MARICOPA ASSOCIATION of GOVERNMENTS

COMMUTER RAIL

System Planning

System Review Team Kick-off

June 30, 2009

URS

Meeting Agenda

- Introductions and Roles/Responsibilities of Team
- Project Background and Overview
- Study Goals & Objectives
- Objectives/Work Flow
- Schedule
- Coordination/Milestones
- Next Meeting

Introductions and Roles

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Responsibilities of Team

Consultant Team

- **URS:** Project management, operations, stations/land use
- **Gannett-Fleming:** Design engineer
- **Goodman-Schwartz:** Public involvement
- **Lima & Associates:** Rail operations and GIS mapping
- **Lonnie E. Blaydes Consulting:** Railroad coordination
- **Dunbar Transportation Consulting:** Technical assistance for ridership forecasting
- **Parsons Brinckerhoff:** Technical assistance for ridership forecasting

System Review Team

- **Project Management Team**
  (MAG, ADOT, RPTA & METRO)
- **Union Pacific Railroad**
- **BNSF Railway**
- **Local Jurisdictions**

Project Background

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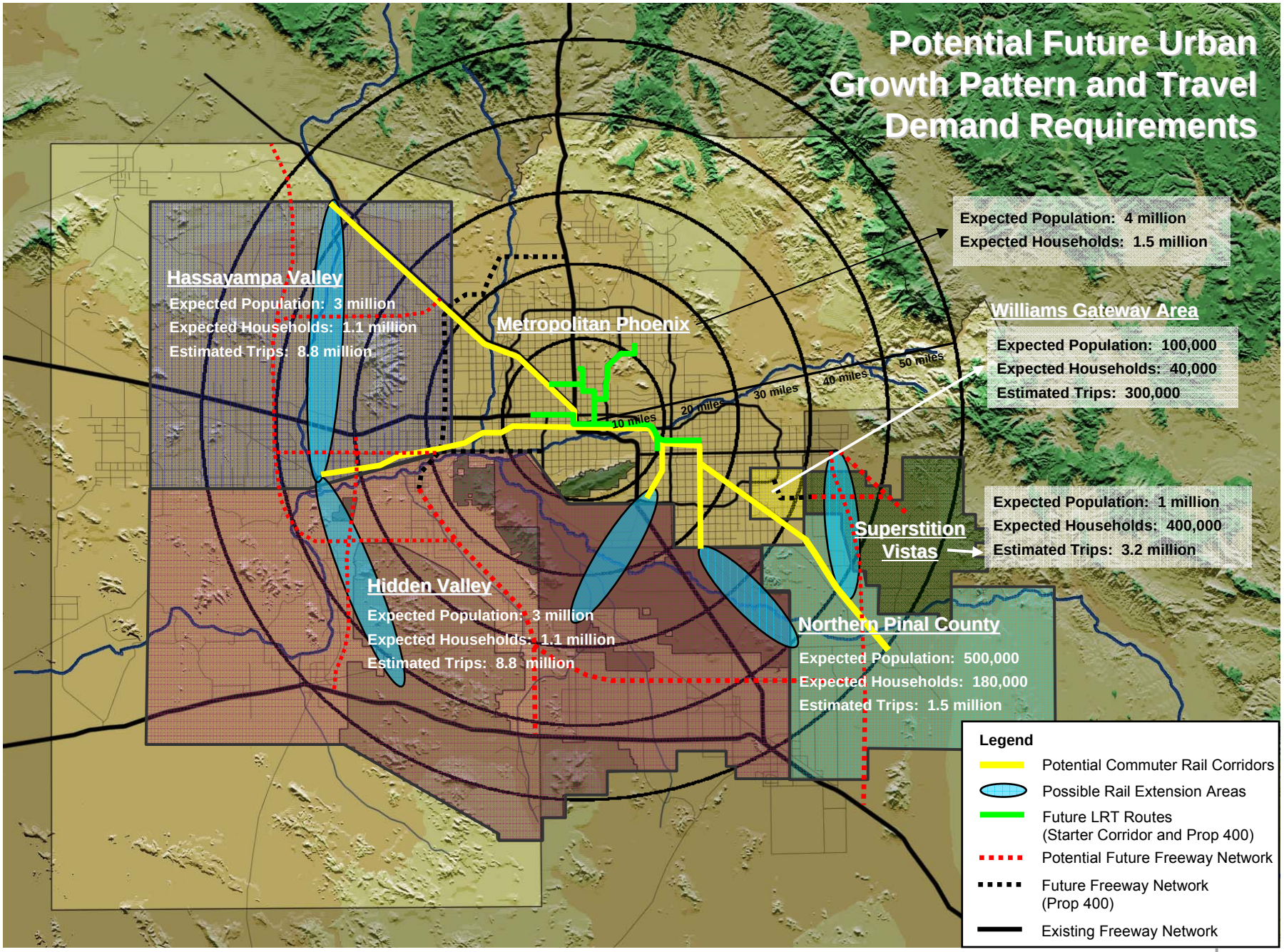
Overview



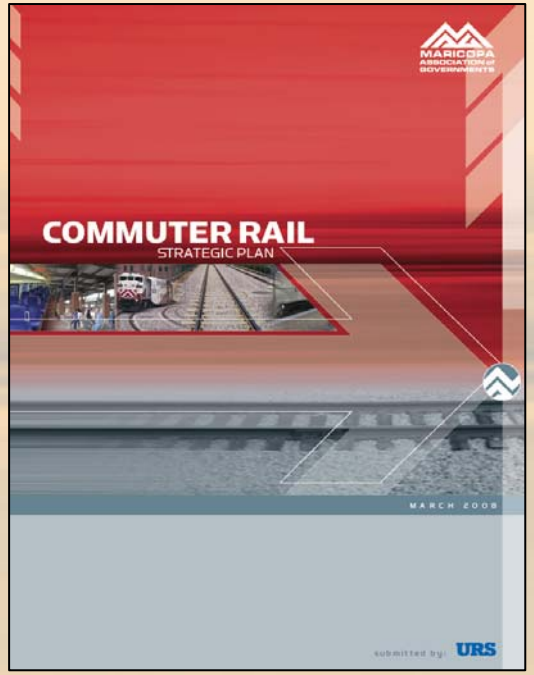
09/25/06

DMJM HARRIS | AECOM

Commuter Rail Strategic Plan

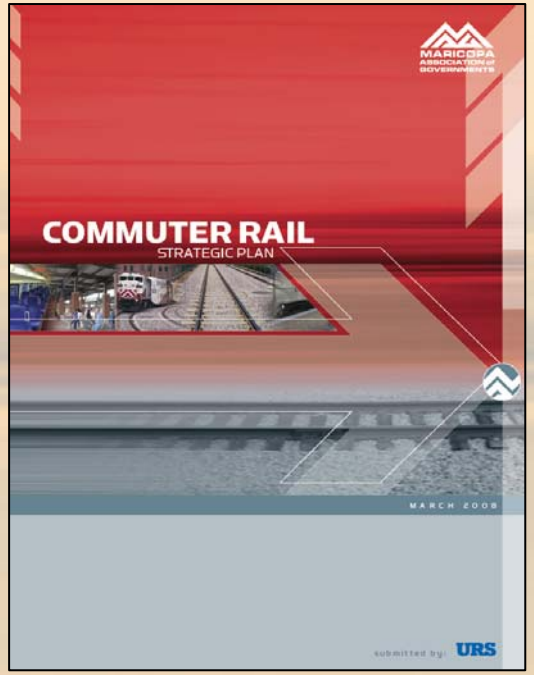
- Previous transit studies showed that commuter rail service operating on freight rail lines could offer an alternative transportation mode in congested primary corridors in the region.

- Proposition 400 approved by voters in November 2004 and allocated a portion of sales tax revenues to study the options for commuter rail.



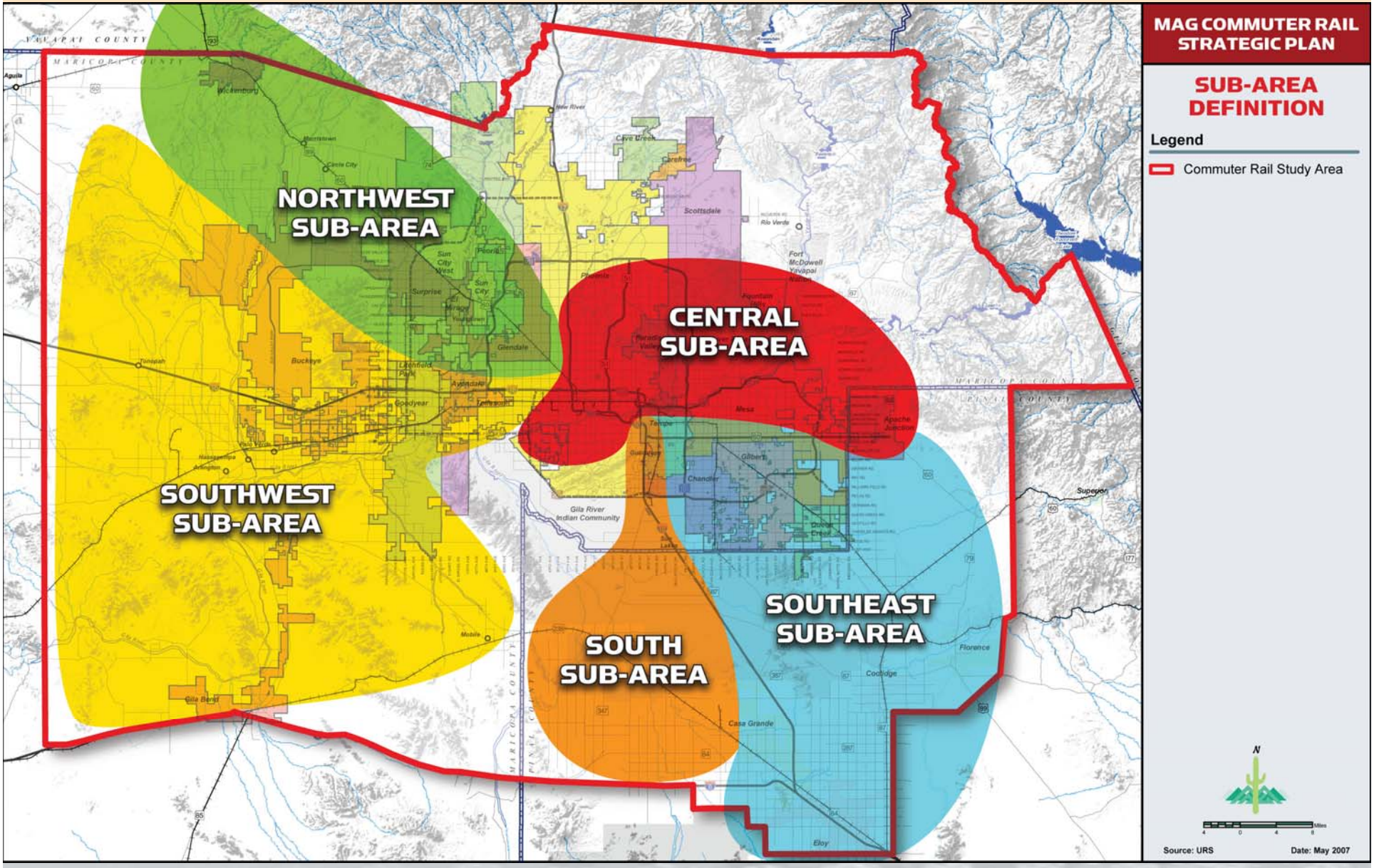
Commuter Rail Strategic Plan

- The Commuter Rail Strategic Plan was initiated by MAG to define the steps needed to be taken for Maricopa and Northern Pinal Counties to plan for and potentially implement commuter rail service.



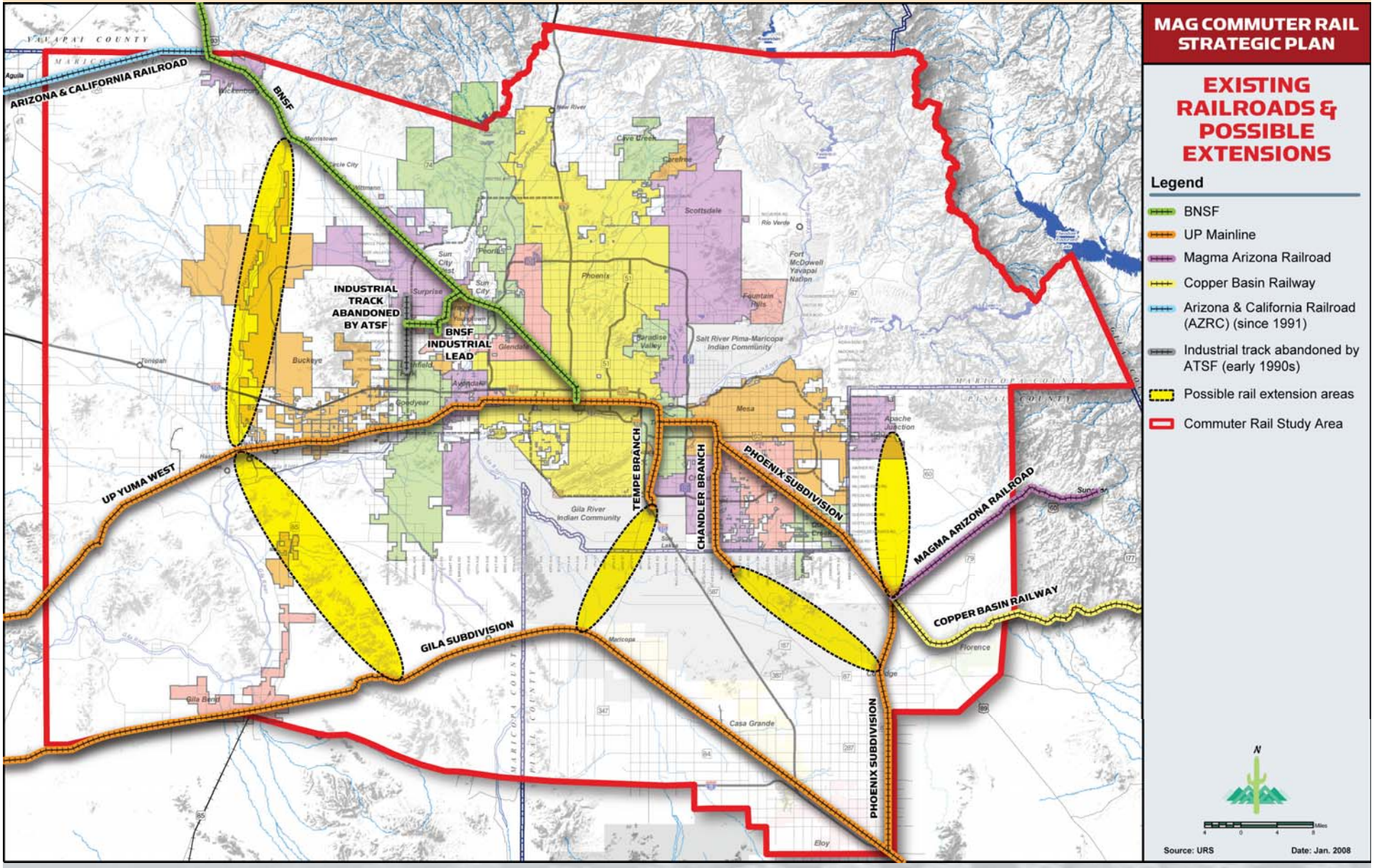
Commuter Rail Strategic Plan

- **Contributing Organizations**
  - Maricopa Association of Governments (MAG)
  - Pinal County
  - Arizona Department of Transportation (ADOT)
  - METRO
  - Regional Public Transportation Authority (RPTA)
  - Commuter Rail Stakeholders Group


MAG COMMUTER RAIL STRATEGIC PLAN
SUB-AREA DEFINITION
Legend
Commuter Rail Study Area
NORTHWEST SUB-AREA
CENTRAL SUB-AREA
SOUTHWEST SUB-AREA
SOUTH SUB-AREA
SOUTHEAST SUB-AREA
Source: URS
Date: May 2007

Commuter Rail Strategic Plan

- **Potential Commuter Rail Corridors**
  - BNSF/Grand Avenue
  - UP Mainline/Southeast
  - UP Mainline/Chandler
  - UP Mainline/Tempe
  - UP Mainline Yuma/West
  - Possible Extensions/Northern Pinal County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ARIZONA & CALIFORNIA RAILROAD
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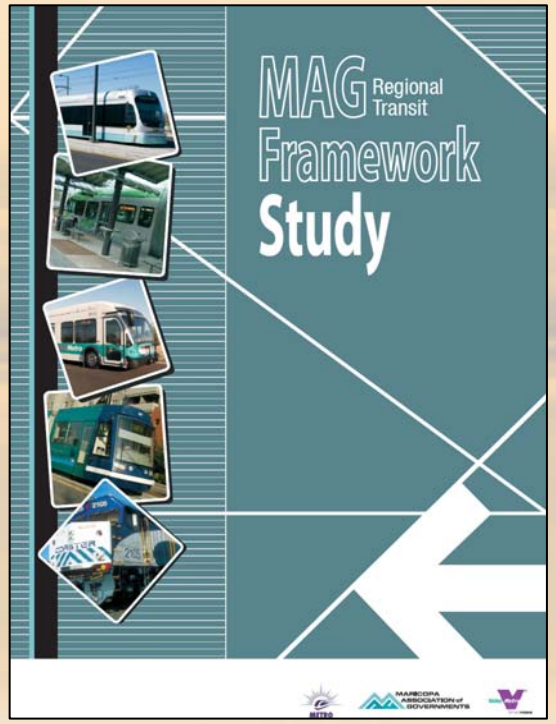
INDUSTRIAL TRACK ABANDONED BY ATSF
BNSF INDUSTRIAL LEAD
UP YUMA WEST
GILA SUBDIVISION
TEMPE BRANCH
CHANDLER BRANCH
PHOENIX SUBDIVISION
MAGMA ARIZONA RAILROAD
COPPER BASIN RAILWAY
PHOENIX SUBDIVISION
Source: URS
Date: Jan. 2008

Commuter Rail Strategic Plan

- **"Get Started" Scenario - Typical Characteristics of Each Corridor**
  - 5 trains per peak period in peak direction
  - 1 reverse commute trip in peak period
  - 1 mid-day trip
  - 1 evening trip
  - 4-car trains
  - ~10,000 riders/day
  - $50-$400 million capital cost

MAG Regional Transit Framework Study

- **What is it?**
  - Component of statewide transportation planning framework
  - Multi-modal strategy to achieve a sustainable transportation future
  - Defines long range transit needs with multiple planning horizons: 2030, 2050



Role of Commuter Rail

- **Commuter Rail**
  - Larger, heavier, roomier than light rail
  - Higher maximum speed, slower acceleration and deceleration than light rail, but still has good travel time and reliability
  - Uses latest in clean diesel technology
  - Typically longer station spacing (every 3-5 miles avg.) than light rail (1-2 miles) with emphasis on park-and-rides

Role of Commuter Rail (cont.)

- Meets federally mandated structural requirements for rolling stock
- Can share ROW, track with freight (does not need exclusive right-of-way like light rail)
- Lower cost per mile ($10-$20M) than light rail ($40-$60M)

Role of Commuter Rail (cont.)

- **Locomotive-hauled coaches**

Role of Commuter Rail (cont.)

Characteristic	Light Rail	Commuter Rail
Corridor length	5-20 miles	10-50 miles
Right-of-way	Exclusive (separate from other trains) or semi-exclusive (shared street ROW)	Can be shared with freight
Street running possible?	Yes	No
Average station/activity center spacing	½ to 2 miles	5-7 miles +
Speeds (avg/max)	20/55 mph	30/79 mph
Minimum turning radius	90'-100'	300'
Typical train lengths	2-3 cars	2-8 cars
FRA compliant (crashworthy) required?	No	Yes unless physically or temporally separated from freight
Typical service frequency	5-15 minutes peak 10-20 off-peak	20-30 minutes peak 30-60 off-peak

Recent Commuter Rail Implementation

- The implementation of commuter rail in other areas provides an outline of potential issues and lessons to be learned.
- A project from Rail North Texas provides a useful list of lessons to be learned and potential issues to be aware of.

BUSINESS MODEL : Parameters Outline Participants and Relationships

Business Issue	Transit Agency	Freight Railroad
Track Ownership	Purchases, improves, and assumes control	Sells and relinquishes control
Track Maintenance	Pays all costs and defines standards subject to FRA regulation; define limits of agency ownership	Identifies needs for continued freight service; define limits of freight ownership
Track Access	Manages freight and passenger schedule interactions	Perpetual and exclusive trackage rights, subject to per-use fee
Liability	Assumes all risks over and above the old status quo	Provides suitable insurance for own employees and operations
Capital Financing	Uses traditional public transit financing mechanisms	Pays for freight-specific improvements on an incremental basis
Incident Management	Leads the incident site and recovery effort	Assists as necessary if freight equipment is involved
Operating Rules	Maintains railroad-like rules for both freight and passenger operations	Coordinates with transit agency and FRA to identify rules necessary to preserve and operate freight service
Employee Training	Trains transit employees and provides cross-training where needed	Trains freight employees for operation on transit territory
Emergency Recovery	Retrieves disabled passenger equipment and evacuate passengers	Retrieves disabled freight equipment so that transit service can resume
Labor Laws	Avoids rail labor laws	Operates under railroad labor laws
Command and Control	Combined Command-and-Control system with either temporal separation or "fail-safe train separation"	

Key Issues/Lessons Learned

- Issue: **Railroad Coordination**
  - Keep railroads informed and involved
  - Collect as much data as possible
  - Be realistic in developing operating agreements and scenarios
  - Understand the railroads' perspective

Key Issues/Lessons Learned (cont.)

- Issue: **Cost Estimating**
  - Update cost estimates annually or more often
  - Be conservative but use recent actual industry prices
  - Be sure stakeholders understand the baseline estimate

Key Issues/Lessons Learned (cont.)

- Issue: **Rail Vehicles**
  - Long lead-time, unpredictable cost item
  - Explore options early
  - Prepare stakeholders for options
  - Be flexible
  - Look for partnering opportunities with other agencies

Key Issues/Lessons Learned (cont.)

- Issue: **Existing and Future Land Use Plans**
  - Consider necessary land use changes and timing
  - Consider jurisdictional desires
  - Manage expectations and be realistic
  - Additional work needed before located station nodes

Key Issues/Lessons Learned (cont.)

- Issue: **Community Issues**
  - There will always be opposition so be prepared
  - Try to answer all questions (within reason)
  - Educate the public and be proactive
  - Be realistic as to what the impacts will be
  - Usual suspects: traffic impacts at crossings and park-and-rides, safety, quiet zones, property values

Key Issues/Lessons Learned (cont.)

- Issue: **Funding**
  - There are no easy answers
  - Federal funding may not always be realistic
  - Local funding has budget and schedule advantages
  - Finding right mix of funding that has public, agency and legislative support
  - Funding sources needed for both capital and operating expenses

Study Goals & Objectives

Purpose of the Project

- Evaluate commuter rail options for the MAG region and the potential connecting routes immediately adjacent to the MAG region.
- Establish priorities for implementing commuter rail service through the evaluation of ridership potential, operating strategies, and associated capital and operating costs.
- Evaluate existing freight corridors and possible rail extension areas identified in the Commuter Rail Strategic Plan.

Study Goals & Objectives

- **This study will explore and document:**
  - Ridership forecasting: Evaluate passenger boardings under alternative operating configurations using the MAG TransCAD travel demand model.
  - Southeast Valley: Evaluate commuter rail options in the Southeast Valley, including possible extensions into areas immediately adjacent to the Southeast Valley.
  - Railroad Coordination: Develop long term-relationships with railroads operating within the study area, to provide an opportunity for the accommodation of commuter rail service.

Study Goals & Objectives (cont.)

- Statewide and Inter-regional Plans: Provide inputs into the Statewide Rail Framework Study, including ridership forecasts, operating configurations, capital requirements, community input, planning level cost estimates, and other factors.

- Prioritization: Establish a ranked prioritization for implementation of commuter rail corridors and future corridor development plans in the MAG region.

- Coordination: Provide strong coordination with other two ongoing MAG Commuter Rail Projects, which include: Grand Avenue Corridor Development Plan and Yuma West Corridor Development Plan.

Project Coordination

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Major Milestones

Project Coordination & Major Milestones

- PMT Meetings
- System Review Team Meetings
- MAG Committee Briefings
- Project Management Plan
- Stakeholder Involvement Plan
- Milestones:
  - Project Initiation
  - Corridor Definition/Data Collection
  - Issue Identification / Evaluation Criteria
  - Alternatives Development / Initial Screening
  - Detailed Evaluation (including TransCAD modeling analysis)
  - Financial Analysis
  - Corridor Prioritization
  - Institutional and Implementation Mechanisms
  - Final Report

System Study Factors

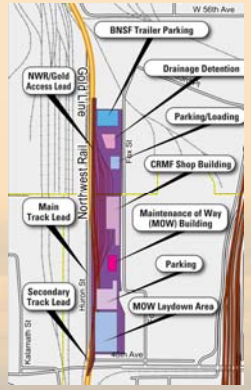
System Study Factors

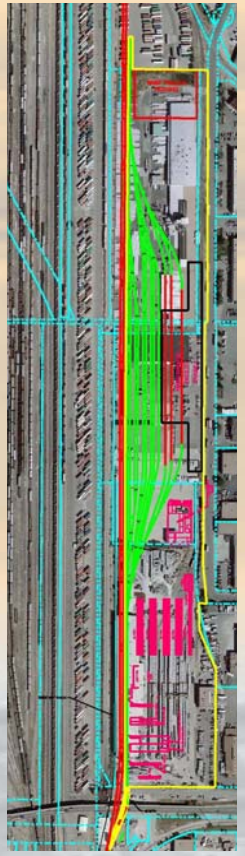
- Elements common to all corridors
- Operations/station/ridership analysis
- Cost methodology
- Corridor evaluation process

Commuter Rail Corridor Common Features

1. Maintenance facilities

- Central facility for rolling stock heavy maintenance, maintenance-of-way
- Assumed to be somewhere near central Phoenix
- Layover facilities likely at end of each corridor



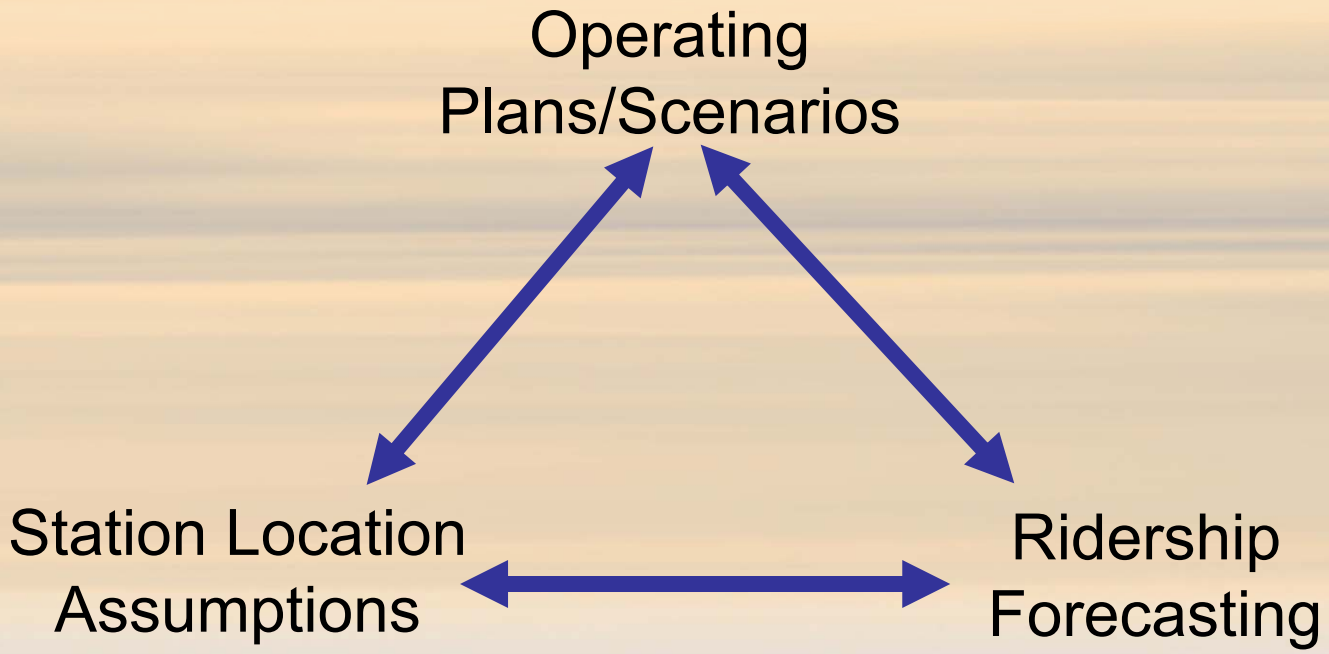


Commuter Rail Corridor Common Features (cont.)

2. Vehicle technology

- Assumed to be locomotive-hauled coaches
- Consistent technology, performance characteristics across all corridors

Operations/Stations/Ridership



Operations/Stations/Ridership (cont.)

1. **Develop initial operating concepts**
2. **Review/refine initial regional assumptions for stations:**
   - High-Capacity Transit Study
   - Commuter Rail Strategic Plan
   - Regional Transit Framework Study

Operations/Stations/Ridership (cont.)

3. **Refine operating plans**
   - Station spacing
   - Run times (including dwell times)
   - Fleet size assumptions
4. **Input into travel demand forecasting process**
5. **Run forecasts**
   - Stand-alone corridors first; evaluate vs. No Action
   - Interlining or networks next; evaluate vs. No Action
   - Model runs in July

Cost Methodologies

Capital costs:

1. **Grand/Yuma Corridors**: based on individual infrastructure components (length of track, number of turnouts, special conditions, etc.) since more detail is available
2. **System Study Corridors**: unit per-mile costs based on current industry costs, engineering/ constructability issues, railroad issues (sliding scale based on degree of complexity)

Cost Methodologies (cont.)

Operating and maintenance costs:

1. **All Corridors**: based on analysis of comparable systems; latest estimates for labor, fuel, etc.; National Transit Database reports on operating costs.

Modeling Process

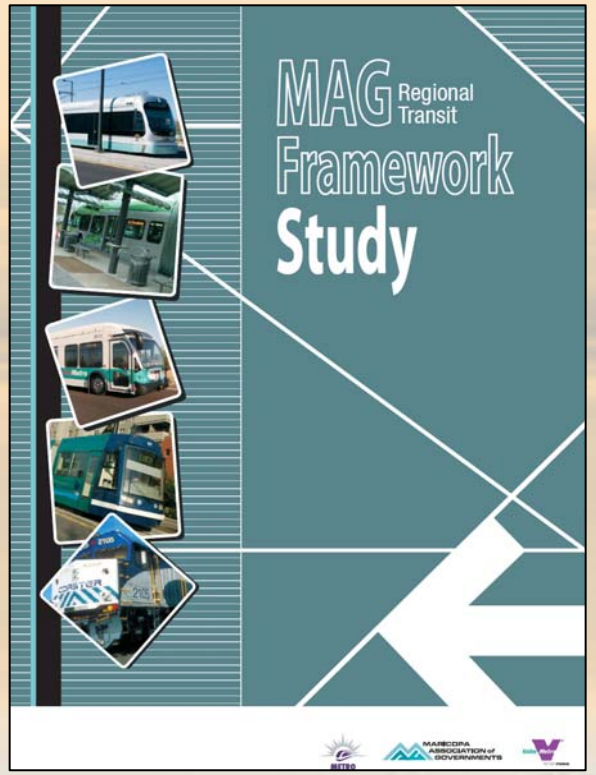
- The MAG TransCAD model update is currently underway, which includes the addition of the commuter rail mode.
- TransCAD modeling results will be compared to previous forecasts, including those from the High Capacity Transit Study.
- The MAG Study Team will evaluate ridership projections relative to various operation scenarios and potential station locations.
- Ridership projections will be based on modeling work for years 2015, 2030 and 2050.
- Grand Avenue sensitivity run results are expected in early July.
- System wide ridership forecasts are expected in July as well.

Commuter Rail Corridor Evaluation Process

- **Reviewed goals from Strategic Plan**:
  - Shape regional growth
  - Improve mobility opportunities
  - Provide seamless and cost-effective option
  - Promote sustainability
  - Increase public/private cooperation

RTFS Operational Characteristics

- **Reviewed Regional Transit Framework Study categories**
  - **Primary mode choice**
    - Flexibility for speed/travel time
    - Potential demand
  - **Rider perception**
    - Regional connectivity
  - **System/policy compatibility**
    - Land use connections



Commuter Rail Corridor Evaluation Process

- **Developed as many comparable categories and criteria as possible, which focused on**:
  - Primary mode choice
  - Rider perception
  - System/policy compatibility
  - Cost-effectiveness
  - Implementation/constructability

Commuter Rail Corridor Evaluation Process (cont.)

- **Primary mode choice:**
  - Estimated corridor end-to-end travel time savings
  - Total daily ridership forecast
  - Total peak hour ridership forecast

- **Rider perception:**
  - Direct connections to activity centers

Commuter Rail Corridor Evaluation Process (cont.)

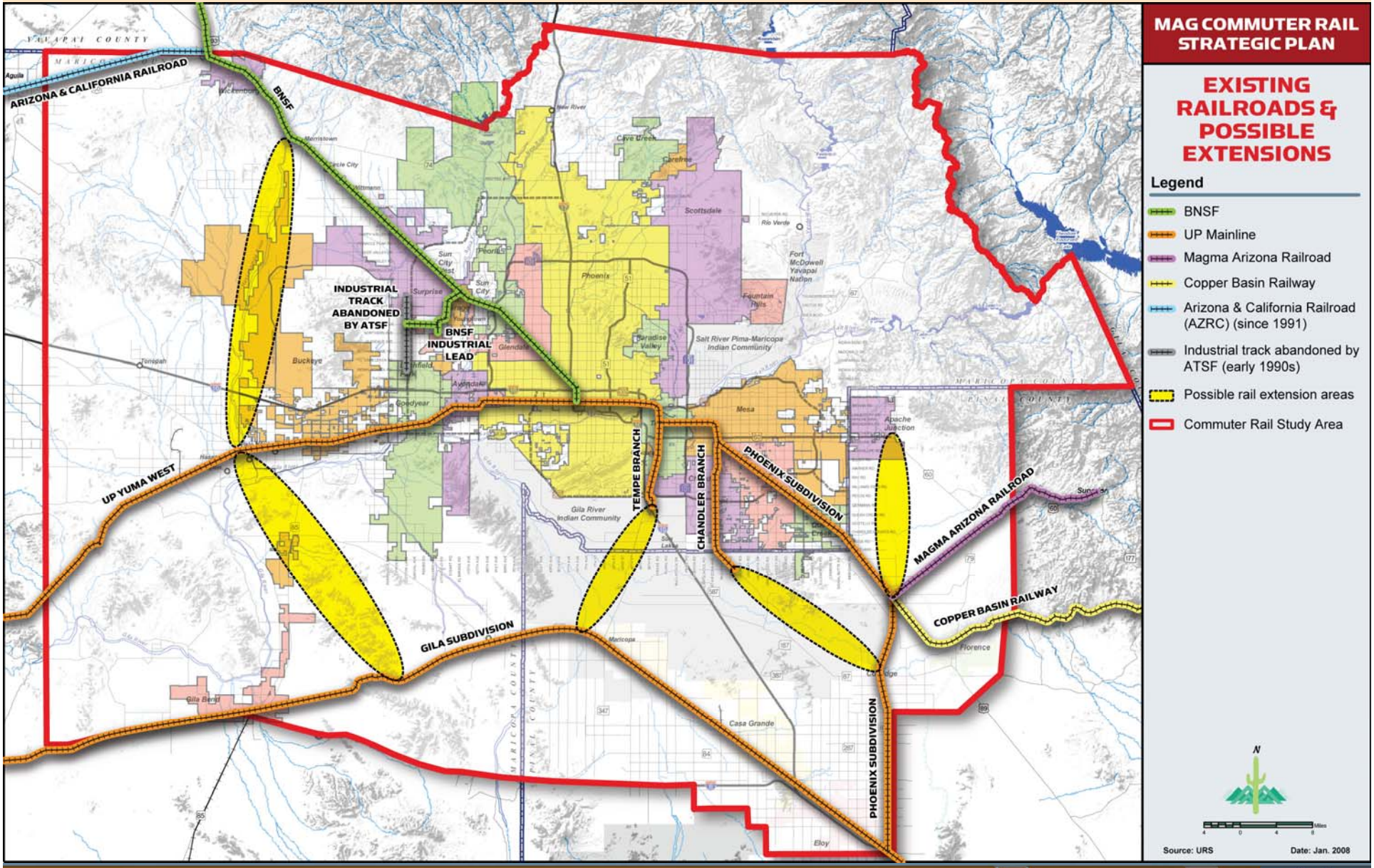
- **System/Policy Compatibility:**
  - Land use compatibility
  - Impact on Regional Travel and Air Quality

- **Cost effectiveness:**
  Total capital cost per corridor or system mile
  - Total annualized capital and O & M cost per corridor or system mile
  - Annual O & M cost per annual rider
  - Total annual cost per annual rider
  - Annual cost per travel time savings

Commuter Rail Corridor Evaluation Process (cont.)

- **Implementation / constructability:**
  - Ease of implementation/constructability (issues related to ROW, environmental factors, etc.)
  - Compatibility with freight railroad
  - Benefit to adjacent or crossing highway infrastructure

Corridor/Segment Review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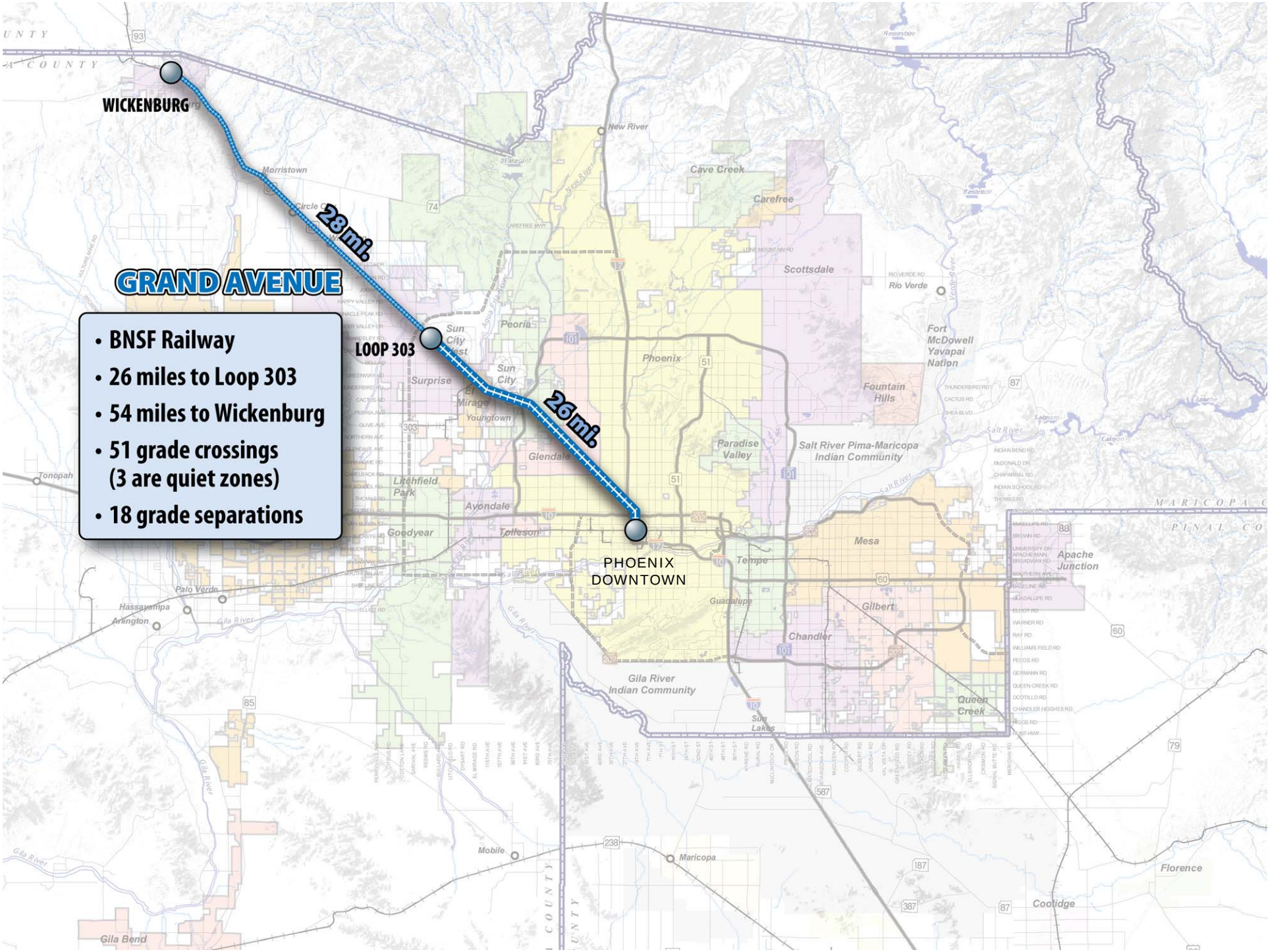
MAGMA ARIZONA RAILROAD
COPPER BASIN RAILWAY
PHOENIX SUBDIVISION
Source: URS
Date: Jan. 2008


WICKENBURG
28 mi.
GRAND AVENUE
• BNSF Railway
• 26 miles to Loop 303
• 54 miles to Wickenburg
• 51 grade crossings
(3 are quiet zones)
• 18 grade separations
LOOP 303
26 mi.
PHOENIX
DOWNTOWN
Morristown
Cave Creek
Carefree
Scottsdale
Rio Verde
Fort McDowell Yavapai Nation
Fountain Hills
Peoria
Sun City West
Sun City
Surprise
El Mirage
Youngtown
Phoenix
Glendale
Paradise Valley
Salt River Pima-Maricopa Indian Community
Litchfield Park
Avondale
Goodyear
Tolleson
Tonopah
Palo Verde
Hassayampa
Arlington
Tempe
Mesa
Apache Junction
Guadalupe
Gilbert
Chandler
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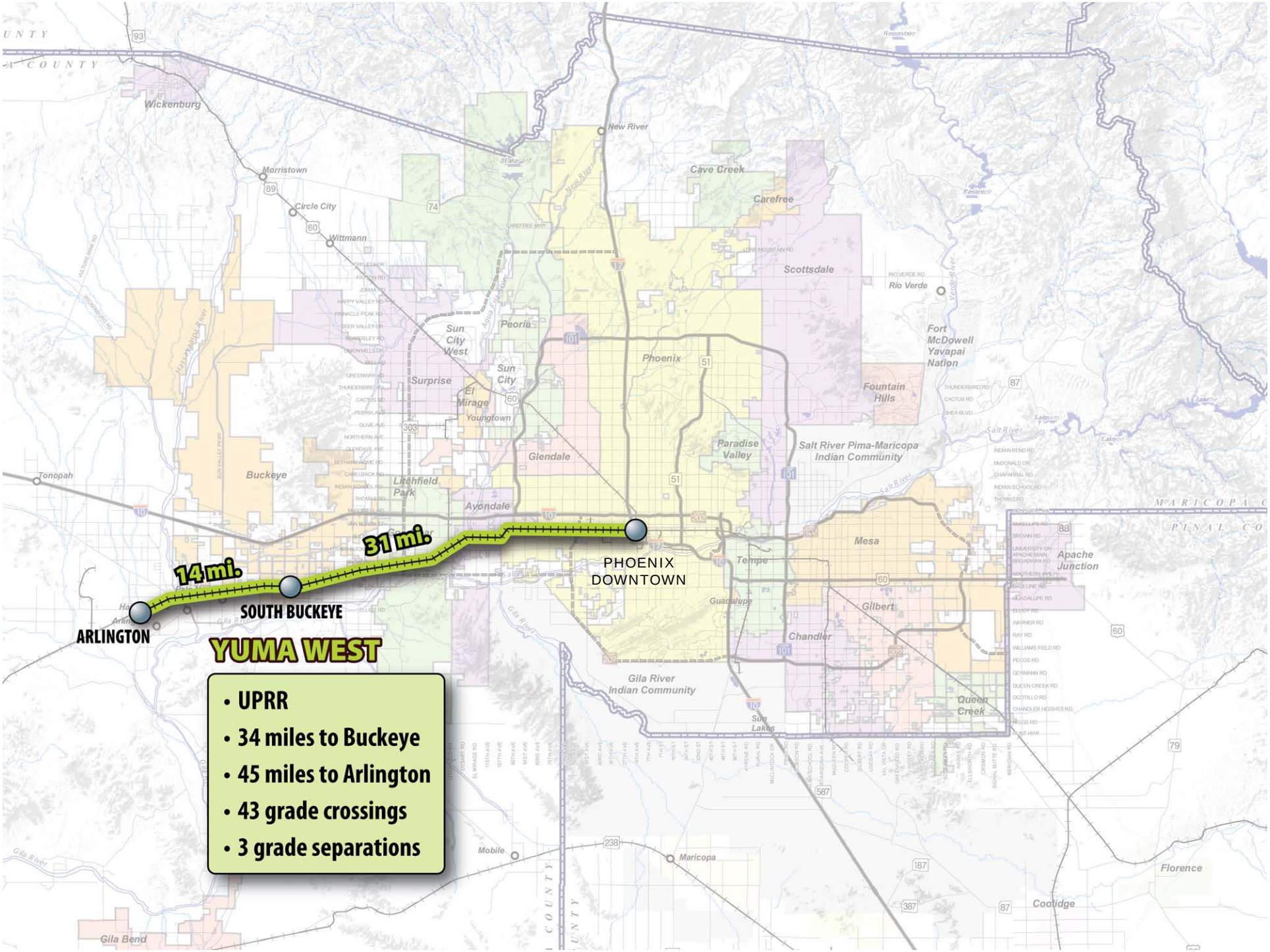
Queen Creek
Sun Lakes
Mobile
Maricopa
Florence
Cooldge
Gila Bend
New River
Gila River
Salt River


14 mi.
31 mi.
ARLINGTON
SOUTH BUCKEYE
PHOENIX DOWNTOWN
YUMA WEST
• UPRR
• 34 miles to Buckeye
• 45 miles to Arlington
• 43 grade crossings
• 3 grade separations
Wickenburg
Morristown
Circle City
Wittmann
New River
Cave Creek
Carefree
Scottsdale
Rio Verde
Fort McDowell Yavapai Nation
Fountain Hills
Peoria
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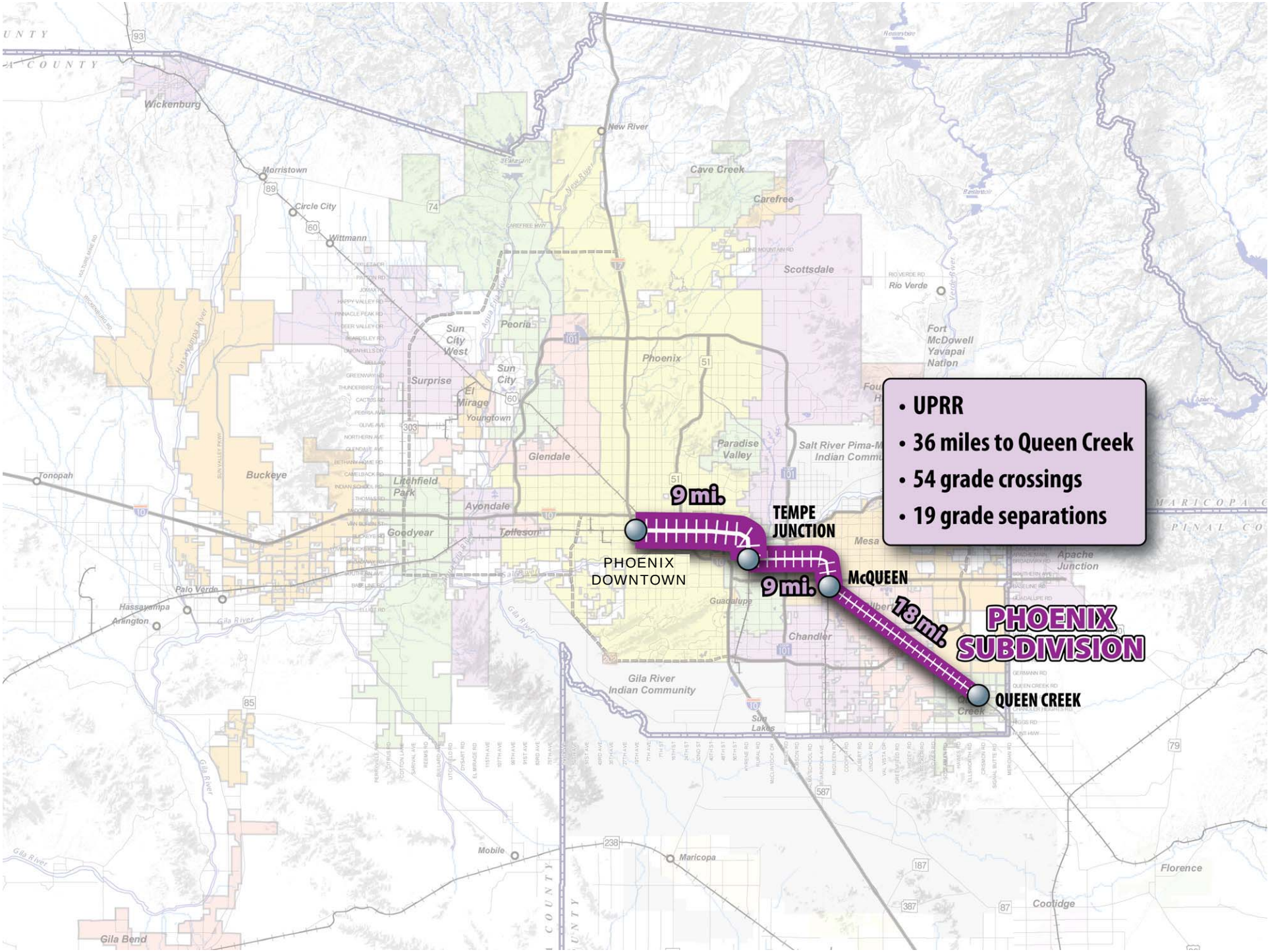
• UPRR
• 36 miles to Queen Creek
• 54 grade crossings
• 19 grade separations
9 mi.
TEMPE JUNCTION
PHOENIX DOWNTOWN
9 mi.
McQUEEN
18 mi.
PHOENIX SUBDIVISION
QUEEN CREEK
Wickenburg
Morristown
Circle City
Wittmann
New River
Cave Creek
Carefree
Scottsdale
Rio Verde
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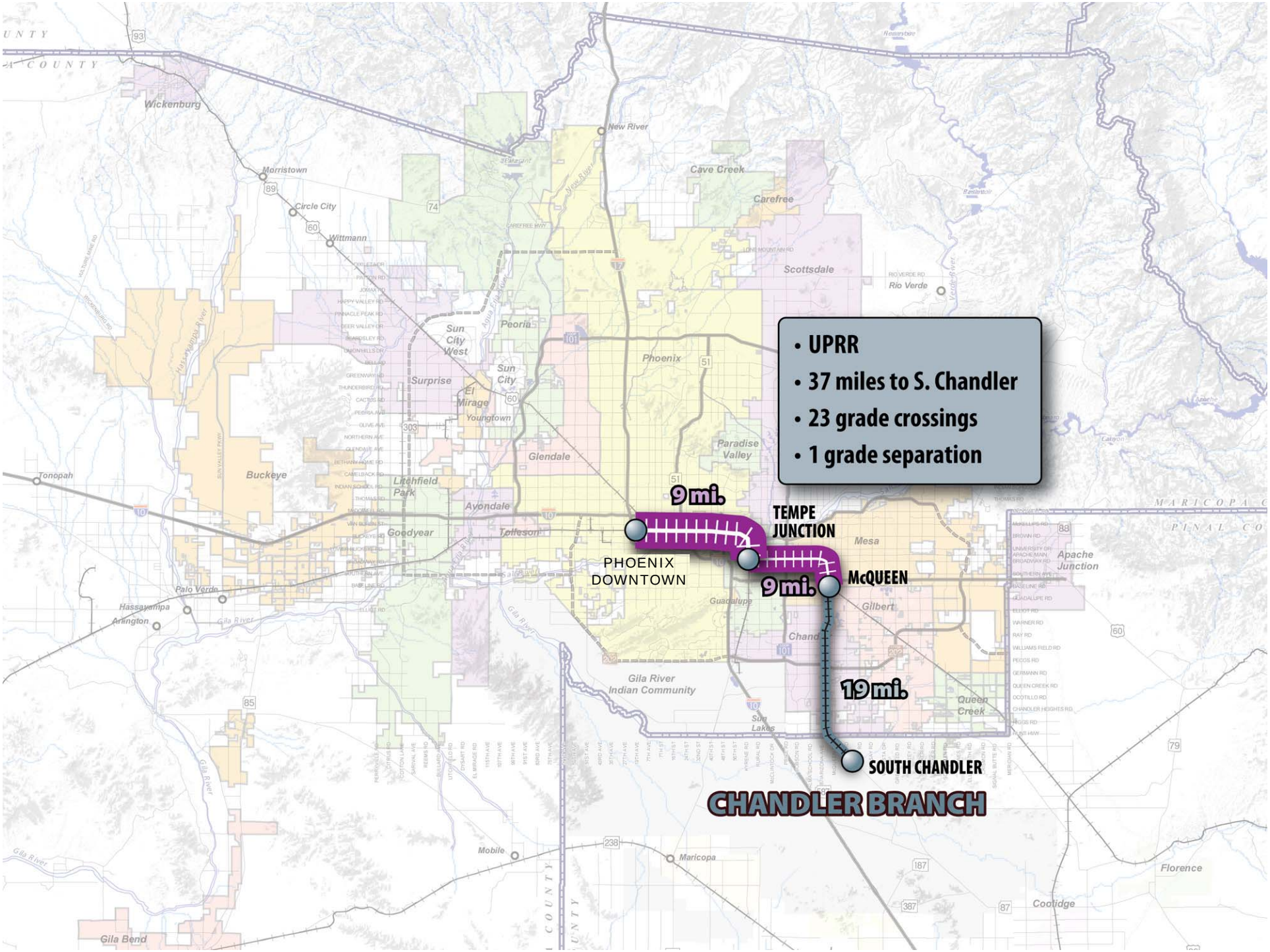
• UPRR
• 37 miles to S. Chandler
• 23 grade crossings
• 1 grade separation
9 mi.
TEMPE JUNCTION
PHOENIX DOWNTOWN
9 mi.
McQUEEN
19 mi.
SOUTH CHANDLER
CHANDLER BRANCH
Wickenburg
Morristown
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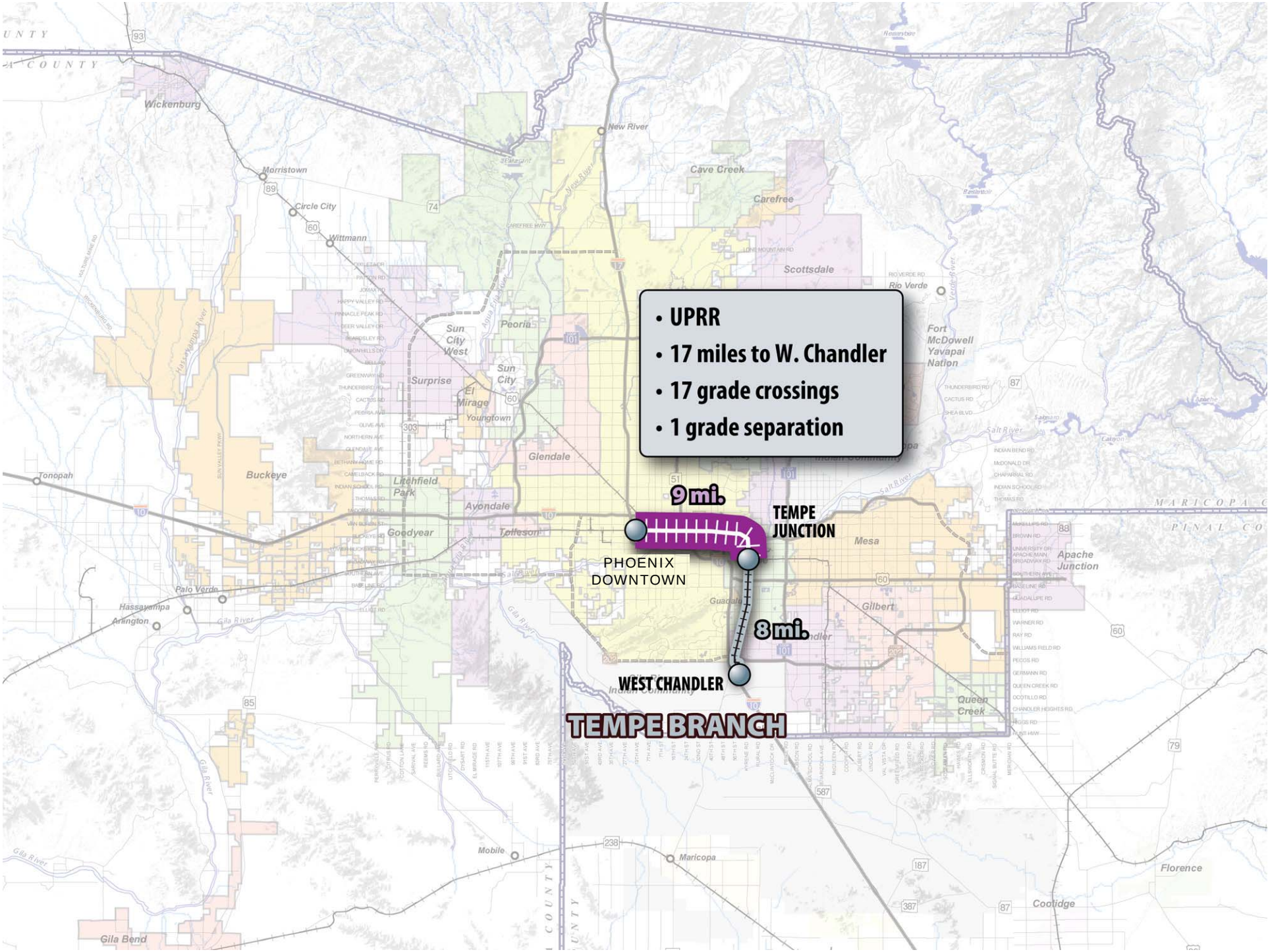
• UPRR
• 17 miles to W. Chandler
• 17 grade crossings
• 1 grade separation
9 mi.
8 mi.
PHOENIX DOWNTOWN
TEMPE JUNCTION
WEST CHANDLER
TEMPE BRANCH
Wickenburg
Morristown
Circle City
Wittmann
New River
Cave Creek
Carefree
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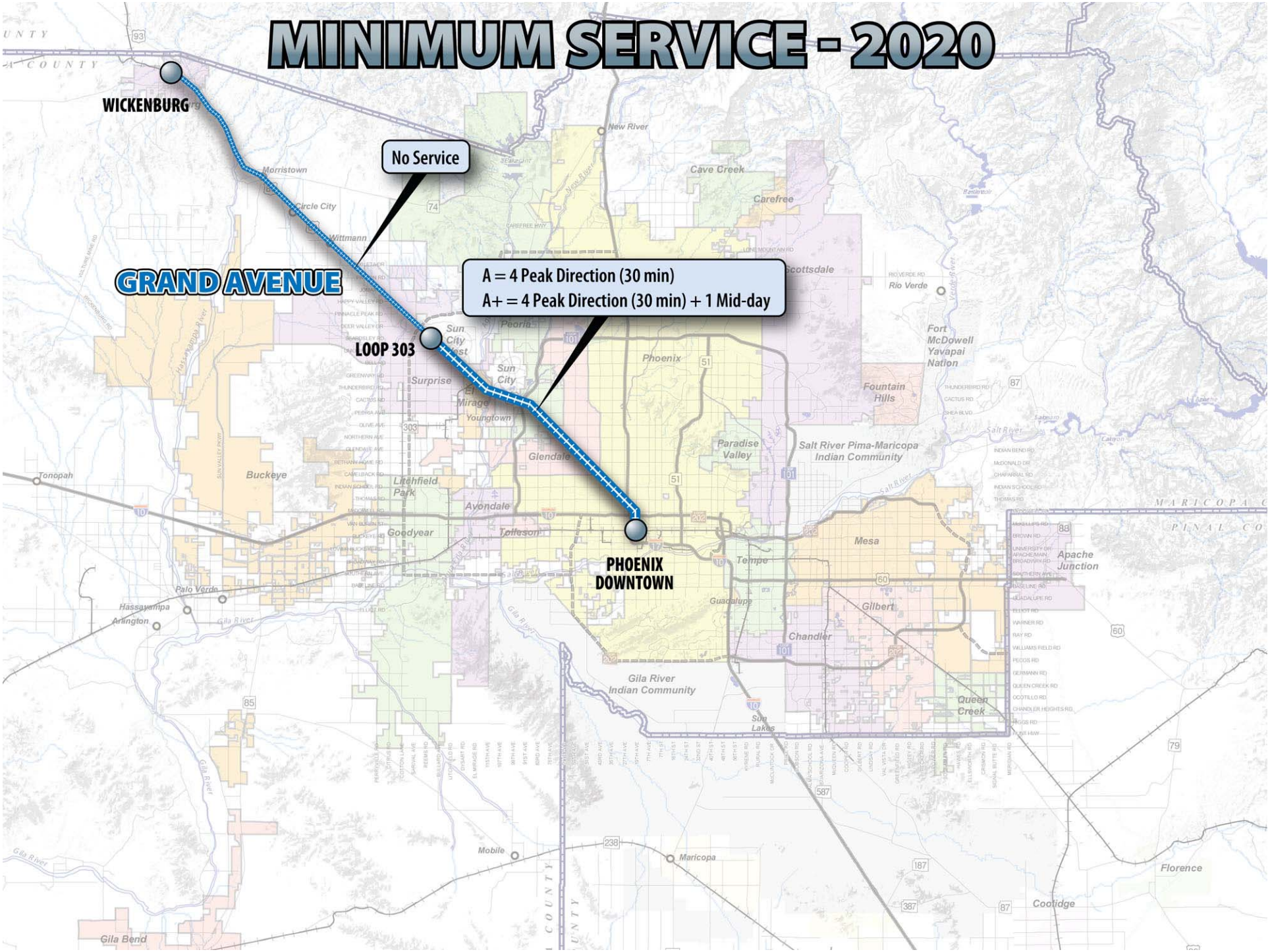
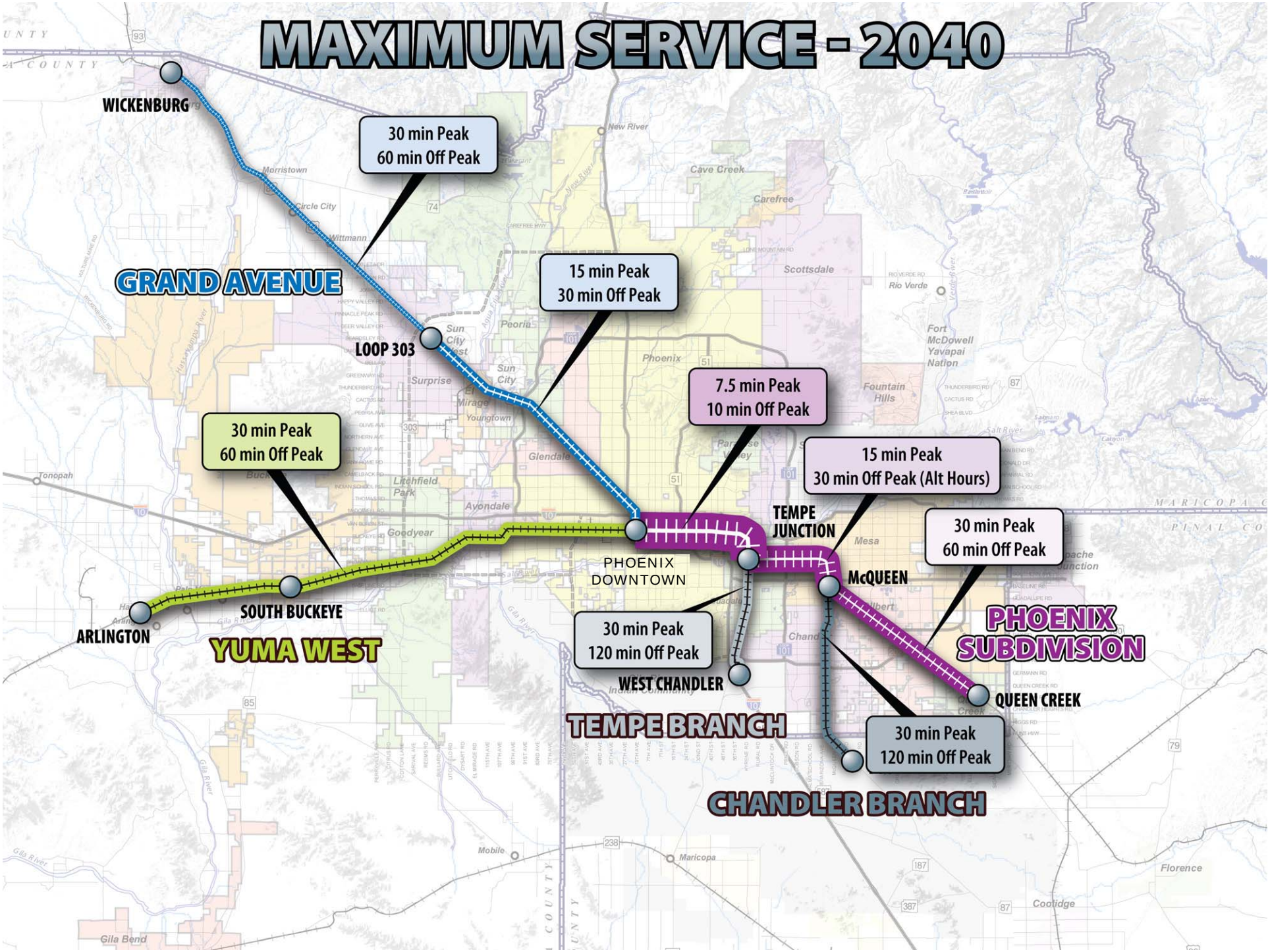
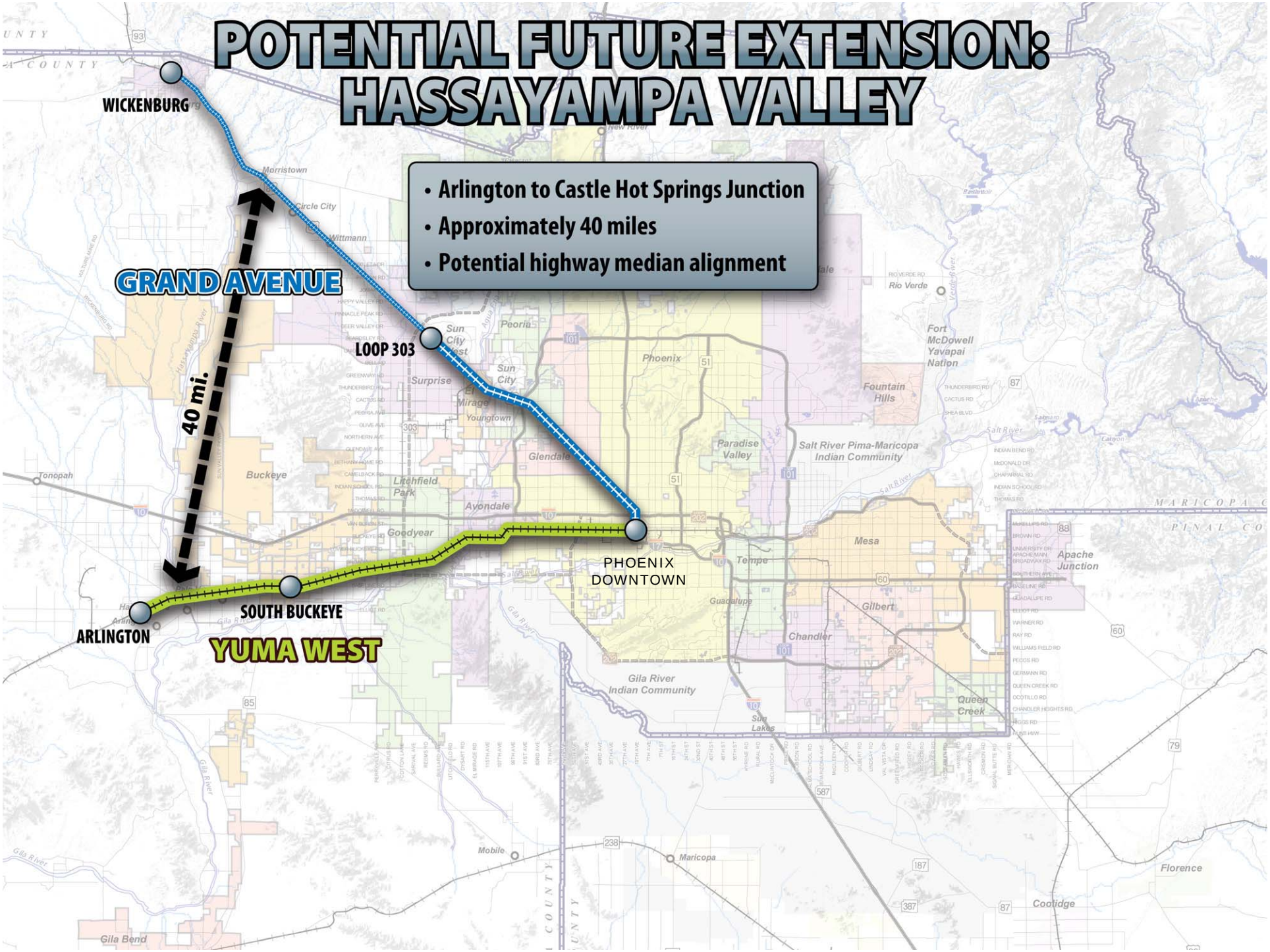
MINIMUM SERVICE - 2020



MAXIMUM SERVICE - 2040

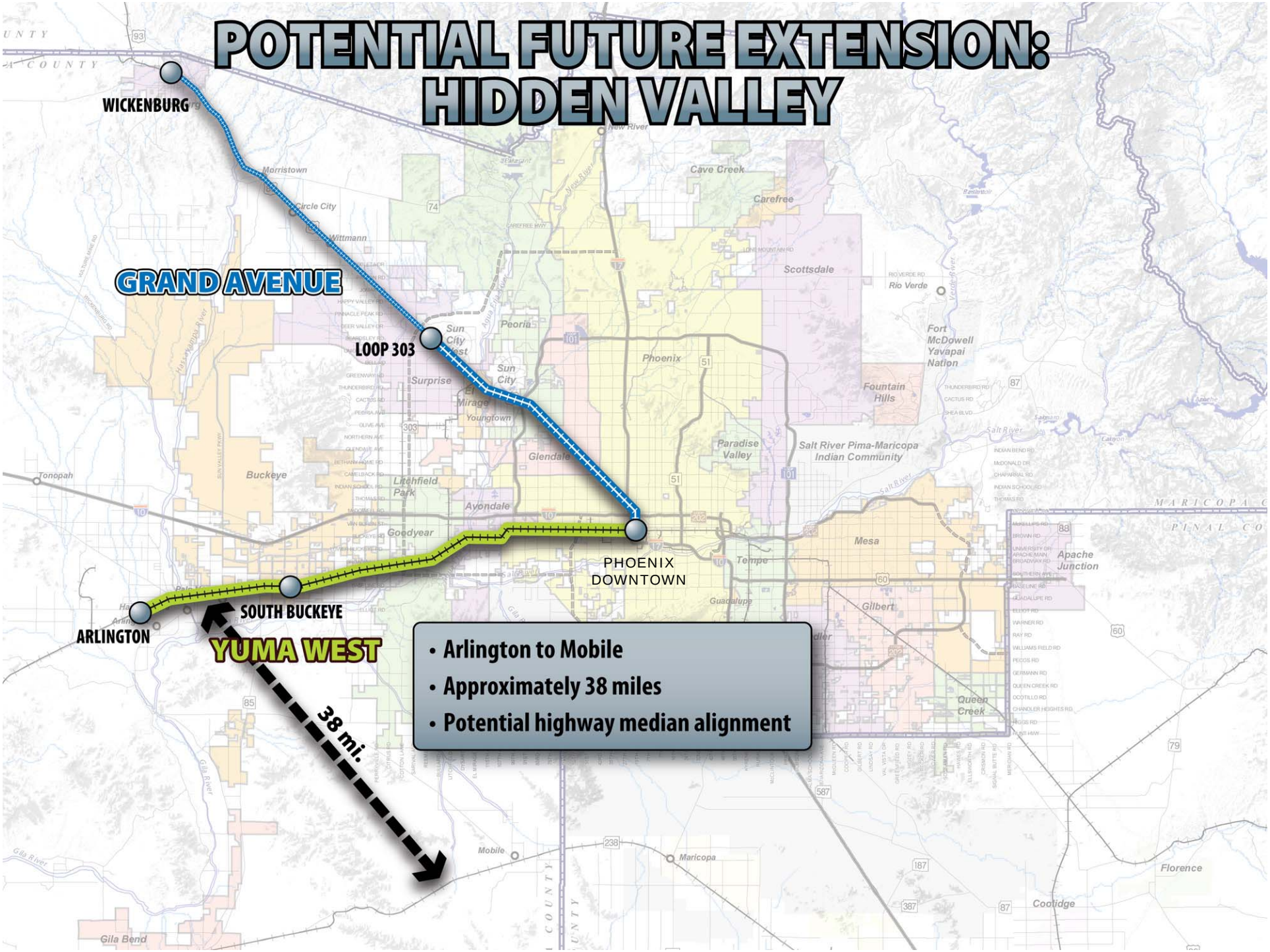


POTENTIAL FUTURE EXTENSION: HASSAYAMPA VALLEY

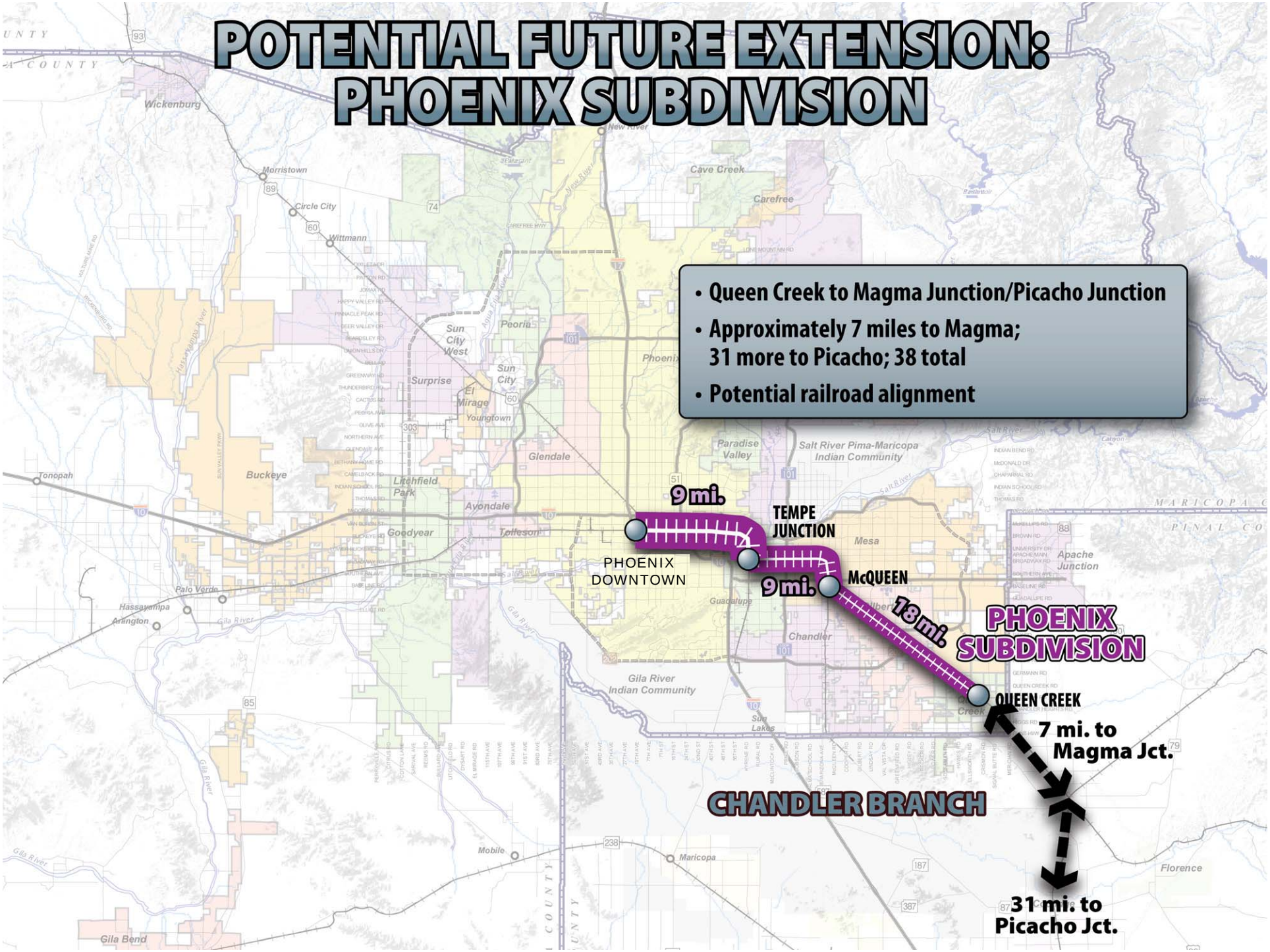


- Arlington to Castle Hot Springs Junction
- Approximately 40 miles
- Potential highway median alignment

POTENTIAL FUTURE EXTENSION: HIDDEN VALLEY



POTENTIAL FUTURE EXTENSION: PHOENIX SUBDIVISION



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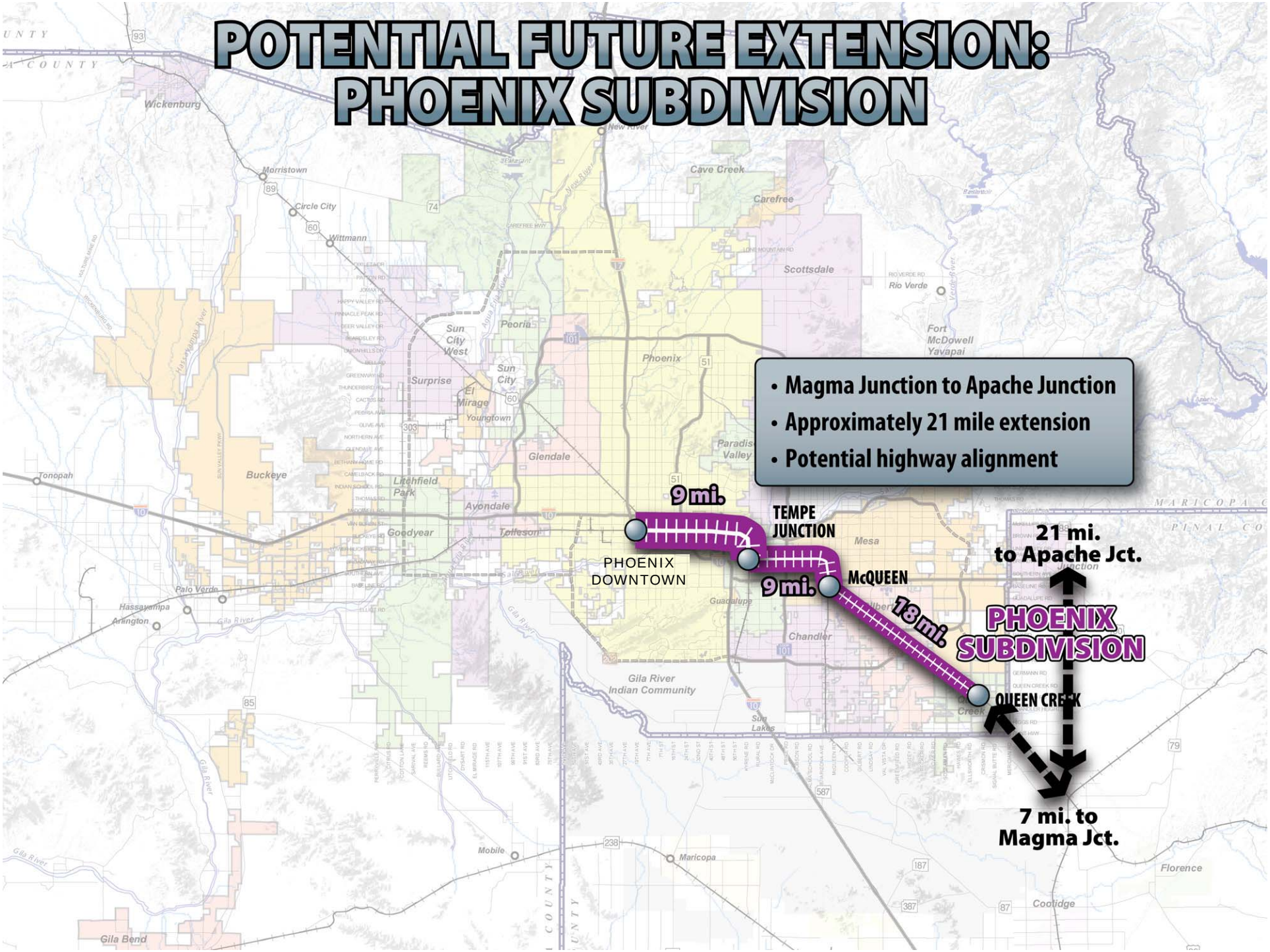

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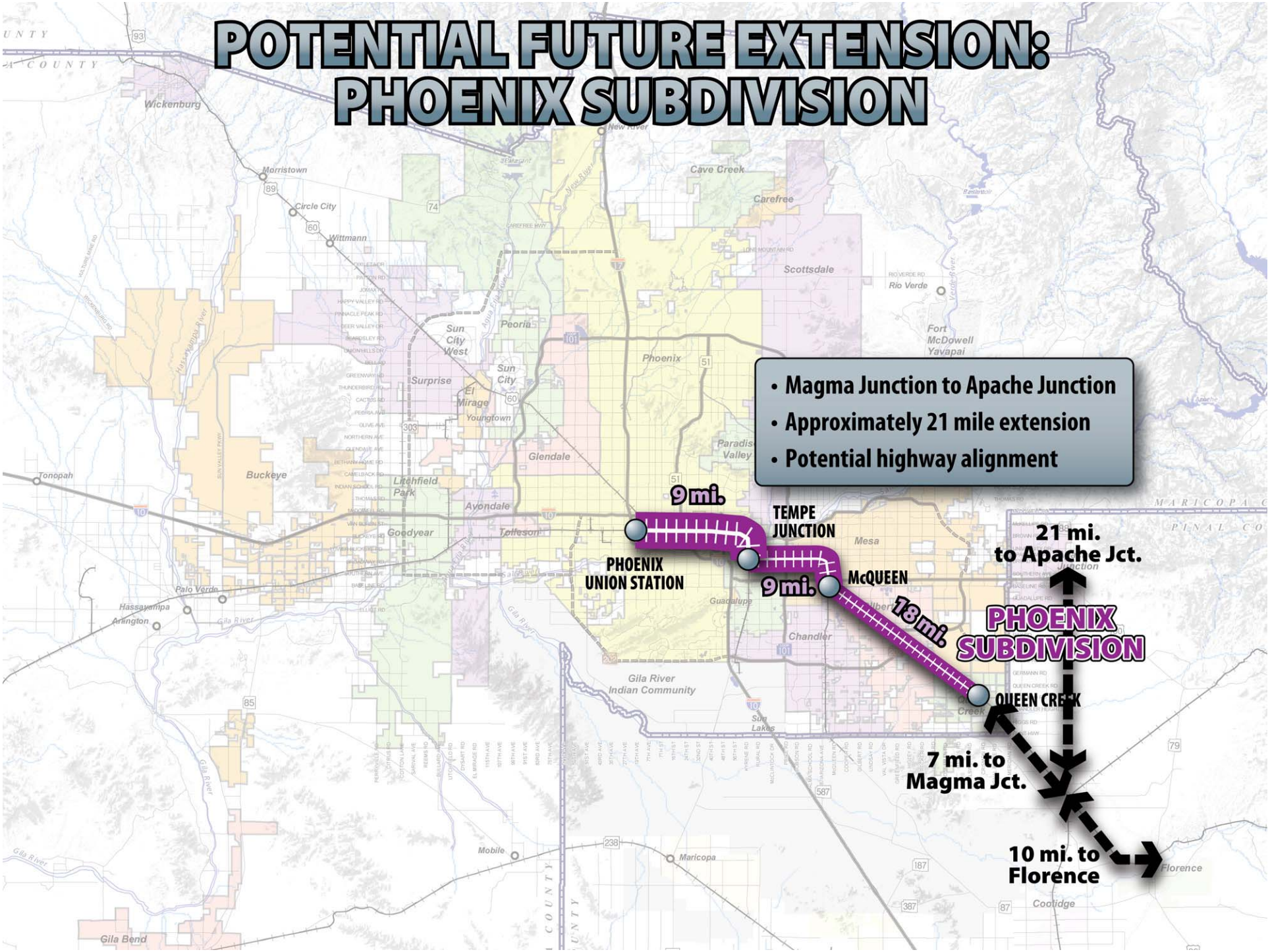
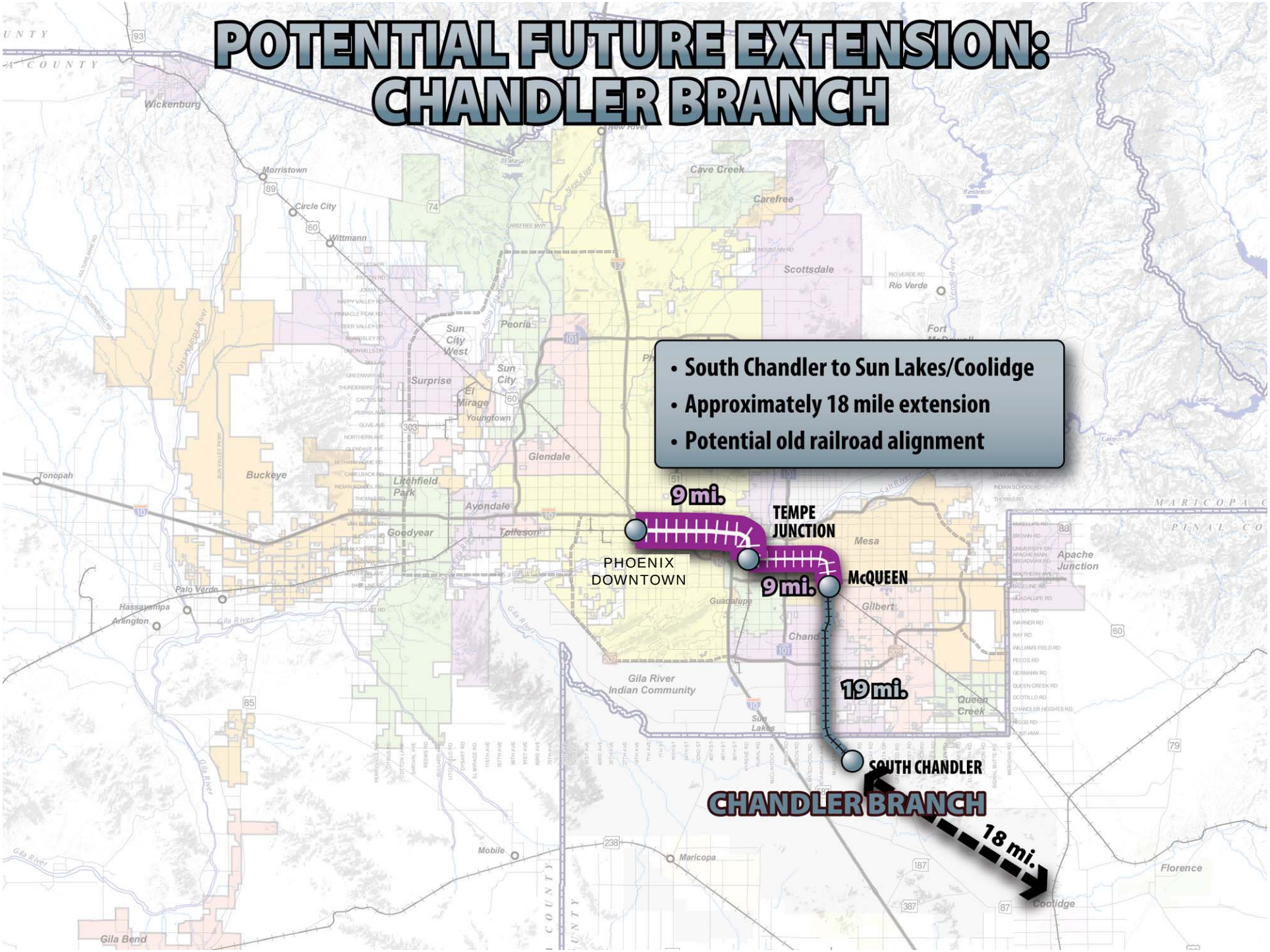
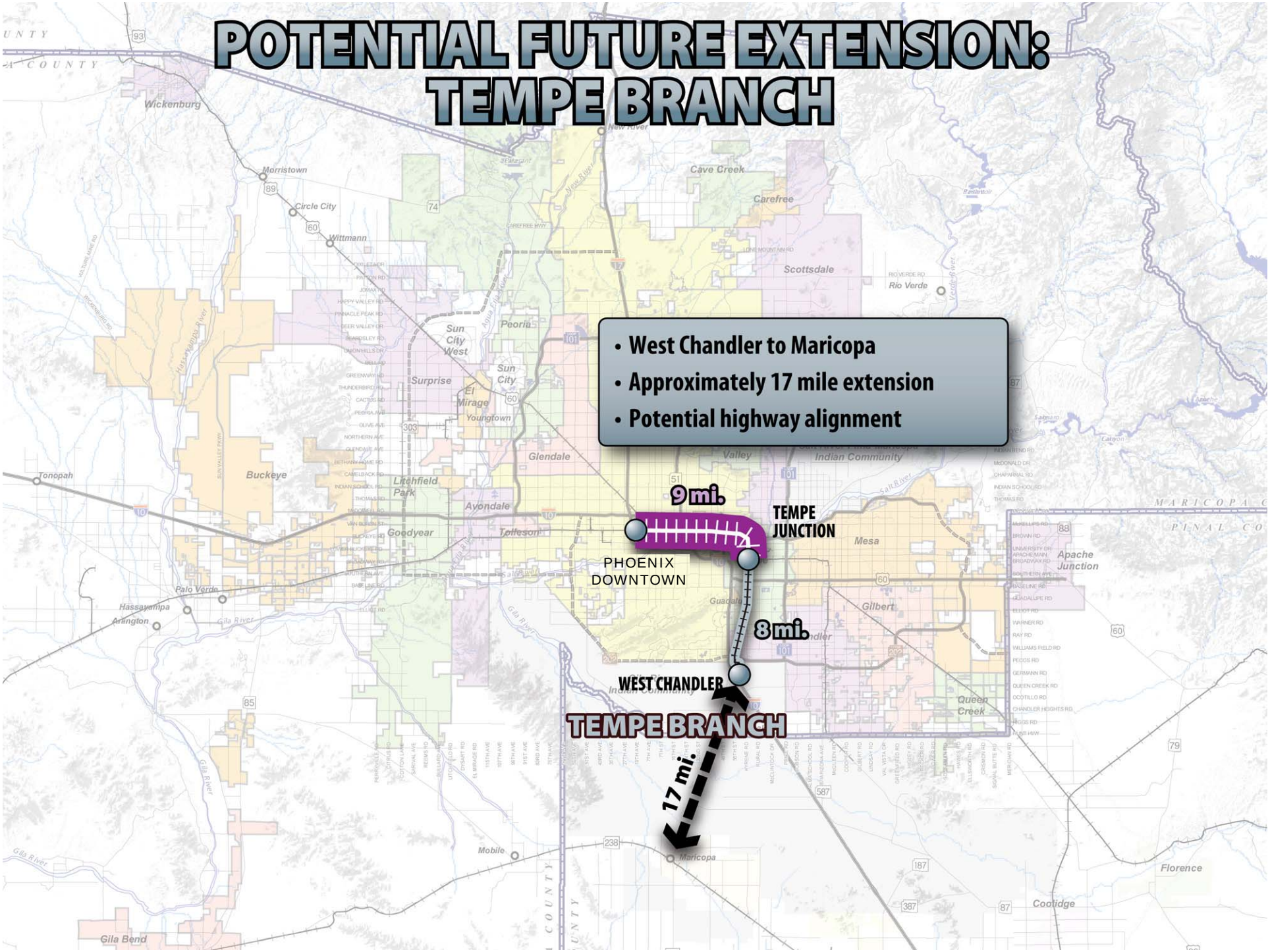


POTENTIAL FUTURE EXTENSION: CHANDLER BRANCH



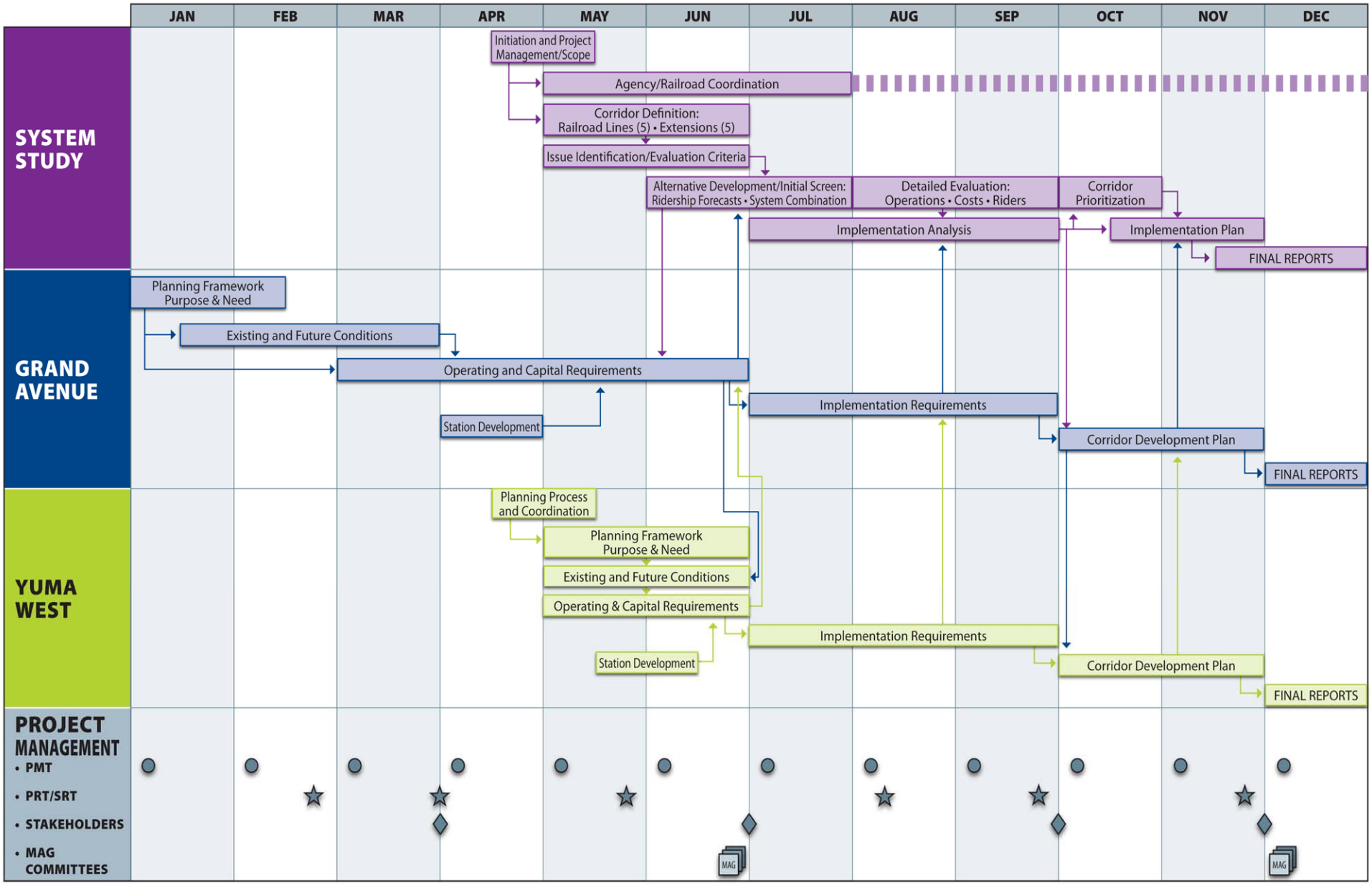
POTENTIAL FUTURE EXTENSION: TEMPE BRANCH



Project Schedule

COMMUTER RAIL PROJECT INTEGRATION - DRAFT

MARICOPA ASSOCIATION of GOVERNMENTS



June 5, 2009

Next Meeting

- **Next System Team Meeting – August 2009**
- **Meeting Frequency**
- **Meeting Location**