2023 Las Vegas Valley Flood Control Master Plan Update

Clark County Regional Flood Control District

March 2024

Executive Summary

In response to severe flooding problems in Clark County, the Nevada Legislature authorized the creation of the Clark County Regional Flood Control District (RFCD) in 1985. Among other activities, the RFCD is responsible for developing and implementing a comprehensive flood control master plan to alleviate flooding within Clark County. Starting with the original flood control master plan in 1986 that encompassed the entire county, the RFCD has reviewed and updated flood control master plans at least every five years in accordance with Nevada Revised Statute (NRS) 543.596. The 2023 Las Vegas Valley Flood Control Master Plan Update (MPU) is one of those updates. Master Plan Updates for Las Vegas Valley were prepared and adopted in 1991, 1997, 2002, 2008, 2013, and 2018. The purpose of the update is to add any new relevant information, to assess progress towards fulfillment of the Master Plan, to identify obstacles in completing the Plan, and to recommend changes resulting from growth and development. The 2023 MPU has been developed to satisfy these requirements.

The study area for Las Vegas Valley MPU is 1,651 square miles and is divided into twelve hydrographic planning areas or watersheds to facilitate the implementation of the flood control plan. Each watershed is analyzed using consistent criteria and methodology. The 2023 MPU and previous MPUs are based on assumptions about future growth and development in Las Vegas Valley to represent the ultimate hydrologic condition and to aid in the planning of future flood control facilities. The ultimate hydrologic condition uses land use data that represents the full “build out” condition. To facilitate the use of this condition, an Ultimate Development Boundary (UDB) was generated for the Las Vegas Valley that factors in the mountainous terrain that surrounds the Valley and the locations of protected lands. Future land use and existing soil data are used in conjunction with the 100-year frequency flood event to develop hydrologic models that establish peak flow rates and flow volumes for drainage corridors. These peak flow rates and flow volumes are then used to analyze the flood control system to identify deficiencies in the existing flood control plan. The final flood control facility plan is then recommended to mitigate these identified deficiencies.

The 2023 MPU serves as a planning tool for implementation of the flood control system in Las Vegas Valley and the planning of future flood control facilities. The flood control system identified and described in this MPU may be subject to further amendments and revisions in the future as more detailed analyses are completed for facilities during pre-design, design, and other activities that may warrant modification of the flood control plan. The hydrologic analyses developed with the 2023 MPU are intended to aid in the planning of the flood control system in the Las Vegas Valley. Therefore, more detailed hydrologic analyses should be completed during the design phase of flood control facilities.

The 2023 MPU was developed in close coordination with RFCD staff and representatives of four local entities: City of North Las Vegas, City of Las Vegas, City of Henderson and Clark County Public Works Departments. Many progress meetings were held, and representatives of these agencies were informed of project progress and given the opportunity to provide input.

These agencies were also provided with the opportunity to review and comment on the information collected and developed for the master plan, which included information on the major master plan tasks such as data collection, hydrology, and facility planning. Representatives of the agencies reviewed the master plan information, and their comments and assistance toward development of the 2023 MPU are greatly appreciated.

Modifications made to the flood control plan during development of this 2023 MPU are based on the following:

- Identification of flood control facilities constructed after the 2018 MPU
- Modifications made, through Master Plan Amendments, to the flood control plan after the 2018 MPU
- Updates to UDB and land use data including changes reflecting the passage of Assembly Bill 356 which requires the removal of non-functional turf by 2026
- Incorporation of the 2022 National Resources Conservation Service (NRCS) soils data
- Updates to the hydrologic methodology
- Revisions to watershed and subbasin boundaries
- Updates to hydrologic models that reflect changes in the watershed that have occurred since the 2018 MPU was completed
- Revisions to facility sizes and alignments due to changes in flow rates and volumes generated from the updated hydrologic models
- Addition of new facilities where deemed necessary to better address flood hazards

The 2023 MPU is based on current information available during its development in late 2022, and 2023. The resulting plan should be viewed as a living document capable of being adjusted in response to changing conditions and priorities.

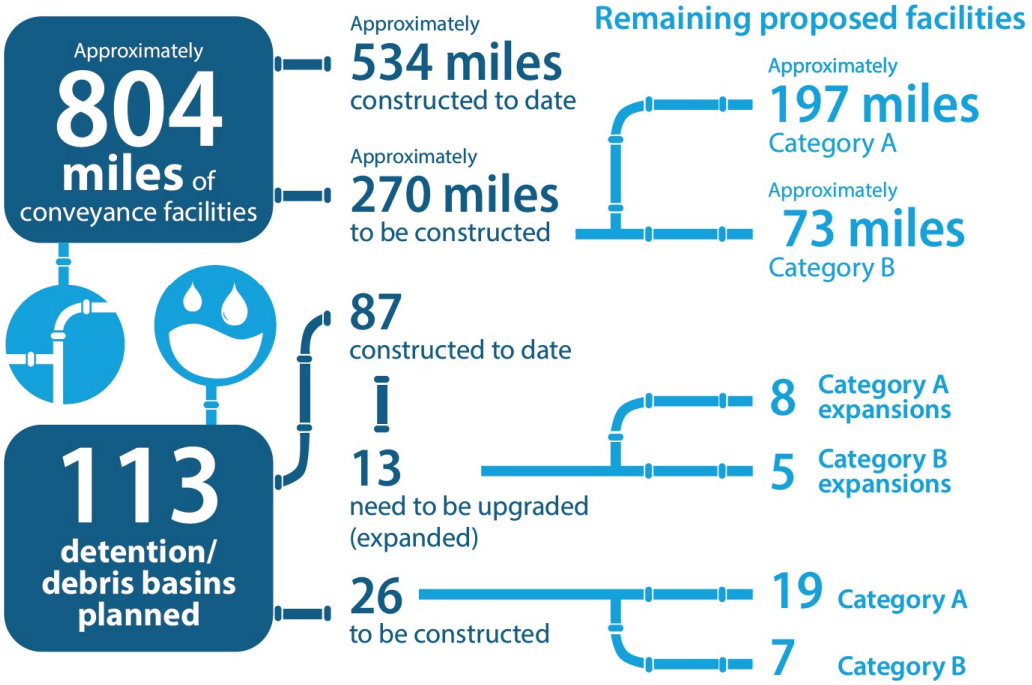
Key enhancements and updates that were made in the 2023 MPU include:

- Employed a GIS-based master planning approach by utilizing a cloud-based, multi-user, GIS database that served as a foundation for all aspects of MPU development and presentation such as data collection, hydrology, facility planning, cost estimation, quality assurance/control and report creation.
- Compatibility updates to a previously developed GIS-based curve number tool which utilizes a subbasin layer, land use layer and soils layer to automatically calculate curve numbers for each subbasin.
- Updates to the hydrologic methodology: revisions were made to the hydrologic parameters such as percent impervious, open space distribution, land use and soils data. Land use assumptions were modified to reflect the passage of AB 356 which requires to the removal of non-functional turf by 2026.

  - Compatibility updates to a previously developed GIS-based facility sizing tool that computes facility conveyance capacity and proposed sizes.
- Updated the Cost Estimation Tool to include:
  - Unit costs equations based on recent construction bid tabulations.
  - Compatibility updates to a previously developed GIS-based Cost Estimation Tool that that computes costs.
- Updates to Watershed Maps (W-Maps) W-Maps include land use, subbasin delineations, concentration points with peak flow rates, flow arrows, soils data and aerial imagery.
- Utilized ESRI ModelBuilder tools to facilitate the generation of facility inventory tables that accompany the F-Maps.

Below is a summary of the existing and proposed conveyance facilities and detention basins for the 2023 MPU.

LAS VEGAS VALLEY PLANNING AREAS IN THE 2023 MPU INCLUDE:



CONSTRUCTED SINCE THE 2018 MPU WITHIN THE LAS VEGAS VALLEY PLANNING AREAS

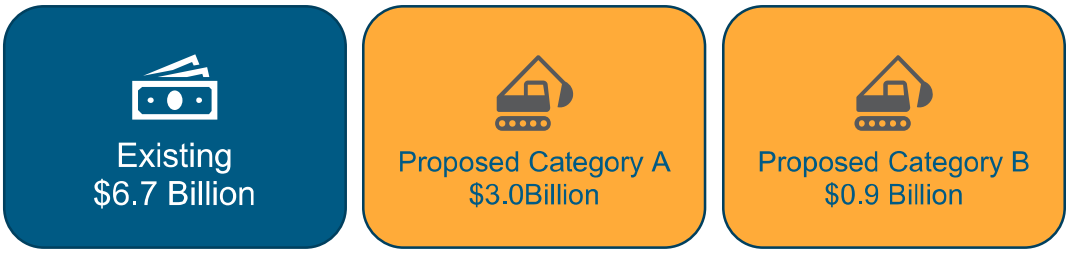
Approximately **57 miles** of conveyance facilities

9 detention basins

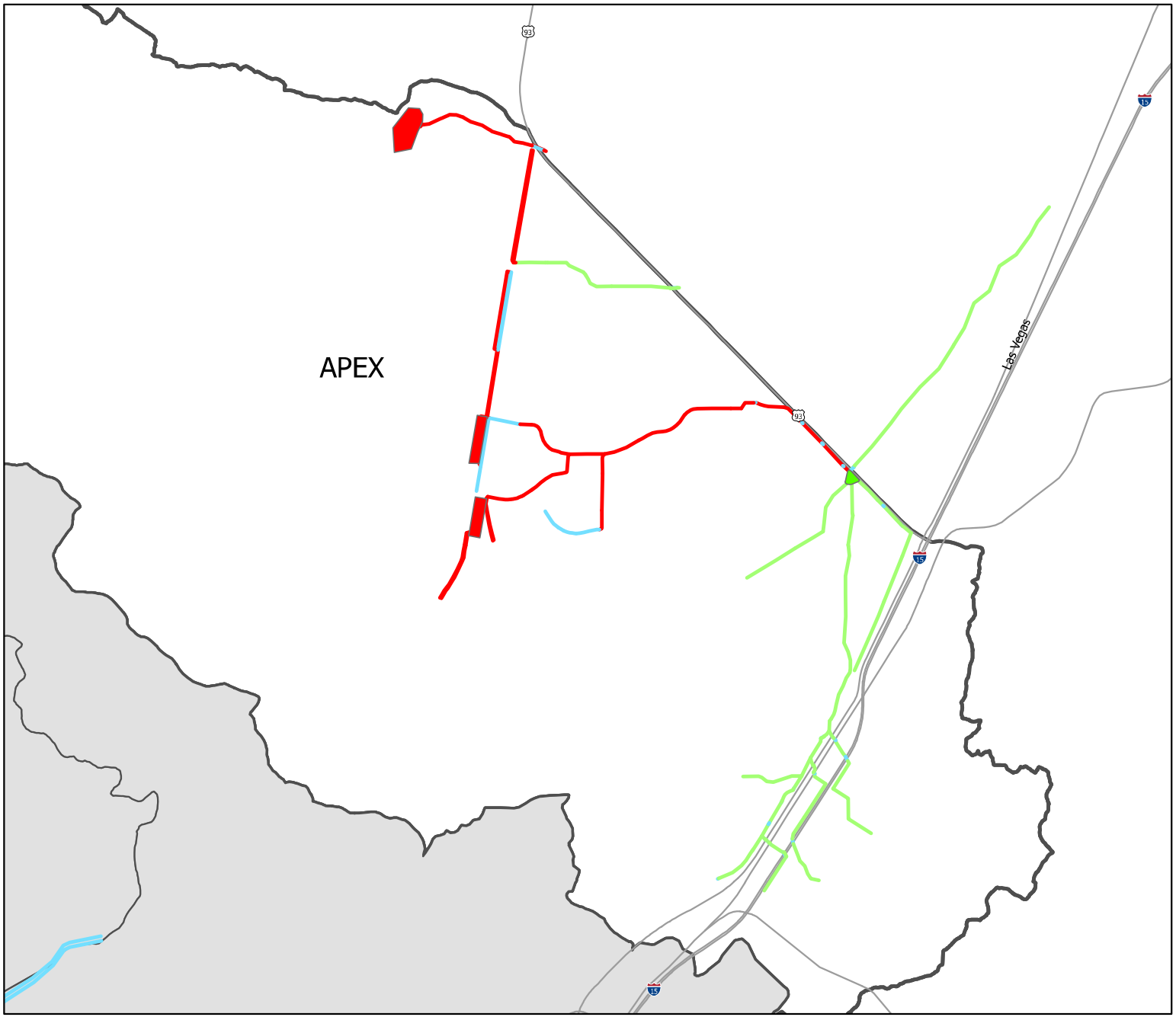
1. Total length for facilities does not include floodways, natural washes, or existing facilities that are planned to be replaced.
2. Category A - Given priority for RFCD funding over Category B.
3. Category B - Primarily located in undeveloped areas to protect land or eventually replace an existing facility which provides a high level of flood protection but cannot convey the entire 100-year peak flow.

Category A proposed facilities are given priority for RFCD funding over Category B facilities. Category A facilities are considered essential for the protection of existing development and constitute around 74 percent of all proposed facilities. Category B facilities are either located in undeveloped areas and primarily protect undeveloped land (that is planned to be developed in the future) or they will eventually replace an existing facility which provides a high level of flood protection but cannot convey the entire 100-year peak flow. Category B facilities associated with future development are not expected to require public funds for implementation.

The estimated value of all existing regional flood control facilities in the Las Vegas Valley and the estimated construction costs of proposed Category A and B facilities are shown below.



The total estimated construction cost of Category A and Category B proposed facilities has increased from that estimated in the 2018 MPU by $931 million and can be attributed to both the rising construction costs and modifications made to the flood control facility plan. The total estimated value of existing flood control assets has increased from that estimated in the 2018 MPU by $2.2 billion.



Apex Watershed

Legend

DETENTION BASINS
- Existing
- Proposed Category A
- Proposed Category B

FACILITIES
- Existing
- Proposed Category A
- Proposed Category B
- Watershed Boundary

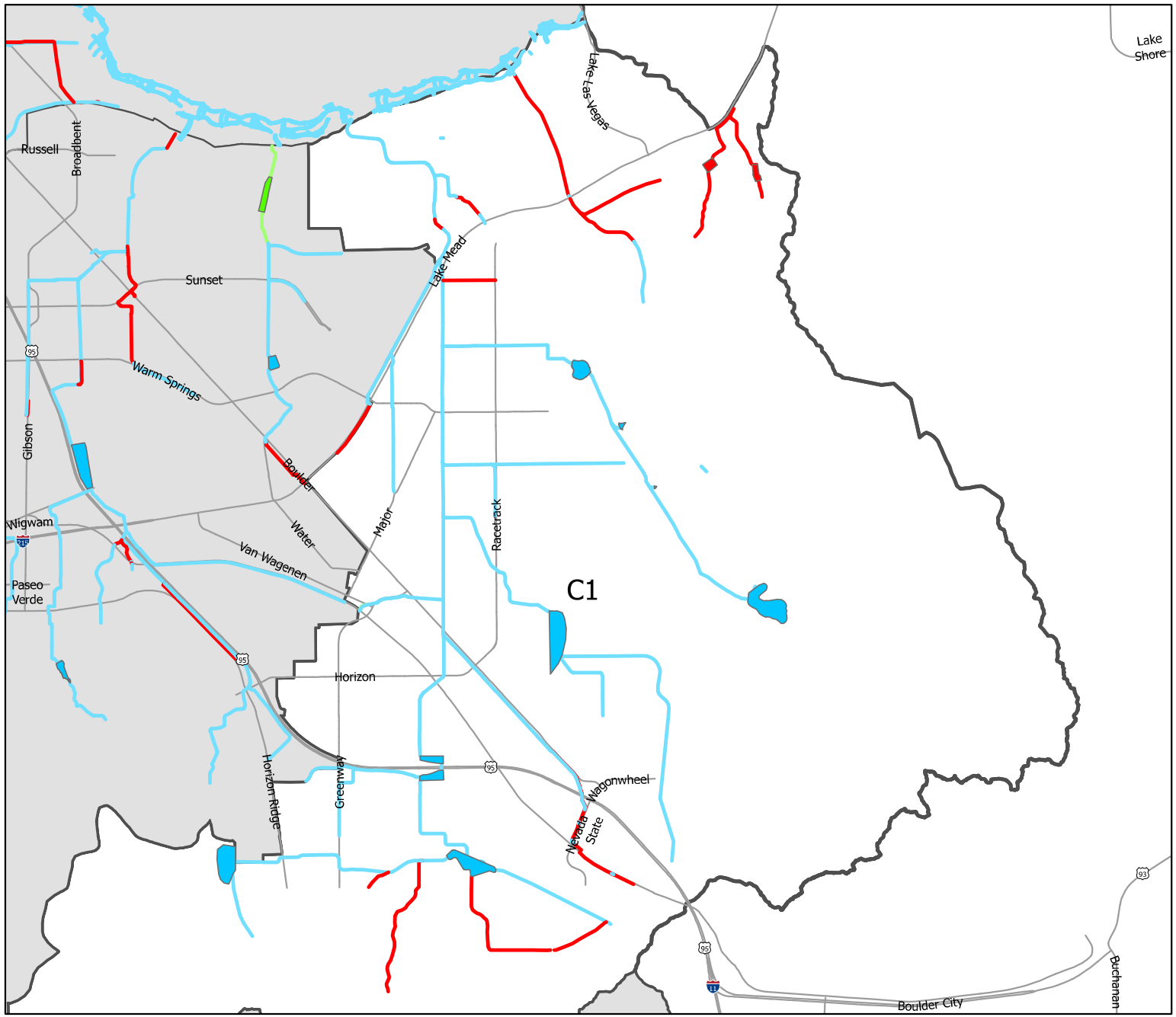
N

0 0.5 1 Miles

REGIONAL FLOOD CONTROL DISTRICT

AtkinsRéalis

Westwood



C1
Watershed

Legend

DETENTION BASINS
- Existing
- Proposed Category A
- Proposed Category B

FACILITIES
- Existing
- Proposed Category A
- Proposed Category B
- Watershed Boundary

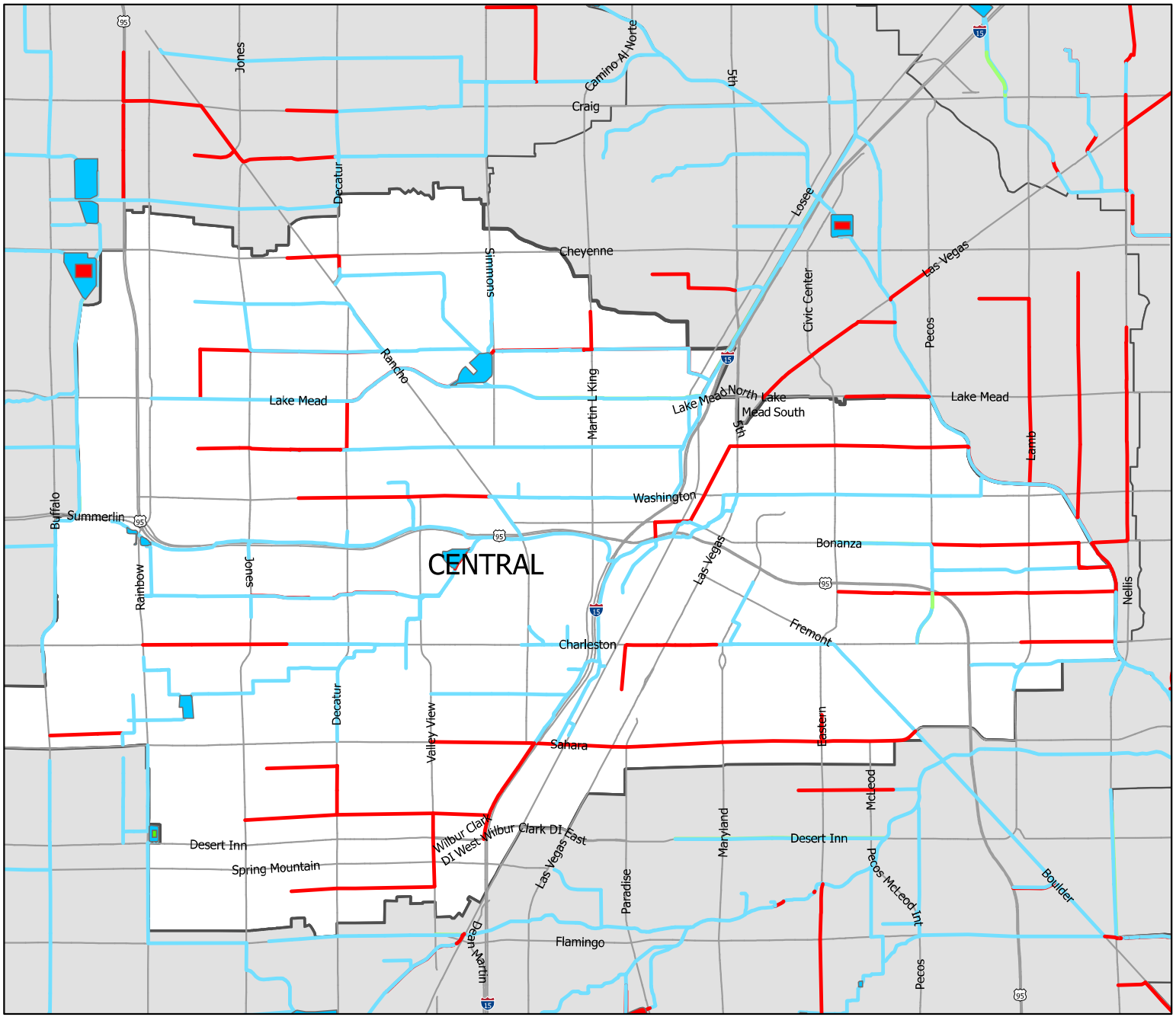
N

0 0.5 1 Miles

REGIONAL FLOOD CONTROL DISTRICT

AtkinsRéalis

Westwood



Central Watershed

Legend

DETENTION BASINS
- Existing
- Proposed Category A
- Proposed Category B

FACILITIES
- Existing
- Proposed Category A
- Proposed Category B
- Watershed Boundary

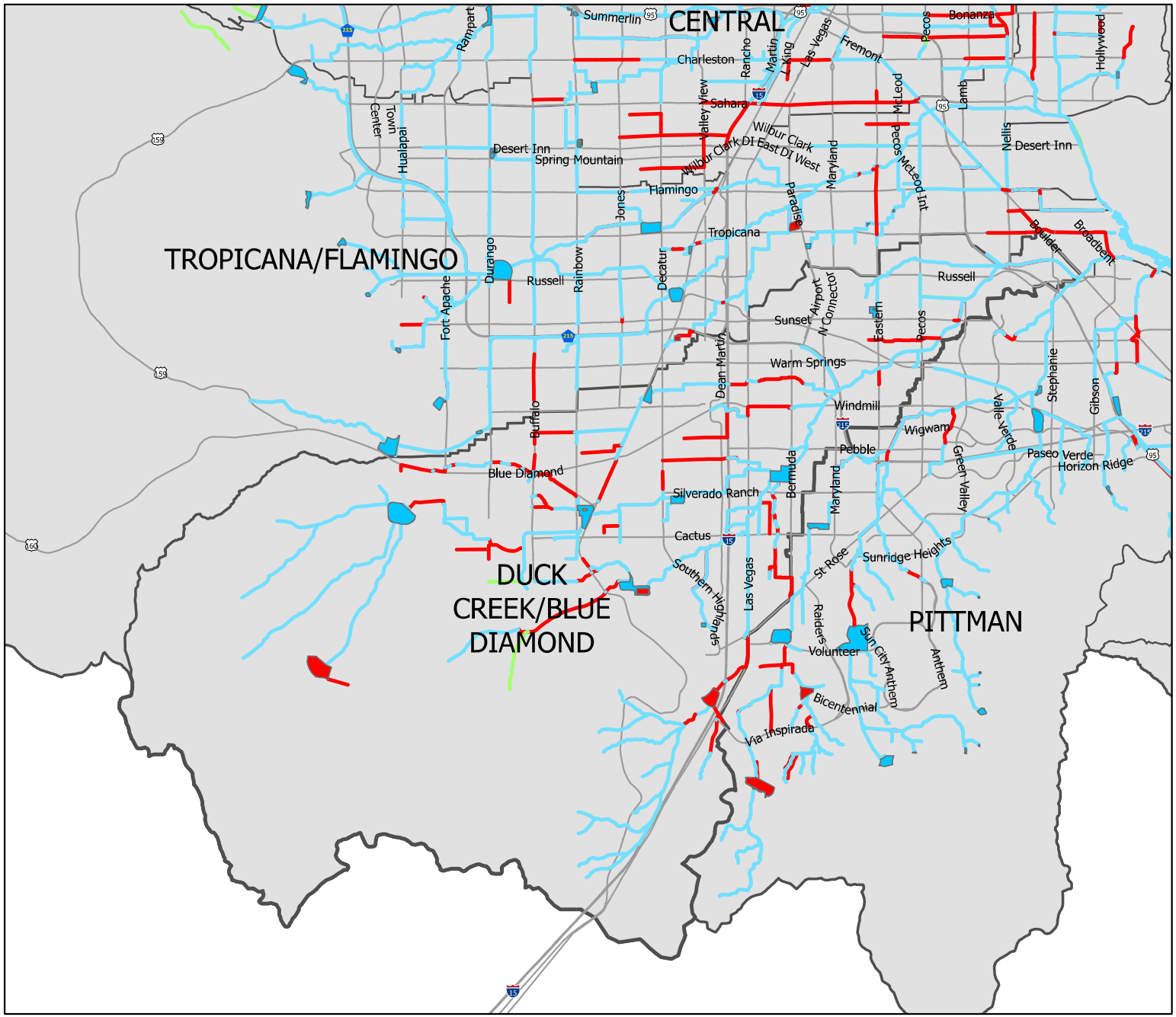
N

0 0.5 1 Miles

REGIONAL FLOOD CONTROL DISTRICT

AtkinsRéalis

Westwood



Duck Creek/
Blue Diamond
Watershed
Legend

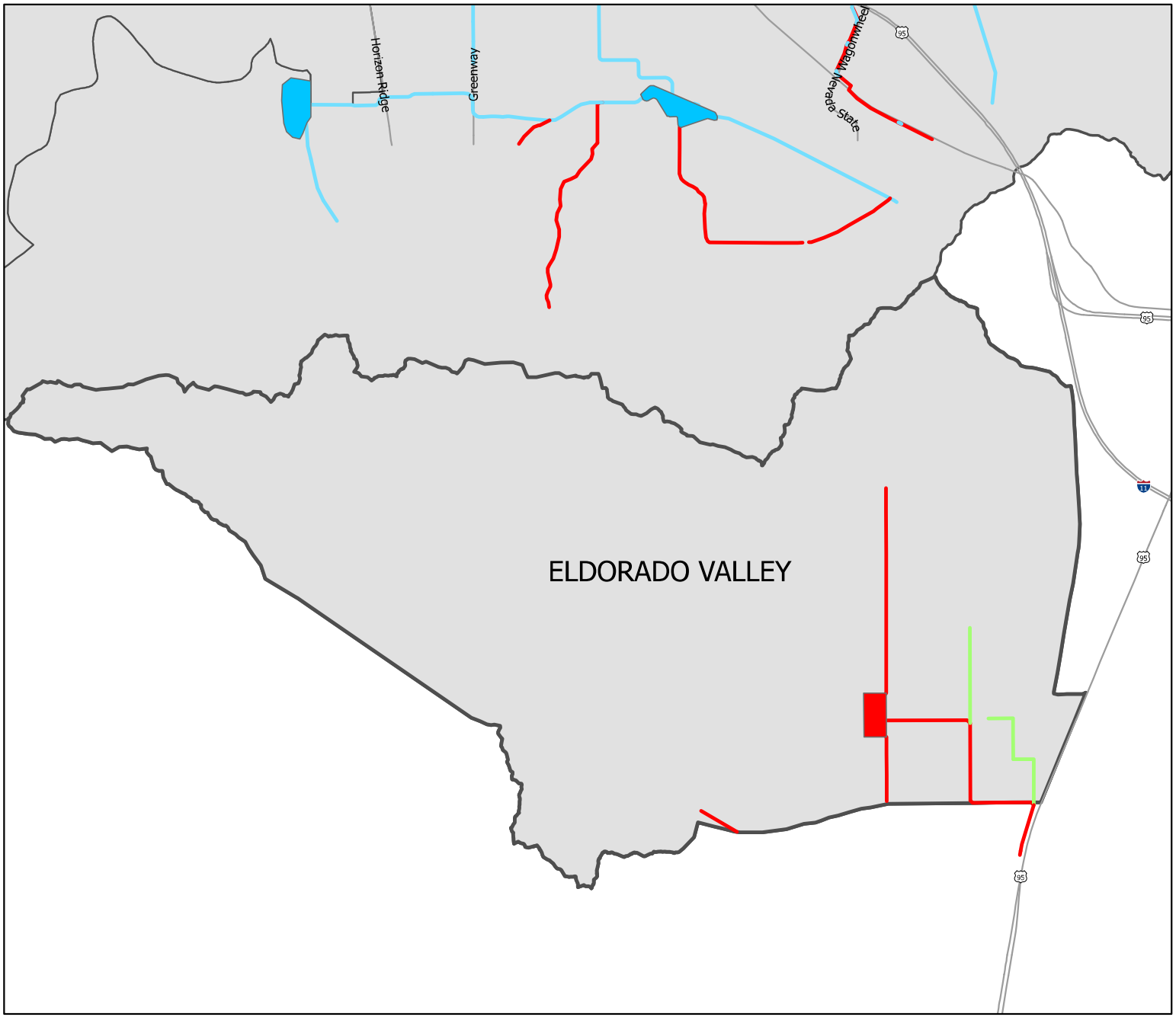
DETENTION BASINS
- Existing
- Proposed Category A
- Proposed Category B

FACILITIES
- Existing
- Proposed Category A
- Proposed Category B
- Watershed Boundary

REGIONAL FLOOD CONTROL DISTRICT

AtkinsRéalis

Westwood



Eldorado Watershed

Legend

DETENTION BASINS
- Existing
- Proposed Category A
- Proposed Category B

FACILITIES
- Existing
- Proposed Category A
- Proposed Category B
- Watershed Boundary

N

0 0.25 0.5 Miles

REGIONAL FLOOD CONTROL DISTRICT

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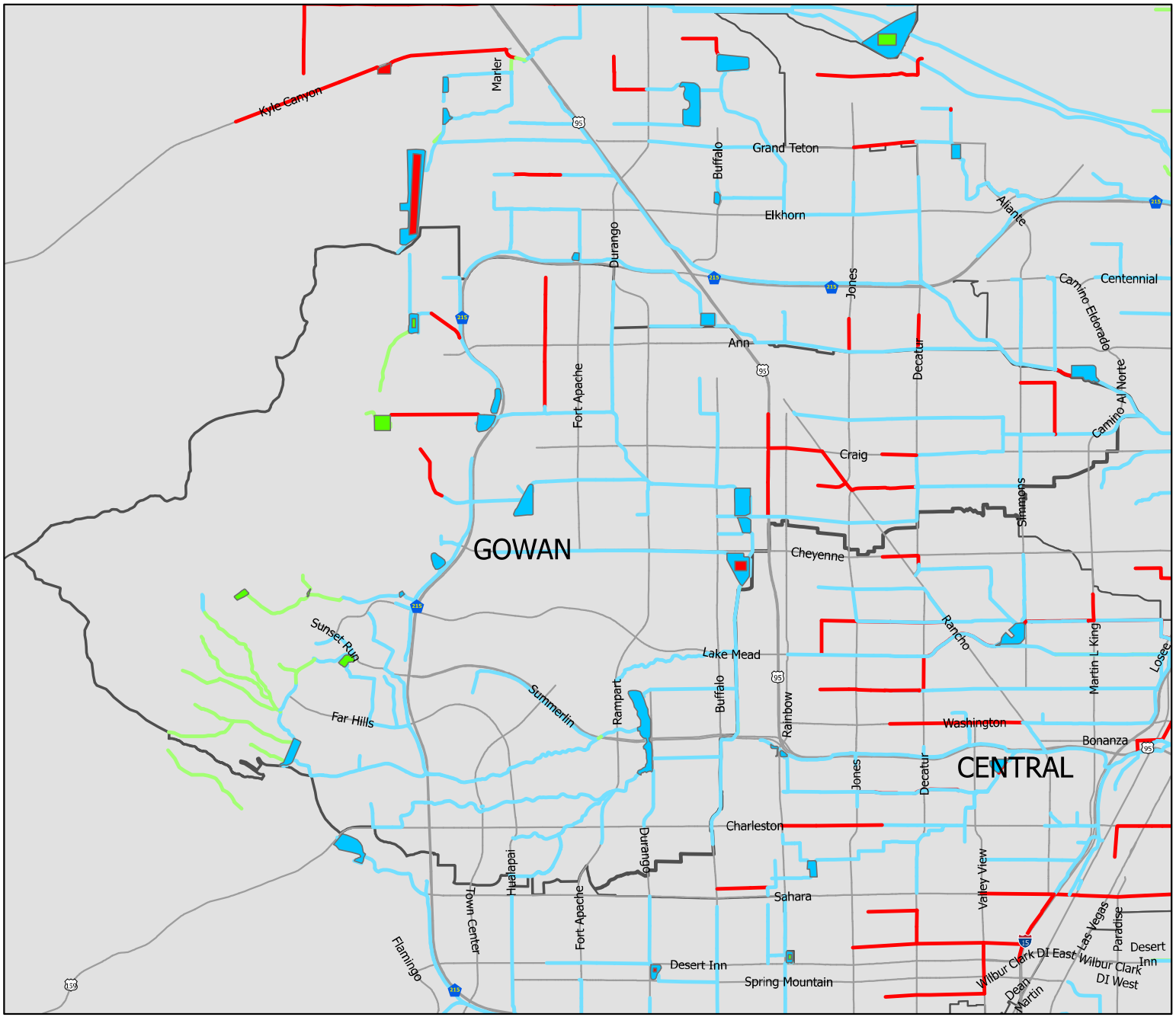
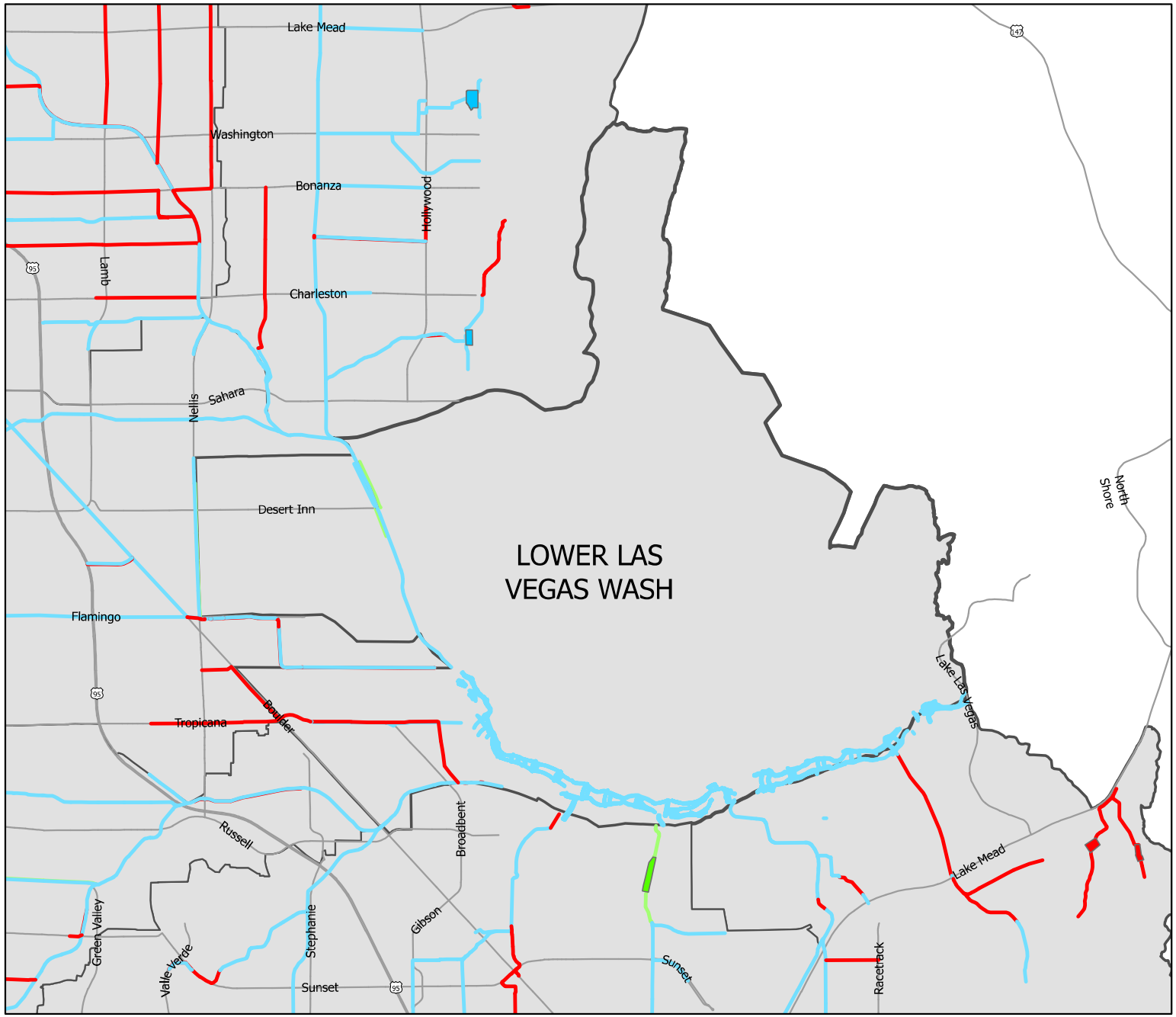
Westwood


Gowan Watershed
Legend
DETENTION BASINS
Existing
Proposed Category A
Proposed Category B
FACILITIES
Existing
Proposed Category A
Proposed Category B
Watershed Boundary
N
0 0.5 1
Miles
GOWAN
CENTRAL
Kyle Canyon
Marler
Grand Teton
Buffalo
Elkhorn
Durango
Jones
Centennial
Ann
Fort Apache
Decatur
Craig
Cheyenne
Lake Mead
Sunset Run
Far Hills
Summerlin
Rampart
Rainbow
Washington
Bonanza
Charleston
Sahara
Desert Inn
Spring Mountain
Flamingo
Town Center
Valley View
Las Vegas
Paradise
Desert Inn
Wilbur Clark DI East
Wilbur Clark DI West
Dean Martin
Rancho
Martin L King
Losee
Camino Al Norte
Camino Eldorado
Alante
Simmons
REGIONAL FLOOD CONTROL DISTRICT
AtkinsRéalis
Westwood



Lower Las Vegas Wash Watershed

Legend

DETENTION BASINS
- Existing
- Proposed Category A
- Proposed Category B

FACILITIES
- Existing
- Proposed Category A
- Proposed Category B
- Watershed Boundary

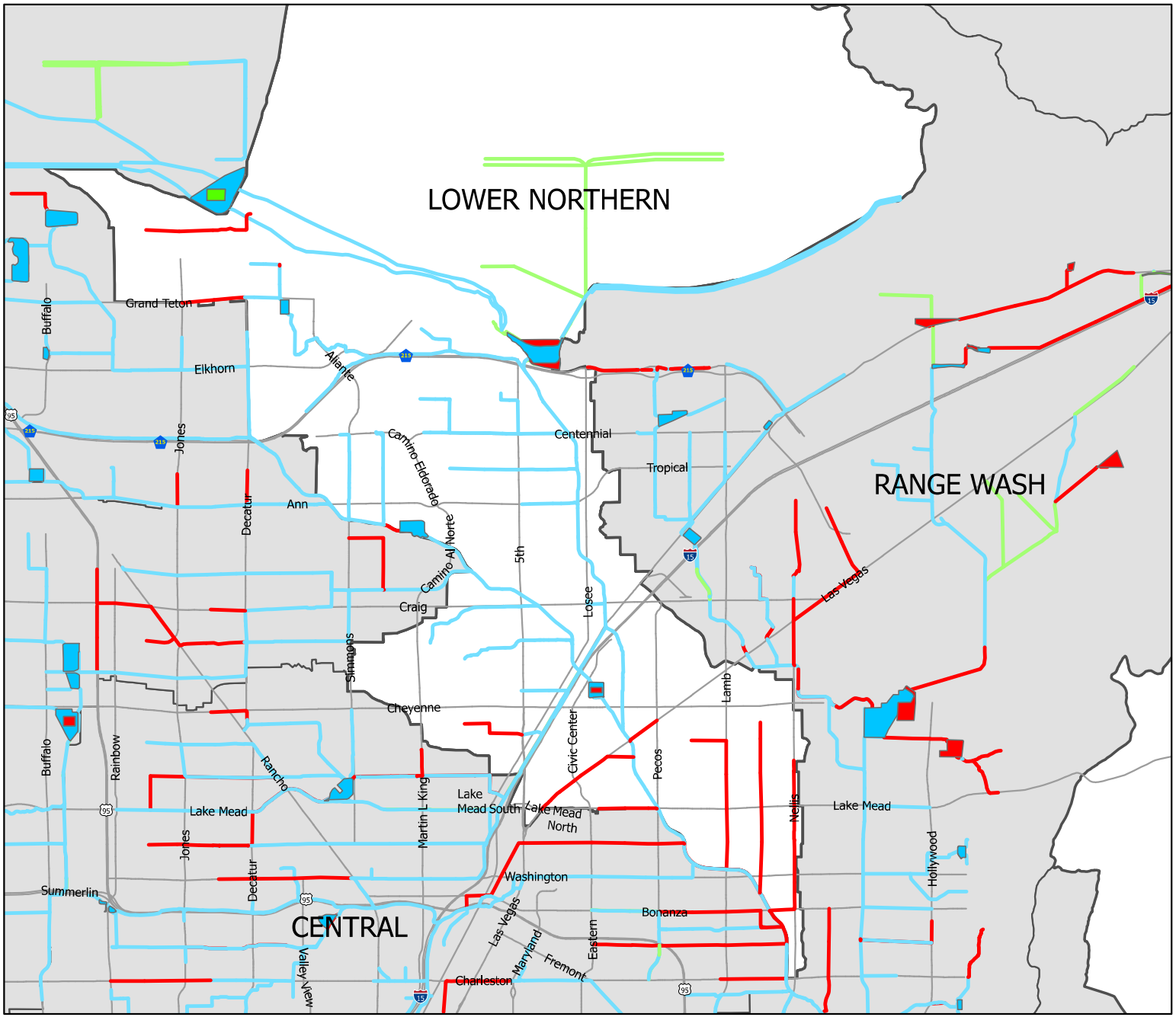
N

0 0.5 1 Miles

REGIONAL FLOOD CONTROL DISTRICT

AtkinsRéalis

Westwood



Lower Northern Watershed

Legend

DETENTION BASINS
- Existing
- Proposed Category A
- Proposed Category B

FACILITIES
- Existing
- Proposed Category A
- Proposed Category B

Watershed Boundary

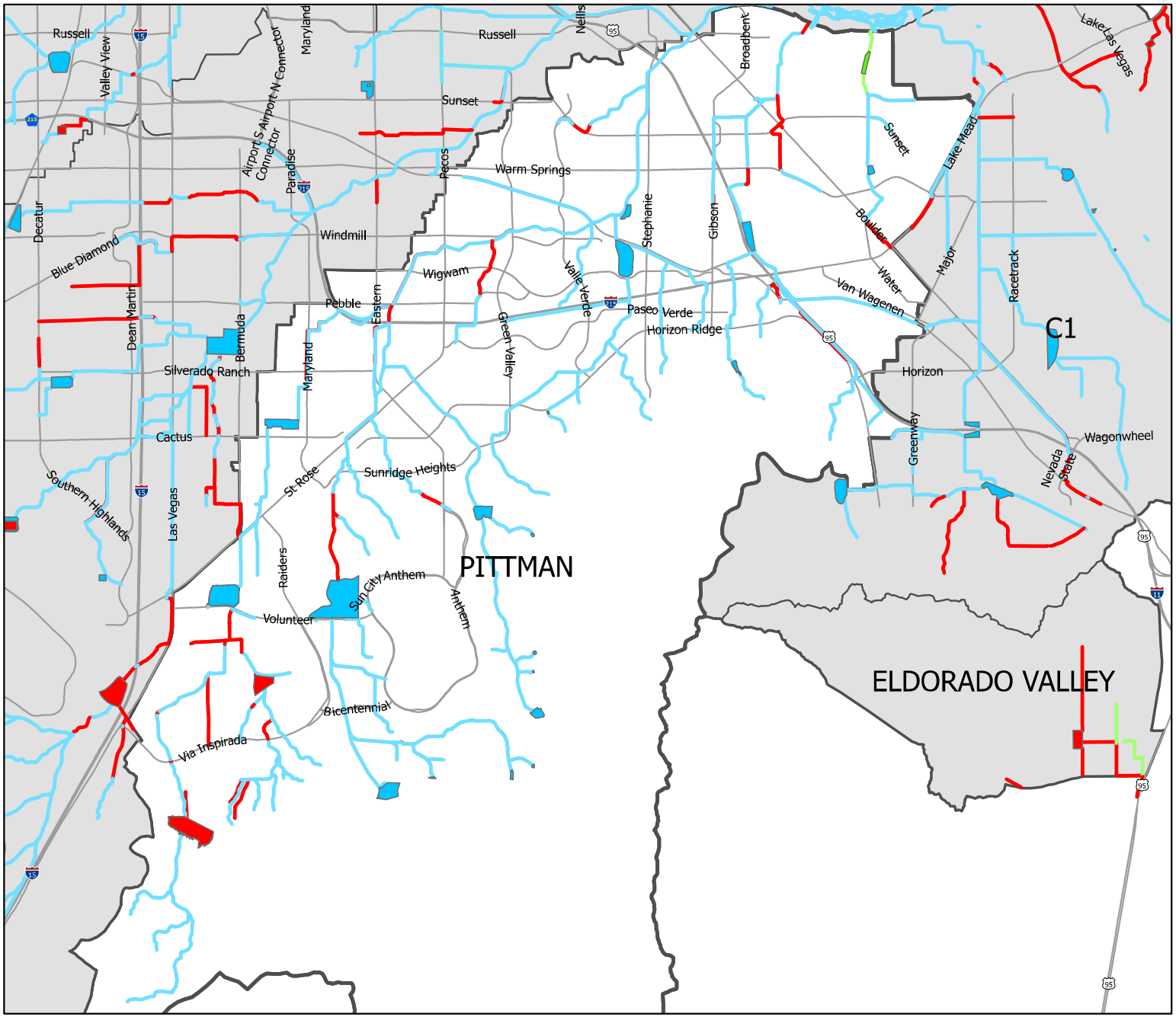
N

0 0.5 1 Miles

REGIONAL FLOOD CONTROL DISTRICT

AtkinsRéalis

Westwood



Pittman Watershed

Legend

DETENTION BASINS
- Existing
- Proposed Category A
- Proposed Category B

FACILITIES
- Existing
- Proposed Category A
- Proposed Category B
- Watershed Boundary

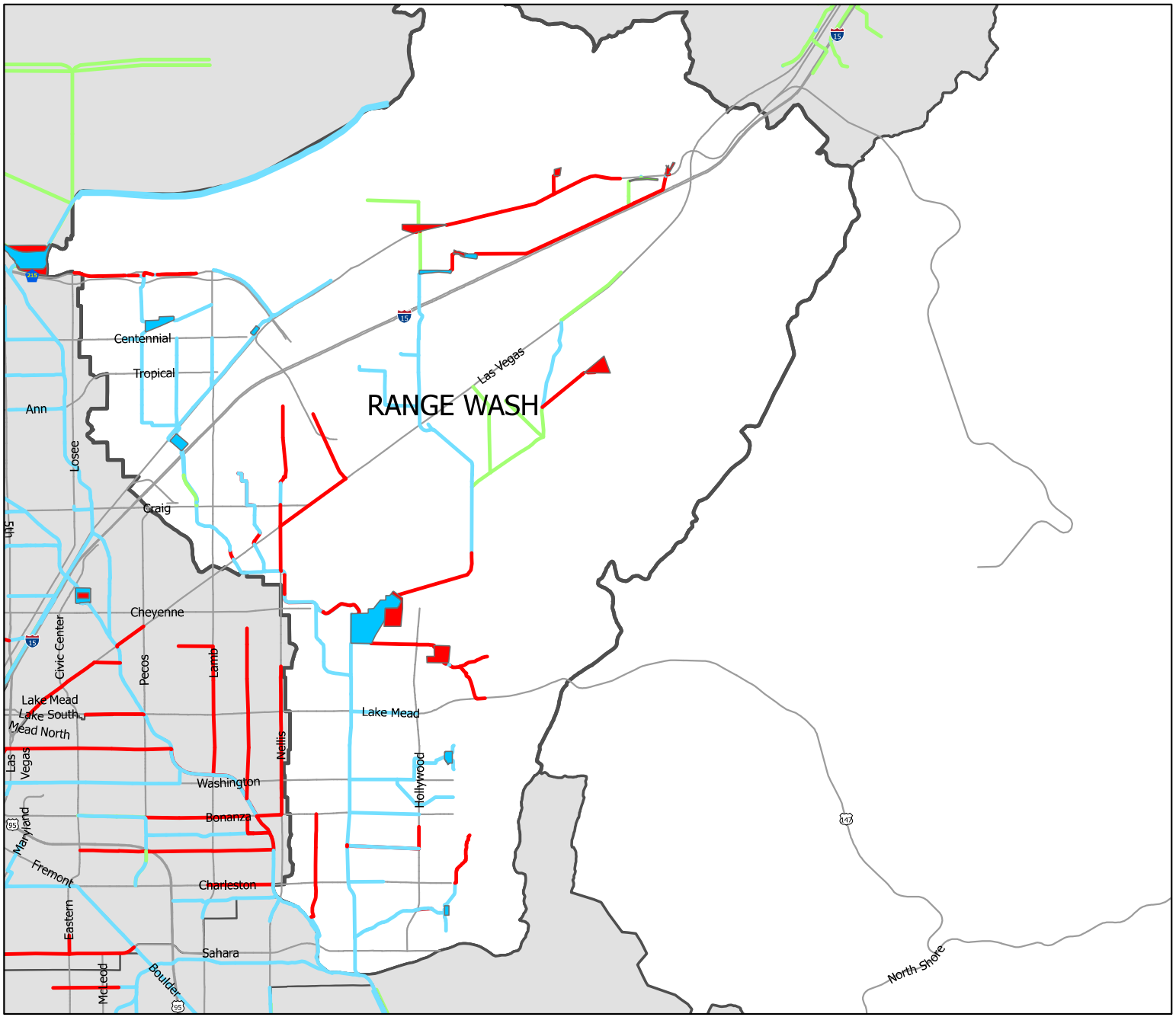
N

0 0.5 1 Miles

REGIONAL FLOOD CONTROL DISTRICT

AtkinsRéalis

Westwood



Range Wash Watershed

Legend

DETENTION BASINS

- Existing
- Proposed Category A
- Proposed Category B

FACILITIES

- Existing
- Proposed Category A
- Proposed Category B
- Watershed Boundary

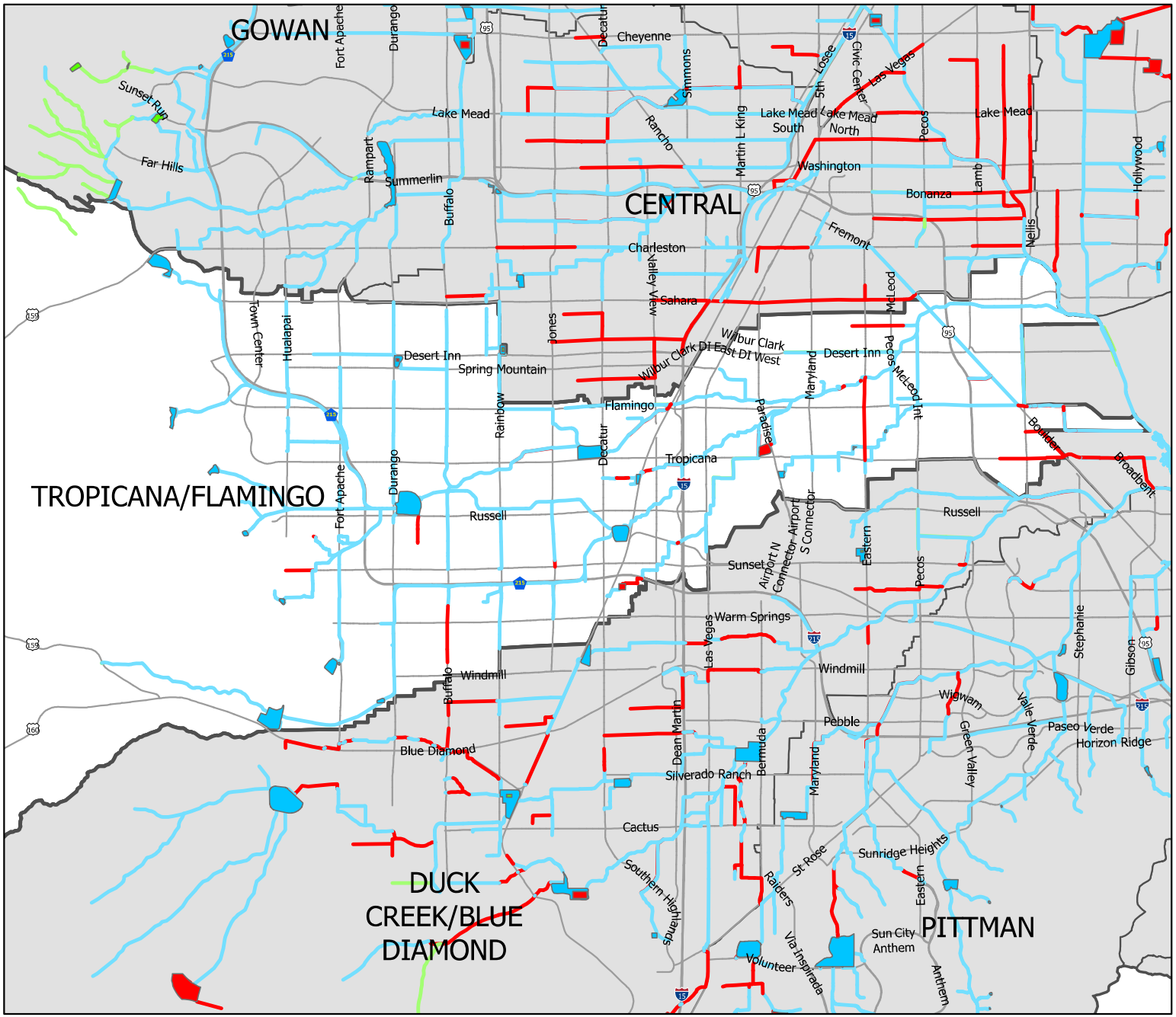
N

0 0.5 1 Miles

REGIONAL FLOOD CONTROL DISTRICT

AtkinsRéalis

Westwood



Tropicana/
Flamingo
Watershed

Legend

DETENTION BASINS
- Existing
- Proposed Category A
- Proposed Category B

FACILITIES
- Existing
- Proposed Category A
- Proposed Category B
- Watershed Boundary

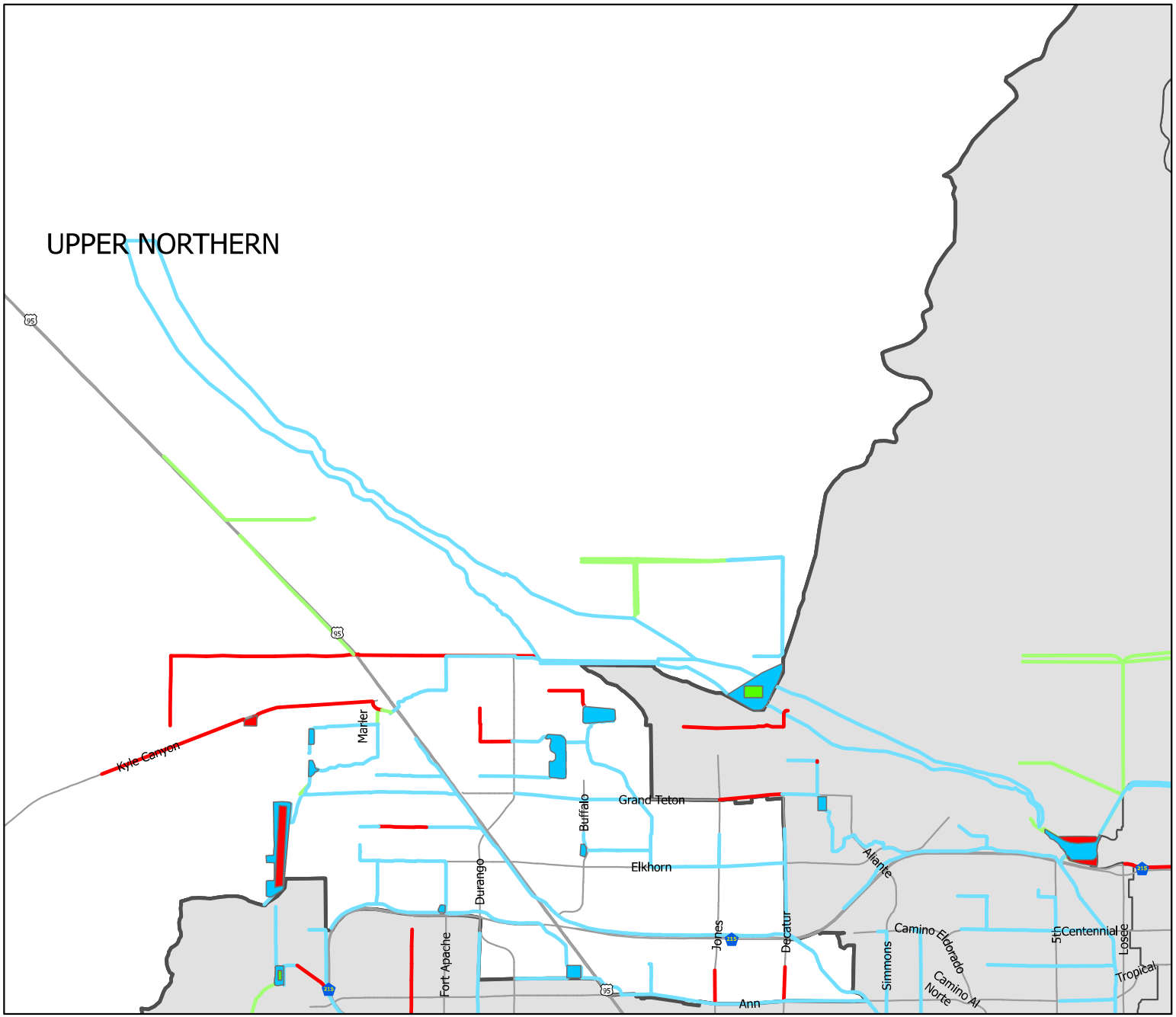
N

0 1 2 Miles

REGIONAL FLOOD CONTROL DISTRICT

AtkinsRéalis

Westwood



Upper Northern Watershed

Legend

DETENTION BASINS
- Existing
- Proposed Category A
- Proposed Category B

FACILITIES
- Existing
- Proposed Category A
- Proposed Category B
- Watershed Boundary

N

0 0.5 1 Miles

REGIONAL FLOOD CONTROL DISTRICT

AtkinsRéalis

Westwood