



Utility tunnel safety program

Facility Services

Table of Contents

I.	Purpose and Scope.....	4
II.	Definitions.....	4
	A. Authorized Entrant.....	4
	B. Tunnel System.....	4
	C. Central Power Plant.....	4
	D. Control Room Operator (CRO)	4
	E. Tunnel Work Authorization Request (TWAR).....	4
III.	Responsibilities.....	4
	A. Contractors.....	4
	B. CP Control Room Operators (CRO).....	5
	C. Customer Service Center	5
	D. Facility Services Supervisor.....	5

E.	Environmental Health and Life Safety	5
F.	FP&C Project Managers (PM).....	6
G.	Authorized Tunnel Entrants	6
IV.	Tunnel Work Assessment.....	6
A.	Routine Work.....	6
B.	Authorized Personnel.....	6
C.	Buddy System	6
D.	Protective Equipment Requirements.....	7
E.	Communications.....	7
F.	Tunnel Security.....	7
G.	Exiting the Tunnel and Check-Out.....	7
H.	Housekeeping and Work Site Responsibility.....	8
V.	Non-Routine Work.....	8
A.	Tunnel Work Authorization Request.....	8
B.	Tunnel Work Authorization Request Information.....	8
C.	TWAR Approval.....	8
VI.	SPECIAL CONDITIONS.....	9
A.	CHANGE OF PROJECT SCOPE.....	9
B.	Conflict Resolutions.....	9
C.	Open Hatches and Doors.....	9
D.	Stop Work.....	10
E.	Urgent & Unexpected Tunnel Entry.....	10

VIII Appendices

A. Blank Copy of TWAR Form..... 11

B. Drawing of Some of the Tunnel System..... 13

C. Photographs of Some Tunnel Areas..... 15

I. Purpose and Scope

- A. Purpose: The University of Houston (UH) maintains an extensive utility tunnel system to facilitate the maintenance and repair of campus utility distribution systems. This 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 Tunnel Safety Program is to provide guidance for safely working in the UH tunnel system and sets forth the requirements for all University employees, associated contractors and vendors.
- B. Scope: This policy applies to the UH employees and to all persons entering the tunnel system.

II. Definitions

- A. **TUNNEL ENTRANT:** Any individual that has received the tunnel safety video training and enters the tunnel system.
- B. **TUNNEL SYSTEM:** The tunnel system is the underground system connecting buildings and conveying utilities across the University of Houston campus. See tunnel map and tunnel pictures at end of document.
- C. **CENTRAL PLANT (CP):** The CP is the University unit that is assigned the responsibility for the tunnel system.
- D. **CONTROL ROOM OPERATOR (CRO):** Position composed of qualified CP employees who operate utility systems including the systems in the University of Houston Tunnel System. The CRO position is staffed 24 hours per day in the Central Plant.
- E. **TUNNEL WORK AUTHORIZATION REQUEST (TWAR):** A formal request submitted by outside UH employees, vendors, contractors and organizations for conducting work in the tunnel system. An approved TWAR is required before entering Tunnel System. See TWAR blank copy at end of document.

III. Responsibilities

- A. Contractors: Contractors will be responsible for:
 - 1. Communicate the University Tunnel Safety Policy to all contractor employees and sub-contractor employees.

2. Complying with this University Tunnel Safety Program when conducting work in the Tunnel System.
3. Ensure all entrants take the tunnel safety online training class.
4. Contractor Supervisors will ensure 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.
5. At the end of an employee's shift, Contractor Supervisors will get positive confirmation of safe exit from the tunnels from each of their workers working in the tunnels that day.
6. Anytime a worker, or group of workers, is considered "overdue" or missing, the CRO will be notified and appropriate emergency procedures will be implemented.

B. CP Control Room Operators (CRO): Responsible for operation of the CP systems and directly monitor access to the tunnel systems. The CRO shall:

1. Acknowledge calls or emails from Customer Service Center that entrants have entered or exited the tunnel system.
2. Promptly report any unexpected alarms indicating tunnel entries/exits to Customer Service for follow-up with planned entry persons for that day.

C. Customer Service Center

1. Maintain a daily log of entries/exits for tunnel system. Daily log will consist of both routine maintenances by UH employees and planned entries by contractor and vendors with an approved Tunnel Work Authorization Request (TWAR).
2. Communicate entries and exits to the CRO as they occur.

D. Facility Services Supervisors: Responsible for supervising assigned UH employees.

1. Oversee assignments in the tunnel system and seek any additional permits such as for cutting and welding are secured.
2. Ensure employees have taken tunnel safety training and have access to the tunnel system.
3. Ensure employees notify customer service center when employees enter exit tunnel system.

E. Environmental Health and Life Safety (EHS): Responsible for:

1. Assist with program development and review.

2. Assist with production of online training.
3. Advise UH employees and other tunnel entrants on tunnel health and safety issues.
4. Invoke permit required confined space entry procedures for UH employees or verify contractor permit required confined space entry procedures are followed when conditions and/or planned work introduces additional hazards.

F. FP&C Project Managers (PM).

1. Share this program with their contractors.
2. Arrange all entrants to take the online tunnel safety training at CPS or EHLS.

G. Authorized Tunnel Entrants: Responsible for following these procedures:

1. Including check-in/check-out procedures.
2. Wearing appropriate personal protective equipment (PPE).
3. Reporting any safety hazards observed while working in the tunnel.

IV. Tunnel Work

1. Routine Work

2. Prior to beginning any routine work in the tunnel system a briefing must be conducted by the employee's supervisor to determine if the work or the conditions in the tunnel could create a potential atmospheric hazard, a potential for entrapment, or create any other safety or health hazard that would either require specialized equipment or create a permit required confined space.
3. If the work could create a hazard, refer to the Confined Space Entry manual on the EHLS Website.

B. 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.

C. Buddy System

1. All work performed in the tunnels will be conducted by a minimum of two

workers together.

2. Workers in the tunnels will move and work in pairs, as a minimum. Work groups larger than two workers are considered to meet the “pairs” requirement as long as the entire group stays within eyesight of each other.
3. Each group must maintain a radio and ability to communicate with Customer Service.

D. Protective Equipment Requirements:

1. Supervisors will ensure all proper protective equipment and PPE is utilized while workers are in the tunnel system. The following is a list of items required to be used while in the tunnel system:
 - a. Personal Protective Equipment (PPE): Head protection, e.g. hard hat. Other PPE shall be worn as work requirements dictate (e.g. eye protection, hearing protection).
 - b. All workers entering the tunnels will have a working flashlight, or other portable light source, for use in case of loss of normal permanent lighting in the tunnels.
 - c. Appropriate clothing for the work that will be performed which must include long pants long sleeve shirts and shoes appropriate for area transiting and work being performed. No opened toed shoes are allowed.
 - d. A Radio.

E. Communications

1. The Customer Service Center and Tunnel Entrants shall communicate on Channel 1.
2. Tunnel Entrants shall use a working channel if radios are used for work related communications within the tunnels.
3. Channel 1 will be monitored by the CRO.

F. Tunnel Security

1. Tunnel doors are to be secured at all times. Hatches are to be secured at the end of the day. Security is not to be compromised.

G. Exiting the Tunnel and Check-out

At the end of the work shift, supervisors and Customer Service will get positive confirmation of safe exit from the tunnels from each of their workers working in the tunnel that day.

1. Anytime a worker or a group of workers is considered “overdue” or missing, appropriate emergency procedures will be implemented.
2. For Security, Entrants will lock any gate, door or manhole that they pass through, ensure that lights are turned off as they exit an area, and make note of any hazards observed during the course of their transit and work.
3. Entrants will notify the Customer Service Center of any safety hazards, such as steam or sewer leaks, asbestos issues, inappropriate wiring, vermin infestations, vandalism, evidence of unauthorized entry, equipment failure or any other hazard observed within the tunnel.

H. Housekeeping and Work Site Responsibility

1. Projects are to be cleaned up at the end of each day. University organizations and Contractors conducting work in the tunnels are responsible for any damage to other systems and tunnel infrastructure during the course of work.
2. No hazards which could cause injury or impede movement and access in the tunnel system will be left adrift in the tunnels.
3. No Hazardous materials will be left unattended in the tunnels.

V. **Non – Routine Work**

A. Tunnel Work Authorization Request (TWAR)

1. All non – routine tunnel work accomplished by Non-UHS staff, or vendors and contractors in the tunnel system will be coordinated with a TWAR.

B. Tunnel Work Authorization Request Information: The following minimum information is required before access will be approved. The applicable project manager or University supervisor will route a TWAR to the CP Manager.

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/Tag out Requirements, if applicable
9. Supervisor Name and Supervisor Phone Number

C. TWAR Approval

1. The TWAR will be routed to the CP Manager and should be provided no less than 3 working days prior to the desired initial tunnel entry date to start work.
2. The CP Manager or a designated CP Supervisor will review and approve a TWAR then forward to EHLS. Once approved the TWAR will be scanned in and sent to Customer Service for daily log purposes.

VI. Special Conditions

- A. Change of Project Scope: Should the scope of work change once in the tunnel, the entrant must:

Exit the space and notify the Customer Service or CRO.

1. The employee's supervisor will re-evaluate the work.
2. Should the work meet the criteria for a permit required confined space then permit required confined space entry procedures must be followed.
3. 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.) approval must be obtained from the CP Director.

- B. Conflict Resolution

1. The CP Manager will immediately be notified of work conflicts between different University departments or between University personnel and outside contractors related to adhering to the Tunnel Safety Program.
2. The CP Manager will consult with EHLS and resolve tunnel work related issues in conformance with the procedures of this program, and other safety programs of the University.
3. Unauthorized Personnel: The CRO will be notified and a report made to Campus Police any time someone is observed within the tunnels that is not authorized.
4. If an authorized entrant is observed not conforming to the procedures of this program the CRO will be notified and the CRO will report the incident to the CP Manager for action.

- C. Open Hatches and Doors: Sufficient measures to prevent unauthorized persons from entering the tunnel system will be taken when hatches or doors are open.

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.

D. STOP WORK Authority: If a situation is unsafe or the nature of the work is beyond the scope that has been authorized, all CP Staff and anyone associated with the work in the tunnels can initiate a STOP WORK order.

1. The STOP WORK order can be directed at the job site or reported and initiated via the CRO.
2. In the event of a STOP WORK order:
 - a. All work related to the job will immediately cease.
 - b. On site supervisors will notify the CRO if a local STOP WORK order is directed.
 - c. The CRO will instruct workers to stop all work and exit the tunnels if necessary.
 - d. The CRO will assess any other work and ensure the affected work site does not endanger others.
 - e. The CRO will direct STOP WORK on other tunnel work sites impacted if deemed necessary.
 - f. The CRO may direct the evacuation of the tunnels if needed.
 - g. If the situation requires, the CRO will follow the Emergency Response Procedures of CP.
 - h. If a STOP WORK order is issued the CP Manager will be immediately notified. The CP Manager will contact EHS, Project Managers and/or Supervisors depending on the circumstances and work affected.
 - i. The CP Manager must grant permission to recommence work once a STOP WORK order has been in effect.

E. 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.

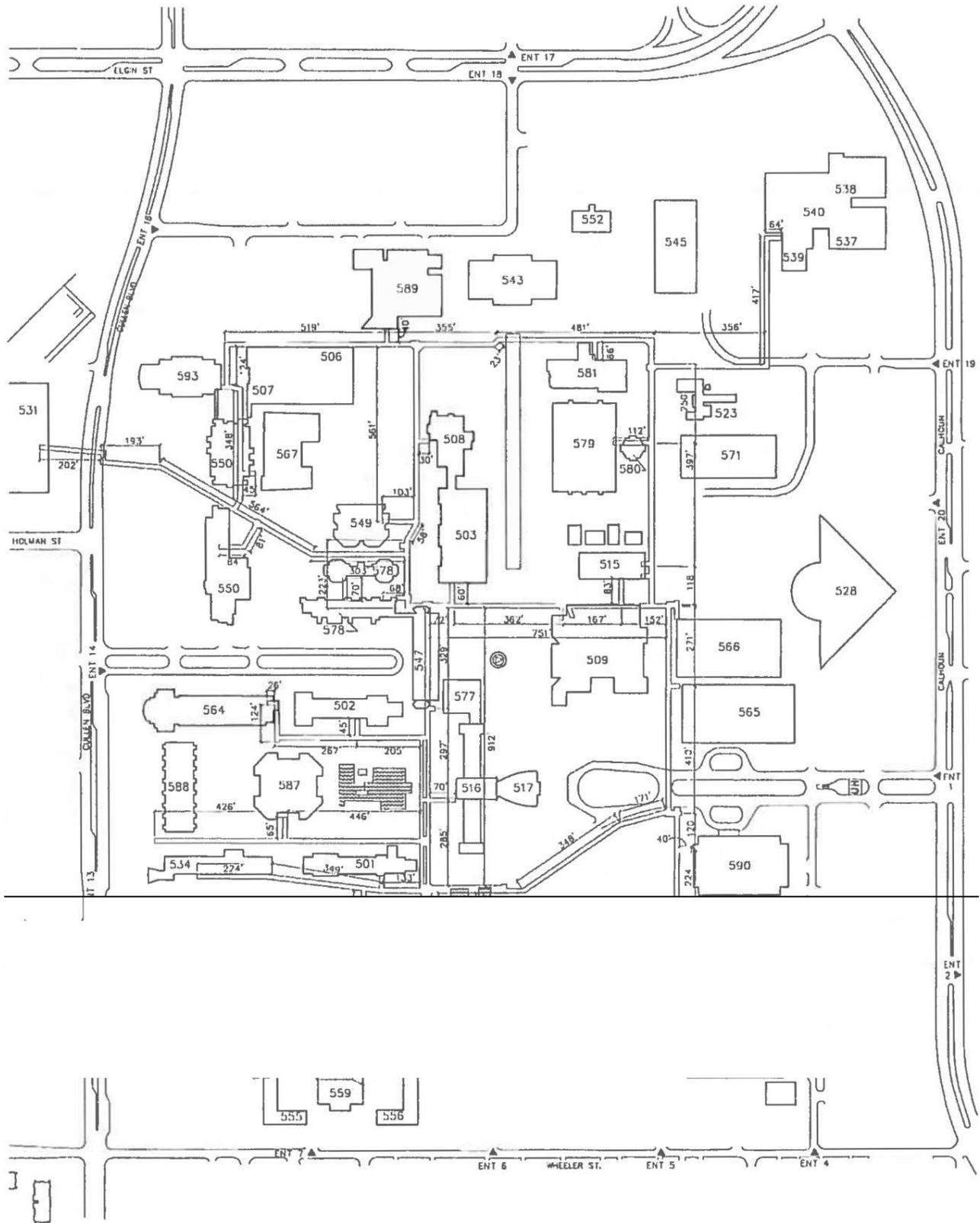
Appendix A

Tunnel Work Authorization Request

Appendix B

Map of Utility Tunnel System

Drawing of some Tunnel System:



Appendix C

Photographs of Tunnel System



A Tunnel in Fairly Good Condition



A Flooded Tunnel



A Tunnel Depicting the Cables without the Cables on a Cable Tray.