



COURTHOUSE SQUARE BOLLARDS

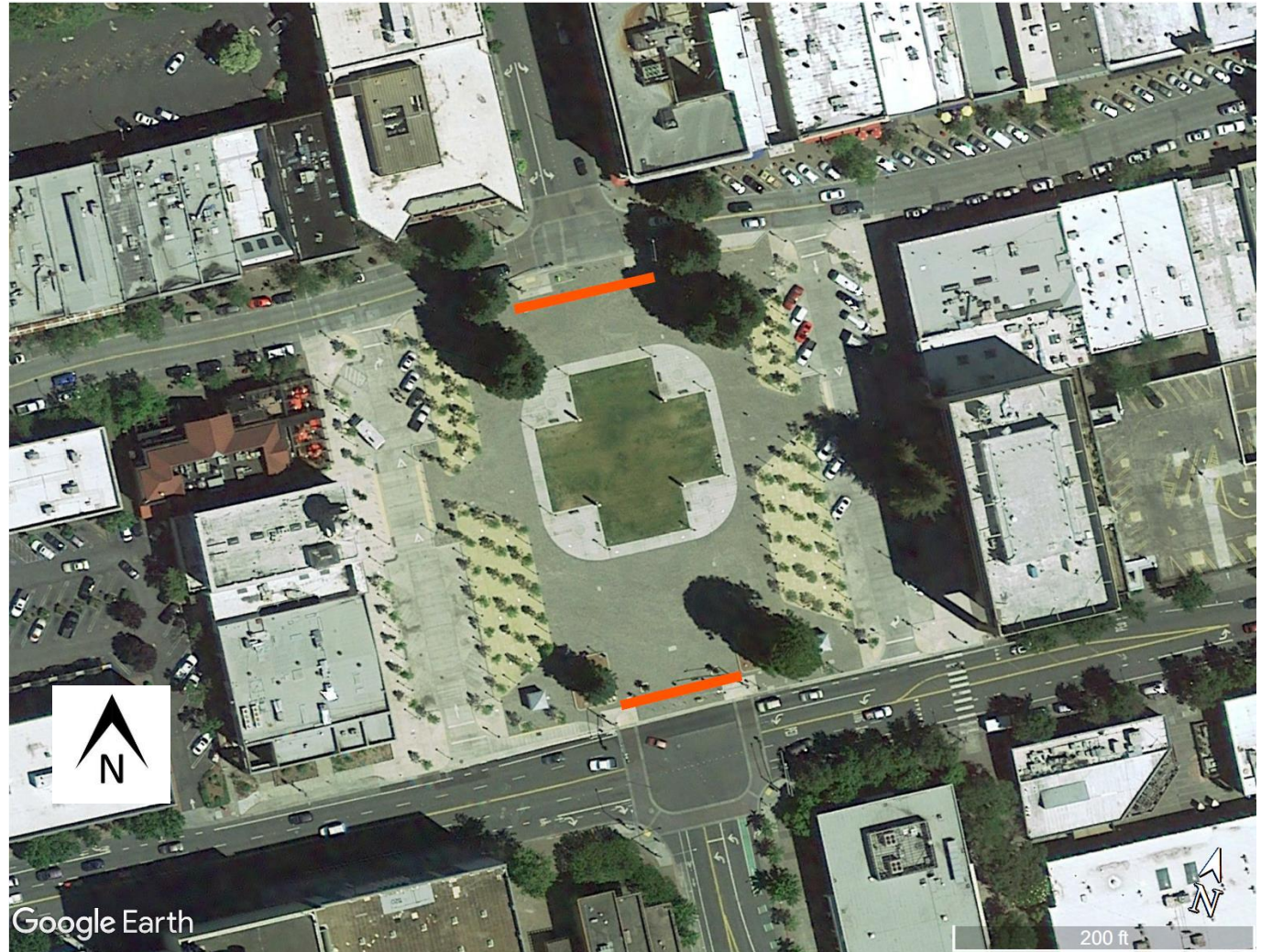
PROJECT DISCUSSION

GRANT BAILEY – ASSOCIATE
CIVIL ENGINEER, TPW

ERICH RAUBER – SUPERVISING
ENGINEER, TPW

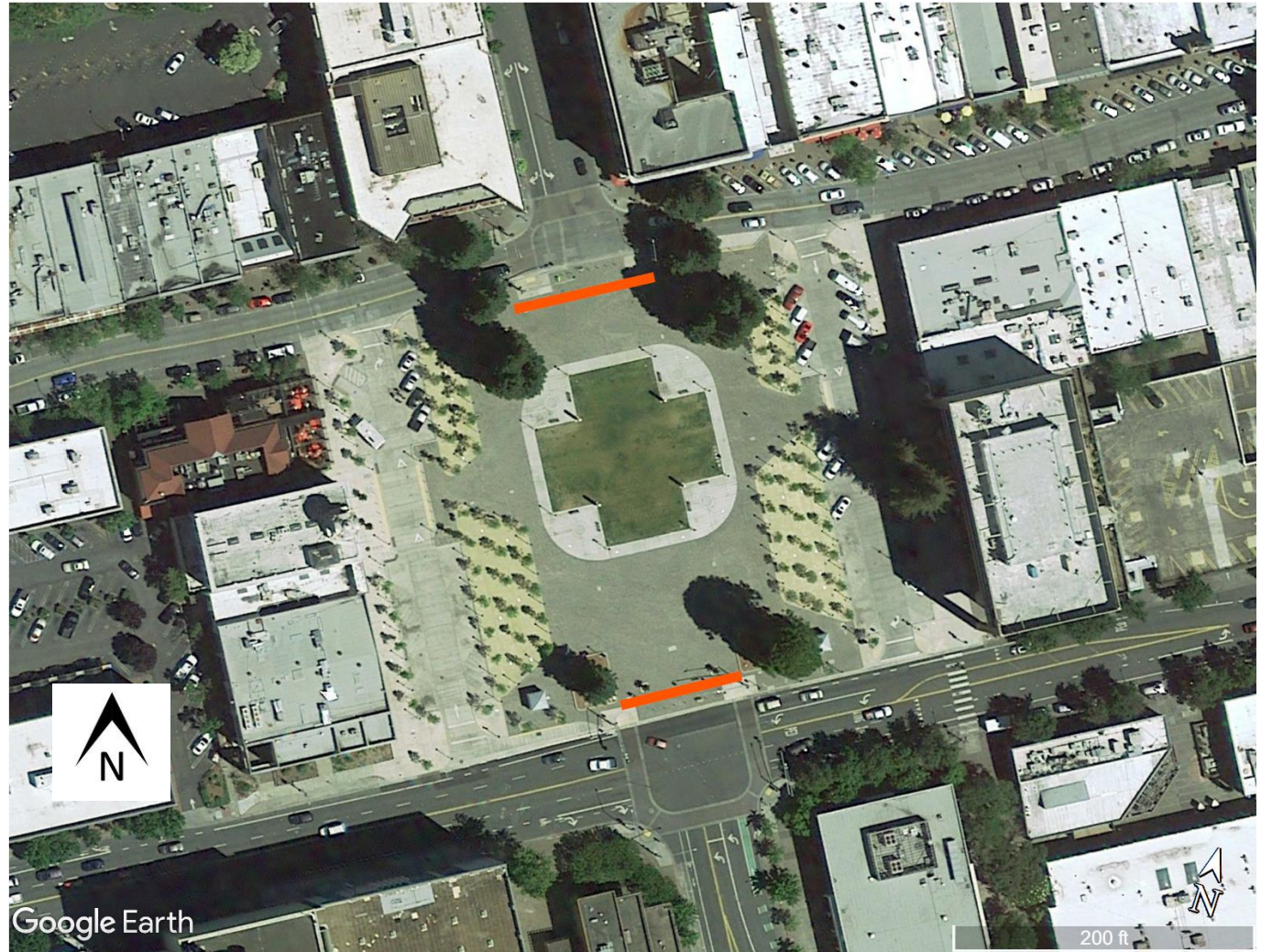
EXISTING CONDITION

- Recent events throughout the world have demonstrated protection of public spaces is necessary
 - Nice, France
 - London
 - Charlottesville
 - New York City
- Courthouse Square is unprotected
- North and South Approach on Mendocino/Santa Rosa Ave
- 6" bollards currently in place act as more of a visual deterrent



SCOPE OF WORK

- Protect Courthouse Square
 - Errant Vehicles
 - Terrorist Attack
- Minimum design protection should stop:
 - 15,000 lbs vehicle
 - Travelling at 50 MPH



ALTERNATIVES

■ Passive Barriers

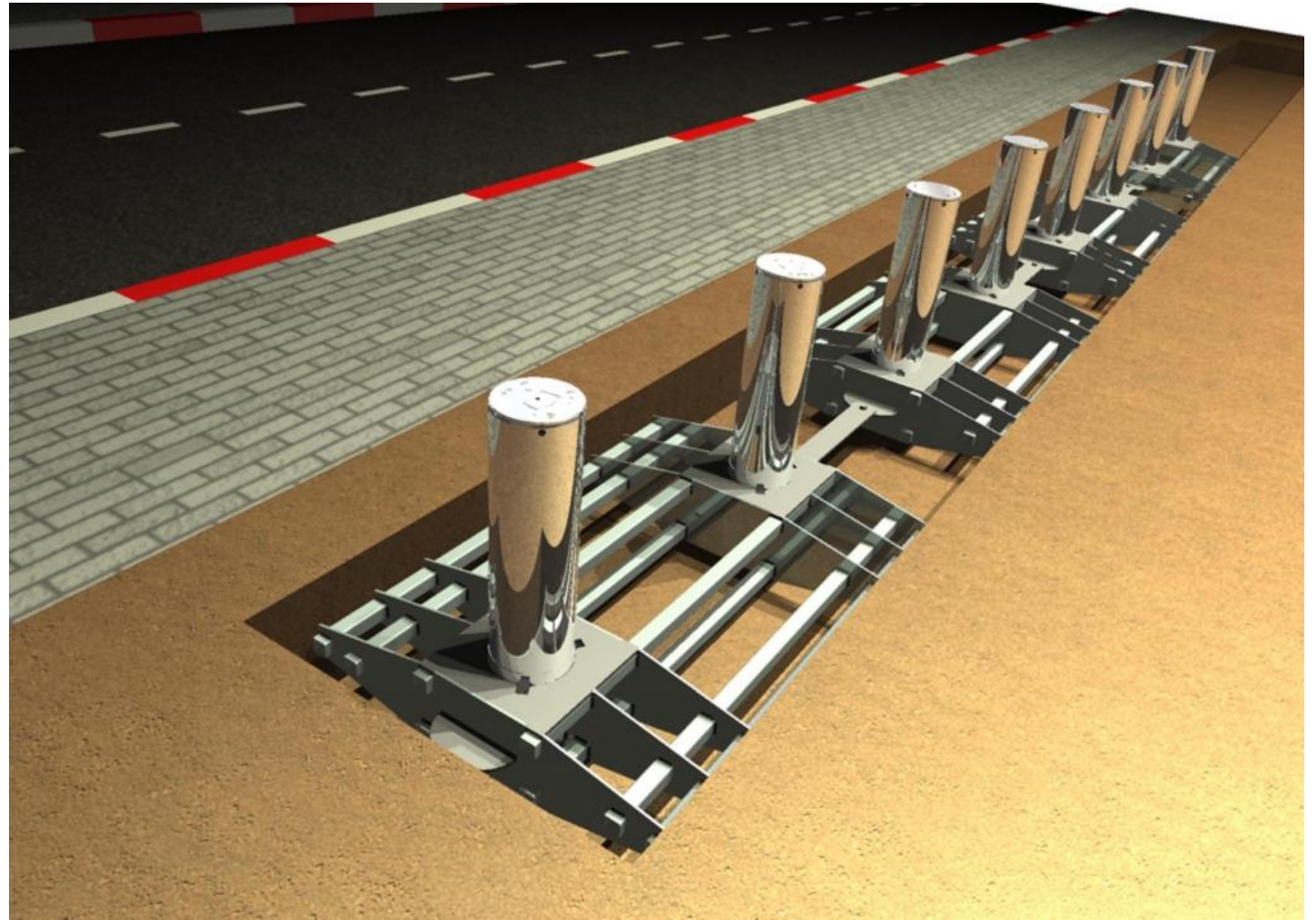
- Wall or berm
- Engineered Planter
- Heavy objects & Trees
 - Reinforced steel furniture
 - Boulders
 - Fortified Art
- Water Obstacles
- K-Rail
- Fencing
- NOGO barrier
 - Visually attractive barrier system
- Tiger Trap

■ Active Barriers

- Retractable Bollards
- Rising wedge barriers
 - Fixed
 - Mobile
- Crash gates

SOLUTION

- Vehicle rated bollards
- 75' array at the 3rd and 4th Street entrances



SPECIFICATIONS

- K12 Rated Bollards
 - Capacity to stop a 15,000 lbs vehicle traveling at 50 mph
 - 3 foot penetration
- Capacity certified through
 - ASTM Rating (Crash rated)
 - Structural Analysis (non-crash/engineering rated)



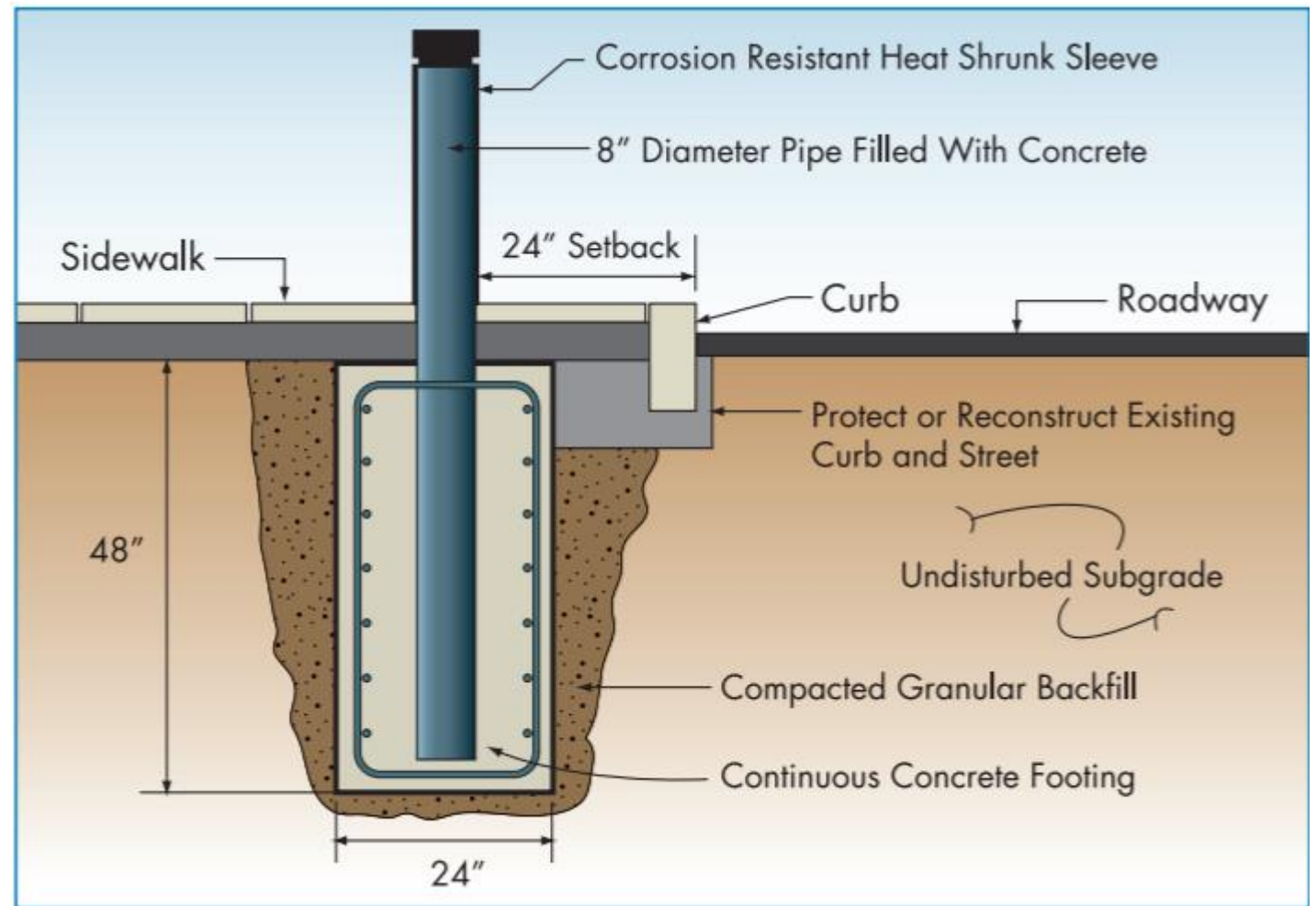
BOLLARDS

■ Current Proposed:

- Fixed
- Shallow mount

■ Options:

- Mountable decoration
- Sleeves available in a variety of colors/finishes
- Deep foundation
- Removable/recessed
- Different casting options



COST

- Total Project Cost = \$575,000
 - Bollard Material Costs
 - \$150,000
 - Construction Cost + Contingency
 - \$300,000
 - Project Delivery – Design + Construction Management & Inspection
 - \$120,000



QUESTIONS?