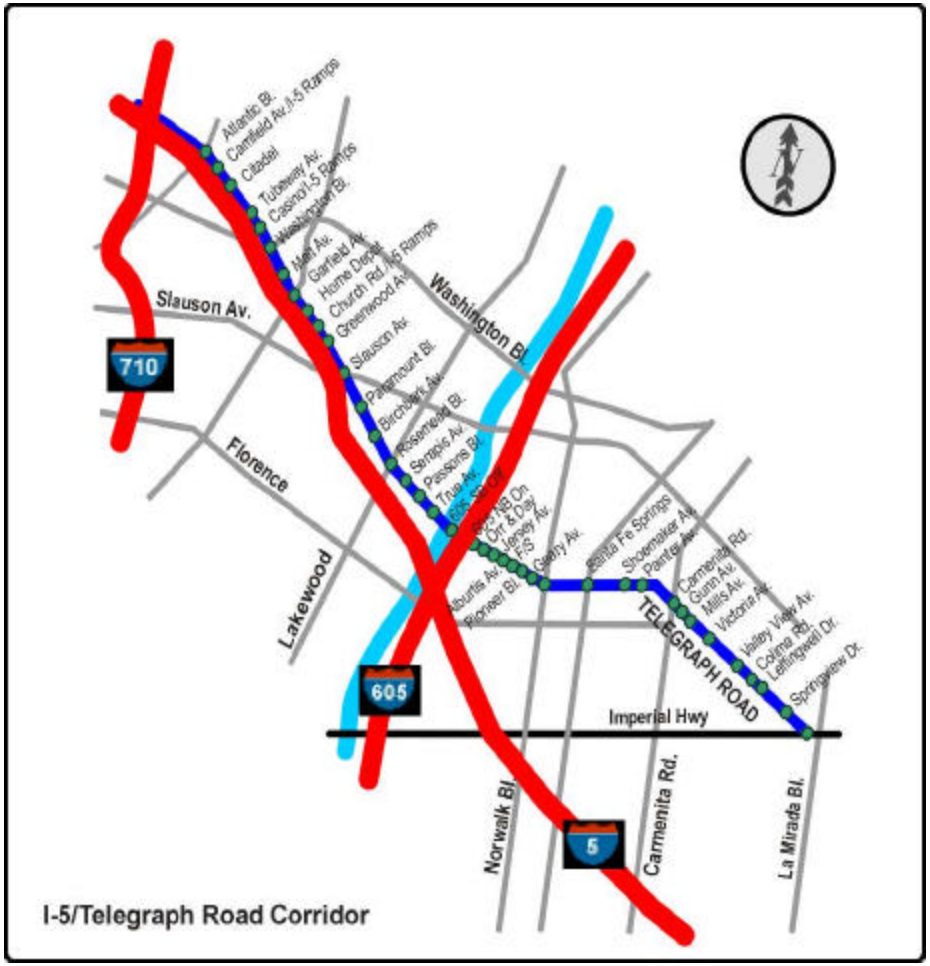
Gateway Cities
Traffic Signal Synchronization and Bus Speed Improvement Project
I-5/Telegraph Road Corridor

Project Status Update
June 19, 2003

Today's Agenda

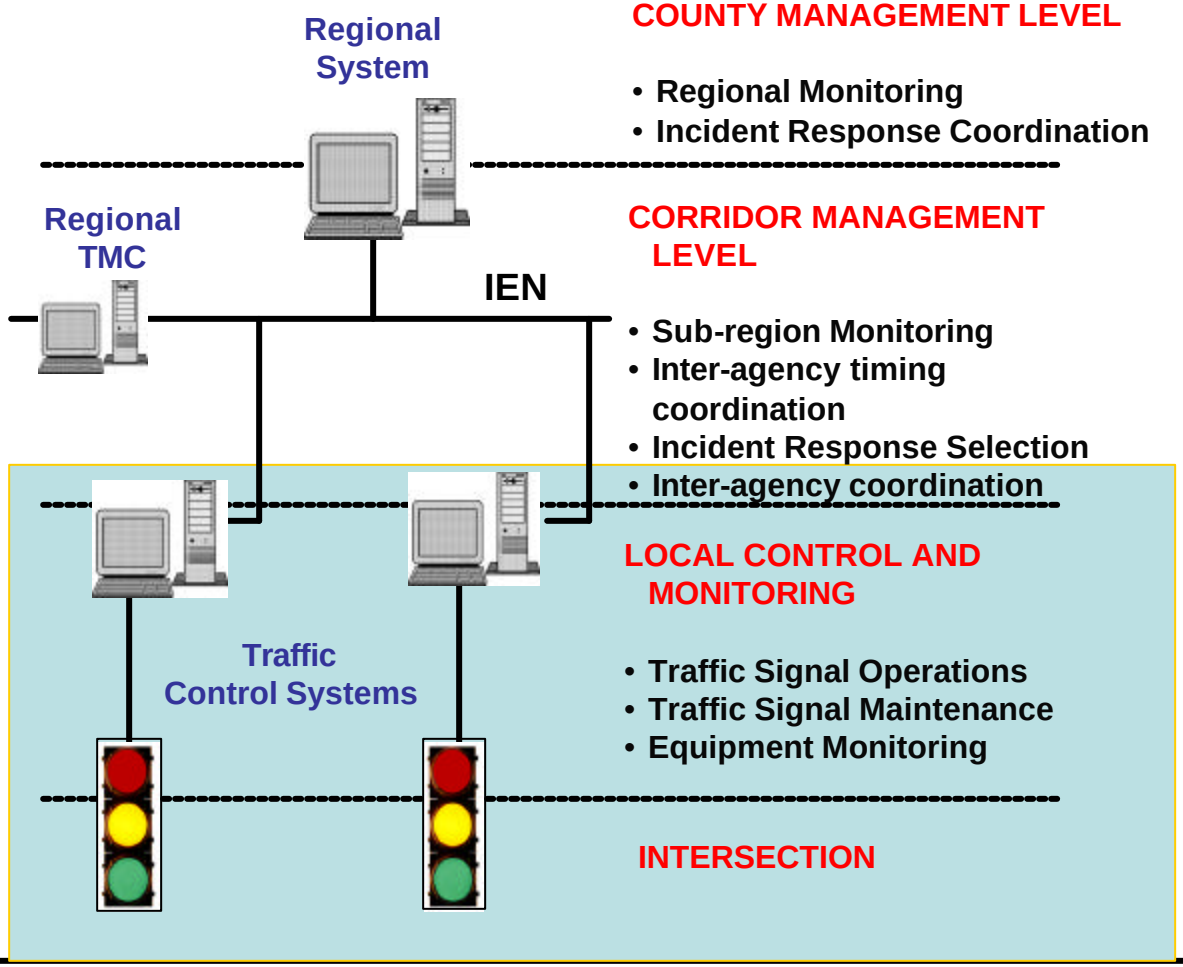
- Review of Overall Project
- Project Status
- LCC Recommendations
- ATMS Analysis
- Communications Analysis
- Next Steps

Original Project Area

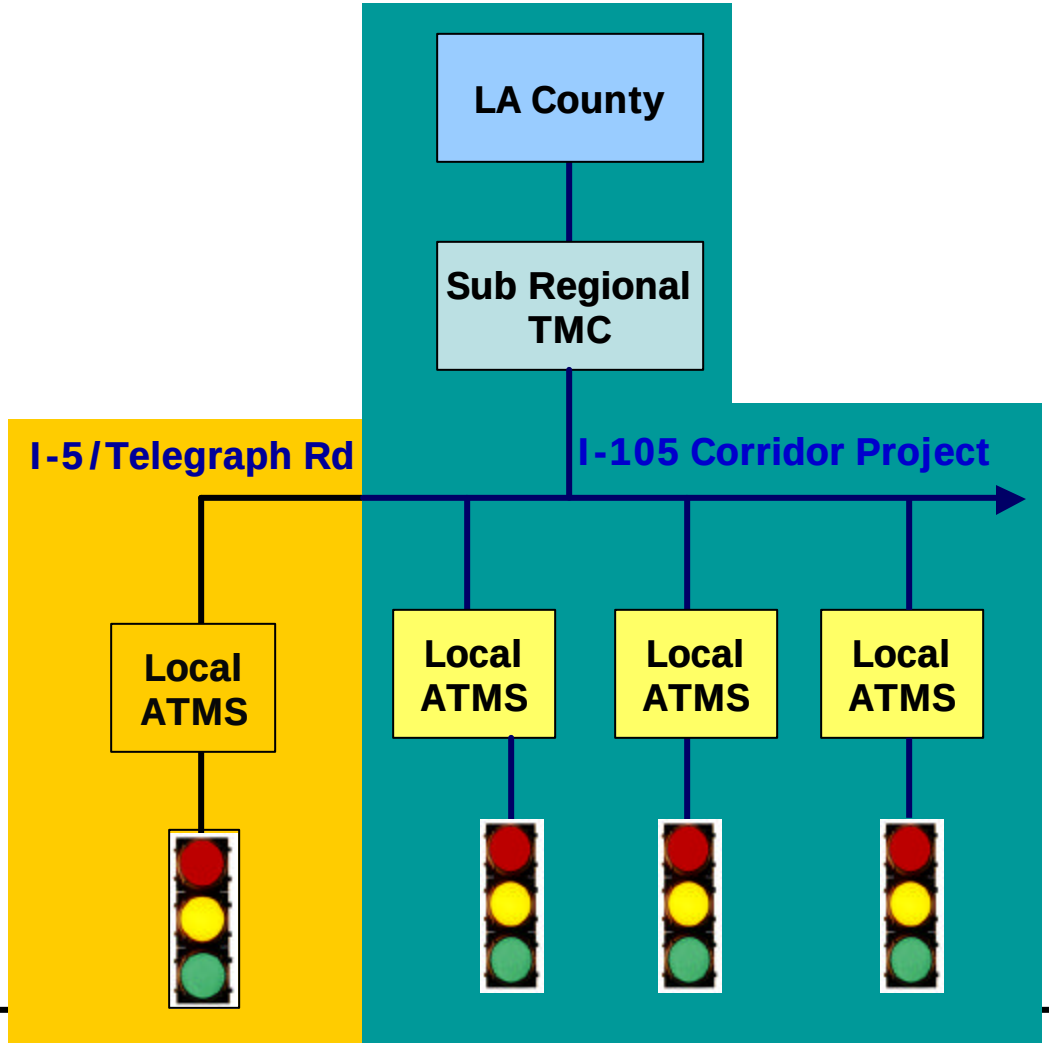


Expanded Project Area

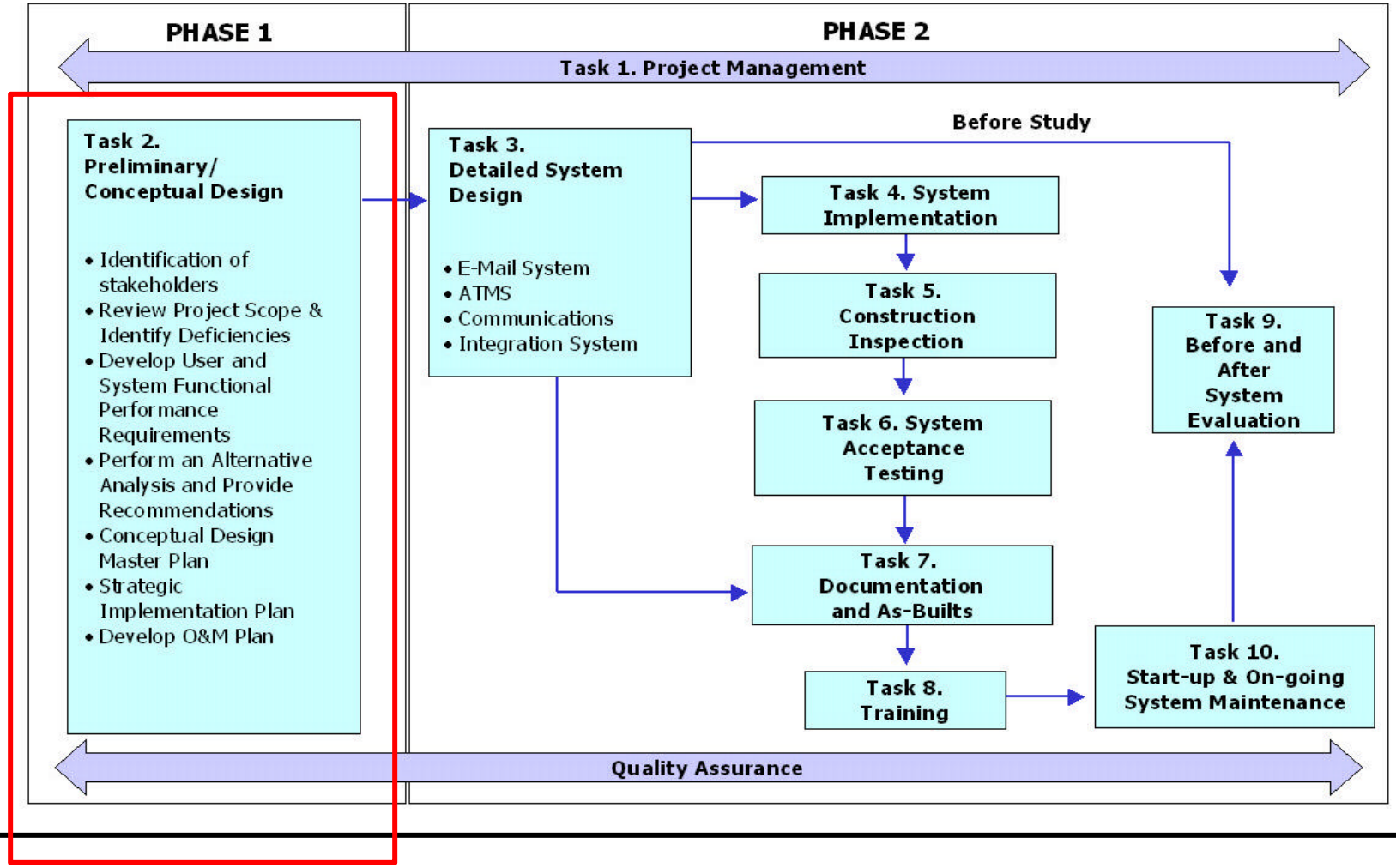
Project Focus – Implementing the IEN at the Local Level



Relationship with Other Projects



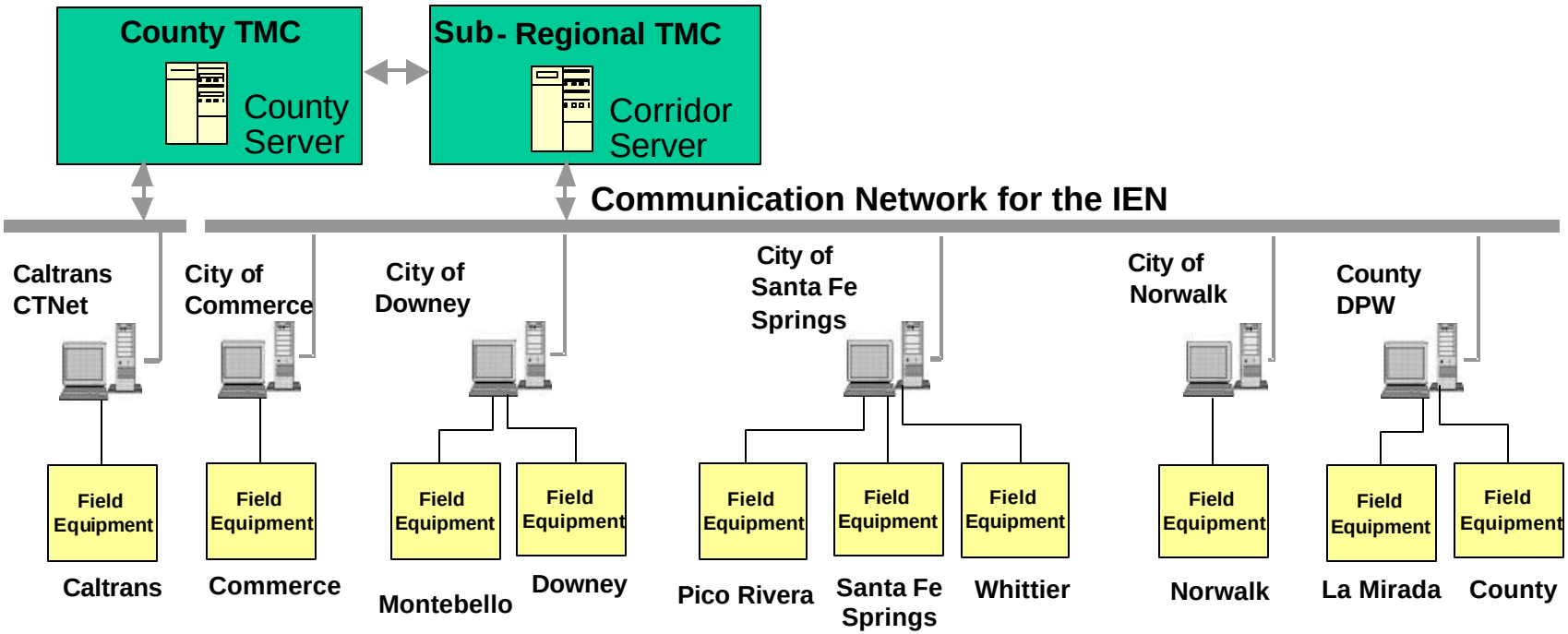
Work Flow Plan



Project Status

• Web Page	On-Going
• Agency Interviews	Complete
• Field Surveys	Complete
• Operational Objectives and	
• City Reports	Complete
• ATMS User Requirements	Complete
• ATMS Functional Requirements	Complete
• System Integration Requirements	Complete
• Communication System Requirements	Complete
• Final System Requirements	Complete
• High Level Design	Complete
• LCC Recommendations	Complete
• Communications Analysis	
• General	In Review
• Location Specific	On Going
• ATMS Analysis (Draft)	In Review
• Conceptual Design	On Going

Corridor Architecture



LCC Recommendations

- Originally Presented in October, 2002 to PWD Meeting
- Recently updated to incorporate expanded area

Commerce LCC Location

Norwalk LCC Location

LCC Site

Server Location

Remote LCC Site

Downey Host

Downey LCC

Downey Equipment Room

Montebello LCC

Santa Fe Springs Host

Santa Fe Springs LCC Site

Whittier LCC Site

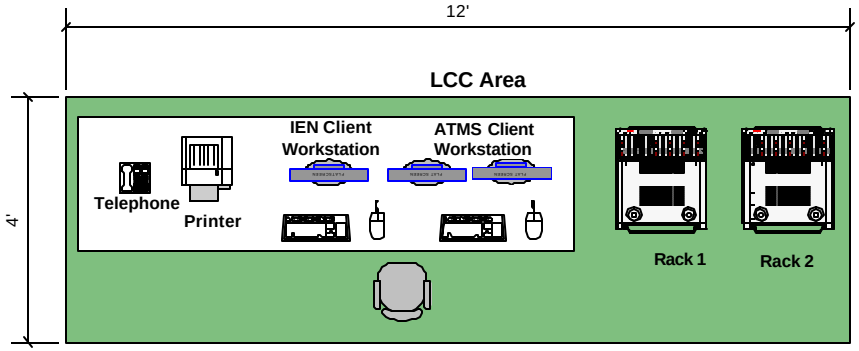
Whittier Remote LCC Site

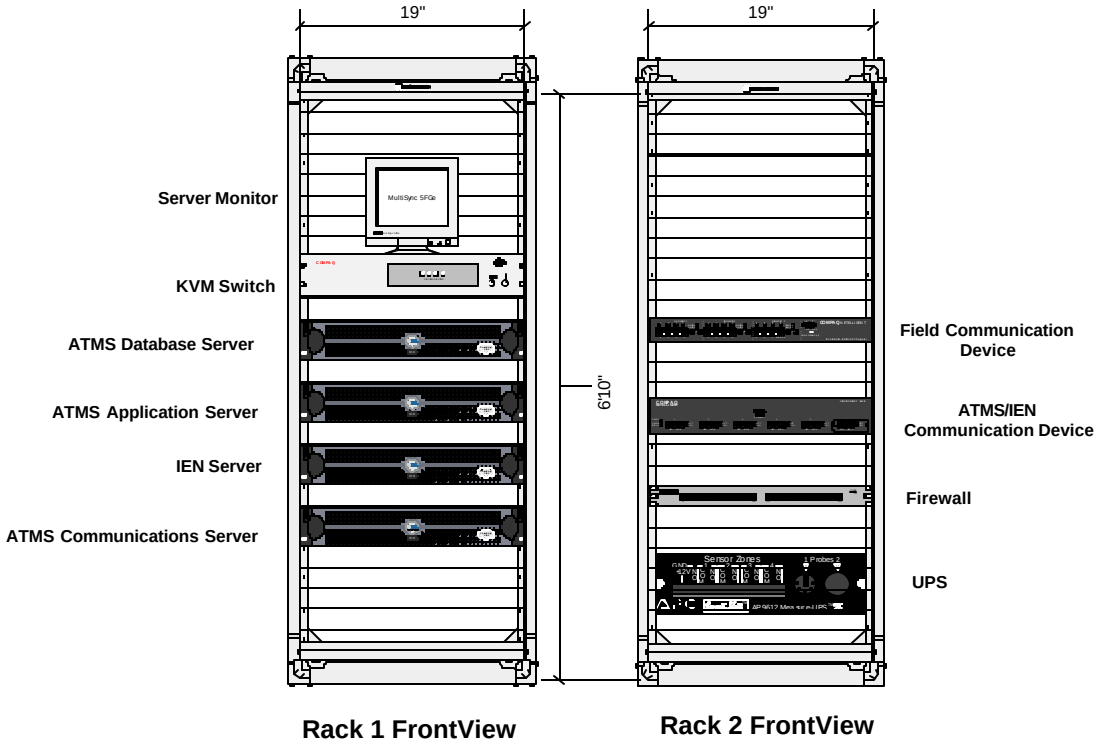
La Mirada LCC Location

LCC Site (DPW)

Remote LCC Site Resource Center

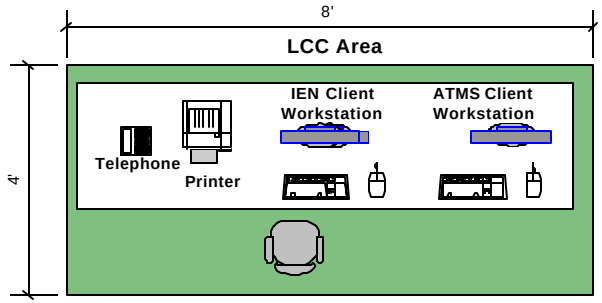
LCC Recommendations Commerce



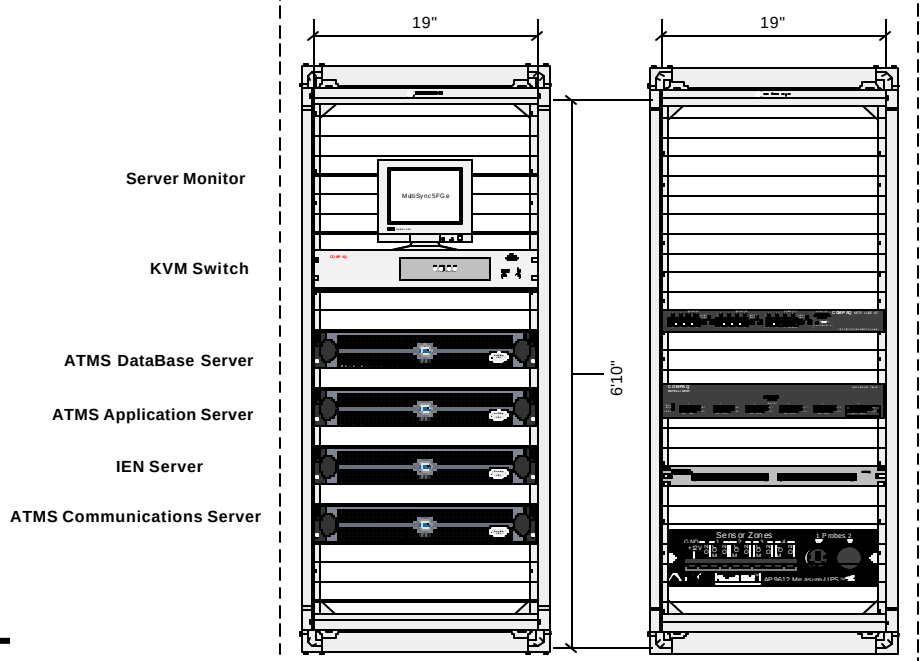


S

LCC Recommendations Norwalk

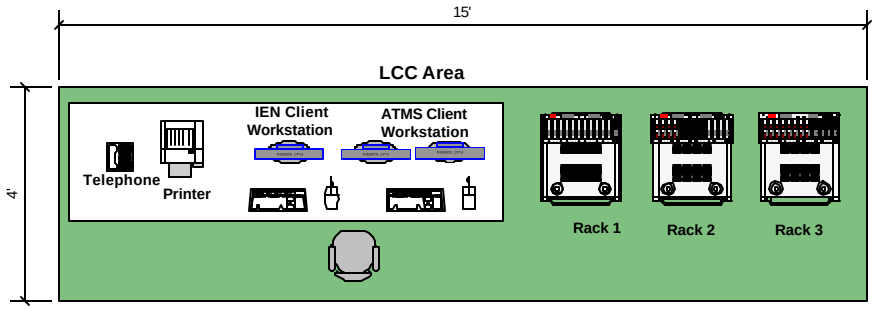


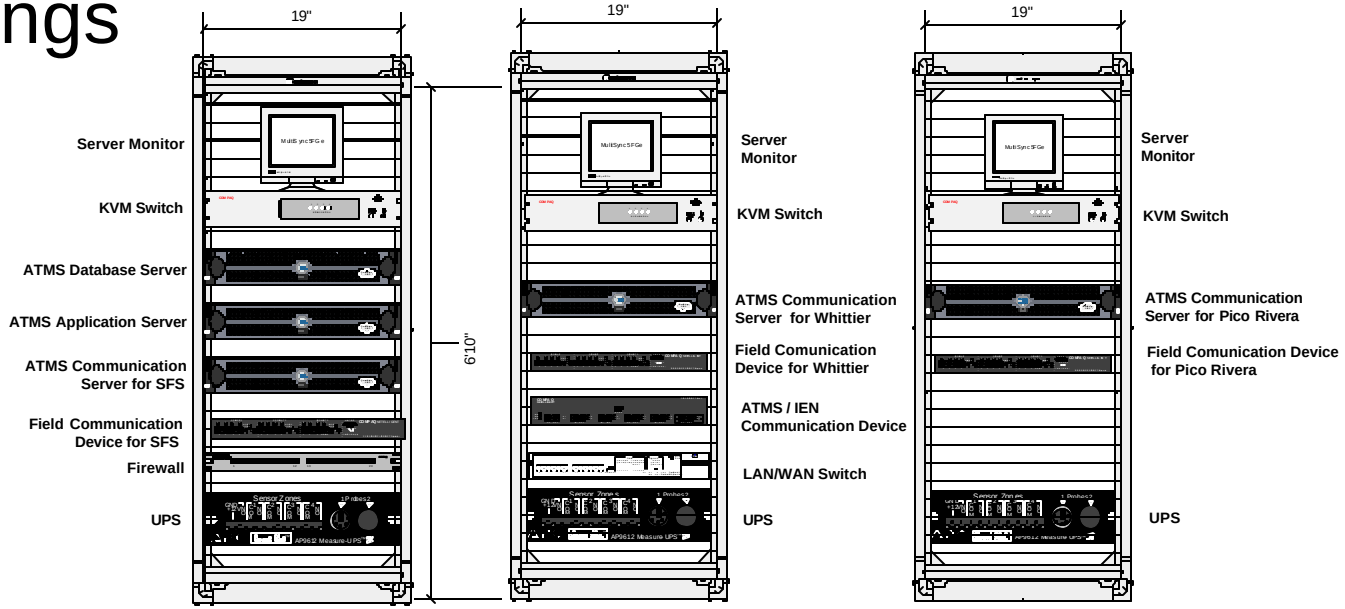
Signal Lab at Maintenance Yard



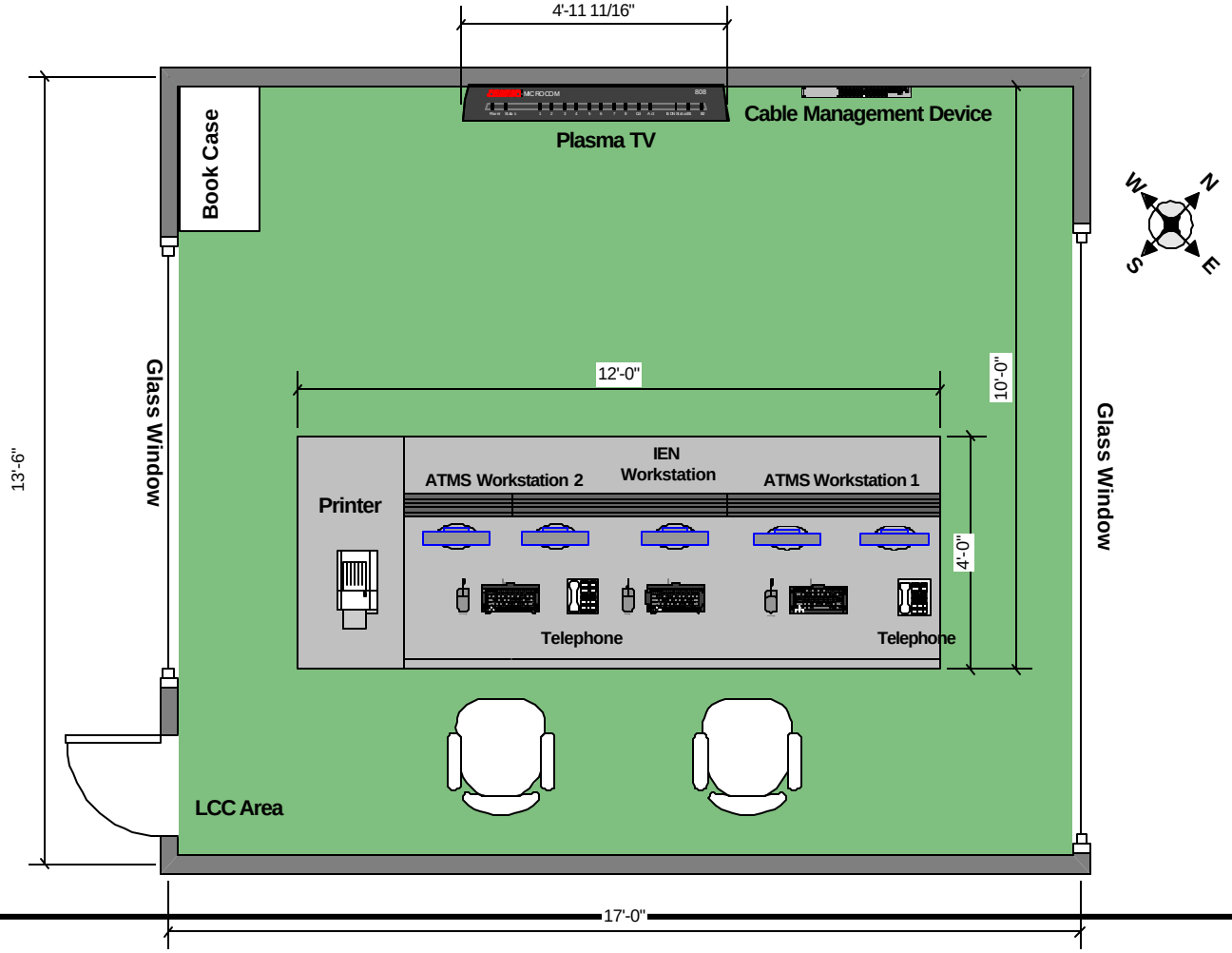
IT Department Equipment
Room at Maintenance Yard

LCC Recommendations Santa Fe Springs



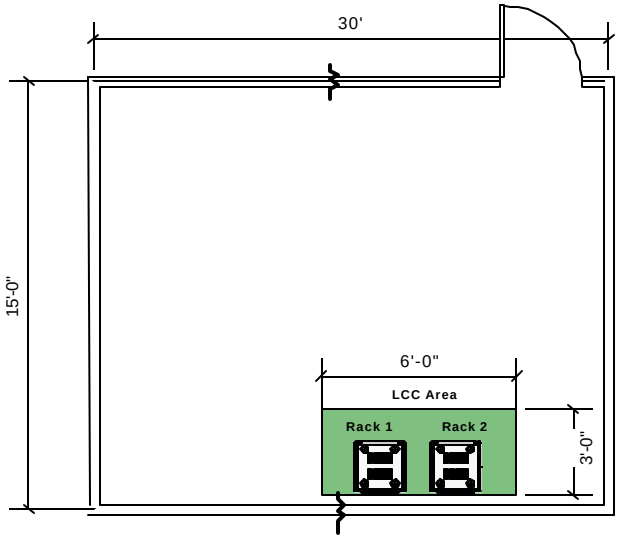


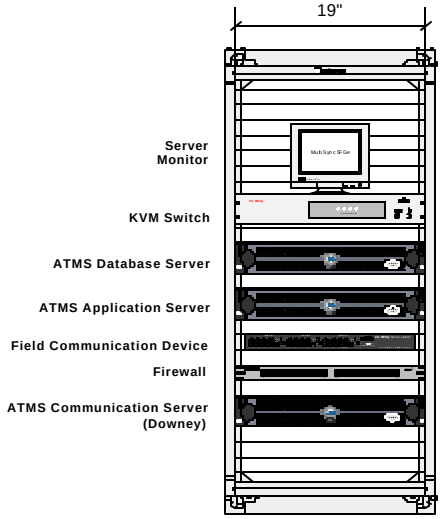
LCC Recommendations – Downey 2nd Floor



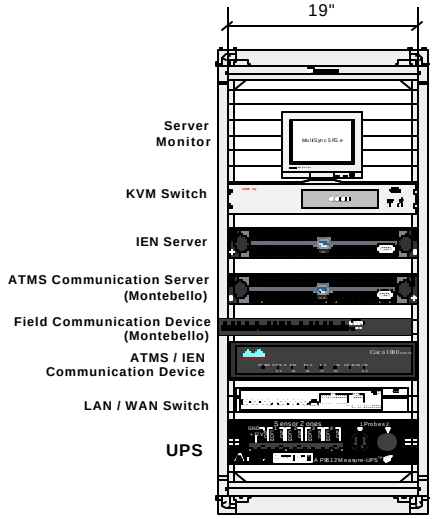
S

LCC Recommendations Downey



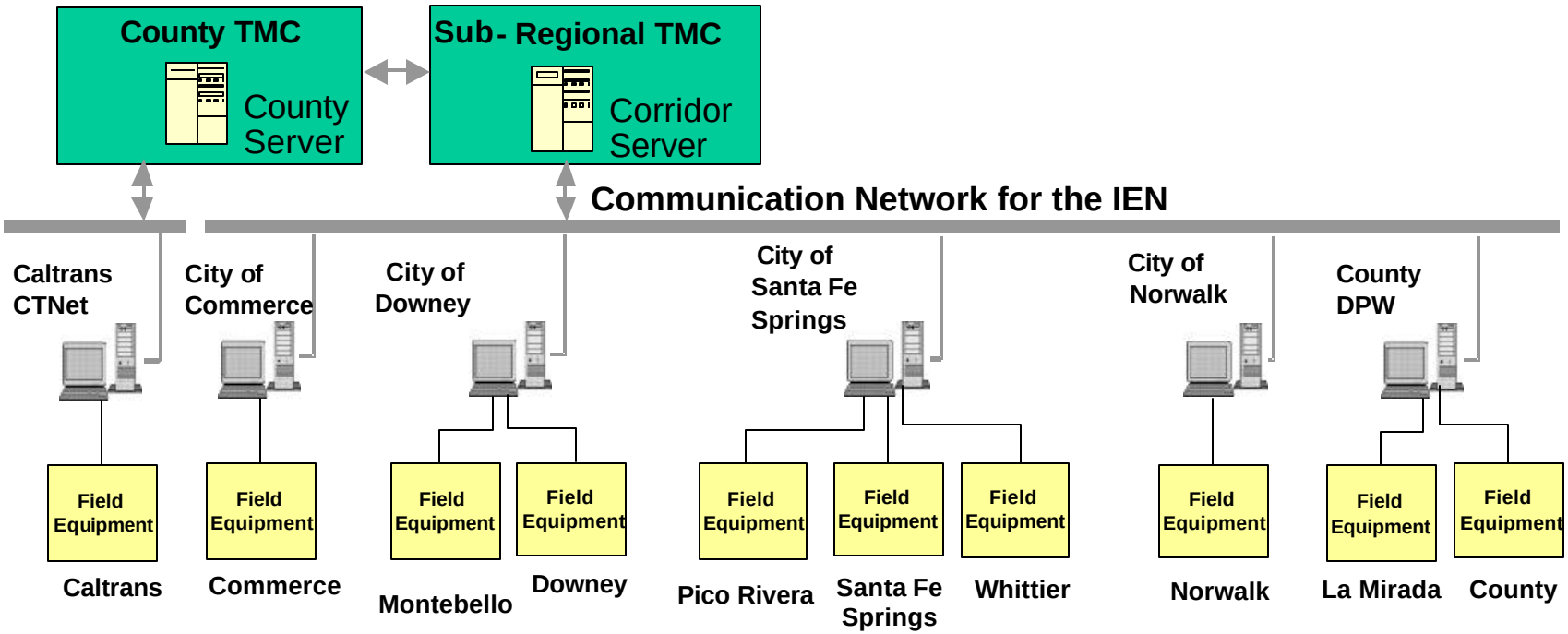


Rack 1 (Downey ATMS) FrontView



Rack 2 (Hosting City) FrontView

Corridor Architecture



ATMS Analysis: Starting Point

- A set of requirements (from the ESGV Pilot Project)
- The County's ATMS selection process (which currently has eliminated all but two systems).
- Pomona Valley ATMS Alternative Analysis Report

Project Specific Information

- An expanded set of requirements which we have prepared for the I-5/Telegraph Road project which incorporates all of the Pilot project requirements.

  - An initial systems architecture which identifies the following systems: (*Indicates no ATMS analysis needed)

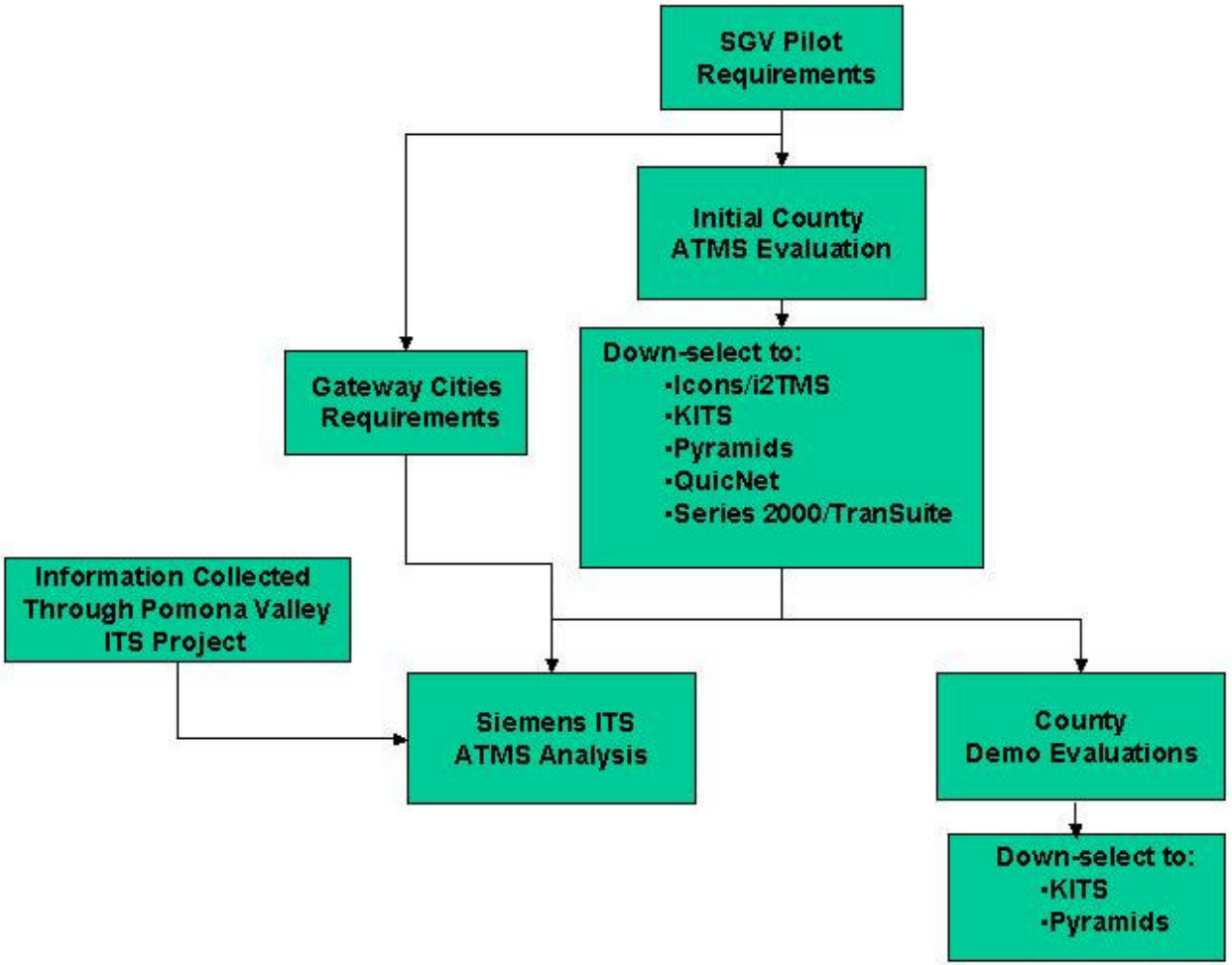
    *Caltrans: CTNet
    *Commerce - BiTrans upgrade
    *Montebello (on another System e.g. Downey)
    *Pico Rivera (ditto or SF Springs)
    Downey
    Santa Fe Springs
    *La Mirada (on another system - County's)
    Norwalk
    *Whittier

Issues

- Identify a relevant sub-set of the requirements rather than an exhaustive list for comparison at this stage

- Additional Requirements that may be key selection criteria:
  - Downey: Multi-jurisdictional
  - SF Springs Traffic diversions due to rail closures
  - Commerce: Open protocols?
  - General: Integrating CCTV and CMS in the traffic control system.

ATMS Analysis Process



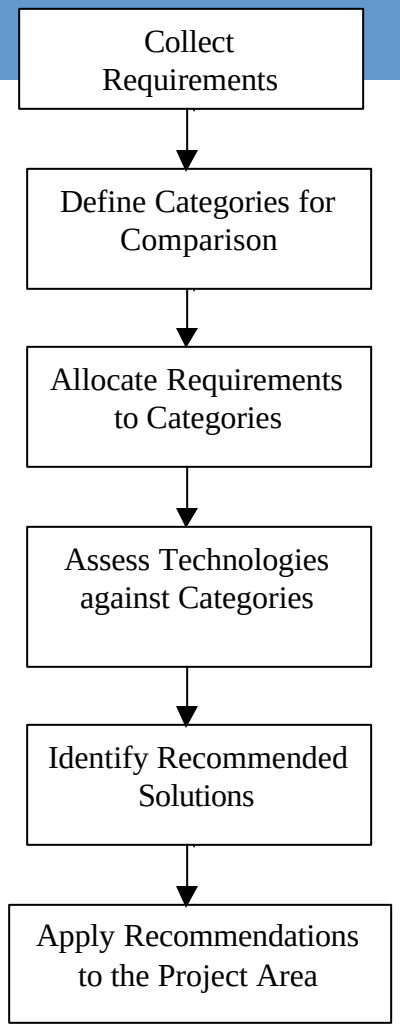
ATMS Recommendations

City	Hosting ATMS Server For	Controllers to be supported	Recommended ATMS Options*

Commerce	• Commerce	• Type 170	• Upgrade existing QuicNet II to QuicNet IV
			• Change out the system to one of the following:
			  • ***icons***™/i2TMS
			  • KITS
			  • TranSuite
			  • Pyramids

Downey	• Downey • Montebello	• Type 170 • Type 2070 (Downey future)	• ***icons***™/i2TMS • Pyramids • KITS
Santa Fe Springs	• Santa Fe Springs • Pico Rivera • Whittier	• Type 170 • Econolite ASC/2	• ***icons***™/i2TMS • TranSuite
Norwalk	• Norwalk	• Econolite ASC/2	• ***icons***™/i2TMS • TranSuite

Communications Analysis

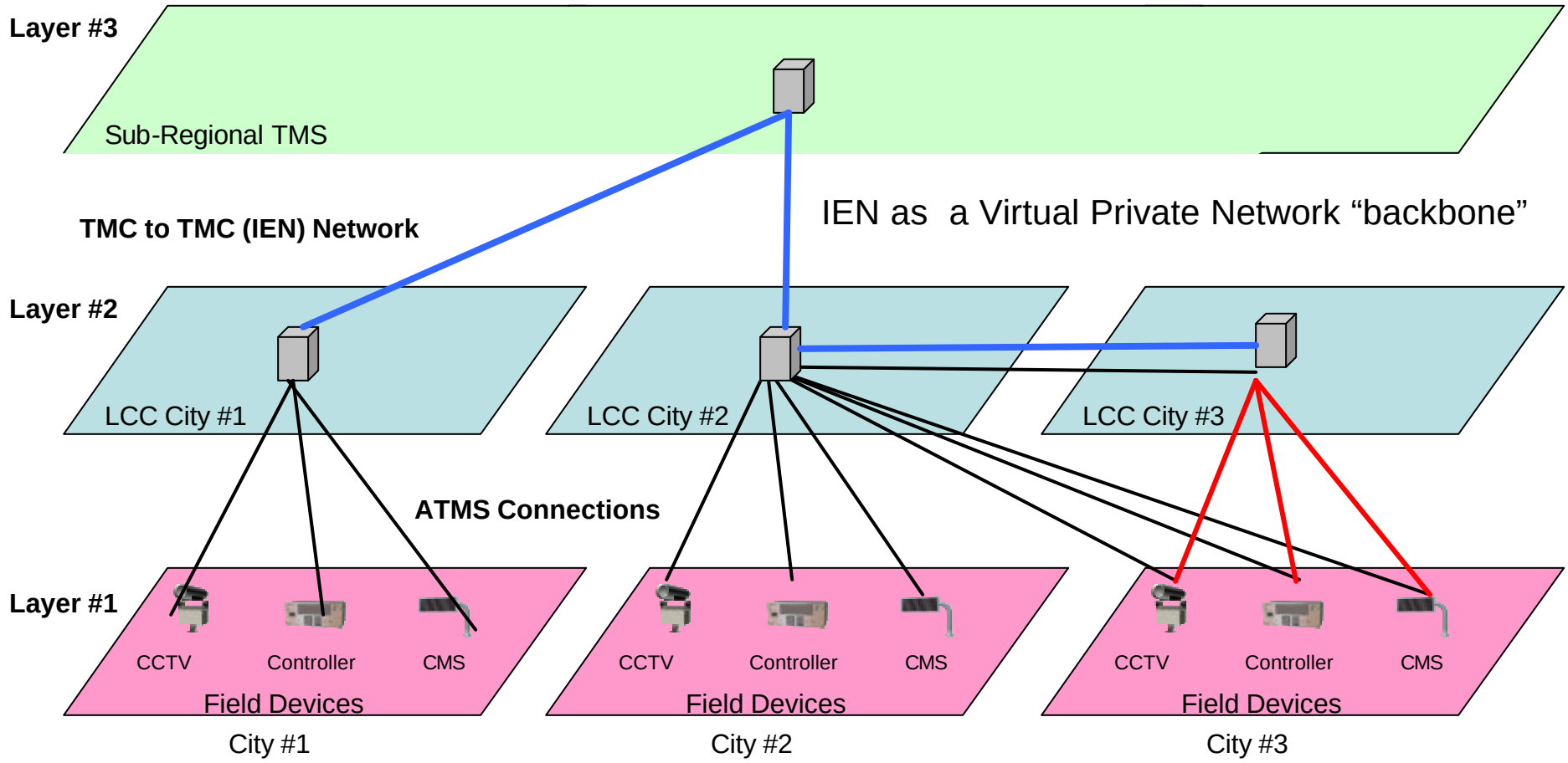


Communications Analysis

Recommendations

Conceptual Design

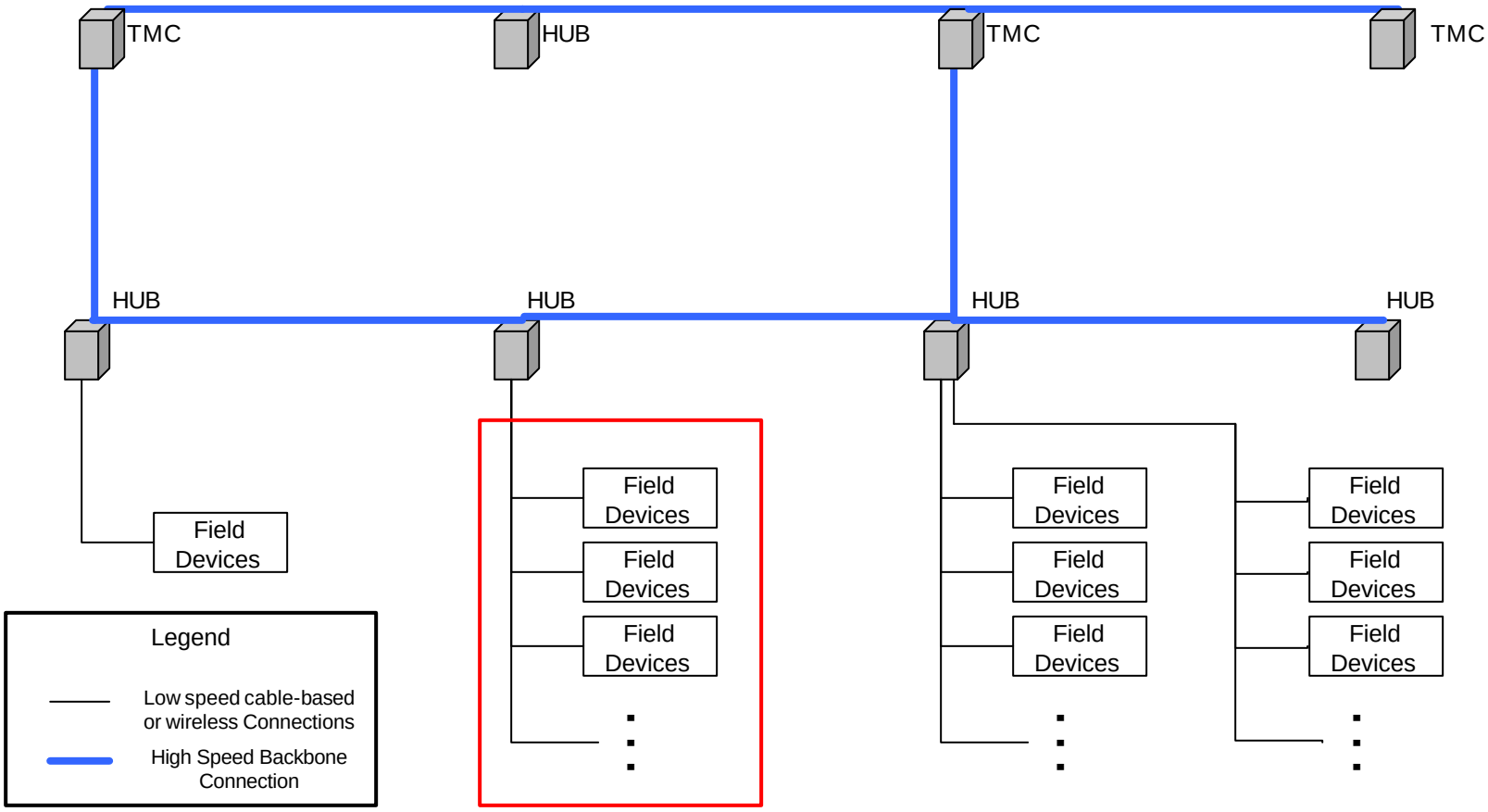
Physical Communication Architecture



Conclusions:

- Main points:
  - IEN as a Virtual Private Network “backbone”
  - Individual links (LCC to LCC) may be leased or agency owned depending upon:
    - the logical communications links to be supported on that physical link
    - Geographic situation
  - Field Network
    - Backbone with last mile circuits

Field Communication Architecture



Recommendations

- **Field to Central Communication (CCTV Video Images)**

  – **Scenario # 1:** Hardwire cable media exists or will be installed

    Fiber: Ethernet IP

    TWP: DSL

  – **Scenario # 2:** No existing communication and distance greater than 300 feet

    Fiber: Ethernet IP or

    DSL (cost issue)

  – **Scenario # 3:** No existing communication and distance to closest Hub or LCC is less than 300 feet

    Ethernet IP over SSR

Recommendations

- **Field to Central Communication (controller data, CMS, and CCTV control)**

  – **Scenario # 1:** Hardwire cable media exists or will be installed

    Fiber: Ethernet IP

    TWP: Analog modems

  – **Scenario # 2:** No existing communication and distance greater than 300 feet

    Fiber: Fiber analog (serial devices) or Ethernet IP

    Leased analog or wireless IP

  – **Scenario # 3:** No existing communication and distance to closest Hub or LCC is less than 300 feet

    Ethernet IP over SSR

Recommendations

- **LCC to LCC (IEN Network) Communication**
  - **Scenario # 1**: High Speed connection (e.g intranet) exists between two LCC locations

    Use if >1.5Mps
  - **Scenario # 2**: Hardwire cable media exists or will be installed between two LCC locations

    Fiber: Ethernet

    TWP: Private DSL
  - **Scenario # 3**: High Speed Internet connection exists to one or more LCC locations

    Use if >1.5Mps
  - **Scenario # 4**: Distance between two LCC's is less than 5 miles and there is no existing communication infrastructure.

    Fiber Ethernet or

    Frame Relay

Communications Analysis (2)

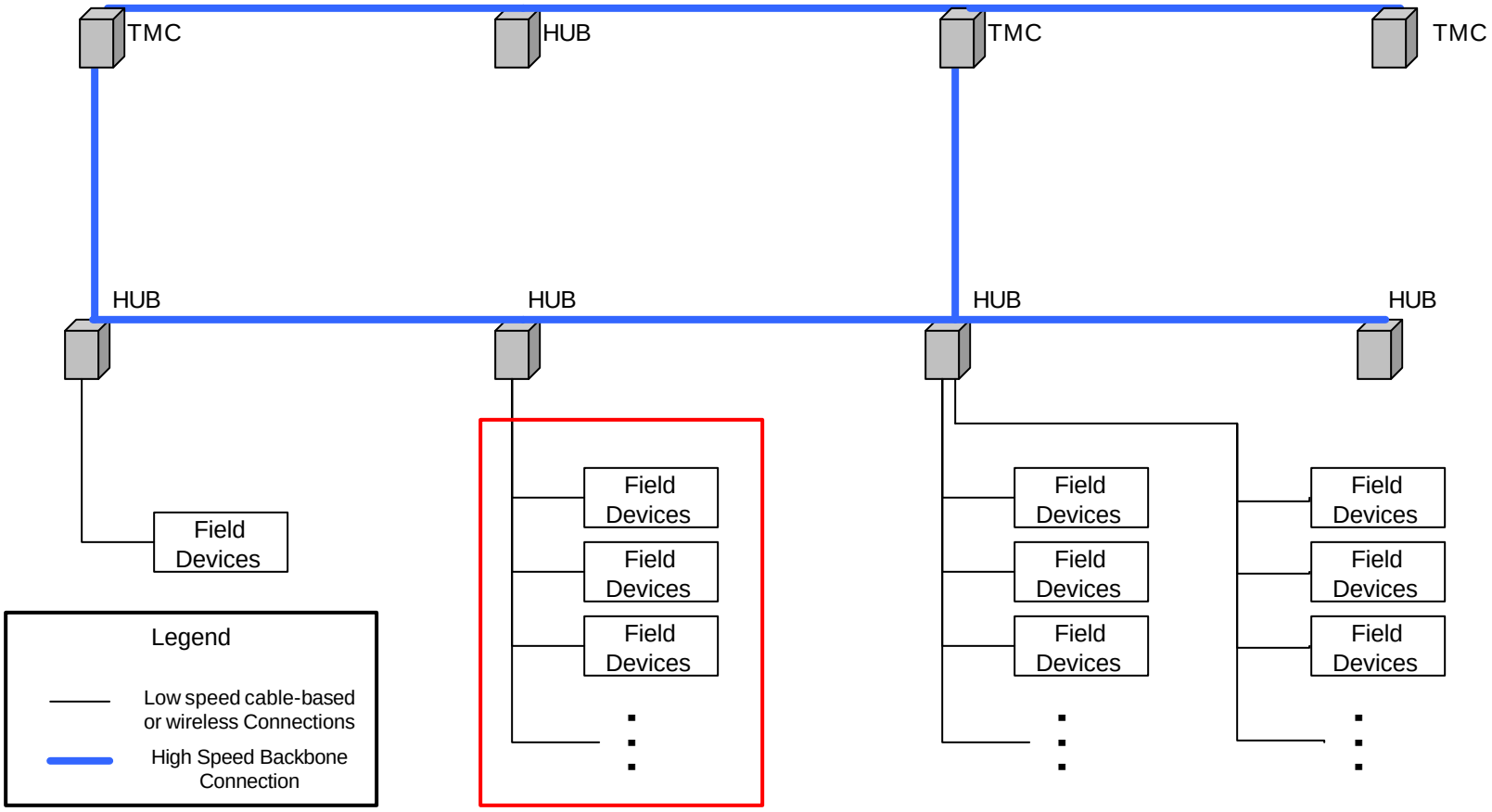
Objective:

- Identify communications technologies specific to the project components
  - Field Communications
  - Center-to-Center

Location Specific

- Starting Point
  - Scenario Recommendations from Communications Analysis Report
  - Sub-regional TMC link excluded
- Assumptions
  - Field Communications (Data and Video)
    - Fiber backbone with tail circuits
  - Center-to-Center Communications (Data)
    - Frame Relay (if no fiber available)
  - Center-to-Center Communications (Video)
    - Internet Technology Based

Field Communication Architecture



Design Approach

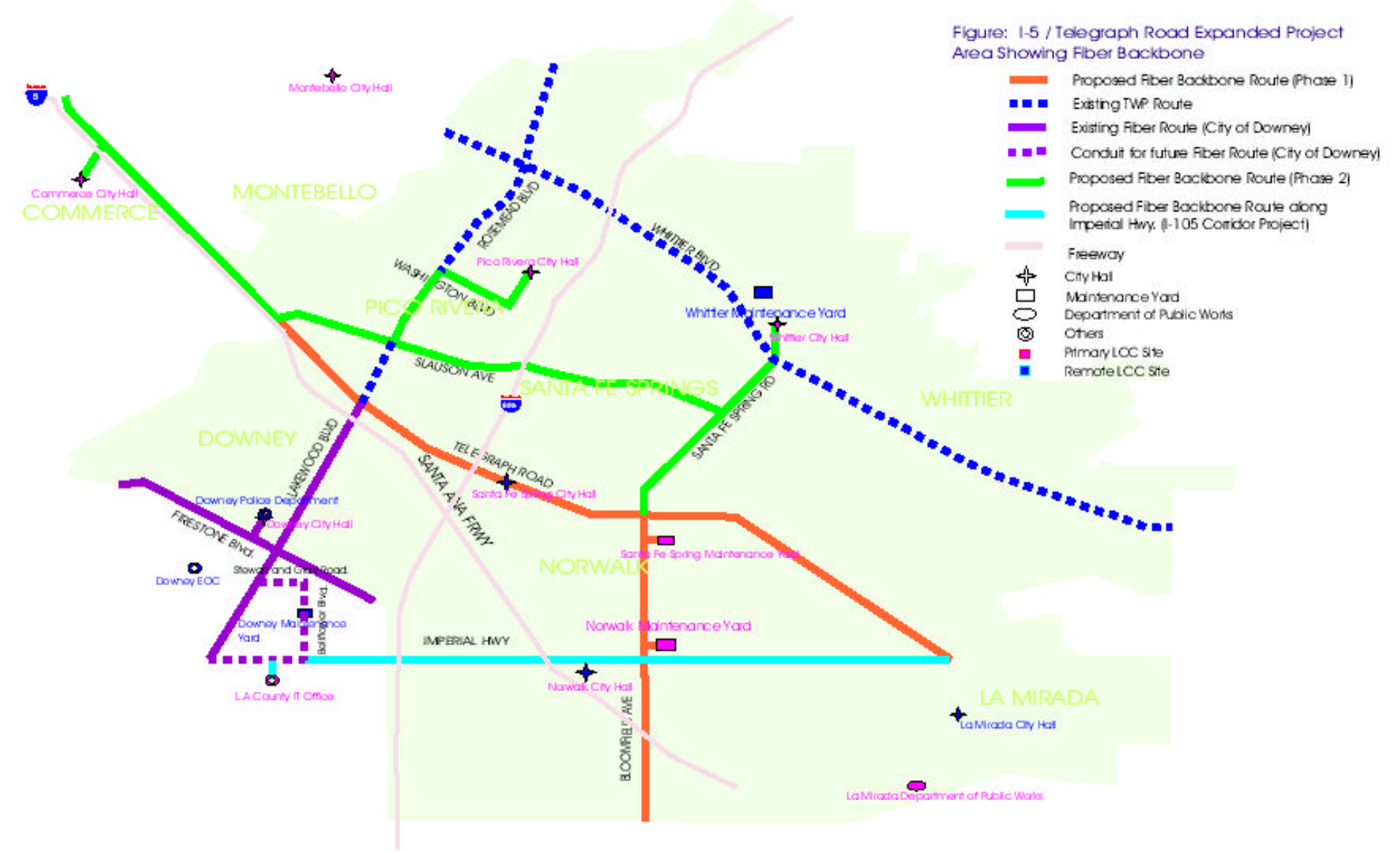
- Use common fiber cable infrastructure across jurisdictions
  - Provides for redundancy
  - Provides path for center-to-center communications
  - Anticipated reductions in installation costs
- Communications technology to be selected per Agency
  - Assign individual fiber pairs to each jurisdiction
  - Field devices directly interconnected to parent LCCs

Design Methodology

- Route fiber-optic cable to CCTV and LCC locations
  - Connect both signals and cameras to fiber at these locations
  - Maximize number of LCCs connected
- Use tail circuits off above fiber to provide communications to other intersections
- For Tail Circuits, use the following selection priority order:
  1. Existing TWP
  2. SSR for locations with clear line of sight
  3. Wireless data services if service is available
  4. Leased telephone lines

Design Methodology (Cont.)

- Define two primary technology solutions per LCC
  - Serial (Analog)
  - Ethernet (Digital)
- Cost out the above two solutions per LCC
- Make recommendations per intersection per LCC
  - Connection method recommendation per intersection
  - Single technology recommendation per LCC
- Recommendation Criteria
  - 10 Year life cycle costs
  - Existing/planned infrastructure
  - Future expansion



Proposed Fiber Backbone

Field Equipment Scenarios

- Serial Analog (Controller Only)
  - Fiber
  - Copper
  - Wireless Serial (SSR)
  - Leased Lines Digital
  - Leased Wireless (3G Digital)

Field Equipment Scenarios

- Serial Analog (Controller and CCTV)
  - Fiber
  - Copper
  - Wireless (SSR)
  - Leased Line Digital

Field Equipment Scenarios

- Ethernet (Controller Only)
  - Fiber
  - Copper
  - Wireless (SSR)
  - Leased Line Digital
  - Leased Wireless (3G Digital)

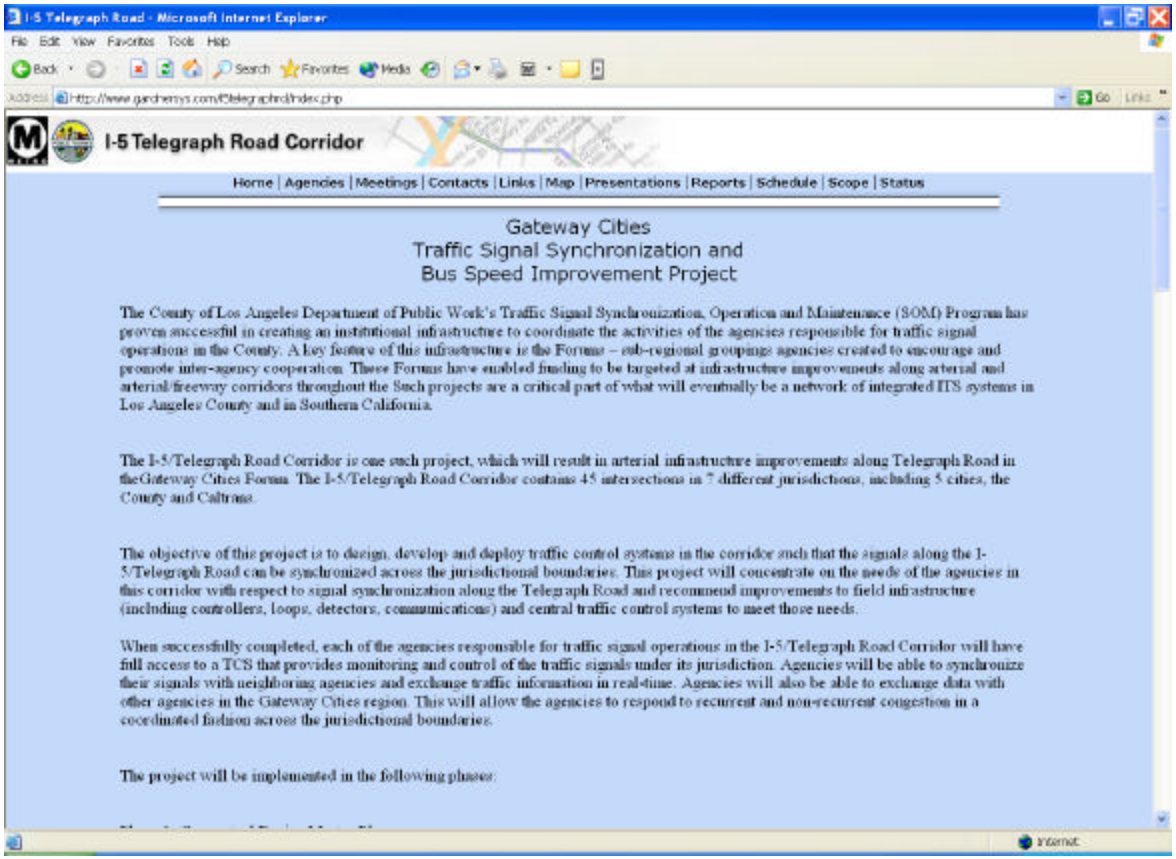
Field Equipment Scenarios

- Ethernet (Controller and CCTV)
  - Fiber
  - Copper
  - Wireless (SSR)
  - Leased Line Digital

Next Steps

- Finalize Device Locations
- Complete Communications Analysis
- Develop Conceptual Design
- Develop Operations and Management Plan

Project Web Page



www.itssiemens.com