

# Risk Mitigation Matrix

Reference Document X.5.2

	Risk Type	Risk Description	Potential Consequence	Likelihood	Responsible Party	Risk Mitigation Strategy
	Catagories:	Provide: List of Descriptions -	Provide: List of Consequences -	High/Med/Low	Owner/Arch/GC/Sub	Provide: List of Strategies -
1	Systems Integration - Ensure that all rail, train and building systems work are integrated for safe and efficient operation	Design Coordination - Early engagement of system vendors and systems to ensure full systems integration into design.  Design Coordination - Systems integration matrix will be prepared during design to list and track all required systems interface points. Commissioning - Maximize off site factory and integration testing to prove functionality prior to site arrival Commissioning - Subsystem testing and commissioning has been scheduled early enough in the project to allow for expected levels of troubleshooting Project Coordination - Systems integration has been scheduled after subsystem testing is complete and includes time for trial testing, troubleshooting and integrated testing	Missed integration between systems Lack of coordinated systems that meet owner requirements  Delay in Scheduling	Med  Low Med Low Med	GC/Sub  Owner/Arch/GC/Sub Sub GC/Sub GC/Sub	DB Sub contractors to be coordinated ang bought out early. Systems Integration will be coordinated per Owner PR requirements, as Design Build Subcontractors are brought onto the project. Coordinate factory tests prior to shipment of equipment. coordinated with sub during coordination meeting prior to work install and commissioning activities.
2	Construction Schedule and Sequencing - Complete the physical construction of the OMF project within the boundary posts of design/permitting and systems integration	Construction Coordination - Hensel Phelps coordination and collaboration with trade partners.  Scheduling - Maximize civil improvements and earthwork during the productive summer construction seasons of 2018 and 2019  Site Logistics - Construct stabilized haul roads and access pads around all structures to ensure safe, dependable and productive wand access for all construction vehicles through the winter season of 2018 and 2019	Lack of coordination between major trade partners Delay in Scheduling due to coordination of work with seasonal changes.  unsafe site conditions to operate equipment. Unable to properly access site. Poor site logistics could delay work on the project.	Low  Med  Med	GC/Sub  GC  GC	Design Build Subcontracts are coordinated early with required engineering to ensure systems are integrated correctly with the porject, meeting all owner requirements. Schedule sequence of work to utilize site lay down areas that still allow for site impovrement activities to be made.  Properly plan and coordinate a site utilization/ logistics plan for access to promate construction area of the project.
3	Labor, Materials and Equipment - Ensure that there is an adequate supply of skilled labor, materials and equipment given the booming construction market in the PNW along with known future construction	Construction Coordination - Hensel Phelps will be self performing the building construction work and other concrete work, ensuring availability of skilled labor for this critical path scope and setting the pace for safety, quality and schedule  Project Coordination - We have already teamed with trade partners representing the largest and most qualified pool of contractors in the Seattle region, including Granite Construction for civil improvements, Stacy Witbeck for railwork, Valley Electric for electrical work, C3M for specialty electric work and Hermanson for mechanical and plumbing work. Combined with Hensel Phelps this represents almost 60% of the labor for the project  Buyout - During preconstruction and job purchasing, Hensel Phelps will ensure all bidders for the project are aware of the project schedule and can provide adequate resources for the project	Lack of labor to meet the project requirments could delay the project. Poor quality of work by untrained workers could result in unhappy owner Unable to staff project with proper labor force could delay work. Lack of trade partners could lead to poor quality of work or sub that is unable to perform the work. Lack of resources or material for subs to meet project requiremnts. Subs unable to properly coordinate to meet project requirments.	Med	GC  Owner/GC/Sub  GC/Sub	Ensure staff i  Early Buyout of large contracts ensures proper labor allocation for the project.  Buyout meetings and early coordination with subcontractors.
4	Environmental Risks -Soil & Site Work, containment, treatment and discharge of stormwater	Scheduling - The lead times for all major equipment and materials has already been included in the CPM schedule so that design packages and submissions can be properly managed and fabrication and delivery dates maintained.  SWPP violoation of water runoff from the site into surrounding area.  Coordination of detail transitions at exterior of building Moisture Penetration through the enclosure of the building	Material being delayed or missing milestone dates for the project.  City or County fines for violations. Delay in schedule to mitigate hazards and violations. Lack of coordination between design and construction doesn't provide adaquite system for building. Unsafe conditions to perform work in. Delay	Low  Med  Med High	GC/Sub  GC/Sub  Arch/GC/Sub GC/Sub	Prep meeting prior to start of work, and updated tracking log to track submittal requirements and deliveries of items.  SWPP plan prepared at the start of the project. Propper measures taken as the site changes and weather conditions effect operations.  Mock up & detail coordination. Quality control/ quality assurance. Internal Inspections.
5	Exterior Enclosure - Ensure the exterior enclosures of the OMF and MOW buildings are complete prior to rainy season	Design Coordination - Exterior component design has been streamlined so that the insulated metal panels make up both the weatherproof building exterior as well as the aesthetic building finish  Construction Method - The roof monitors will be prefabricated on the ground and hoisted into place to accelerate the start of roof construction and eventual dry in of the buildings  Weather Conditions- In the CPM schedule the building structure and exterior enclosure have been accelerated so that the majority of skin and roof are complete prior to winter weather, supporting interior construction	Lack of coordination before installing work could lead to trade damage or system that does not meet project requirements. Unsafe conditions to work. Delay in start of interior work because roof is not complete. Trade damage due to weather conditions. Unsafe conditions to perform work in. Delay in schedule due to weather.	Med  Low  High	Arch/GC  Sub  GC/Owner	Design is coordinated early so systems are coordinated and detailed.  Coordinated with sub prior to start of work.  Coordinated with owner upon award of contract, to maximize efficiency of construction.
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