is to be performed during these dates.
    a. NASCAR Spring:
        i. 3/12/21 – 3/15/21
        ii. 3/11/22 – 3/14/22
        iii. 3/10/23 – 3/13/23
    b. Spring Break: March 2021, 2022, 2023
    c. NASCAR Fall:
        i. 11/5/21 – 11/8/21
        ii. 11/4/22 – 11/7/22
        iii. 11/3/23 – 11/6/23
4. Hard Moratoriums: The following is a list of moratorium days. No work is to be performed during these dates.
    a. Independence Day:
        i. 7/1/21 – 7/6/21
        ii. 7/1/22 – 7/6/22
        iii. 7/1/23 – 7/6/23
    b. Thanksgiving Day:
        i. 11/21/21 – 11/29/21
        ii. 11/20/22 – 11/28/22
        iii. 11/19/23 – 11/27/23
    c. Winter Holidays:
        i. 12/19/21 – 1/3/22
        ii. 12/18/22 – 1/2/23
        iii. 12/17/23 – 1/2/24
5. The schedule should be on a standard 5-day work week calendar, except for milestones. Milestones should be on a standard 7-day work week calendar.

vi. Bid Packages & Scope Buyout

1. Hensel Phelps will need to sign up subcontractors to perform various scopes of work and will need to ensure that this subcontractor is capable to perform the work needed.
2. Assume the estimating department cannot buyout all scopes of work during the same time.
3. Assume 20 workings days to allow for Buyout scopes noted below. You may need to add additional scopes to facilitate any submittal requirements.
    a. Structural Steel
    b. Equipment
    c. Framing & Drywall
    d. Electrical Systems
    e. Metal Stairs
    f. Caissons/Shoring
    g. Structural Concrete & Reinforcing
    h. Waterproofing
    i. Glazed Curtain Wall Systems
    j. Doors & Hardware
    k. Flooring
    l. Metal Panels
    m. Roofing

vii. Submittal Preparation, Review & Approval:
   1. Submittal preparation and review allows time for your subcontractors to provide you with the product data (PD) and shop drawings (SD) related to their material and scope of work that they plan to utilize on the project. This time is also utilized for Hensel Phelps, the Design Team and Owner to review the submittal information for design compliance and acceptance.
   2. Assume a period of 5 working days for subcontractors to create submittals, 5 working days for internal review of submittals, 5 working days for submission and review to Architect/Engineer, and 10 working days for submission and review by the Owner.
   3. Provide Submittal activities for the following scopes:
      a. Early Site Utilities
      b. Equipment
      c. Framing & Drywall
      d. Electrical Systems
      e. Caissons/Shoring
      f. Structural Concrete & Reinforcing
      g. Waterproofing
      h. Doors & Hardware
      i. Flooring
      j. Metal Panels
      k. Roofing
      l. Art Wall at Deboarding Platform
   4. Provide Delegated-Design Submittal activities for the following scopes and their respective submittal preparation and review times:
      a. Early Site Micro Piles / Drilled Shafts (35 WD)
      b. Structural Steel (80 WD)
      c. Metal Stairs (40 WD)
      d. Glazed Curtain Wall Systems (50 WD)

viii. Material Procurement:
   1. Material procurement is a very important aspect of any Project. In many cases, the material can't get on site fast enough to facilitate the Schedule. Before a Subcontractor can even start material procurement, you need approved submittals. In some cases, only the Architect/Engineer need to review/approve those submittals prior to the Subcontractor proceeding with material procurement. Similarly, to other sections, utilize the best activity as a predecessor to the Subcontracting procuring material. The schedule should depict material procurement (fabrication and delivery) of the following items:
      a. Steel – (160 WD)
      b. Air Handling Units (AHU's) – (120 WD)
      c. Roofing – (80 WD)
      d. Metal Panels – (50 WD)
      e. Glazed Curtain Wall Systems – (50 WD)

Notes: Material Procurement activities cannot begin until its associated Buyout and Submittal activities have been completed. You need to track its release. Do not forget to show an Owner activity for this. You are not limited to only these material deliveries, add additional as you deem necessary.

ix. Commissioning Schedule Build-out:
    1. Electrical System Start-up & Commissioning
    2. Fire Protection System Commissioning
    3. Mechanical System Start-up & Commissioning
    4. Plumbing System Start-Up & Commissioning

Schedule Part A Deliverables:

- Submit one electronic copy of the Full Baseline CPM Schedule in Native File Format (i.e. XER file).
- Submit one electronic copy (PDF) of the following:
    a. Full CPM with WBS: Earliest start date.
    b. Primary Critical Path with no WBS: Sorted by start date.
    c. Full CPM with no WBS: Filtering all activities sorted by start.

6. COORDINATION OF WORK

Written by Cody Young

(Time warp to the utility distribution on level one of the Rental Car Center. Consider this section independent of other sections.)

You are the area superintendent responsible for the level one utility distribution work at the Rental Car Center (RCC). The distribution spans from end to end of the facility and the pathway is approximately 1450 linear feet. The rental car return is a 2 lane one way road that passes directly in front of the newly constructed electrical and mechanical buildings that the utilities tie-in to. The rental car exit (booths) disperses vehicles onto that same roadway but just before the mechanical building. With this work approaching, a meeting with the City of Phoenix needs to take place to communicate our plan and obtain any feedback they may have. In preparation for your meeting, you have asked your field engineer to provide an overview drawing that shows the utility routing, rental car company leasing areas, drive lanes and exit booth locations to assist you in producing a phasing plan that you will present to the stakeholders in your meeting. Due to the overall length phasing the work is the only way to proceed in the active facility that, much like the buses is in constant operation 24/7/365. Coordinating with the rental companies is paramount to not impact their daily operations. Avis and Budget have specifically asked that all work passing over drive lanes and by the exit booth be performed during off peak hours. There will also be limitations to how many parking spaces can be blocked off. As you start your phasing plan, schedule days is just as important to communicate how long we will be in each area, so assume the following install progress per day: Steel – 50 linear feet, Electrical/Communication – 20 linear feet, and Mechanical – 30 linear feet.

1. Utilizing the provided contact documents (X.6.0), distribution overview drawing (X.6.1), electrical, mechanical, and steel shop drawings (X.6.2), and aforementioned information above, produce a phasing plan with schedule durations (e.g., Steel – 1 day, Electrical – 3 days, etc.) per definable feature of work (DFOW) utilizing attachment X.6.1 and produce the meeting agenda for the stakeholder meeting. At a minimum your meeting agenda should include the following items:
    a. Key personnel
    b. Schedule (days per DFOW. Based off phasing plan)
    c. Talking points (Minimum of 4)
    d. Phasing plan with no less than 4 and no more than 10 phases.

Coordination of Work Deliverables:

1. Submit one electronic copy (.pdf) of the meeting agenda.
2. Submit one electronic copy (.pdf) of your phasing plan with schedule durations utilizing attachment X.6.1.
3. Submit one electronic copy (.pdf) of a narrative that describes the logic behind your phases, flow of work, etc.

7. CHANGE MANAGEMENT

Written by Nick Kawamoto

(Time warp – Design Phase; this section is independent of all other sections)

PART A – Bulletin Cost Proposal

Hensel Phelps is an industry leader; dedicated to delivering the highest quality of work. One benefit to the CMAR delivery is the ability for early coordination during the design phase, value engineering, as well as constructability reviews. This leads to the early selection, scheduling, and coordination of major trade partners on the project. This early project construction, design, and engineering coordination provides avenues for strong communication throughout the entire duration of the project and improve the overall delivery of the final product.

Throughout the design review of the both the 24th St. Station and the Rental Car Center Station, the City of Phoenix is completing an internal evaluation to finalize a bulletin to be released with additional scope for the project. This bulletin will include work to be incorporated at both station locations, potentially effecting work that has already been engineered, design, or possibly installed. They feel there is an opportunity to emphasize the sweeping roofline of the building and highlight this as an architectural feature. There have been previous conversations about the addition of lights on the roof perimeter to enhance the design and accentuate the long span roof structure that covering both the 24th St. Station platforms, and the Rental Car Center Station. After final review by the City of Phoenix, the decision has been made to issue a Construction Bulletin to Hensel Phelps, requesting a cost proposal summary for the additional perimeter roof lights.

As the manager for the overall design of the project, it is your responsibility to oversee the development and incorporation of the additional design requested by the owner. You have distributed the Bulletin for review and have requested formal pricing from all parties within the next two weeks. However, the Owner has requested a quick turnaround Rough-Order of-Magnitude (ROM) to gauge the overall cost impact these changes will have on the project budget. Your trade partners have provided some guidance for general material pricing and installation production to use as a guide in developing a ROM.

It is your teams' task to review the bulletin issued by the City of Phoenix and prepare a ROM to help guide the Owner. Your team will need to respond to the Construction Bulletin (X.7.1), provide a narrative outlining the scope of work to be covered in the Bulletin, and complete a rough cost estimate (X.7.2) for all work.

Change Management Part A Deliverable:

1. Submit one electronic copy (pdf) of your analysis and estimate.

PART B – Letter to the Owner

As the team continues to work through design and move into the construction phase of the project, packages are released for bid and contracts begin to be written for scopes of work. Your team has issued a contract for the terrazzo flooring to be installed at both the 24th St. Station and RCC Station. Included in the bid documents used to write this subcontract, was the architectural drawings showing the design and pattern to be installed in the flooring. A particularly important component of this scope of work is that the Terrazzo floor at both stations is an art installation piece selected by the City of Phoenix. During early phases of design, the City of Phoenix selected an artist to design the floor mural that would be created out of different colors and patterns of terrazzo. This design was included in the final drawing package that was issued for construction, prior to issuing the subcontract to your terrazzo trade partner. The project

manager for your terrazzo flooring company has worked with City of Phoenix on previous projects and is familiar with the process of coordinating feature art pieces.

During a coordination meeting, it is brought to your attention that the City of Phoenix feature art artist has been meeting directly with your terrazzo trade partner and corresponding with them for the past several months. Throughout the time they have been corresponding, the design of the feature art has become more complex. This will require additional time for installation and fabrication, along with addition materials needed to complete the design. This will result in a cost increase to addition to the original contract value that you have already awarded to the trade partner completing the work.

Change Management Part B Deliverable:

1. Your team will need to provide a correspondence letter to the Owner assessing the situation between the feature art artist and your terrazzo trade partner. Identify risks of the current situation and how they may impact construction activities on the project. Finally, explain how the increased cost and potential schedule impacts should be tracked and explain who is responsible for covering the additional costs for materials and installation. Provide an electronic copy (pdf) of your owner correspondence letter (X.7.3).

8. PERSONNEL ISSUES

Written by Angelica Cabal

PART A – Office Engineer Management

The Sky Train Project will create many career development opportunities which will lead to upward momentum throughout the Western District. You are a Project Engineer leading a team of Office Engineers. Your Project Manager has communicated that your career growth will be influenced by your ability to train your replacement.

For the office team, it is often challenging working with different trade partners, the field team, and the Owner's design team to meet submittal deadlines and to coordinate RFI responses. If submittals and RFI's are completed late, it can delay the schedule and impact the project financially. To complete these tasks accordingly, it is imperative that the office engineers to have good communicating skills and accountability for their responsible scopes of work.

It has come to your attention that your most senior Office Engineer is building a reputation of being argumentative and not personable. From your perspective, this is your lead Office Engineer and is ready to become a Project Engineer because he is consistent, knows how to manage work, and completes task accurately. Recently, you have been hearing complaints from his trade partners that they don't like working with your Office Engineer because he doesn't like to solve issues with a teamwork mentality. He keeps blaming his trade partners for everything that is incorrect. In addition to that, your other Office Engineers have a hard time going to him for help because he is not easy to talk to and is rude.

As a Project Engineer, you are preparing to have a conversation with your office engineer to discuss these issues. As a manager, it is important to see what your office engineer's perspective is and how to come up solutions that will benefit his career. Using the Managing Difficult Conversations tool (X.8.A), plan how you will direct this conversation.

1. What questions will you ask your Office Engineer to understand his perspective?
2. What is your productive purpose in having this conversation?
3. What advice will you offer and how will you track progress?

Personnel Issues Part A Deliverables:

1. Submit one electronic copy (PDF) of the answers to both questions 1, 2, and 3.

PART B – Intern to New Hire Recommendations

The RCC project was assigned five interns this year. Throughout the summer, each intern had mixed reviews regarding their performance. It is time for their supervisors to determine which interns should receive offers for future employment. For the Western District, our goal for the summer is to offer 25 positions (either full time or repeat internships). Currently, the District plans to extend 20 offer letters to the interns on other projects; meaning RCC has the flexibility to extend offers to all interns if warranted. It is important for Hensel Phelps to reach our hiring goals to prepare for future projects and maintain the upward growth of our staff. Without enough incoming employees, our ability to grow and provide opportunities for our people will be hindered. It has been emphasized in Western District that our future growth is dependent on our hiring goals.

In this scenario, you are the Project Manager and have an upcoming meeting with Upper Management to give your final feedback and recommendation regarding the RCC summer interns. Using the intern evaluations (Attachment B.1), prepare your recommendation and explanation regarding whom you recommend receiving an offer. Remember, it is not as simple as following the numbers. Our employees are the essence of our company and determining who

will fit into our culture and provide long term value is vital. You are stating your case in how these interns can potentially be a great fit to our company and with our values.

1. Evaluate your recommendation based on the intern evaluations. Provide a clear decision regarding each intern and explain in no more than 500 words your justification for your recommendations.

Personnel Issues Part B Deliverables:

1. Submit one electronic copy (PDF) of the explanation to question 1.

9. SAFETY

Written by Eric Freedman

(Time warp – Guideway Pier Pre-Planning)

Hensel Phelps prides itself on integrating our safety culture into our everyday tasks and working with Trade Partners to ensure craft workers go home to their families safely every day. An integral process that has been developed and implemented company wide, is the use of a Right to Excavate form which requires the Area Superintendent, Field Engineer, Safety Engineer and Foreperson to review the existing underground utility drawings (as-builts) to ensure there is a clear understand of what utilities may come in contact during an excavation operation. This checklist is imperative and a requirement to be reviewed and signed prior to a bucket hitting the ground to help prevent damage to existing utilities, but most importantly, keeping workers safe.

PART A – Pothole Location Planning

Our Team has decided that prior to starting excavation, potholing predetermined locations and elevations will help prevent a utility strike as Owner's As Built Drawings are not always accurate to what was installed so we need to validate what is in the ground. Additionally, we need to ensure that we properly lay out the pier locations to identify any unknown utilities, prior to potholing. Your objective is to utilize the As Built Drawings (X.9.1) to determine the locations that we will pothole using a Hydrovac. Your Project Superintendent wants to minimize our risk of striking a utility, so we intend to pothole at least 20 locations. Using the coordinated underground utility drawings (X.9.1), provide a red 'X' where you intend to pothole for the future pile locations. At the bottom of the drawing, indicate a depth in which you intend to pothole, this can be consistent throughout each pothole or can vary depending on the depths of the piers. Some of the station (STA xx+xx) locations have been identified on X.9.1 to assist with the area in which the potholing will occur. The black line indicates the general location of the guideway. Use the scale (line length is equal to 100'-0") on X.9.1 to layout the distances between stations which will help locate where we should pothole. Additional information for distances between stations and depths of piers have been provided on X.9.2.

PART B – Right to Excavate Form

As the Area Superintendent, it is your responsibility to ensure the Trade Partners are utilizing the Right to Excavate Form (X.9.3) prior to starting any excavations on site. Your objective is to review the As Built drawings which have been provided to the Team during the RFP (request for proposal) stage of the project to ensure your Electrical Trade Partner is aware of all potential conflicts with their excavation that needs to occur today.

Using the As Built Drawings (X.9.1) and Right to Excavate Form Right to Excavate Form (X.9.3), complete the Right to Excavate form, and identify any underground utilities that may come in conflict with the excavation indicated. You will only need to fill in the yellow highlighted sections.

Safety Part A Deliverables:

1. Submit one electronic copy (PDF) of the answers to Part A and B.

10. SITE UTILIZATION & LOGISTICS

Written by Isaac Gilles

(Time warps – There are several Construction phases and key moments that will require an adaptation to the plan):

Hensel Phelps has a reputation of being a world class builder that rises to the occasion when complexity is thrown into the picture. The buses at the Sky Harbor Airport are operational 24/7 365 days a year and are responsible for bringing travelers to and from the Rental Car Center. With the impending construction at the existing Rental Car Center, the client expects us to maintain schedule while at the same time not impacting the schedule of the current bus operations. The RCC receives approximately 180 buses per hour at its peak, so it is imperative we have foresight to avoid future clashes. Site utilization plans play an integral role in construction, and for this project there needs to be a plan in place to keep buses moving in and out of the RCC. Effective plans clearly communicate the flow of vehicles, equipment, and personnel, while allocating adequate space for both material laydown and assembly areas. Conversely, a poorly assembled site utilization plan will yield severe downsides to the schedule and budget due to double handling of materials and crew inefficiencies. In this case your plan will have implications on airport business, public safety, scheduling, construction efficiency and the performance of the project.

Site Utilization Logistics:

- Site Fence
- Site Access
- Parking Area
- Construction Zone Delineation
- Evacuation Areas & Signal
- Construction Vehicle Access/Exit to and from Site
- Guard Shack at Entrance gate
- Traffic flow / Haul Roads

Bus Metrics:

- Overall Height: 141.25in
- Overall Length: 32 feet
- Overall Width: 8.5 feet
- Overall Weight: 46,328 lbs
- Wheelbase: 304 in
- Engine: Detroit Diesel Series 60, 400 hp
- Number of Passengers: 36
- Fuel Tank: Clean Diesel / 183 gallons

To demonstrate to the client how Hensel Phelps will effectively build at the RCC without impacting the buses, upper management has tasked you with putting a plan together for sequencing the buses and maintaining their travel paths in conjunction with several different building phases.

Site Constraints:

- Bus operations may not stop for any reason at all
- At peak operations, the RCC receives 3 buses per minute
- The RCC must maintain an entrance and parking lot for all POVs (Personally Occupied Vehicles)
- Simultaneous 2-way traffic is *NOT* permissible on the bus ramps
- The new sewer line intersects bus ramp entrances and exits
- There is only access to RCC from Sky Harbor Circle; no access is allowable from the back of the structure

You are the Area Superintendent assigned to the Site Civil and Utilities scope. With the management of this scope, you are aware that your work will heavily impact bus routing. You must utilize proper project phasing, temporary asphalt, barricading, flaggers, etc. in order to maintain constant access to and from the RCC (See X.10.2 Example). The following phases of work will require your expertise to keep things running smoothly. The owner's rep has their doubts.

PART A | Phase I – Sewer Line Install & Temporary Parking

You have been doing an excellent job setting up the site and have been maintaining your site utilization plan diligently. Furthermore, there has been no initial complaints from the City's bus drivers. However, your first challenge to maintaining bus access is just around the corner and the project team is very aware of the impending risk. As you've taken over the site it is apparent that your team will have to take over the existing parking lot. Hensel Phelps will have to build a temporary lot to accommodate civilians. In conjunction with the new lot, sewer line install is set to begin as well. The sanitary sewer line is 36" in diameter and sits 17' deep. The layout of the sewer line intersects the existing bus ramps as well as the new ones that are set to be installed. The owner has asked to see your phasing plan for this scope of work in the upcoming OAC meeting. Prepare your plan for temporary bus access, the POV entrance and temporary parking lot, and how they tie into the sequencing of the sewer line install and South Ramp construction. Use the provided drawing/aerial view X.10.1A to show the sequencing of the work and the measures that are being taken to allow for a safe and well-coordinated install of the temporary parking lot, south bus ramp, and sewer line.

To create these phased plans, highlight the scopes of work and give a number representing the order in sequence that the scope is being completed in. Then, utilizing the legend show the route the buses will take in and out of the RCC.

Site Utilization Part A Deliverables:

1. Submit one electronic copy (PDF) of your Phasing map(s) and brief explanation.
    a. Overall sequencing of planned work (X.10.1A)
    b. Give a brief explanation of the logic of your sequencing.

Part B | Phase II – North Ramp Shutdown

It's time for you to build the new north entryway ramp for bus access. This work will result in you shutting down and demoing the existing entrance lane. By this point, you know the drill, the buses cannot stop! With the North Ramp shutdown, come up with a plan to reroute the buses, so they can still access the RCC at their regular pace. Make your modifications on X.10.1B. Please note that buses may not go through the construction zone extents (see legend). Utilizing the legend show the route the buses will take in and out of the RCC.

Site Utilization Part B Deliverables:

1. Submit one electronic copy (PDF) of your Traffic Plan(s) and brief explanation.
    a. Traffic Plan (Bus Routing) (X.10.1B)
    b. Give a brief explanation of the logic of your sequencing.

Part C | Phase III – Steel Erection

Steel erection is underway! As erection makes its way to the west side of the RCC station, it is well known that tie into the existing building is going to prove difficult and will require shoring. Due to shoring and overhead work, thru access has been temporarily disabled. Reroute the buses so they can still hit their desired drop offs. Fortunately, all steel erection is taking place on second shift (nightwork), so bus frequency has dropped to one bus every 10 minutes. Make your modifications on X.10.1C. Please note that buses may not go through the construction zone extents (see legend). Utilizing the legend show the route the buses will take in and out of the RCC.

Site Utilization Part C Deliverables:

1. Submit one electronic copy (PDF) of your Traffic Plan(s) and brief explanation.
    a. Traffic Plan (Bus Routing) (X.10.1C)
    b. Give a brief explanation of the logic of your sequencing.

11. QUALITY CONTROL

Written by Nadine Roeser

Hensel Phelps' internal QC 6- Step Process was created to ensure the highest quality product and involves the following steps, crucial to starting, continuing, and finishing a project:

- Purchasing Meeting: identifies scope, early RFIs, and evaluation of trade partners' ability to perform work
- Pre-Mobilization Meeting: identifies submittal schedule commitments, long-lead items, and tentative schedule
- Preparatory Meeting: occurs 1-2 weeks prior to start of work, review in depth schedule, and overall production plan
- Initial Inspections: acts as representative sample of work, work through constructability and other details prior to continuing with remainder of work
- Follow Up Inspection: will occur throughout work in progress to ensure quality and safety compliance
- Final Feature Inspection: ensure quality of work prior trade demobilizes

With the QC 6- Step Process in mind, Hensel Phelps completes similar processes throughout construction to assure double checks prior to placements of final work.

PART A – Shop Drawing Review

You are the Office Engineer that is overseeing the site work scopes of work, specifically preparing for the installation of the drilled piers at the Elevated Sky Train. You are a few months away from starting the work and just received shop drawings for the rebar cages and pile caps. A good quality submittal review is needed to ensure that the material you release will be correct compared to the contract documents and help the project team maintain on schedule.

- Utilizing the provided drawings (X.11.0), please complete a thorough quality control review on the drilled piers cages (X.11.1) and pile cap rebar shop drawings (X.11.2).

Quality Control Part A Deliverables:

1. Submit one electronic copy (PDF) of **each** shop drawing review: drilled pier cages and pile cap rebar shop drawings.

PART B – Inspections Review Solutions via RFI

*(**Time Warp** – Fast forward a few months after the initial shop drawing reviews. The project team is currently in the ground preparing for the drilled piers to be installed this week. The field has completed several material and initial inspections and you, the Office Engineer, must ensure that the field team is covered to install the delivered material.)*

The field has assisted in the completion of the material and initial inspections of the drilled piers and rebar for the pile caps upon delivery (X.11.3). Due to scheduling constraints, there is not enough time to re-order material. You, the Office Engineer, must review the completed inspections and submit RFI's for installation that is not matching the drawings and/or specifications.

- Utilizing the Hensel Phelps Initial and Material Inspection (X.11.3), please review against Contract Documents and submit (2) RFI's: (1) for pile caps and (1) for drilled piers. Please use RFI template provided (X.0.3).

Quality Control Part B Deliverables:

1. Submit one electronic copy (PDF) of **each** RFI for pile caps and drilled piers.

12. TEAM MEMBERS RESUMES

Provide each team members personal resume (not a resume tailored to this problem). Include mailing address, telephone and email contact information. Photos are encouraged but not required.

VII. COMPETITION SCORING SYSTEM

Item	Description	POINTS
0.1	Early Deliverable - Biographies	0 (note 1)
0.2	Quality of Submitted Proposal	2
0.3	Timeliness of Proposal	0 (note 2)
1.	Financial Status Report	8
2.	Estimate	18
3.	General Conditions	10
4.	Proposal Summary	14
5.	Schedule	20
6.	Coordination of Work	12
7.	Change Management	8
8.	Personnel Issues	6
9.	Safety	6
10.	Site Utilization	10
11.	Quality Control	6
Subtotal		120
Oral Presentation		80
GRAND TOTAL		200 POINTS

Note 1: No points shall be issued in the competition for content of this previously due item; however points may be deducted from the team's score for having failed to comply with this item in a timely and professional manner.

Note 2: **½ point** will be deducted from the total score for **every minute** past the deadline time. Judges reserve the right to "cap" the penalty amount at their discretion; however, no team with a penalty cap will be allowed to place in the competition awards.

As the team placement results often are separated by mere fractions of a point, it is recommended that your team take each point seriously. No points scoring information will be provided to the teams at the conclusion of the competition, but feedback will be provided for each component in an "above-average / average / below-average" format.

VIII. LIST OF JUDGES

Oral Presentation Judges:

Wade Chance, Project Manager
(480) 383-8480
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Isaac Gilles, Area Superintendent
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Phoenix, AZ 85008

Lissette Flores, Design Engineer
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Northern California District
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Nick Kawamoto, Project Engineer
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Bellevue, WA 98007

Jeff Schelling, Area Superintendent
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Pacific Northwest Area Office
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Alina Vo, Project Engineer
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Alternates:

Monica Ashley, Project Manager
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Eric Freedman, Project Engineer
(949) 852-0111
efreedman@henselphelps.com
Southern California District
18850 Von Karman Ave., Suite 100
Irvine, CA 92612

Administrator / Executive Judge:

Ryan Piper, Operations Manager
(425) 646-2660
rcpiper@henselphelps.com
Pacific Northwest Area Office
15375 SE 30th Place, Ste 110
Bellevue, WA 98007

IX. THE RULES

The rules for the competition are designed to provide each team with an equal opportunity to apply their knowledge in developing their respective solutions and an equal opportunity to present their solutions to the panel of judges. The following rules apply to the Commercial Division and serve to supplement the ASC Competition Rules.

Rule No. 1 One (1) hard copy and two (2) electronic copies of the proposal must be turned into the judges. Two (2) thumb drives will be provided at the start of the competition for your use. Your final submission must be submitted on the provided thumb drives. No proposals will be formally returned. If you desire a copy for yourself or need one for your oral presentation preparation, please make copies prior to the submission of the proposal. Some proposals may be available for students to re-claim at the conclusion of the competition but may have marks from the grading effort in certain sections.

Rule No. 2 The equipment usage for each team is to be as outlined in the Competition Rules as published by the ASC. Use of the Internet is allowable and may be necessary for certain components of the problem; Hensel Phelps will pay for each team to have one (1) internet connection through the hotel for Thursday only. Wireless access coupons will be distributed at the opening conference. Any additional equipment required for a presentation is the responsibility of the team. If your presentation requires specific software, you must provide your own computer or inquire as to its availability on the provided computer.

Rule No. 3 The problems that are used for the competition are drawn from actual construction projects. In the past, there have been situations where student team members have worked on, or have specific knowledge of, the project that is the subject of the problem. This can be perceived as giving the team an unfair advantage in developing a solution. If, upon receiving the problem, any student recognizes the project that is the subject of the problem statement, the student shall notify the problem sponsor to discuss the extent of the student's project or problem knowledge. Alternates may be considered should there be an identified conflict. The judges will have the final decision. Failure to notify the problem sponsor makes the team subject to disqualification.

Rule No. 4 While the judges will endeavor to administer the problem with all fairness and appreciation for the team's perspectives, the decisions of the judges shall be final when deciding conflicts and scoring.

Rule No. 5 A one-half (½) point deduction will be taken for each minute the proposal is turned in past the time it is due. Written proposals are due Thursday at 10:00PM (Midnight Thursday night). Location of proposal delivery will be announced at opening conference. Other deliverable items, if applicable, will be due as specified elsewhere herein.

Rule No. 6 Oral interviews will begin at 7:00 AM on Friday, February 7th. Presentation materials for all teams are to be turned in to the Judges by 6:45 AM. No other presentation material will be allowed into the presentation that is not turned into the judges by this time - NO EXCEPTIONS WILL BE ALLOWED. Teams are encouraged to bring electronic presentation materials on a CD or thumb drive for use on the Hensel Phelps provided presentation computer; this will save on set-up time. Hensel Phelps' computer will utilize Microsoft Office 2013 software; if specialized software is necessary then the team must provide a computer to run their presentation and this computer must be delivered prior to the 6:45 AM deadline.

Rule No. 7 No phone calls or emails may be made to the Owner, Construction Manager, Architect, Civil, or Structural Engineer, or any other design consultants listed on the Drawings. Similarly, no components of the problem may be sent to others outside the team for assistance in completing the problem. Any violations of the above are subject to point penalties or team disqualification, at the Judge's discretion.

Rule No. 8 Due to the sensitive nature of disclosing project information that the Owner and / or design professionals may not wish to be publicly distributed, Hensel Phelps reserves the right to require Confidentially Agreements be signed by each team member prior to distribution of the Problem Statement. This may further require that all or some Contract Documents or other material provided to the team, both electronically and hard copy, be returned to Hensel Phelps at the conclusion of the competition.

Rule No. 9 The premise of the proposal and oral interview is that you are presenting to the upper management of your own company. It is preferred that your team take the identity of Hensel Phelps but other team / company names are acceptable. You are therefore asked to refrain from including extra peripheral information about your company such as safety plans, company profiles or other marketing materials. Our intent is to test you on your knowledge of construction concepts, means and methods, not your ability to make up or compile marketing materials and canned programs. Please limit your responses generally to the information requested, although innovation and enhancement is encouraged.

Any team observed violating these rules may be asked to withdraw from the competition or be assessed point penalties. These Rules are subject to change; and, the final version will be included in the Problem Statement distributed at the opening conference.

X. SUPPLEMENTAL INFORMATION

Note: Documents are provided in electronic format only on thumb drive:

X.0.1	Drawings
X.0.2	Specifications
X.0.3	Request for Information Form
X.0.4	Evaluation Form
X.1.1	Financial Status Report Template
X.1.2	Prime Contract
X.2.1	Concrete Estimate Spreadsheet
X.2.2	Rates & Cost Data Sheet
X.2.3	Reinforcing Weight Data
X.2.4	Pour Plan Sequence Template
X.2.5	Estimate Drawings
X.3.1	GC Estimate Spreadsheet
X.3.2	Staffing Matrix Template
X.4.1	Subcontractor Proposals
X.4.2	Proposal Summary (Bid Tabs) Template
X.6.0	Coordination of Work Documents
X.6.1	Overview Drawing
X.6.2	Shop Drawings
X.7.1	Perimeter Lighting Bulletin
X.7.2	Cost Estimate Template
X.7.3	Owner Correspondence Letter Template
X.8.A	Managing Difficult Conversations
X.8.B	Intern Evaluations
X.9.1	Site Utilities Map
X.9.2	Station Location and Pier Depths
X.9.3	Right to Excavate
X.10.1A	RCC Sewer Line Install
X.10.1B	RCC North Ramp Shutdown
X.10.1C	RCC Steel Erection
X.10.2	RCC Traffic Plan Example
X.11.0	Package B02 Documents
X.11.1	Submittal Sec 9 Rebar Shop Drawings
X.11.2	Submittal Taxiway U Pier 1 Shop Drawings
X.11.3	Inspections