 Duke University - Facilities Management Department Standard Operating Procedure	
Excavation Risk Mitigation	
Applicable to: All Duke Organizations and Contractors	Date Effective: January 1, 2023
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Introduction

The primary purpose of the formal Risk Mitigation process is to provide Duke Utility and Engineering Services with the necessary review of all potential impacts to utilities on Duke University's Campus. Risk Mitigation review was established to identify all potential risk when digging in the critical areas of campus or for any major construction/renovation projects. Risks shall be identified, documented, assessed, and managed during any excavation operation. Risk planning is required for every task associated with the specific project. The project team is required to identify, analyze and propose action to the Risk Mitigation team using a Utility Risk Assessment Plan.

The Utility Risk Assessment Plan is a project tool that may be initiated as early as the Schematic Design phase of the project. The design team shall identify significant utility risks and make appropriate modifications during the design process to show mitigated risks and unavoidable impacts/risks. The Utility Risk Assessment Plan shows all known utilities within the project limits and identifies, documents and addresses utility related project risks with cost and schedule implications. The PM should rely on a mixture of the following to identify the potential risk:

- Brainstorming
- Challenging of assumptions
- Innovative approaches (e.g., new materials, technologies or processes)
- Discussing with other similar projects or PM's
- Consultation with others who have specific knowledge of similar projects
- The experience of project stakeholders or system owners

As the project progresses through the design process, the plan will be modified to reflect utility solutions. The solutions are typically a result of access to more detailed design information (i.e., pothole information, updated survey, etc.) as the project evolves and identifies utility related solutions. During the Construction Document phase, the plan will be submitted with the CD documents for review through Bluebeam. This will be the plan that is submitted to the Risk Mitigation Review Committee for approval. PM's should provide the Bluebeam session ID for reference when scheduling Risk Mitigation review meeting. Risk Mitigation will only review project documentation submitted through Bluebeam review.



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Risk Mitigation Roles and Responsibilities

Project Manager	<ul style="list-style-type: none"> • Responsible for development of Utility Risk Assessment Plan, and scheduling Risk Mitigation meetings with DUES at the appropriate times • Ensure proactive response to all comments received from Risk Mitigation meeting • Perform monitoring of contractor activity and communicating progress to Risk Mitigation Committee • Scheduling and conducting project risk meetings as site conditions change
Designer	<ul style="list-style-type: none"> • Assist PM with the Utility Risk Assessment Plan • Provide risk mitigation assistance • Avoid risks through responsible design • Incorporate Utility Risk Assessment Plan into the contract documents with the appropriate risk response strategies
Contractor	<ul style="list-style-type: none"> • Implement appropriate risk response strategies and action plans • Assist Designer during planning phase • Shall develop a procedure to monitor the mitigation plan. • Shall communicate with PM and Risk Mitigation Committee when conditions change, or new risks are identified
System Designees	<ul style="list-style-type: none"> • Assist PM, Designer, and Contractor • Assist Risk Management Team • Provide guidance on specific risk mitigation tools • Review/Approve the final Utility Risk Assessment Plan to be included in the contract documents and presented at Risk Mitigation meeting.



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The project team should be able to answer the following questions before scheduling the Risk Mitigation meeting:


Project Task	Question
1. Risk Planning	Is the project in the identified High Risk - Critical Utility Zone or a Capital Project?
2. Risk Identification	What utilities are at the risk for each task of the project?
3. Quantitative Risk Analysis	How would the damaged utility impact the university in terms of services and facilities?
a) Risk Response Planning	What steps can be taken to mitigate the associated risk?
b) Risk Mitigation Approval	Has the project team presented and been approved through the Duke University Risk Mitigation program?
c) Risk Mitigation Monitoring	Are the measures in place and working as expected?
d) Risk Communication	Is the project team in communication/providing updates to the system designees?

1. Risk Planning

If the project is in the identified High Risk - Critical Utility Zone or a Capital Project; then utility risk planning should start during the conceptual phases of the project. The designer should initially identify potential utility risks during the beginning phases of the project and modify the plan as the design progresses. It is the project team's responsibility to develop the Utility Risk Assessment Plan that shows all known utilities within the project limits and identifies, documents and addresses utility related project risks with overall project impacts. The Utility Risk Assessment Plan will be an important tool in project planning and required for Risk Mitigation approval. The Utility Risk Assessment Plan will become part of the project documents and the Plan that is presented during Risk Mitigation.

2. Risk Identification

Identify tasks that might impact a Duke Utilities system. A common challenge at Duke University is verifying that the known utilities are shown on a plan correctly and verified by the project team. The project team should review all existing condition documents and field verify that the existing conditions are correct. The project team is also responsible for the development of a potholing plan to further verify existing conditions. It is the responsibility of the PM to identify the potential risks with the assistance of the project design team and other entities who have knowledge of the associated utilities.

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Quantitative Risk Analysis

Utility systems identified need to be analyzed to determine the potential community and facility impact if damaged by work scope. The Utility Risk Assessment Plan should detail each system, and specific facilities and equipment that may be impacted.

Risk Response Planning

Risk Response Planning is the process of developing strategic options and determining actions to enhance opportunities and reduce threats to the project’s objectives and the university community. Project risks should be avoided by removing the cause or executing in a different way while still aiming to achieve project objectives. Risk avoidance is the preferred solution; however not all risks can be avoided or eliminated. Risk mitigation reduces the probability and/or impact in the event of an emergency.

The following are the response strategies for risks:


For Risks

Avoid Risks - Risk can be avoided by removing the cause of the risk or executing the project in a different way while still aiming to achieve project objectives. Not all risks can be avoided or eliminated, and for others, this approach may be too expensive or time-consuming. However, this should be the first strategy considered.

Transfer Risk - Transferring risk involves passing the known risk and responsibility to the CM for its management and ultimately the liability of the risk should it occur. This can be an option on campus when the risk doesn’t impact other users. For example, if a specific utility has been de-energized during construction because the system is looped and doesn’t require a shut down for other users, then the risk can be transferred to the CM during construction. If the utility is damaged, then it’s the responsibility of the CM to repair.

Mitigate Risk - Risk mitigation reduces the probability and/or impact of an adverse risk event to an acceptable threshold. Taking early action to reduce the probability and/or impact of a risk is often more effective than trying to repair the damage after the risk has occurred. Risk mitigation may require resources or time and thus presents a tradeoff between doing nothing versus the cost of mitigating the risk.

Opportunities – The aim is to ensure that the opportunity is realized during the design process. Certain risks can be eliminated if the opportunities are realized during the design process. The design team should evaluate “opportunities” based on the long term goals of the University and

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the utility in question. The design team should work closely with the System Owners to ensure that all opportunities are realized.

Risk Mitigation Approval

If the work area is in the High Risk - Critical Utility Zone or is a Capital Project- then:

- a) Utility Risk Assessment Plan must be submitted with design documents for Bluebeam review.
- b) Submit and schedule a Risk Mitigation meeting with Martin Rimmer using email address dukeexcavationprogram@duke.edu
- c) Utility Risk Assessment Plan must be submitted NLT COB Tuesday prior to the scheduled Risk Mitigation on Thursday.
- d) Risk Mitigation committee will review project requests on Wednesday morning prior to the Risk Mitigation meeting on Thursday. If project documentation is not provided or is insufficient, then the project will be notified and will have to wait until the next scheduled meeting.
- e) Risk Mitigation committee will send the meeting agenda on Wednesday afternoon prior to the meeting on Thursday.

Risk Mitigation Committee Members

	<u>Name</u>	<u>Cell Number</u>	<u>Email Address</u>
Thermal Systems Designee	Richard Adams	(919)597-1167	richard.adams@duke.edu
High Voltage System Designee	Bhupinder Singh	(919) 597-9244	bhupinder.singh@duke.edu
OIT System Designee	Dickson Clifford	(919) 358-0376	dickson.clifford@duke.edu
Civil Systems Designee	Martin Rimmer	(919) 730-4345	martin.rimmer@duke.edu
Landscape Services	Roger Conner	(919) 697-5091	roger.conner@duke.edu
Natural Gas System Designee	Ken Harrison	(919) 884-8049	ken.harrison@duke.edu
Locator	Ken Harrison	(919) 884-8049	ken.harrison@duke.edu



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Risk Mitigation Monitoring and Communication

Project team shall develop a procedure to monitor the mitigation plan. The project team shall ensure control measures are in place, and working as expected. Communication shall occur between project team and Risk Management team in event there are any concerns. This plan shall be communicated, and agreed upon at the Risk Mitigation meeting. The Project Manager shall keep the Risk Mitigation team updated on project progress and completion.

The Project Manager will bring back any work scope that was not initiated within 6 months of receiving Risk Mitigation approval.