CHANDLER arizona

Information Technology Bond Subcommittee

October 2020, Telecommunications & Utility Franchise Administrator: Dennis Aust

Overview

- Introduction
  - Speaker intro
  - Public benefits
  - Public-Private Partnerships
  - City benefits
- History
  - Network growth
  - Challenges
- Fiber Master Assessment and Master Plan
- Capital Projects
- Questions

INTRODUCTION

Public benefits:

- The City of Chandler's Smart traffic system
- Remote connectivity to facilities means effective efficient service delivery with fiscal prudence

Public-Private Partnerships:

- New Development strategies
- Joint Conduit Projects
- Smart Parking

City benefits behind the scenes:

- More efficient government (cutting the red tape)
- Electronic permit applications and plan review

History

- Network Growth
  - Funding (1980’s-today) - A City Traffic Engineering initiative
    - Federal Highway Administration Grants (FHWA)
    - Fire and Public Safety Grants
    - Maricopa Association of Governments (MAG) Intelligent Traffic System (ITS) Grants
- Challenges
- Fiber Master Assessment
- Fiber Network Overview
- The future - Capital Projects 7 year plan

Challenges

- Usage restrictions and loop length limitations
- Lack of Resiliency or Diversity
  - Fiber hits create outages
- Lack of Maintenance Conduit
  - Aging fiber replacements create

Fiber Master Plan

Project Description:

- The Citywide Fiber Project is instrumental to assess the City's current state, strategic fiber usage, expected growth and long-term replacement cycles resulting in the development of a 7 year Master plan with governance policies

Project Goals:

- Complete Current State Condition Assessment ("As-Is")
- Identify and prioritize Fiber Risks and develop a Fiber Risk Mitigation plan (Continuous Improvements)
- Establish a Strategic Fiber Master plan ("Future State")
- Define a fiber governance management plan to support the Fiber Master plan (Standards, Support and Maintenance)

Fiber Master Plan

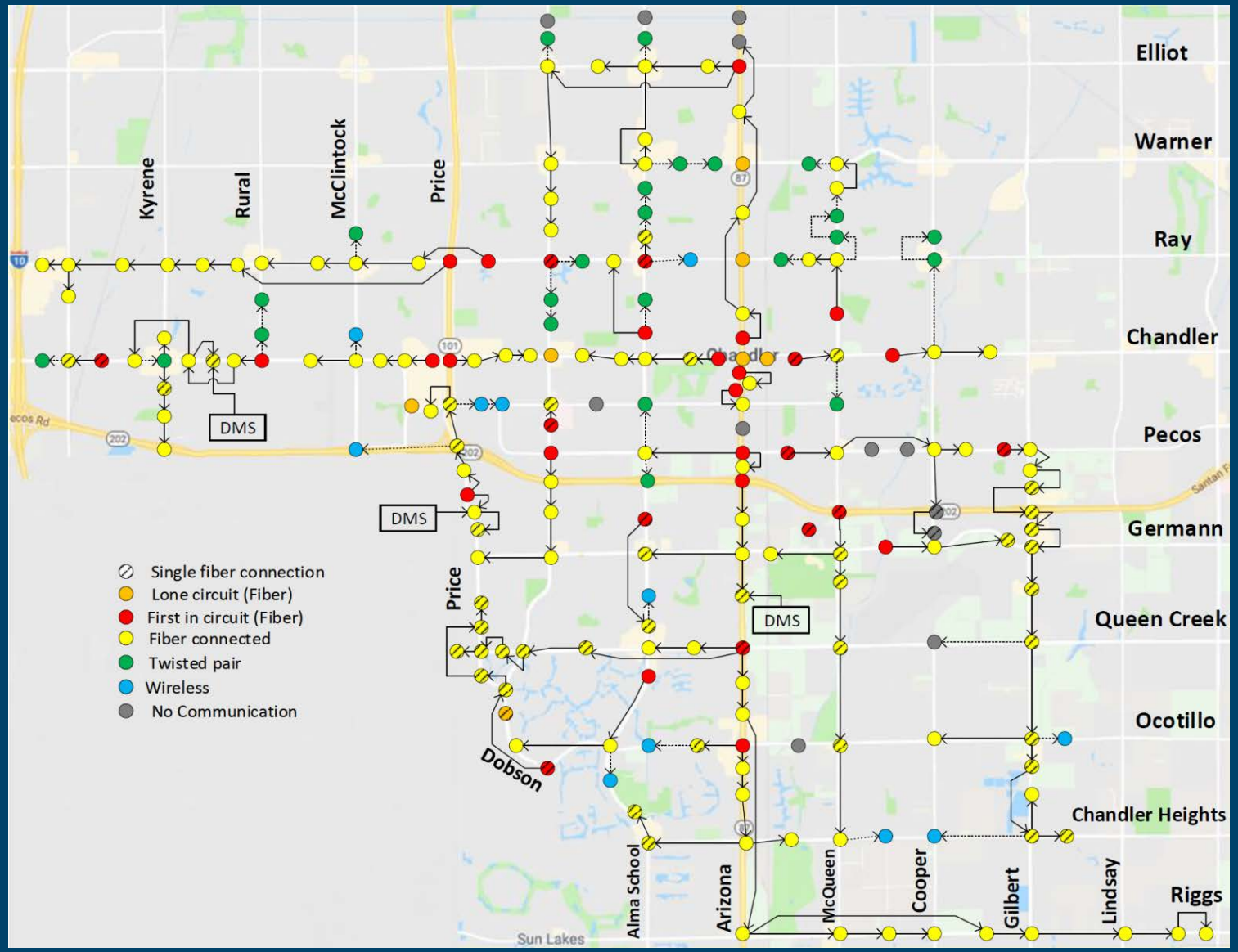
Fiber Assessment Goals achieved:

- Updates to the OSP database using Physical Fiber Network Audits with independent field verification
- 4,800 LIU port “dark fiber” test including Traffic Signals & Transit Stops identified in the Gap analysis
- 216 Traffic Signal Cabinet LIU locations audited with updated maps in cooperation with TMC staff
- 227 Fiber Splice Points assessed & updated for GPS coordinates, Splice type, photos & conduit/cable info
- 100 Internal SP audits to determine the actual fiber condition and splice path for a more accurate record.
- Inventory and Audit Reports generated using Citywide resources (e.g.: CIP, PD, TMC, IT, Valley Metro etc…)
- Identified 6 serious existing fiber splice point concerns assessed and remediated without further incident

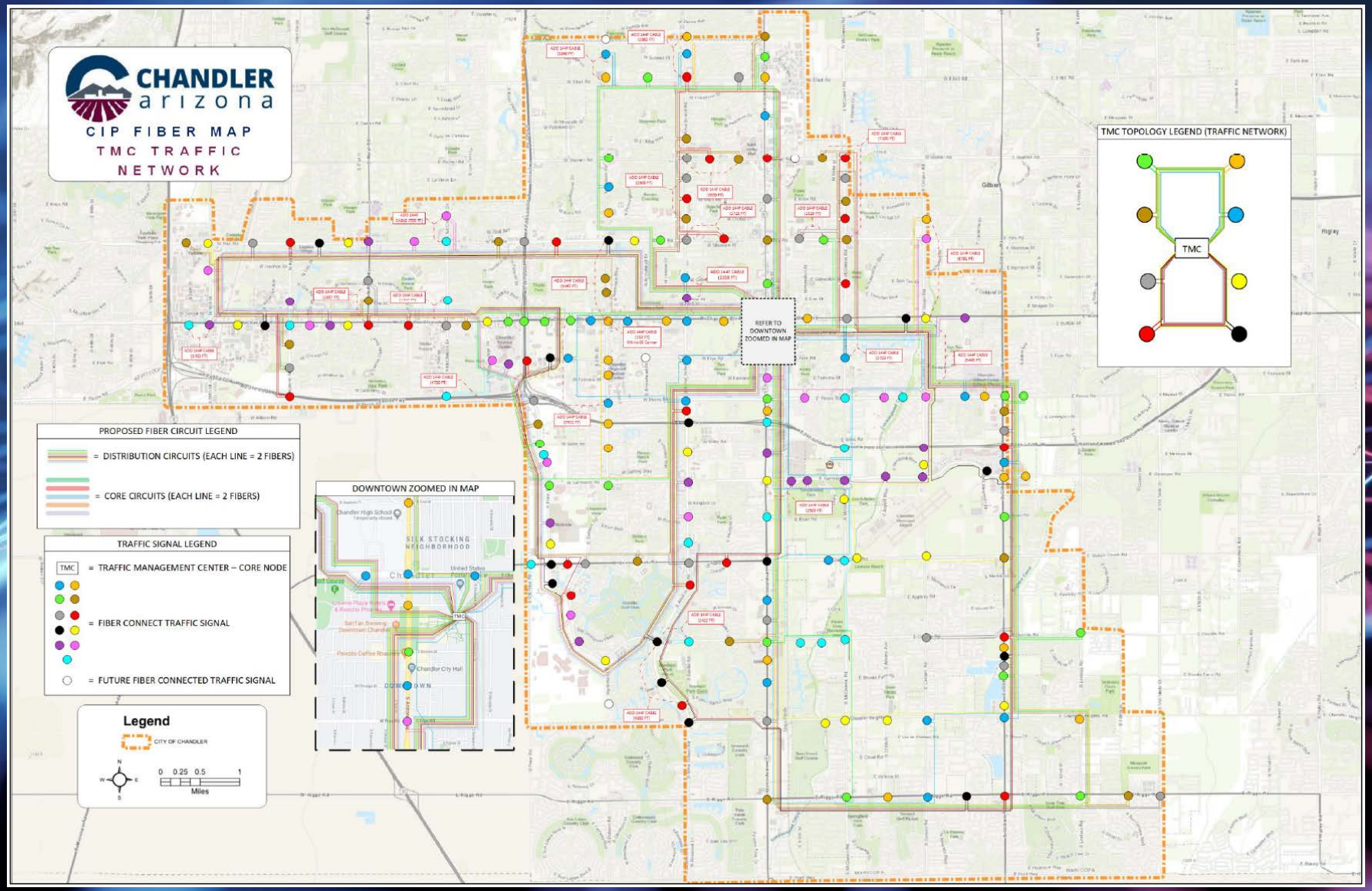
Needs Assessment goals achieved:

- (7) Master Planning workshops held with surrounding City, County and State participation
- Strengths, Weakness, Opportunities, and Threats (SWOT) and RACI analysis to evaluate existing vs future network and resource needs
- Fiber asset assessment, Needs Assessment , Gap Analysis, and Risk Management Reports that includes security, reliability, and sustainability requirements.

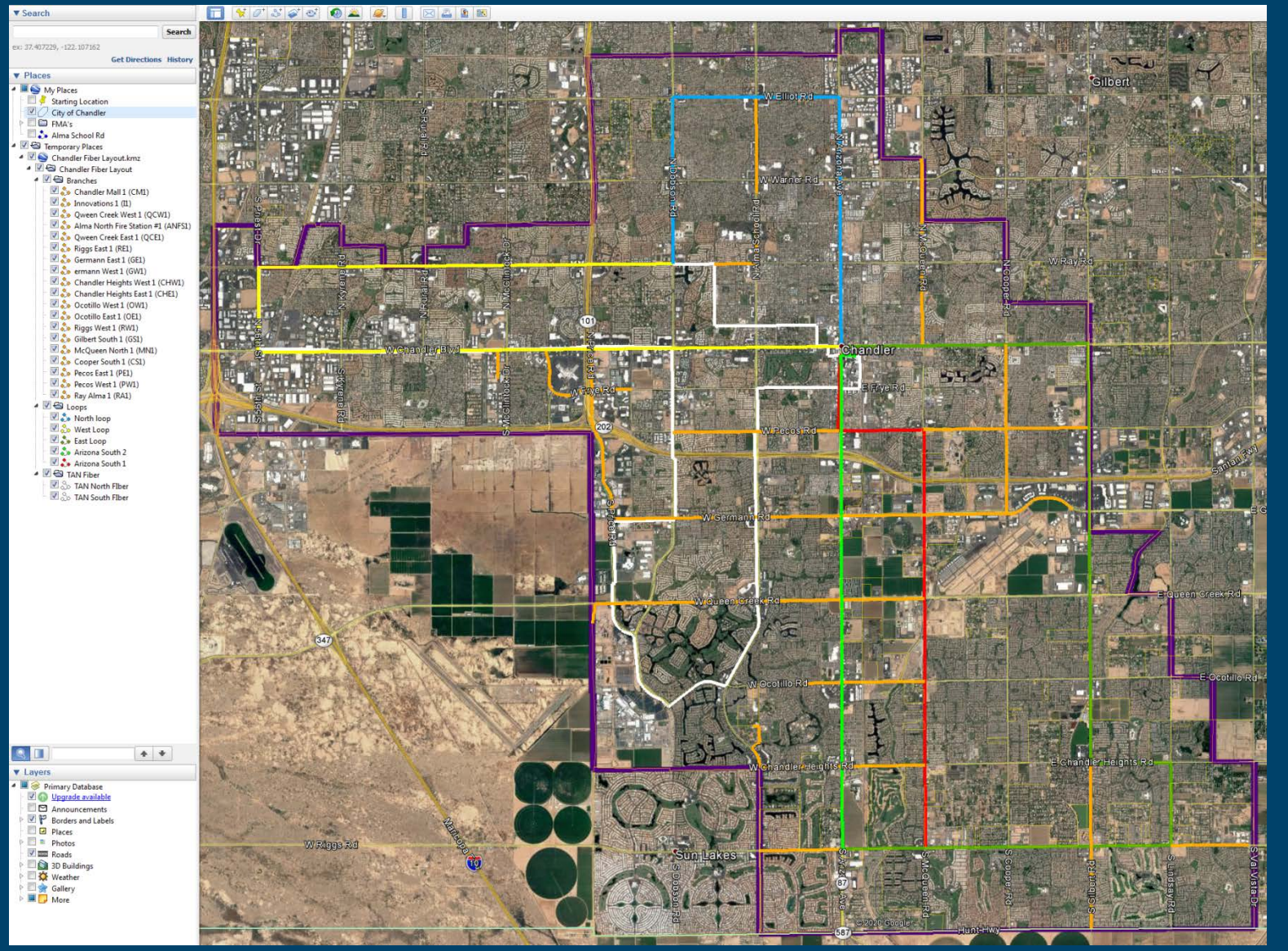
Current Traffic Network



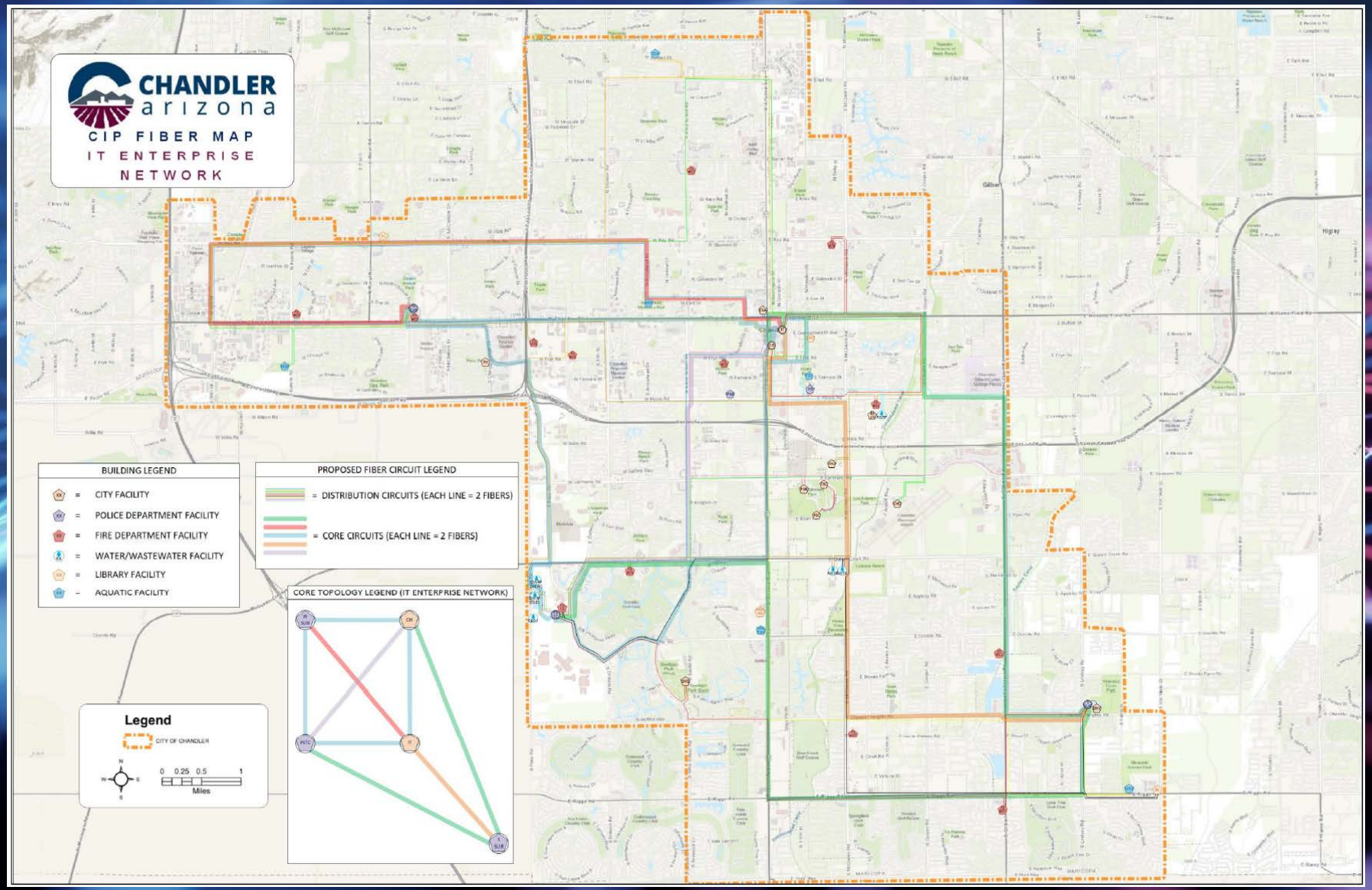
Recommended Traffic Network



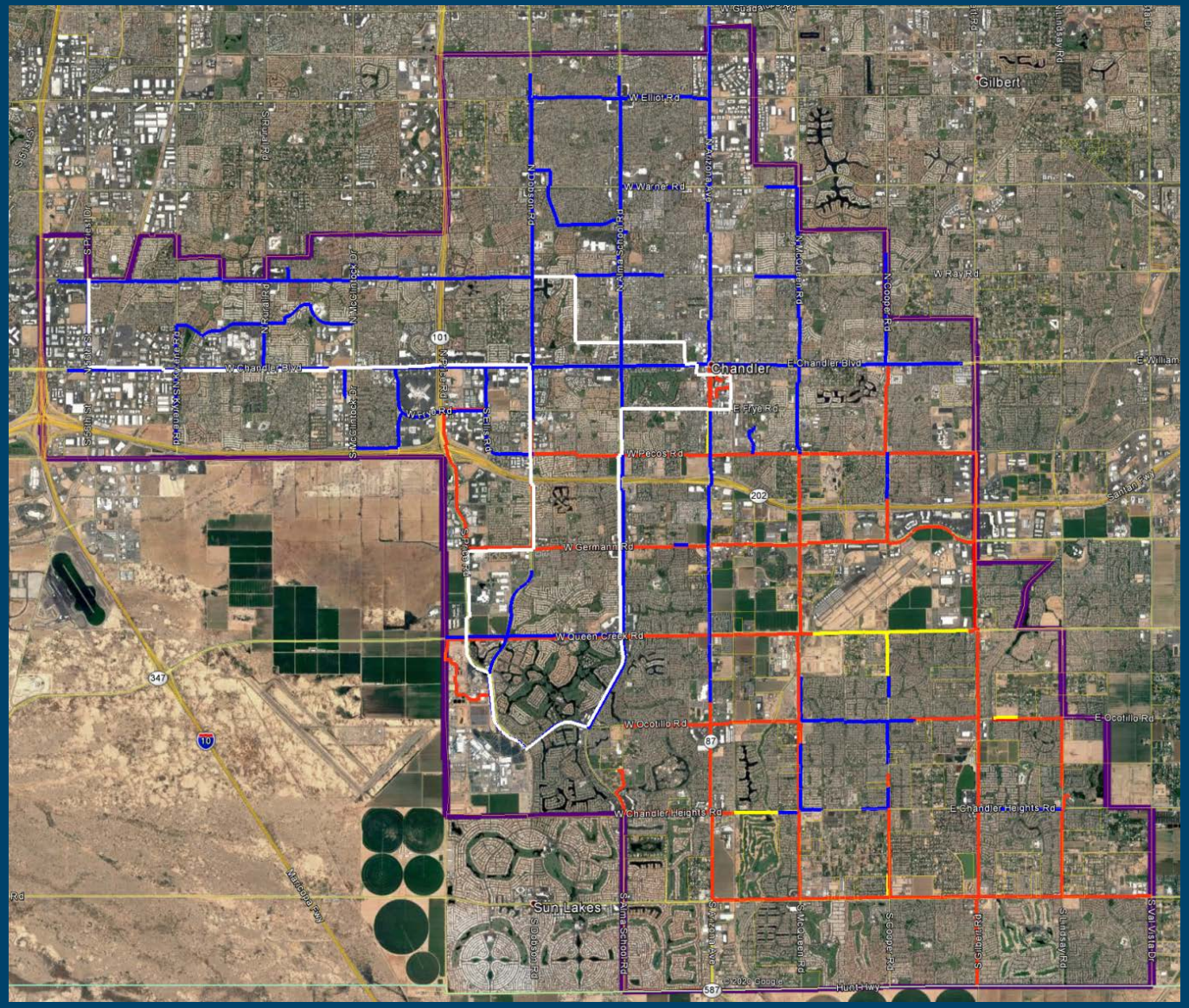
Existing Fiber Layout



Recommended Fiber Topology



Existing Fiber Conduit Layout



Tumbleweed Campus

CIP Table 2

ID	Recommendations	Design / Field Verification	Construction / Database Updates
PRIORITY #1 (NEAR-TERM 0-7 YEARS): COMPLETE REMAINING INVENTORY AND OSP DATABASE UPDATES			
C-1A	Dobson Road Field Verification Project	$38,000	$9,000
C-1B	Dobson Road Field Verification Project	$12,000	$3,000
C-1C	Tumbleweed Park Field Verification Project	$13,000	$3,000
C-1D	Germann Road and Hamilton Street Field Verification Project	$9,000	$2,000
C-1E	Inventory and Audit of Chandler Downtown Campus Fiber Assets	$25,000	$5,000
C-1F	Inventory and Audit of Various Campus Fiber Networks	$250,000	$50,000
C-1G	Replace Aged 48 Strand Fiber Cable	$12,000	$120,000
C-1H	Convert City Facilities to Core Switch Hub Locations – Secondary Fiber Entrance	$89,000	$420,000
C-1I	Convert City Facilities to Core Switch Hub Locations – New Core Switch Equipment	$40,000	$460,000
C-1J	New Distribution Switch Equipment	$28,000	$327,000
C-1K	Re-splicing for Proposed Network Topologies	$122,000	$570,000
C-1L	Add New 144 Strand Fiber Cable in Existing Conduit	$90,000	$410,000
C-1M	Add Gator Patch Panels to Traffic Signals Not Currently Connected via Fiber	$35,000	$410,000
C-1N	Add Traffic Signal Cabinet Layer 2 Switches with Some Layer 3 Functionality	$50,000	$550,000
C-1O	City-wide Conduit Path Field Verification and Associated OSP Database Layer	$1,100,000	$92,000
C-1P	Add Additional Layers and Fields to OSP Database	$0	$350,000
	TOTAL	**$1,926,750**	**$3,781,000**

CIP Tables 3 & 4

ID	Recommendations	Design / Field Verification	Construction / Database Updates
PRIORITY #2 (MID-TERM 7-13 YEARS): MODIFY EXISTING NETWORK TO CREATE RELIABILITY AND PATH DIVERSITY			
C-2A	Adding New 144 Strand Fiber Optic Cable in MCI Joint Conduit Installations	$150,000	$700,000
C-2B	Replacement of Fiber Optic Cables Reaching the End of their Lifecycle	$210,000	$900,000
C-2C	New Conduit/Fiber to Facilities within 1000' of Existing Conduit	$280,000	$1,220,000
	TOTAL	**$640,000**	**$2,820,000**

ID	Recommendations	Design / Field Verification	Construction / Database Updates
PRIORITY #3 (LONG-TERM 13+ YEARS): UPDATE ASSETS AND IMPROVE NETWORK			
C-3A	New Conduit/Fiber to Facilities beyond 1000' of Existing Fiber Conduit	$550,000	$2,550,000
C-3B	Unfold Folded Rings	$150,000	$680,000
	TOTAL	**$700,000**	**$3,230,000**

Questions & Next Steps