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Microtrenching and Your Pavements: What to Know Now

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Why Microtrenching Became Popular

Before 2020 (Pre-Pandemic)

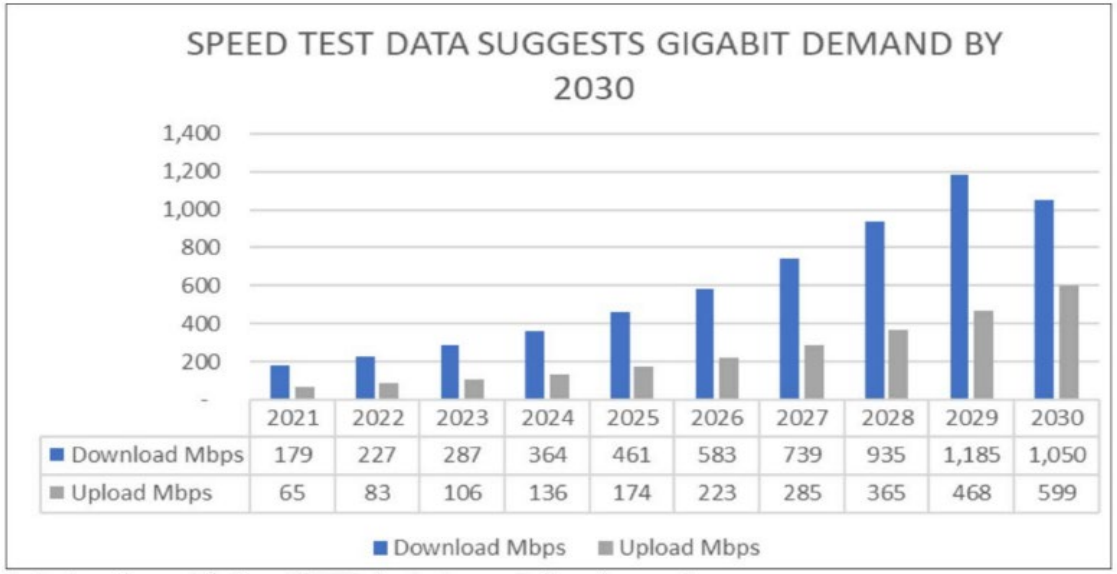
- Remote work was uncommon.
- Broadband demand was growing steadily due to entertainment, e-commerce, and business use.
- Broadband deployment slowed due to limited funding.
- Materials, installation equipment, and labor were readily available.

In 2022 (Post-Pandemic)

- Broadband demand surged across the globe due to remote work, e-learning, e-commerce, telehealth, etc.
- Fiber industry faced resource constraints amid rapid digital service growth.
- Major ISP deployment goals were missed, leading to downward forecast adjustments.

Over past 5 years, US fixed broadband download speed and upload speed have increased at compound annual growth rate of 27% and 28%

To meet the target/demand, unprecedented level of fiber deployment is needed



Source: FBA Technology Committee- The Rural Digital Divide, Fiber Broadband Can Eliminate the North American Rural Digital Divide

Why Microtrenching Became Popular

A narrow (max 4” wide and up to 18”) trench is dug

A hole (3’-5’ deep) is dug and a tunnel is created

Cuts into the ground and shakes the earth

Involves digging a deep and long trench

Horizontal/underground pneumatic/impact boring

Deployment Type	Equipment	Spoil Creation	Avg Feet Per Day	~ Max Depth (inches)	Utility (all) Strikes Per Mile
Microtrench		Low	1,500	16	0.03
Directional Bore/HDD		Low	750	48	0.11
Plow/Vibratory Plow		Medium	5,000	48	0.29
Trench/Conventional Trench		High	400	48	13.97
Missile Bore		High	750	24	0.05

Source: FBA Deployment Specialists Committee

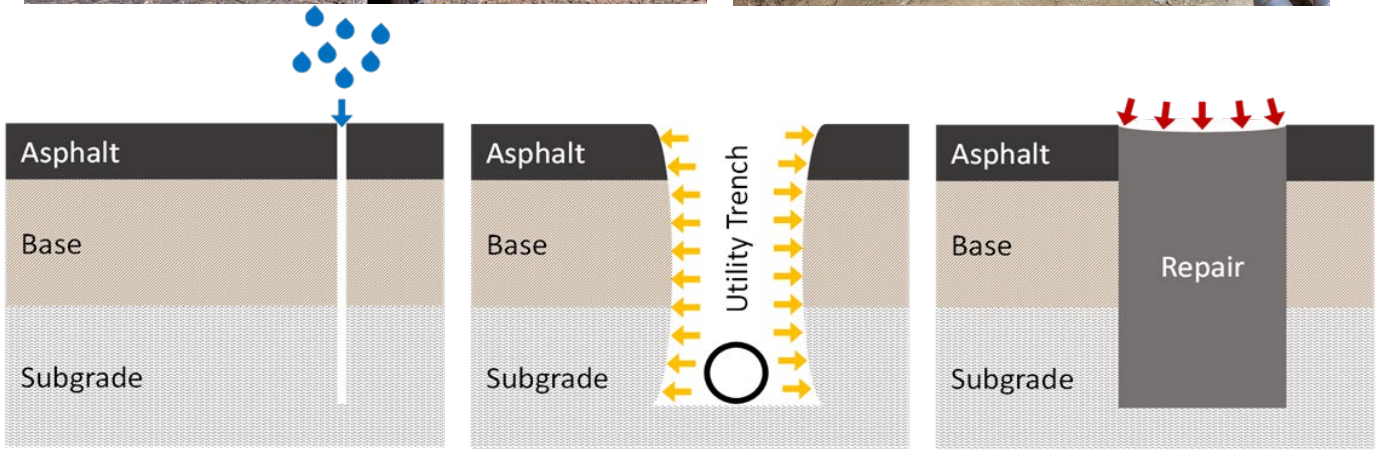
Microtrenching offers

- Minimal Disruption
- Cost-Effectiveness
- Faster Installation

Typical Trench vs Microtrenching

Features	Typical Trench	Microtrench
Size	Usually more than 4” and min 18” deep	2”-4” wide and max 18” deep
Installation Method	Involves extensive restoration	specialized cutting equipment to create a narrow trench
Impact on Surrounding Environment	Significant disturbance of roadways	Minimal disruption and quicker restoration
Cost and Time Efficiency	Large areas, more labor and materials	Small areas, less labor and materials
Applications	Water, sewer, power line	Telecommunication infrastructure

Impact of Pavement Cuts

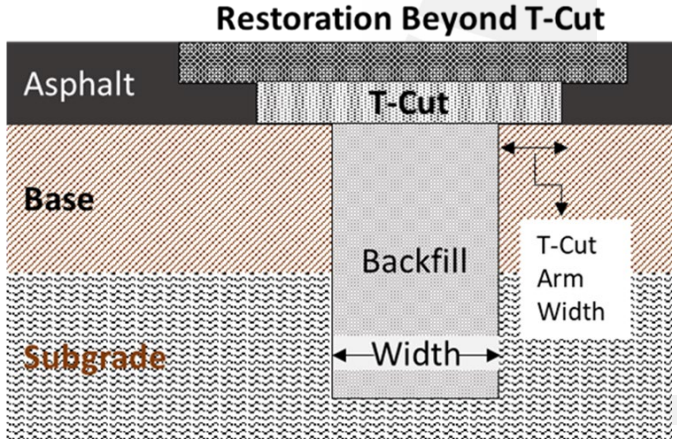


1. Increased Water Access to Pavement Structure

2. Reduced Lateral Support

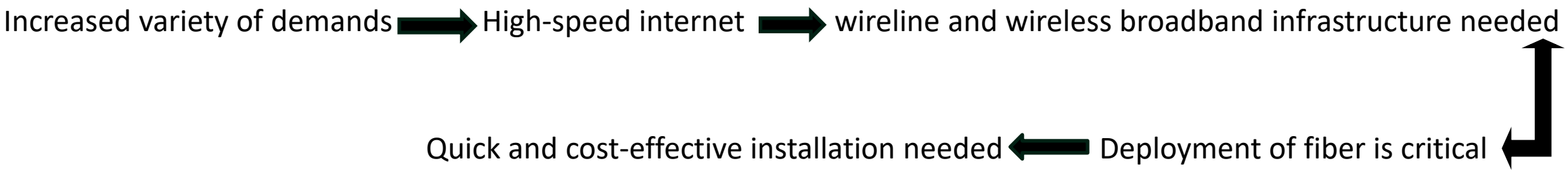
3. Increased Surface Roughness

- Surface Cracking and Deformation
- Base and Subbase Damage
- Soil Settlement and Compaction
- Edge Failure and Raveling
- Drainage Disruption
- Surface Layer Degradation
- Proper Equipment Use
- Support and Reinforcement
- Quality Backfilling and Compaction



- Proper Restoration
  - T-Cut
  - Restoration beyond T-Cut
    - Patching
    - Overlay
    - Surface Seal

Microtrenching in California



In California, the combination of **Government Code § 65964.5, Assembly Bill 1449** and **Senate Bill 378** represent proactive approach and cohesive regulatory environment to

- enhancing telecommunications infrastructure
- Promoting collaboration between providers and local governments
- facilitating faster and more efficient deployment
- expediting fiber permit applications

Microtrenching Overview

- Definition: Technique for installing utility lines and fiber optics with minimal disruption.

- Benefits:
    - Reduces traffic impact.
    - Enables quicker high-speed internet access in urban areas
    - Approx. 1,500 ft of deployment per day

- Key Features:
    - 2 to 4 inches wide, up to 12 inches deep.
    - Used for fiber optics and other utilities.

- Installation Guidelines:
    - Continuous, uniform edges required.
    - Prohibited in sensitive areas (e.g., sidewalks).
    - Must meet street paving standards for materials.

- Restoration:
    - Surfaces must be restored to original or better condition.
    - Ensure durability and aesthetic consistency

Potential Challenges

- ❑ Effectiveness can vary based on soil conditions; rocky or hard soils may pose challenges.
  - Settlement of trenches overtime because of poor compaction or under traffic
  - Public hazard if on bike lane due to dip
- ❑ Installation and surface restoration could be challenging
  - Matching the color of their trench fill material to the adjacent pavement material
  - Keeping the trench backfill material contained within trench
  - Maintaining uniformity of trench cuts on older/fatigued pavement

Potential Challenges

- ❑ Existing underground utilities can complicate the process, requiring careful planning and coordination.
- ❑ Local regulations may impose restrictions on the times and methods of installation.
- ❑ Cracks could form around the edge of the microtrench and thus a proper restoration of the cut is very crucial.
- ❑ Right way to restore the pavement after cut is very crucial

Before

After

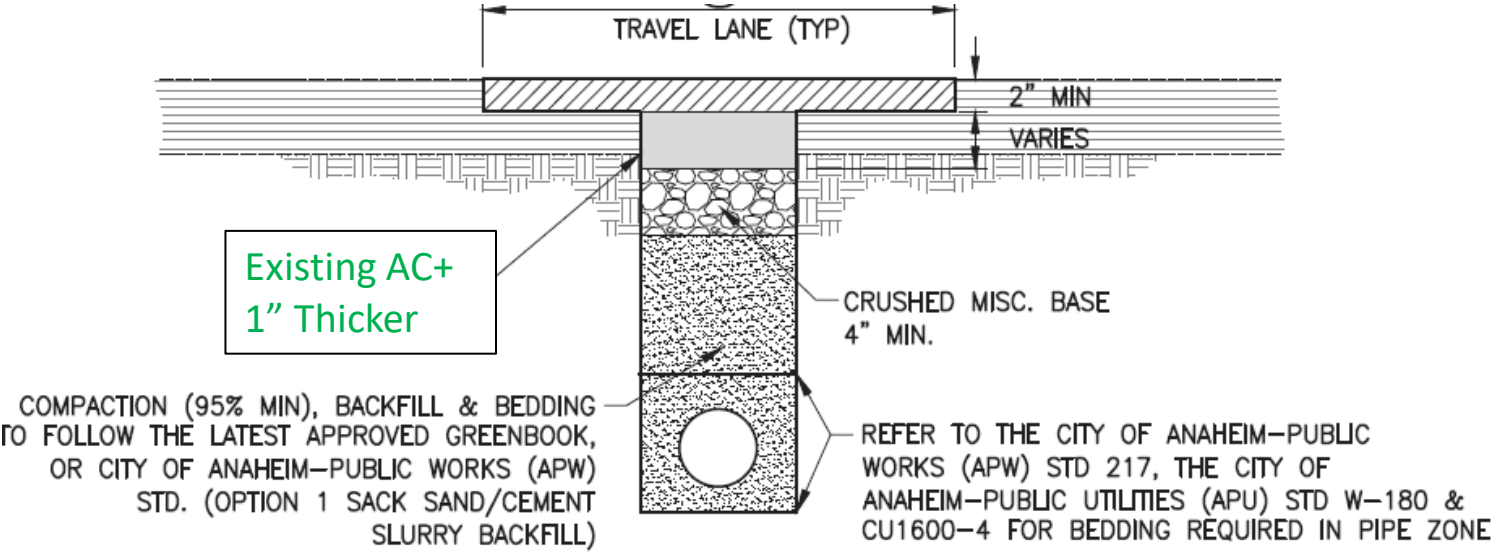
Microtrenching Standards

- **CPUC**: Oversees utility regulations, including telecommunications.
- **Caltrans**: Sets standards for state highway rights-of-way, including microtrenching guidelines.
- **Utility Companies**: Entities like AT&T and Comcast may have specific standards.
- **Industry Organizations**: TIA and FOA provide best practices and recommendations.
- **Local Public Works Departments**: Cities have guidelines for utility installations, including microtrenching.
- **Local Municipalities**: Standards may vary widely across cities and counties.

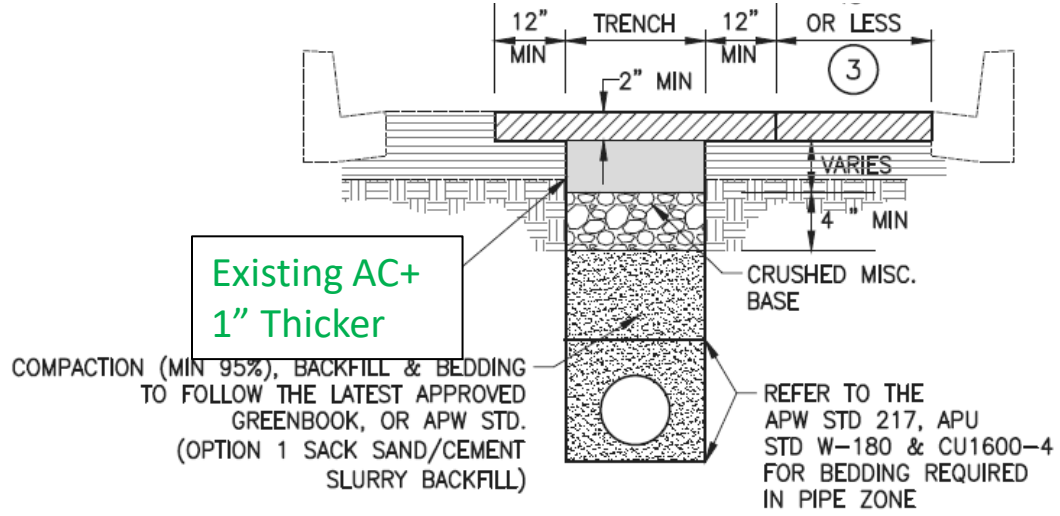
Restoration Standards

Restoration Comparison –Anaheim

Art/Col: Entire Lane Width- 2” Grind and Pave



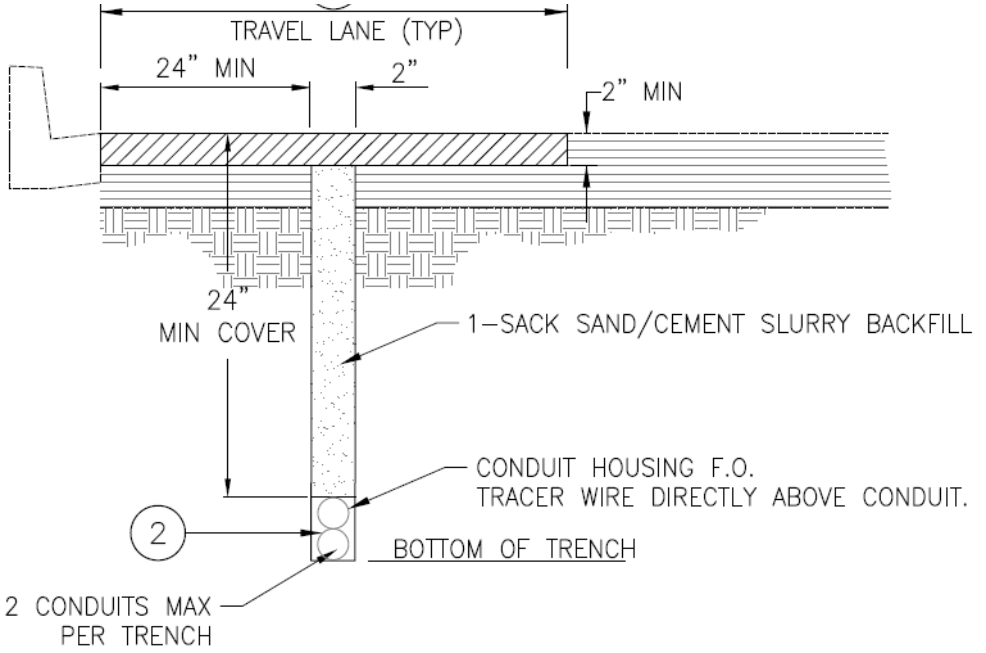
Local Street: T-Cut- 2” Grind and Pave



Typical Trench Restoration

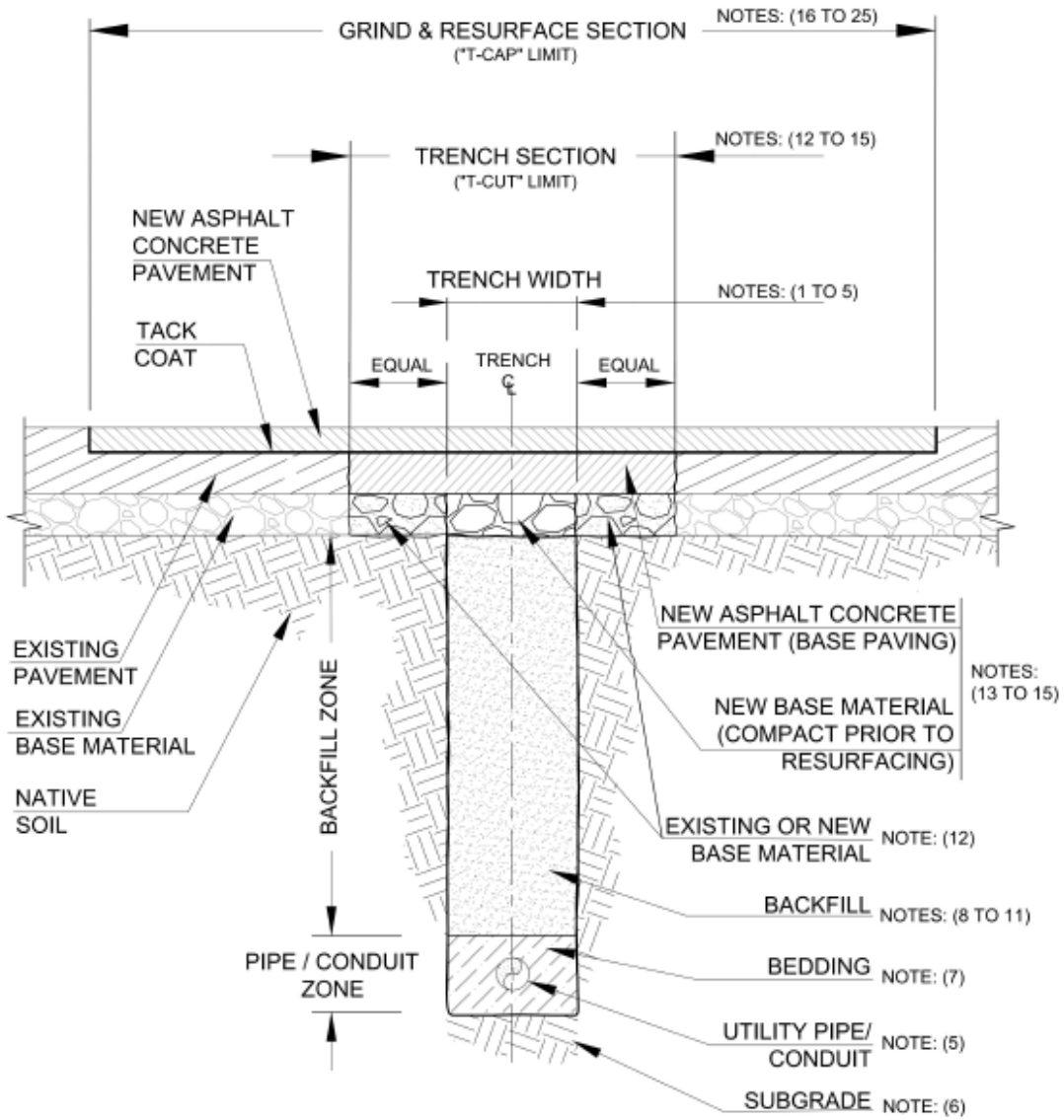
- Restoration by FC vs General Restoration
- 1” Thicker AC than existing vs None

Entire Lane Width- 2” Grind and Pave



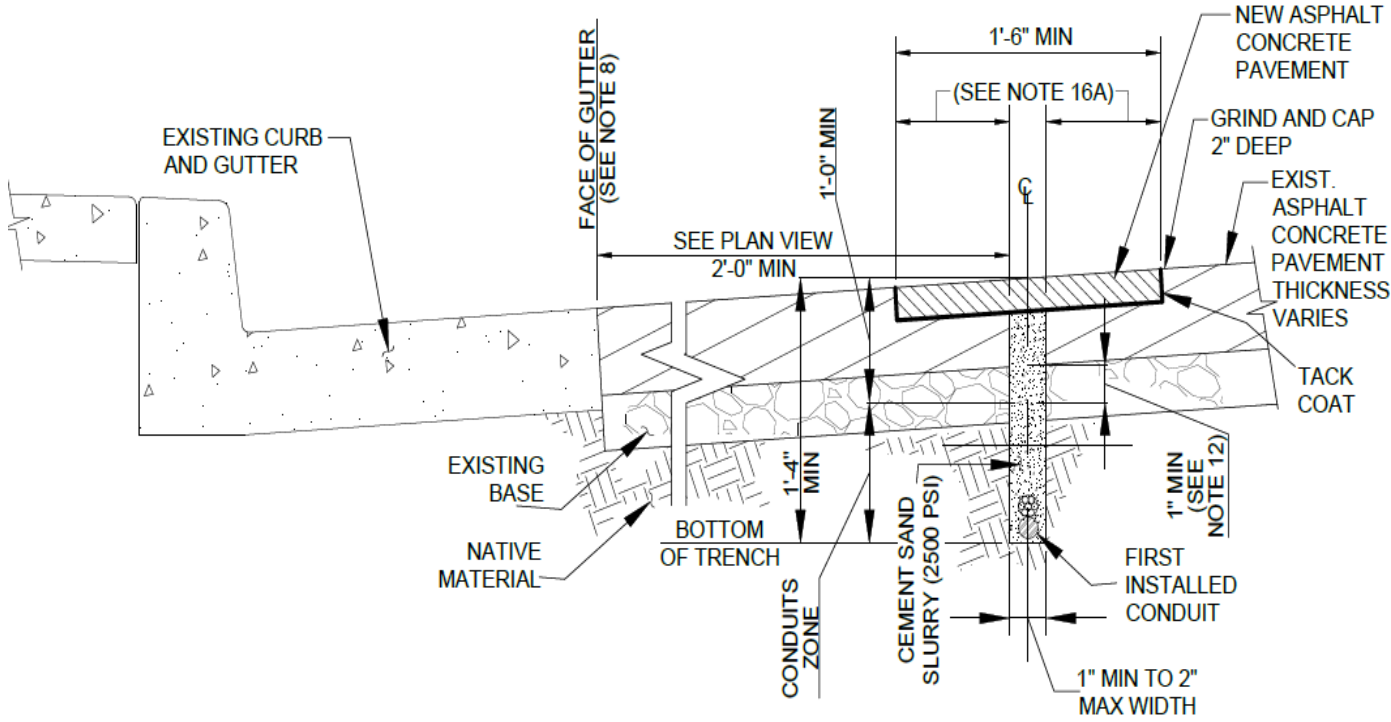
Microtrenching Restoration

Restoration Comparison –LA City



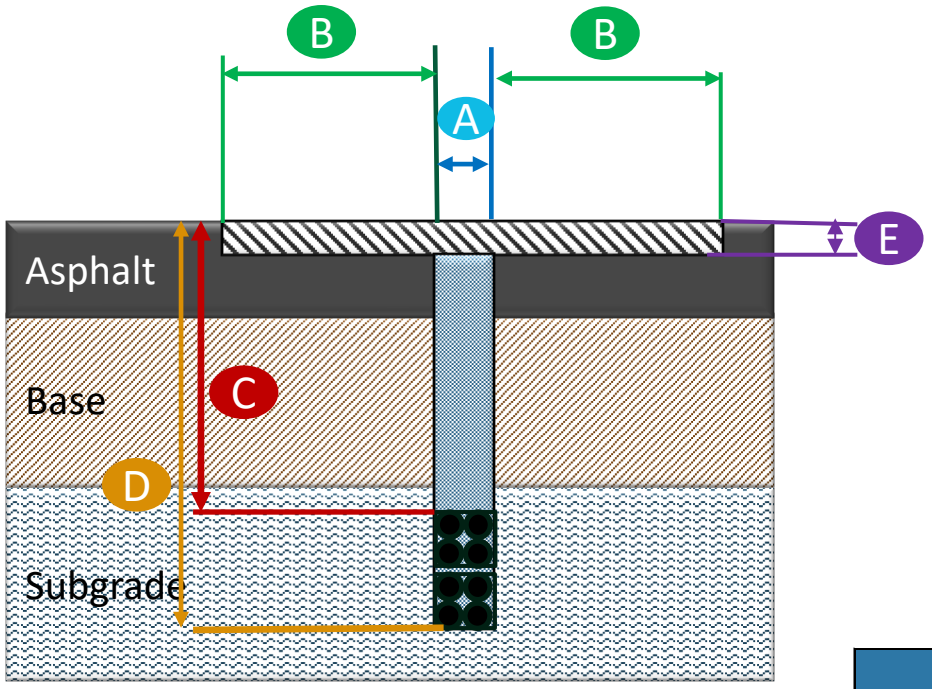
Typical Trench Restoration

- Restoration beyond T-Cut vs No Restoration
- AB along T-Cut vs no AB



Microtrenching Restoration

Microtrenching Restoration Comparison



= Restoration of T-Cut

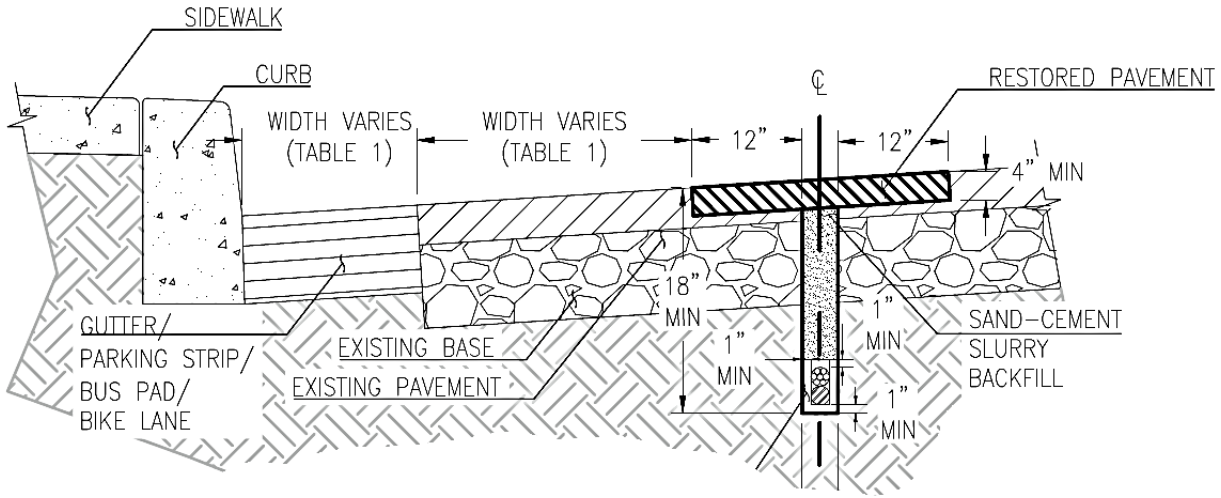
Agency	Restoration Beyond T-Cut Requirement	Backfill Material
Verizon	None	2 Sack Slurry Mix
Anaheim	Pave Full Width Travel Lane	1- Sack Sand + Cement Slurry
San Jose	None	Control Density Fill (CDF) that meets certain requirements
San Diego	Bike lane: full width	2000 PSI Slurry Trench Backfill
LA County	Bike lane: full width If within less than 24" of curb/gutter: full width	Trench backfill slurry (100-E-100)
San Francisco	2” Grind and Pave beyond T-Cut; Bike lane: Full width	Fiber reinforced backfill material

Agency	A Trench Width	B T-Cut Arm	C Min. Cover	D Max. Trench Depth	E T-Cut Depth and Restoration	
Verizon	1"-2"	Min. 8"	-	Max. 26"	1.5"-2"	Grind and Overlay with HMA
Anaheim	2"	No T-Cut Full width travel ln	Min. 24"		2"	Grind and Overlay with HMA
San Jose	1"-2"	Min. 6"	Min. 12"	Max. 24"	2"	Grind and Overlay with HMA
San Diego	2"-2.5"	Min. 6"	Min. 12"	Max. 24"	4"	Grind and Overlay with HMA
LA City/ LA County	1"-2"	Min. 6"	Min.12"	Max 26"	2"	Grind and Overlay with HMA
San Berdino County		Min. 24"	Min. 20"		2"	Grind and Overlay with RHMA
San Francisco	1"-2"	Min. 12"	Min. 18"	Max 26"	8"	Concrete

Typical Microtrenching Details

General

- Width- Min. 2” to Max. 4”.
- Depth- Min. 18” to Max. 26”.
- Location - Outside of the wheel path to the extent possible to minimize vehicular loading.



Restoration Technique

- T-Cut: T-arm width- Min. 12”
- Restoration along T-cut : Min. 4” mill and overlay.

Feature	Typical Width from Face of Curb	Distance to Left Side Edge of Microtrenching
Curb Only	n/a	Min 24" from face of curb; Max center of travel lane
Gutter	Typical 24" (varies)	Min 24" from gutter lip; Max center of travel lane
Parking Strip	7' to 10'	Min 24" from gutter lip or face of curb if no gutter; Max center of parking strip
Bus Pad (Asphalt)	10'	Min 48" from gutter lip or face of curb if no gutter; Max center of bus pad
Bus Pad (Concrete)	10'	No microtrench is allowed along concrete bus pad; Min 24" from inside edge of concrete bus pad Max center of travel lane
Bike Lane	5' to 6'	Min 24" from gutter lip or face of curb if no gutter; Max bike lane center Pave entire bike lane width

Typical Microtrenching Requirements

- **Edges**: Must have continuous, uniform, and neat edges.
- **Prohibited Areas**: Not allowed in sidewalks, parkways, bus pads, curbs, gutters, decorative asphalt, signalized intersections, or moratorium streets.
- **Bike Lanes**: Entire width must be paved with a 4-inch mill and overlay.
- **Compaction and Materials**: Specifications must align with street paving standards (e.g., AC density, mix properties, tack coat).
- **Documentation:** The location of the microtrenching to avoid future construction complications.

Microtrenching Pilot Projects

- **Los Angeles, CA**
  - Downtown Los Angeles: Focused on high-traffic zones to evaluate the impact on urban infrastructure.
  - Westside: Areas like Santa Monica Boulevard were included, targeting neighborhoods with high broadband demand.
  - Hollywood: Selected to assess the effectiveness of microtrenching in a densely populated environment.
- **San Francisco, CA**
  - Market Street: A key thoroughfare in the city with significant pedestrian and vehicular traffic.
  - Mission District: An area known for its vibrant community and increased demand for digital connectivity.
  - South of Market (SoMa): A tech-centric neighborhood that serves as a hub for many startups and tech companies.
- **San Jose, CA**
  - Downtown
  - Neighborhoods with Limited Broadband Access
- **Seattle , WA**
  - South Lake Union, Capitol Hill, Downtown
- **Austin, Texas**
- **Chicago, IL**

Summary

- Be prepared for increased microtrenching
- Standards need to be balanced between agency and provider
- Coordination between agencies and providers is important
- Permitting process needs to be simple and less time-consuming
- Surface restoration is crucial and needs to follow local guidelines
- Quality of backfill materials needs to be ensured
- If microtrenching in a bikelane, the full width bikelane needs to be paved
- T-Cut is a common restoration practice to enhance pavement performance

THANK YOU

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