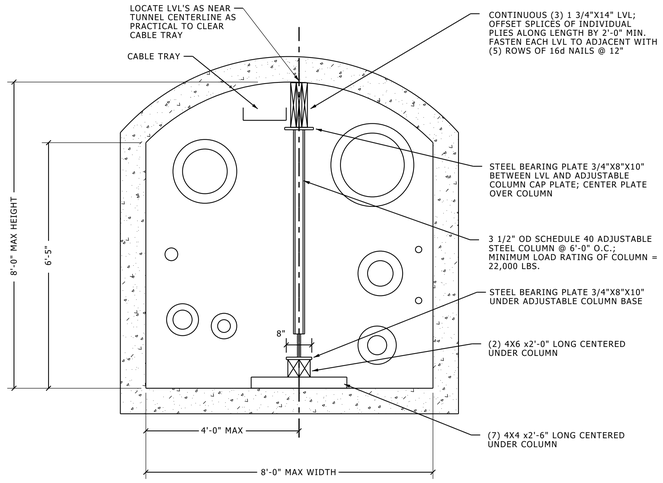
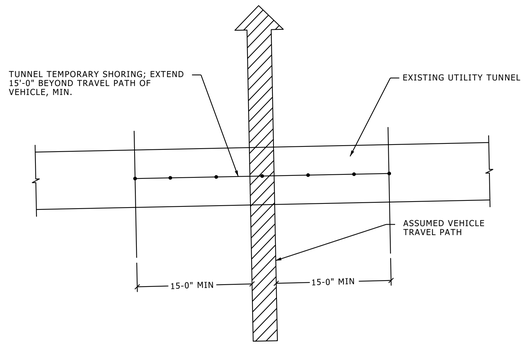


TUNNEL TEMPORARY SHORING DETAIL

NO SCALE

NOTE:

TUNNEL SHORING DESIGN IS BASED ON A MAXIMUM GROSS VEHICLE WEIGHT OF 25,000 LBS AND A MAXIMUM AXLE LOAD OF 16,000 LBS. NOTIFY ENGINEER IF ANTICIPATED LOAD EXCEEDS THIS DESIGN BASIS PRIOR TO TRANSIT ACROSS TUNNEL SEGMENT.



PARTIAL TUNNEL PLAN

NO SCALE

TUNNEL SHORING NOTES

1. LVL = LAMINATED VENEER LUMBER
2. DESIGN OF LVL MEMBERS BASED ON MICROLLAM BY iLEVEL (1.9E, Fb =2600 PSI). ALTERNATE LVL MANUFACTURERS WILL BE CONSIDERED IF DESIGN VALUES EXCEED THOSE OF DESIGN BASIS. SUBMIT ALTERNATE LVL LITERATURE TO ENGINEER FOR REVIEW PRIOR TO ORDERING.
3. DIMENSION LUMBER SHALL BE SPF NO. 1/NO. 2, HEM-FIR NO. 2, SOUTHERN PINE NO. 2, OR BETTER.
4. STEEL PLATES SHALL BE ASTM A36, Fy=36000 PSI.
5. NAIL SIZES NOTED ARE FOR COMMON WIRE NAILS. IF SINKER OR PNEUMATIC NAILS ARE USED, SUBSTITUTE SHALL EQUAL OR EXCEED DIAMETER OF COMMON WIRE NAILS SPECIFIED.
6. ADJUSTABLE STEEL COLUMNS SHALL BE ASTM A500, Fy=42000 PSI, TIGER BRAND OR EQUAL. SIZES NOTED ON SHORING DETAIL ARE A MINIMUM AND CONTRACTOR SHALL SELECT A COLUMN WITH AN ALLOWABLE CAPACITY GREATER THAN OR EQUAL TO LOADS SPECIFIED.
7. WHEN TIGHTENING ADJUSTABLE COLUMNS, TIGHTEN UNTIL COLUMN IS IN FIRM CONTACT WITH WOOD SUPPORTS AT EACH END, SUCH THAT COLUMN WILL NOT MOVE OR LOOSEN. DO NOT OVERTIGHTEN.
8. FIELD VERIFY TUNNEL CONDITIONS AT MULTIPLE LOCATIONS PRIOR TO ORDERING ANY MATERIALS.
9. IF A GAP BETWEEN LVL MEMBERS AND TUNNEL LID IS PRESENT OVER A LENGTH OF 6" OR GREATER, FILL GAP WITH NON-SHRINK GROUT. DO NOT ATTEMPT TO CLOSE GAP BY OVERTIGHTENING OF ADJUSTABLE COLUMNS.
10. SHORING DETAIL FOR USE WITH CONCRETE TUNNELS WITH A MAXIMUM CEILING SPAN OF 8 FEET AND MAXIMUM WALL HEIGHT OF 9 FT. THIS SHORING DETAIL IS NOT INTENDED FOR USE IN BRICK TUNNEL CONSTRUCTION.
11. CONTRACTOR SHALL INSPECT SHORING SYSTEM AT A MINIMUM ONCE PER WORK WEEK TO ENSURE THAT SUPPORTS REMAIN IN CONTACT WITH TUNNEL LID AND THAT ALL SHORING POSTS REMAIN IN CONTACT WITH SUPPORT BEAMS.
12. UNLESS SPECIFICALLY NOTED, CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL SHORING UPON PROJECT COMPLETION.

PROTECTION OF EXISTING UTILITY TUNNELS FROM DAMAGE DURING CONSTRUCTION

GENERAL

THE BELOW PROTOCOL APPLIES TO ALL PROJECTS WITH:
1. PLANNED SITE WORK ABOVE OR ADJACENT TO ANY UNDERGROUND UTILITY TUNNEL STRUCTURE.
2. PLANNED CONSTRUCTION TRAFFIC TO AND FROM SITE THAT IS ROUTED ABOVE OR ADJACENT TO UNDERGROUND UTILITY TUNNEL STRUCTURE.
3. PLANNED CRANE LIFTS FOR REMOVAL OR PLACEMENT OF CONSTRUCTION MATERIALS OR EQUIPMENT, ABOVE OR ADJACENT TO ANY EXISTING TUNNEL STRUCTURE.

DURING DESIGN PHASE

DESIGN MANAGER SHALL UTILIZE UTILITIES GIS SYSTEM TO DETERMINE:
1. IF ANY UTILITY TUNNEL SECTIONS MAY BE IMPACTED BY PROJECT DURING CONSTRUCTION.
2. IF TUNNEL SECTIONS IMPACTED ARE NOT RATED FOR HS-20 LOADING. DESIGN PROFESSIONAL SHALL PROVIDE MEANS TO PROTECT NON-RATED TUNNEL SECTIONS BY:
1. DOCUMENTING (VIDEO RECORD) THE EXISTING CONDITION OF INTERIOR TUNNEL SECTIONS IMPACTED, INCLUDING WALLS, LID, VENTS, INTAKES AND ACCESS HATCHES. LIMITS OF DOCUMENTATION SHALL EXTEND 15 FEET-BEYOND IMPACTED AREA. A COPY SHALL BE TURNED OVER TO DESIGN MANAGER AND SHALL SERVE AS 'RECORD OF EXISTING CONDITION'.
2. INCLUDE ON CONSTRUCTION DOCUMENTS, TEMPORARY SHORING OF TUNNEL SECTIONS, AS SHOWN ON TOOL-KIT DRAWING TK-12.
3. PROVIDE ALTERNATE MEANS OF TEMPORARY TUNNEL PROTECTION, ENGINEERED BY DESIGN PROFESSIONAL AND INCLUDED ON CONSTRUCTION DOCUMENTS.

DURING CONSTRUCTION PHASE

TUNNEL SECTIONS THAT ARE IMPACTED BUT NOT RATED FOR HS20 LOADING, SHALL FOLLOW THE FOLLOWING PROTOCOL:
1. TEMPORARY SHORING AS SHOWN ON CONSTRUCTION DOCUMENTS, SHALL BE INSTALLED BY CONTRACTOR.
2. PROJECT MANAGER SHALL OBTAIN APPROVAL OF TEMPORARY SHORING INSTALLATION BY TUNNEL GROUP, PRIOR TO ANY CONSTRUCTION ACTIVITIES.
3. CONTRACTOR SHALL INSPECT SHORING REGULARLY TO ENSURE SYSTEM REMAINS IN PLACE TO PROPERLY SUPPORT TUNNEL STRUCTURE.
4. CONTRACTOR SHALL REPAIR ANY DAMAGE TO TUNNEL STRUCTURE CAUSED BY CONSTRUCTION ACTIVITIES AT NO COST TO OWNER.
5. ALL INTERIOR TUNNEL TEMPORARY SHORING SHALL BE REMOVED BY CONTRACTOR, PRIOR TO COMPLETION OF CONSTRUCTION.

SCALE: 1/2" = 1'-0"
2' 1' 0 2'

UNIVERSITY OF MICHIGAN
ARCHITECTURE, ENGINEERING AND CONSTRUCTION
ARCHITECTURE & ENGINEERING
326 East Hoover, Mail Stop B
Ann Arbor, MI 48109-1002
Phone: 734-764-3414
Fax: 734-936-3334

TUNNEL TOOL-KIT

REFERENCE DETAILS, SUPPORTS & SECTIONS

For

Design Professionals Use if Deemed Applicable and Adequate for Project

Not For Construction

UM TUNNEL TOOL KIT REFERENCE DETAILS, SUPPORTS & SECTIONS

FOR DESIGN PROFESSIONAL USE IF DEEMED APPLICABLE & ADEQUATE
APPROVED BY

AEC - Architecture & Engineering
REPRESENTING

PS — DRAWN BY
WG — PROJECT LEAD
RRE/FTCH — DESIGNED BY
REVIEWED BY

MARK	ISSUED FOR/REVISIONS	DATE
•	Posted to Web	• 10/20/23
•	New Master	• 06/27/23
•	Draft Manual Review	• 05/09/23

Tunnels

Tool Kit

University Of Michigan
Ann Arbor , MI

UNIVERSITY OF MICHIGAN
ARCHITECTURE, ENGINEERING AND CONSTRUCTION
326 East Hoover, Mail Stop E
Ann Arbor, MI 48109-1002
Phone: 734-763-3020
Fax: 734-763-3238

P0000XXXX — U OF M PROJECT NO.
XXXX — BUILDING NO.

SHEET TITLE: **Tunnels**

Tunnel Temporary Shoring Detail

SHEET NO.

TK-12

SHEET NO. 12 OF 13 SHEET FILE NO. TK-12 03 14.dgn

10/19/2023 1:54:36 PM pschmand Q:\AES\PROJECT TYPES\TUNNELS\TUNNEL TOOL-KIT\CAD\TK-12 Rev 2023_10_20.dgn