**Utility Tunnel**

**Safety Program**

**Environmental Health**

**& Safety**

**THIRD EDITION**

**Table of Contents**

1. **Purpose and Scope…………………………………………………………………………..…… 3**
2. **Definitions………………………………………………………………………………….............3**
3. **Responsibilities………………………………………………………………………...…………..4**
4. **Tunnel Work Assessment………………………………………………………………................8**
5. **Special Conditions…………………………………………………………………………………9**
6. **Training……………………………………………………………………………………............12**
7. **Tunnel Entry Authorization……………………………………………………………………...12**
8. **Entering and Exiting the Tunnels………………………………………………………………..14**
9. **Tunnel Check-In and Tunnel Keys……………………………………………………...……….15**
10. **Purpose and Scope**
	1. Purpose: The University of Oregon maintains an extensive tunnel system to facilitate the maintenance and repair of campus utility distribution systems. The tunnel system is a critical portion of the University’s utility distribution system and must be maintained and used in a safe manner at all times. The purpose of the Utility Tunnel Safety Program is to provide guidance for safely working in the University of Oregon tunnel system and sets forth the requirements for all University employees, contractors, and vendors.
11. Scope: This program applies to University of Oregon spaces requiring a tunnel key for entry, and applies to all persons entering tunnel spaces on behalf of the University of Oregon.
12. **Definitions**
	1. **ASSIGNED KEY:** A tunnel key that is assigned to an individual for an extended period of time; up to 90 days. Persons who have been given an assigned key are responsible for control of the key at all times.
	2. **AUTHORIZED ENTRANT:** Any individual that has received authorization and training from the U&E Director or his designee, and has legitimate University of Oregon business at the time of entering the tunnel system.
	3. **CENTRAL POWER STATION (CPS):** The power station for the main University campus and control point for tunnel access.
	4. **CONFINED SPACE:** A space that is big enough to bodily enter, is not designed for continuous human occupancy and has limited means of entry or egress. NOTE: Under normal conditions, the tunnel system is a confined space.
	5. **CONTROL ROOM OPERATOR (CRO):** Position composed of qualified U&E employees who operate utility systems including the systems in the University of Oregon Tunnel System. The CRO position is staffed 24 hours per day.
	6. **PERMIT REQUIRED CONFINED SPACE:** A confined space that has an additional hazard such as: contains or has a known potential to contain a hazardous atmosphere, contains a material with the potential for engulfment, has an internal configuration that could trap or asphyxiate an entrant by inwardly converging walls or floors or any other recognized serious safety or health hazard. NOTE: Under normal conditions, the tunnel system is a confined space. If work conducted in the space creates an additional hazard as defined here, the space will be considered a permit required confined space.
	7. **TEMPORARY KEY:** A tunnel key that must be checked in and checked out of the control room. Temporary keys must be returned to the control room by the end of each shift.
	8. **TUNNEL ENTRY VIEWER:** A map layer of the University of Oregon digital map created by campus Geographical Information System (GIS). The viewer is a secure layer showing real time tunnel entry and exit information for the day or a specified time period.
	9. **TUNNEL SYSTEM:** The tunnel system is the underground system connecting buildings and conveying utilities across the University of Oregon campus. Entry into the tunnel system begins when entering through the locked door, gate, or access-way that is at each tunnel entry.
	10. **TUNNEL WORK AUTHORIZATION REQUEST (TWAR):** A formal request submitted by organizations for conducting work in the Tunnel System. An approved TWAR is permission to conduct the work and is NOT permission to enter the Tunnel System.
	11. **URGENT WORK:** Work that, if not conducted immediately, will result in injury or harm to building users, and/or damage to facilities or equipment.
	12. **UTILITIES AND ENERGY (U&E):** The University unit that is assigned responsibility for the tunnel system.
13. **Responsibilities**
	1. Authorized Tunnel Entrants will be responsible for:
		1. Following check-in/check-out procedures.
		2. Wearing appropriate personal protective equipment (PPE).
		3. Following confined space and permit required confined space entry requirements, where applicable.
		4. Reporting any safety hazards or damage observed while working in the tunnel.
		5. Follow all instructions from the Control Room Operator.
	2. Control Room Operators (CRO) will be responsible for the operation of the CPS plant systems and directly control access to the tunnel systems. The CRO shall:
		1. Verify training records to ensure that potential tunnel entrants are trained.
		2. Train authorized entrants when necessary.
		3. Forward training records to Environmental Health and Safety (EHS).
		4. Maintain the tunnel entry/exit logs and the Tunnel Entry Viewer.
		5. Provide keys to authorized entrants and maintain the tunnel key checkout log.
		6. Communicate with the U&E Supervisor when entrants have not checked out and cannot be contacted.
		7. Initiate the emergency response procedures as needed.
		8. Report to U&E Supervisors tunnel hazards that are communicated to them from entrants.
	3. The U&E Supervisors will be responsible for:
		1. Assisting the CRO to contact workers and supervisors to account for individuals who have not checked out of the tunnels at the expected time.
		2. Coming to CPS to assist the CRO and other entities with investigation and recovery efforts as needed.
	4. U&E Director will be responsible for:
		1. Approving all access and all work conducted in the tunnel systems.
		2. Ensuring all U&E staff follow the requirements of the tunnel safety program.
		3. Notifying EHS when contracted work in the tunnel system is known to create a permit required confined space.
		4. Approving key authorization.
		5. Reviewing this program annually in conjunction with Environmental Health and Safety.
	5. Environmental Health and Safety (EHS) will be responsible for:
		1. Establishing and reviewing this program.
		2. Assisting with the training of tunnel entrants.
		3. Maintaining the Tunnel Safety training records.
		4. Issuing confined space permits, when required, for non-U&E work completed by UO employees inside the tunnels.
		5. Advising U&E Staff and University employees on health and safety issues relevant to tunnel entry.
		6. Developing and updating the tunnel safety training in conjunction with U&E.
	6. Campus Planning and Facilities Management (CPFM) Supervisors will be responsible for:
		1. Communicating this program with their unit staff and contractors and ensuring it is followed.
		2. Training staff and contractors on tunnel entry procedures and precautions.
		3. Documenting tunnel entry training and providing the tunnel training documentation to U&E.
		4. Conducting a site hazard assessment to determine required safety precautions.
		5. Determining if the work conducted will make the space a permit required confined space.
		6. Following confined space and permit required confined space entry requirements where applicable.
		7. Ensuring they know the locations of their workers and work parties within the tunnels, by point of reference (POR), the names of the workers in the group, the length of time expected to be in the tunnel, tunnel entry and exit locations, and the work to be performed in the tunnel.
		8. Ensuring positive confirmation of safe exit from the tunnels is received at the end of an employee’s shift from each of their staff working in the tunnels that day.
		9. Contacting the CRO anytime a worker, or group of workers, is considered “overdue” or missing to initiate emergency procedures.
	7. Design and Construction (D&C) Project Managers (PM) and Owner Representatives (OR) are responsible for:
		1. Communicating this program with their staff and contractors.
		2. Training staff and contractors on tunnel entry procedures and precautions for D&C sponsored work.
		3. Documenting tunnel entry training and providing the tunnel training documentation to U&E.
		4. Conducting a site hazard assessment to determine required safety precautions.
		5. Determining if the work conducted will make the space a permit required confined space.
		6. Following confined space and permit required confined space entry requirements, where applicable.
		7. Ensuring that D&C sponsored Contractors comply with this program.
	8. University of Oregon Police Department (UOPD) will be responsible for:
		1. Ensuring all officers receive tunnel training.
		2. Assisting in emergency response procedures by unlocking access points, directing first responders to access points, and assisting in perimeter control during the emergency.
		3. Reporting any safety hazards or damage observed while working in or around the tunnels and tunnel access points to the CRO.
		4. Assisting the CRO with unauthorized tunnel entrants and afterhours suspicious activity investigations.
		5. Maintain communications with the CRO for any event requiring emergency responders to access the tunnel system and report the entry and exit of all emergency responders to the CRO.
	9. Contractors: Contractor supervisors will be responsible for:
		1. Communicating the Utility Tunnel Safety Program to all contractor employees and sub-contractor employees.
		2. Complying with the Utility Tunnel Safety Program when conducting work in the Tunnel System.
		3. Ensuring employees are trained on tunnel entry procedures and precautions.
		4. Documenting tunnel entry training and providing the tunnel training documentation to U&E.
		5. Conducting a site hazard assessment to determine required safety precautions.
		6. Conduct a work assessment to determine if the work conducted will make the space a permit required confined space.
		7. Following confined space and permit required confined space entry requirements, where applicable.
		8. Ensuring they know the locations of their workers and work parties within the tunnels, by point of reference, the names of the workers in the group, the length of time expected to be in the tunnel, tunnel entry and exit locations, and the work to be performed in the tunnels.
		9. Ensuring positive confirmation of safe exit from the tunnels is received at the end of an employee’s shift from each of their staff working in the tunnels that day.
		10. Contacting the CRO anytime a worker, or group of workers, is considered “overdue” or missing to initiate emergency procedures.
14. **Tunnel Work Assessment**
	1. Work Assessment
		1. Prior to beginning any work in the tunnel system an assessment must be conducted by the employee’s supervisor to determine if the work or the conditions in the tunnel meet the criteria for a permit required confined space.
		2. If the work assessment determines that the entry will be a permit entry, confined space entry procedures as stated in the UO Confined Space Entry Program will be followed. Responsibility for initiating and following the permit process varies depending on the entity doing the work. The responsibilities for the various groups are as follows:
			1. **U&E:** The confined space entry permit will be generated by qualified and authorized staff within U&E. A copy of the permit will be sent to EHS. U&E will ensure employees working within the permitted tunnel spaces have received Confined Space Entry/Attendant training from EHS prior to work and follow the UO Confined Space Safety Program.
			2. **Contractors:**  Contractors will comply with the contractor’s section of the UO Confined Space Safety Program and their own Confined Space Program. Contractors will provide their own permits, air monitoring, attendants and entry supervisor. Contractors must provide copies of their permit and written program upon request from U&E or EHS.
			3. **CPFM Supervisors**: A TWAR must be submitted to U&E prior to work. U&E will notify CPFM supervisors of any hazards present. If the nature of the work will create a permit required confined space, the CPFM supervisor will contact EHS to initiate confined space entry procedures. The CPFM supervisor will ensure the employees entering the tunnel system have received Confined Space Entry/Attendant training from EHS, tunnel training, and follow the UO Confined Space Safety Program.
15. **Special Conditions**
	1. Change of Project Scope: Should the scope of work change once in the tunnel, the entrant must:
		1. Stop work.
		2. Exit the space and notify the CRO.
		3. The employee’s supervisor will re-evaluate the work.
		4. If the work meets the criteria for a permit required confined space then permit required confined space entry procedures must be followed.
		5. Approval from the U&E Director must be obtained prior to any work in the tunnel that will involve modification to the tunnels, the installation of new equipment, conduit, wiring, and piping (including steam, water, sewer, gas, compressed air, etc.).
	2. Unauthorized Personnel: The CRO will be notified and a report made to UOPD when an unauthorized person is observed within the tunnel system.
	3. Noncompliance: If an authorized entrant is observed to be out of compliance with this program, the observer will report the issue to the CRO. The CRO will report the incident to the U&E Director and U&E Supervisors for action.
	4. Open Hatches and Doors: Tunnel hatches and doors shall remain closed to prevent unauthorized persons from entering the tunnel system If doors or hatches must remain open to conduct work, the following measures must be followed:
		1. Temporary barriers may be used if the barrier will provide a reasonable physical deterrent to prevent unauthorized persons from entering the tunnel system.
		2. Authorized tunnel entrants working in the tunnels may act as security as long as the workers are visually capable of monitoring an open hatch or door.
	5. STOP WORK Authority: All U&E staff and anyone associated with the work in the tunnels can initiate a STOP WORK order if a situation is unsafe or the nature of the work is beyond the scope that has been authorized. The STOP WORK order can be directed at the job site or reported and initiated via the CRO. In the event of a STOP WORK order:
		1. On site supervisors will notify the CRO if a local STOP WORK order is directed.
		2. The CRO will contact workers via radio and instruct them to stop all work immediately and exit the tunnels if necessary.
		3. If a STOP WORK order is issued the CRO will immediately notify the U&E Director and U&E Supervisors. The U&E Director will contact EHS, Project Managers and/or Supervisors depending on the circumstances and work affected.
		4. The CRO will assess any other work and ensure the affected work site does not endanger others.
		5. The CRO will direct STOP WORK on other tunnel work sites impacted if deemed necessary.
		6. The CRO may direct the evacuation of the tunnels if needed.
		7. The CRO will determine if Emergency Response Procedures need to be initiated.
		8. The U&E Director or a U&E Supervisor must grant permission to recommence work once a STOP WORK order has been in effect.
	6. Emergency Response: In the event of a confirmed emergency, the following response will occur:
		1. The CRO will order an evacuation of the entire tunnel system to ensure that no additional tunnel safety issues arise elsewhere while the emergency response team is occupied.
		2. The CRO will call 911 to relay the relevant below information:
			1. The nature of the emergency (e.g. emergency utility tunnel rescue, personal health emergency, etc.).
			2. Nature of the work being done.
			3. The last time of contact with the authorized entrants (e.g. if open communication has been established).
			4. The precise location of the emergency and closest entry point address (information gathered from the Tunnel Entry Viewer).
			5. Relevant first responder information related to entry (e.g. potential environmental hazards, entry restrictions, etc.).
			6. Communicate to the dispatcher that UOPD will be contacted immediately after.
		3. The CRO will contact UOPD and relay the above information.
		4. UOPD will be dispatched to unlock and direct first responders to the tunnel access point and assist in perimeter control of area. If environmental health hazards do not exist UOPD may enter to provide assistance.
		5. The CRO will notify the U&E Director and a U&E Supervisor to assist in the emergency response.
		6. U&E Director or a U&E Supervisor will contact the SRS duty phone and relay known information.
		7. The U&E Director or a U&E Supervisor must grant permission to recommence work once the emergency is resolved.
16. **Training**
	* 1. All personnel requesting entry are required to attend tunnel system training prior to entry in the tunnel system.
		2. Training will consist of a review of the Tunnel Safety Program, entry and exit procedures, personal protective equipment, the hazards associated with the tunnel system, and emergency response procedures.
		3. Only authorized trainers may conduct tunnel system training. Authorized trainers include: Control Room Operators, U&E Director, U&E Supervisors, Design and Construction Project Managers, and individual(s) designated by EHS. Additional trainers may be authorized by the U&E Director.
		4. Training will be documented on the UO Tunnel Entry Briefing form. Copies of the form will be sent to EHS.
17. **Tunnel Entry Authorization**
	1. Tunnel Work Authorization Request (TWAR):
		1. Employees who are not U&E employees will submit a TWAR to request authorization to conduct work within the tunnel system. Before approving a TWAR, The U&E Director or a U&E Supervisor will evaluate the plant conditions and potential conflict with other work in the tunnels to ensure that the requested work can be done without creating additional safety concerns.
		2. An approved TWAR is not required when the work is administrative in nature and does not involve modification to the tunnels, the installation of new equipment, conduit, wiring, and piping and will not involve maintenance, repair, or replacement of any steam, water, sewer, gas, compressed air, or electrical equipment.
	2. Submitting a TWAR: The applicable Project Manager or University supervisor will route a TWAR to the U&E Director. The following information is required in the TWAR before access will be approved:
		1. University entity and/or Company Name
		2. Purpose and scope of work
		3. Drawings or photos identifying the project area and the work to be undertaken.
		4. Primary contact and number of personnel entering tunnel
		5. Location of work
		6. Identify entry and exit points
		7. Start date and duration of the project
		8. Lockout/Tagout Requirements
		9. Supervisor Name and Supervisor Phone Number
	3. TWAR Approval:
		1. The TWAR will be routed in hard copy to the U&E Director and should be provided no less than 2 working days prior to the desired initial tunnel entry date to start work.
		2. Requests to enter the tunnel system by non-U&E staff to conduct work in the tunnel system will be denied by the CRO if a TWAR has not been approved.
		3. The U&E Director or a U&E Supervisor will review and approve a TWAR. Once approved the TWAR will be placed in the “Tunnel Work Authorization Request” section of the Tunnel Entry Log binder and retained until the work is complete.
		4. U&E staff will utilize internal approved planned Work Lists for authorizing tunnel entry for U&E related work.
	4. Urgent and Unexpected Tunnel Entry:
		1. Situations requiring timely access to the tunnels for unexpected work or repairs will be accommodated but should not be the norm.
		2. The same information in the TWAR will be given to the CRO when requesting entry.
		3. The CRO will contact the U&E Director or a U&E Supervisor for permission for the tunnel access request.
18. **Entering and Exiting the Tunnels**
	1. Authorized Personnel:
		1. Only authorized tunnel entrants following the procedures outlined in this program are allowed into the tunnels.
		2. Students, faculty, staff, the public, and outside contractors, unless performing official business of or for the University, shall not to be given access to the tunnels.
		3. All work performed in the tunnels will be conducted by a minimum of two workers together. Work groups larger than two workers must remain within eyesight of each other.
	2. Personal Protective Equipment (PPE) and Tools: The following is a list of items required to be used while in the tunnel system:
		* 1. Personal Protective Equipment (PPE): Head protection, e.g. hard hats or bump caps (hard hats are required in construction areas). Other PPE shall be worn as work requirements dictate (e.g. eye protection, hearing protection, gloves, long sleeves, etc.).
			2. All workers entering the tunnels will have a working flashlight, or other portable light source, for use if permanent lighting in the tunnels is lost.
			3. Required clothing will include pants and shirts made from natural fiber materials, and shoes with a closed toe, rubber soles, and solid uppers. Additional requirements may be required based on the hazard assessment for the work being conducted.
			4. All authorized entrants accessing the tunnels must carry a charged UO radio and maintain communication with the CRO. A cellular phone will not be considered adequate in lieu of a radio.
			5. Any other equipment (e.g. lockout/tagout locks, air monitoring equipment, additional PPE, etc.) for the job to be performed safely.
	3. Hygiene:
		1. Eating and Smoking: Eating and smoking are not allowed in the tunnel system. Drinking water is allowed and recommended for hydration.
		2. Hands and face should be washed after exiting the tunnel system.
19. **Tunnel Check-In and Tunnel Keys**
	1. Key Control:
		1. The U&E Director or designee will be responsible for authorizing key assignments.
		2. The U&E Director will determine those individuals who have a valid need for a tunnel key for an extended time period beyond a work shift (assigned key).
		3. With the exception of UOPD, no key will be assigned for longer than 90 days.
		4. After the designated custody time, individuals approved to have tunnel keys for extended periods of time may come to the CPS Control Room and have keys re-issued.
		5. The CRO will re-issue the key after visually verifying the possession of the key. The authorization of keys for extended time will be limited to U&E staff and select individuals.
		6. Authorized entrants who do not have an assigned key are required to check out a temporary key from the CPS control room.
		7. Temporary keys will be returned to the CPS control room at the end of the scheduled shift.
	2. Checking Out a Tunnel Key:
		1. Individuals authorized to work in the tunnel will report to the CPS control room to check out a key for tunnel entry.
		2. The CRO will issue temporary keys to authorized tunnel entrants.
		3. Authorized entrants who have been assigned a key will check in and out of the tunnels with the control room in person, via radio, telephone or other direct communication method. Voice mails and Email are NOT considered direct communication methods.
		4. Temporary keys will be returned to the CPS Control Room at the end of the scheduled shift.
	3. Forfeiture of Key Privileges:
		1. The U&E Director may revoke an individual’s key privilege and tunnel access if procedures are not followed.
		2. Physical loss of a key is a security risk and may result in charges to re-key the tunnel system to be levied against the responsible contractor or University unit or department.
	4. Boundary Tampering and Re-Keying:
		1. The U&E Director will grant permission to re-key any tunnel system lock, the removal or addition of any doors, gates, or other barriers.
	5. Check-In and Tunnel Entry:
		1. All parties working in the tunnel shall get permission from the CRO in person, radio, or by telephone (541-346-2215) prior to entry. Entering the tunnel system without CRO permission is prohibited.
		2. The CRO will verify an approved TWAR exists for instances where work is being conducted and validate the need for the tunnel entry when a TWAR is not needed.
		3. If permission is granted, the CRO will enter the appropriate information in the Tunnel Entry Log and will update the Tunnel Entry Viewer.
	6. Communications:
		1. The CRO and Tunnel Entrants shall communicate on UO Radio Channel 1.
		2. Tunnel Entrants shall use a different working channel for communications not related to tunnel or control room operations.
	7. Exiting the Tunnel and Check-Out:
		1. Entrants will lock egress gates, doors, or manholes that they pass through, ensuring that lights are turned off as they exit each area.
		2. Entrants will notify the CRO of their exit from the tunnel system in person, via phone or radio.
		3. Entrants with a temporary key will return the key to the control room.
		4. The CRO will collect issued keys from the persons exiting the tunnel system and update the Key log book.
		5. The CRO will update the Tunnel Entry Log and the Tunnel Entry Viewer to reflect individuals who exit the tunnel system.
	8. Failure to Report Exiting of the Tunnels:
		1. The CRO will attempt to contact via UO radio any tunnel entrant that has not reported exiting the tunnels at the time expected.
		2. If contact cannot be made with the entrant, the CRO will contact the entrant’s supervisor and the U&E supervisor.
		3. If the CRO, the entrant’s supervisor, and the U&E supervisor cannot make contact with the overdue entrant over multiple attempts, the CRO will initiate emergency response procedures.
	9. Housekeeping and Work Site Responsibility:
		1. Individual Units and Contractors are responsible for work site cleanliness and safety. Work sites are to be cleaned up at the end of each shift.
		2. Individual Units and Contractors will ensure any hazards which could cause injury or impede movement and access in the tunnel system are rendered safe prior to the end of the shift.
		3. No hazardous materials will be left unattended in the tunnels.
		4. University organizations and Contractors conducting work in the tunnels are responsible for any damage to systems and tunnel infrastructure during the course of work.
	10. Signage:
		1. Each tunnel entry will be signed as follows:

)

University of Oregon

**Tunnel System**

**RESTRICTED ACCESS**

All entrants must be trained and authorized for tunnel entry. Obtain Permission to Enter From CPS

Radio Channel-1 or call (541) 346-2215

**NO TRESPASSING**

(Entry without authorization)

* + 1. U&E will be responsible for installing and maintaining the tunnel entry signs.

|  |
| --- |
| **Revision History – Utility Tunnel Safety Manual** |
| Version #: | Revision Date: | Description of Changes: |
| 2.0 | 05/20/2015 | Effective date; organize Utilities Standby Administrator, Capital Planning Design & Construction (CPDC) Project Managers (PM), Owner Representatives (OR), and Authorized Tunnel Entrants duties list; correct Responsibilities section Letters |
| 3.0 | 09/07/2018 | Effective date; Definition additions; Responsibilities update including addition of UOPD; Emergency Responses outlined; Personal Protective Equipment (PPE) requirements updated; Layout changes as seen fit |