



Coordinated Construction in Public Rights-of- Way Reduces Capital Costs of Integrated Wastewater & Stormwater Solutions

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Background

- + Historic goals: Control stormwater in combined & sanitary sewers
- + Past practices of CWA compliance by individual stormwater & wastewater projects are neither practical nor affordable.
- + Green Infrastructure (GI) solutions are gaining preference over gray infrastructure & in many instances are more cost effective



Conventional Street

South 2nd Street, Walker's Point, Milwaukee



Source: Milwaukee Metropolitan Sewerage District



Green Street (perspective)

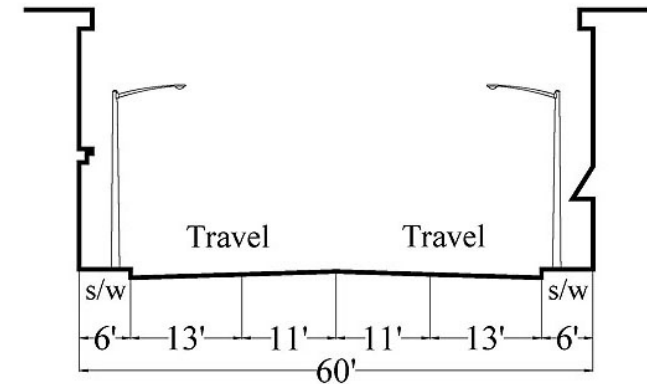


Source: Milwaukee Metropolitan Sewerage District



Capital Construction Costs -- Green Streets vs. Conventional Streets

- + Green streets require less pavement, reducing pavement costs by 49% (Seattle Public Utilities)
- + Paving surface, subgrade, and installation requirements of porous pavements are more complex (expensive?) than those for conventional asphalt or concrete surfaces (FHA)



Typical Conventional Street Cross Section

Capital Construction Costs -- Green Streets vs. Conventional Streets (concluded)

- + Street designs incorporating green infrastructure vs. conventional streets yielded a cost savings equivalent to \$329 per square foot (Seattle Public Utilities)
- + New/re-construction porous pavement projects are cost competitive relative to conventional street construction (City of Ann Arbor)



Typical "Green" Street Cross Section

Interjurisdictional & Private Sector Cooperation

+ Utility owner/operator interests in PROW

- + water
- + stormwater
- + wastewater/reuse
- + natural gas
- + power
- + steam
- + data communications
- + telephone
- + other

+ Other interests and users of PROW

- + public
- + livery cabs/limousines
- + bus transit
- + para transit
- + common carriers
- + mail and parcel deliveries (FedEx, UPS, USPS)
- + emergency services
- + other



Key Benefits of Cooperation

- + Comprehensive capital improvement planning, scheduling and construction coordination in PROW
- + Joint projects and economies of cost sharing of street and sidewalk restoration and improvements on pro rata and/or incremental bases
- + Programmatic traffic planning and detour routing



Key Benefits of Cooperation (concluded)

- + Reduce redundant construction tasks and inconvenience to citizens and visitors in impacted areas
- + Lessen extent and duration of impact to local commerce
- + Minimize street work and extend street life
- + Control potential for misalignment between street work with other utility projects

GI Projects Require New Levels of Coordination and Communication

- + Numerous commercial construction project management software products
- + Information regarding projects can be displayed across space and time via GIS
- + Create web map where local utilities and municipalities can edit their project footprints and enter basic project information
- + Stakeholders have improved understanding of the plans of others in the same geography and time continuum and can coordinate more effectively

Dynamic Map-based Solutions Delivered Via the Web

- + provides visibility
- + real-time insight into street projects and activities
- + enables proactive management of utility projects
- + coordination of buried utility construction with Public Works
- + tracking of incidents, traffic, and planned street events
- + optimize street performance
- + reduce capital costs
- + minimize environmental impact



Integrate all of the Applications with Advanced IT Architecture

- Identify proposed projects
- Map proposed projects relative to existing asset locations
- Identify coordination needs and drivers
- Setup coordination opportunities
- Coordinate projects
- Support right-of-way permitting approval
- Track project execution & coordination performance
- Maintain constructed asset condition and restrictions for reference



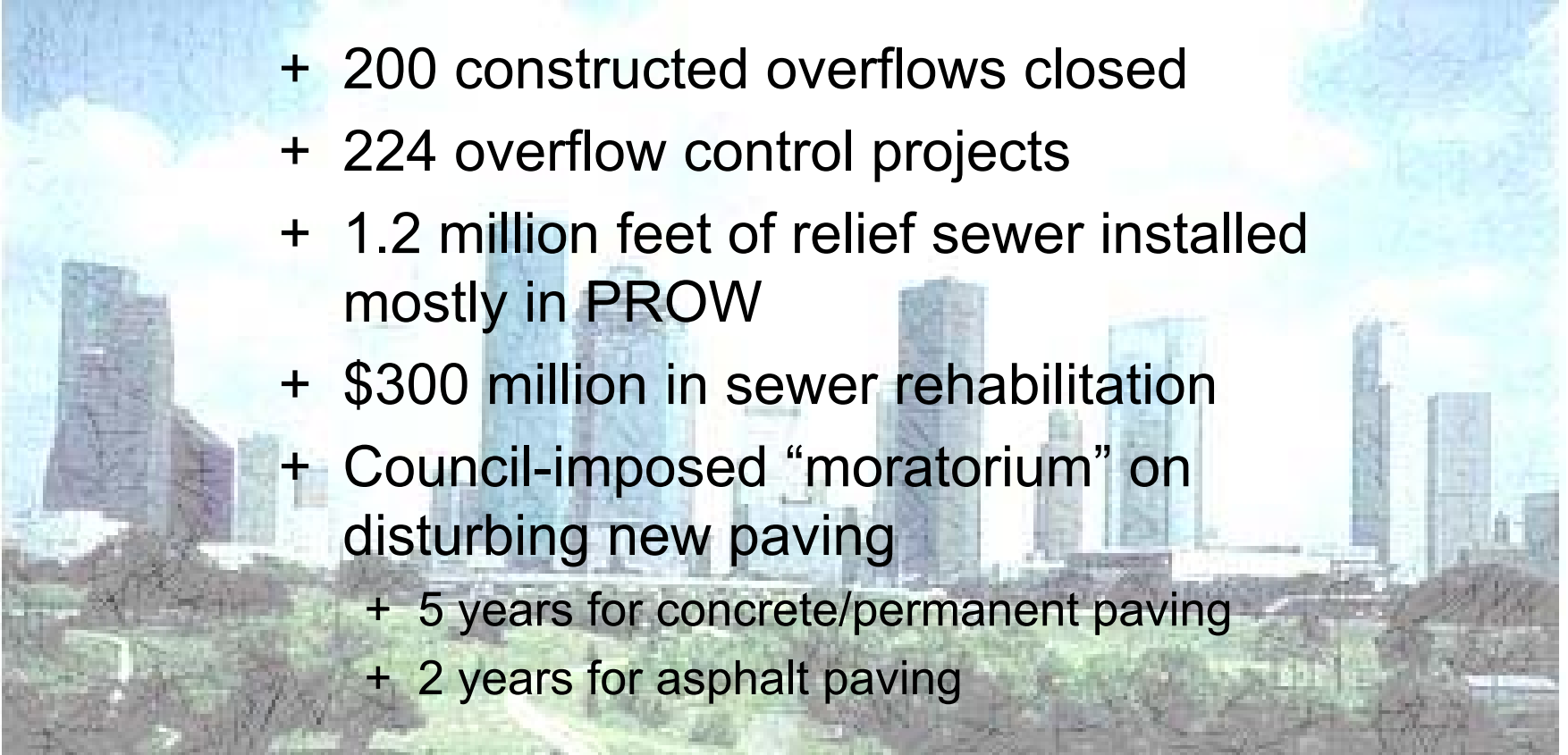


Case Studies

- + Houston
- + Indianapolis



\$1.2B Greater Houston Wastewater Program: One of the Earliest Interagency Coordination Efforts (May '92 - Dec. '97)

- 
- + 200 constructed overflows closed
 - + 224 overflow control projects
 - + 1.2 million feet of relief sewer installed mostly in PROW
 - + \$300 million in sewer rehabilitation
 - + Council-imposed “moratorium” on disturbing new paving
 - + 5 years for concrete/permanent paving
 - + 2 years for asphalt paving

GHWP Interagency Coordination Committee (IACC) Key Participating Agencies

- + Houston Department of Public Works & Engineering
 - + Engineering and Construction Division
 - + Public Utilities Division
 - + Street and Drainage Division
 - + Traffic operations Division
- + Department of Aviation
- + Metropolitan Transit Authority of Harris County (METRO)
- + Harris County (various departments including Engineering)
- + Harris County Flood Control District
- + Texas Department of Transportation



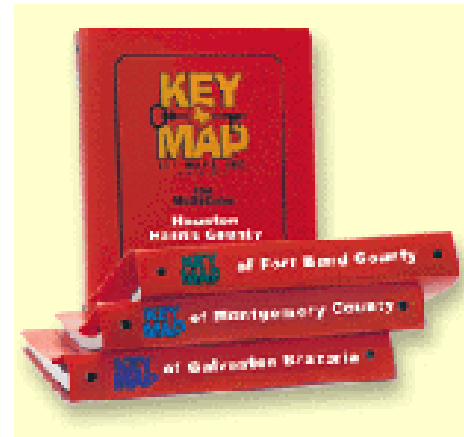
Available, Affordable Tools in early-1990s to Support Houston's Coordination Efforts



Telecommunications



Data Management (spreadsheet)



"Key Map" Atlas

IACC Tools and Functions

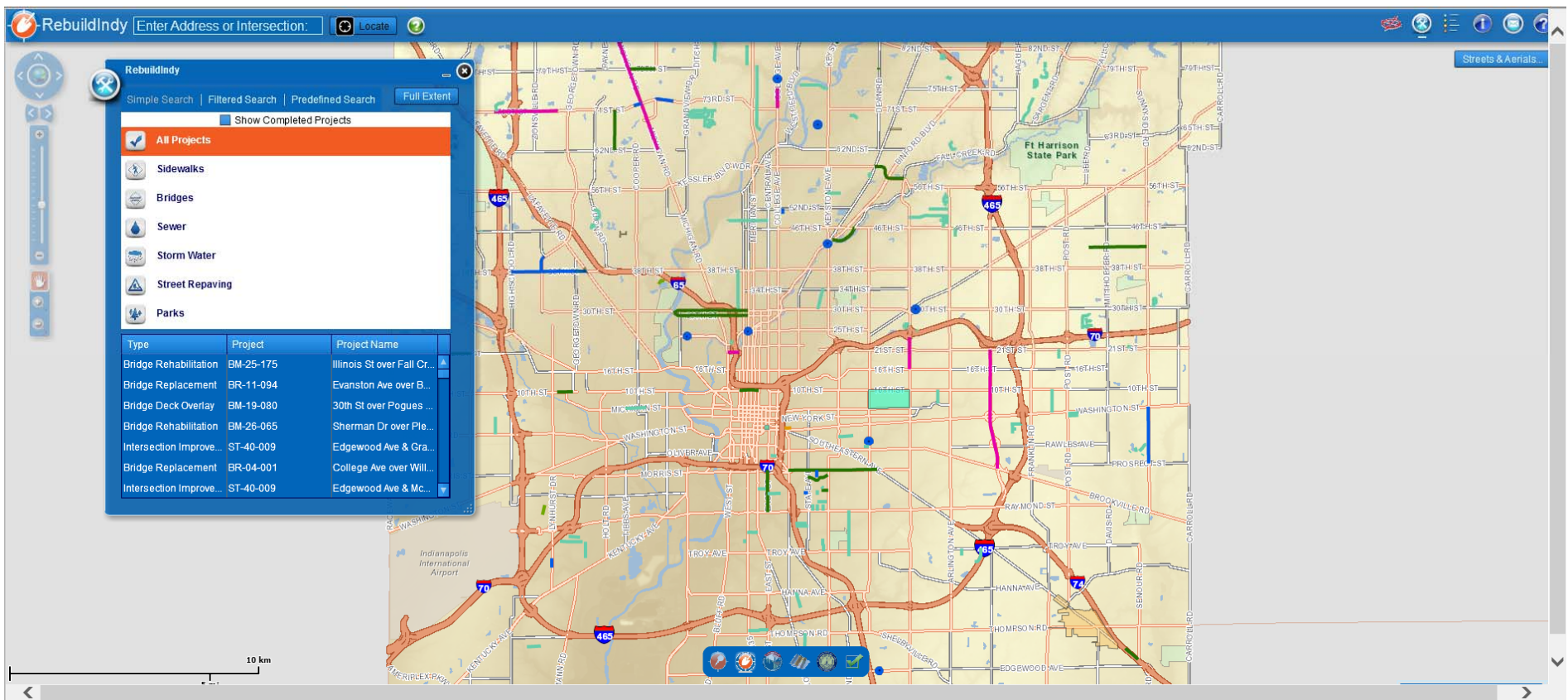
- + Developed and maintained maps using standard “Key Map” hardcopy products to locate projects
- + Developed and maintained projects “database” (Excel spreadsheet)
 - + planning milestone dates
 - + construction schedules
 - + potential conflicts
 - + status and progress
 - + contact information
- + Conducted periodic meetings with project stakeholders for database updating



Indianapolis - Notification Tools Keep the Public Informed



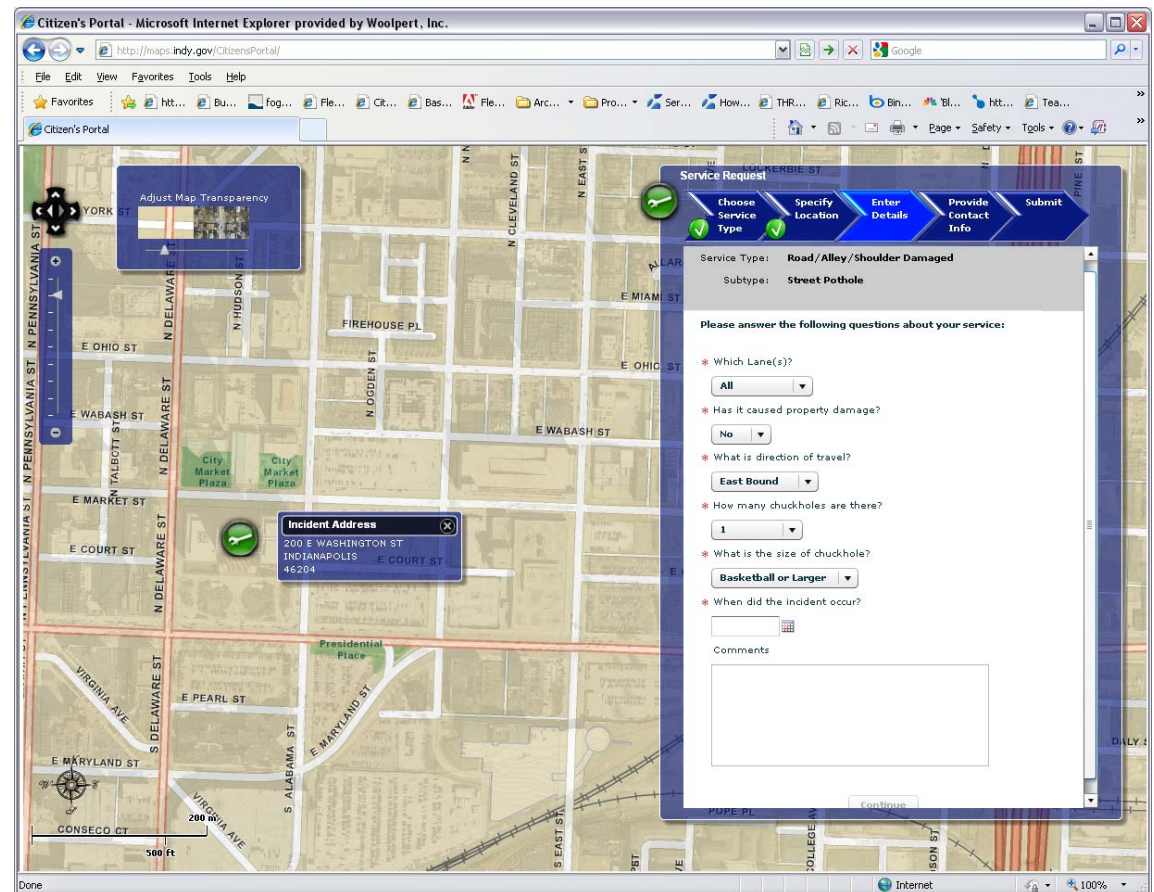
2012 RebuildIndy Projects



Public Request Portals Improve Customer Experience



- Citizens submit requests, receive notices when service is performed
- Requests routed to various agencies automatically
- Back-end services and processes use GIS
- iOS and Android Apps



<http://maps.indy.gov/RequestIndy/>



Mobile Applications Provide Constant Connections

- + Native applications preferred
 - + Access to camera and GPS
 - + Richer functionality
 - + Free download via store
- + Devices
 - + iOS (iPhone, iPad)
 - + Android



Future Public Outreach

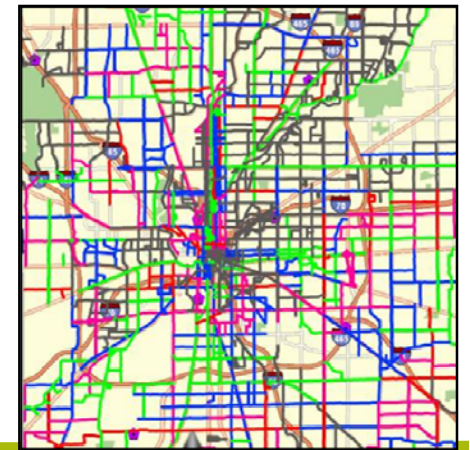
- + Social Media

- + Twitter
- + Facebook
- + Instagram
- + Foursquare



- + MapScriptions concept

- + Citizen inputs daily route(s)
- + Application warns of disruptions, suggests alternate routes
- + Real-time notifications
- + Vehicle/mass transit/bicycle/pedestrian aware



Outcome of Coordination

- + CWA compliance under integrated approach
- + Joint projects with economies of cost sharing
- + Reduced inconvenience to citizens & visitors
- + Lessened extent & duration of impacts to local commerce



Source: City of Toronto Archives, Artist: John DeRinzy, "Underground Utilities, Yonge Street" (1950)

Questions?

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