SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1C

Biological Resources - Miramar Reservoir and San Vicente Reservoir Alternatives

Pure Water San Diego Program North City Project EIR/EIS

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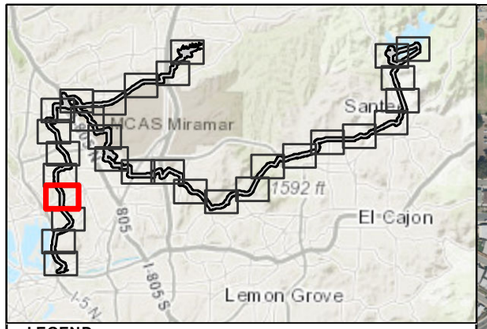

LEGEND

- Project Study Area
- Coastal Zone Boundary

Project Pipeline Alternatives

- Morena Wastewater Forcemain and Brine/Centrate Line

Vegetation Communities/Land Covers

- CLOW, Coast Live Oak Woodland
- CSS, Diegan Coastal Sage Scrub
- DEV, Urban/Developed
- DH, Disturbed Habitat
- EUC, Eucalyptus Woodland
- NNV, Non-native Vegetation
- SWS, Southern Willow Scrub
- dCSS, disturbed Diegan Coastal Sage Scrub

- Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1D

Biological Resources - Miramar Reservoir and San Vicente Reservoir Alternatives

Pure Water San Diego Program North City Project EIR/EIS

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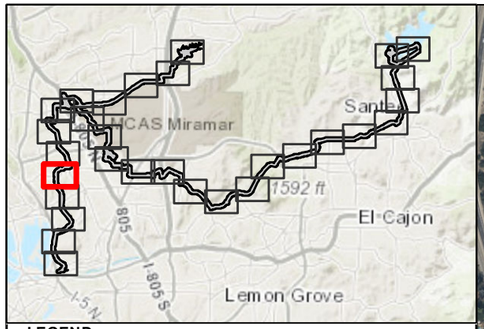


LEGEND

Project Study Area

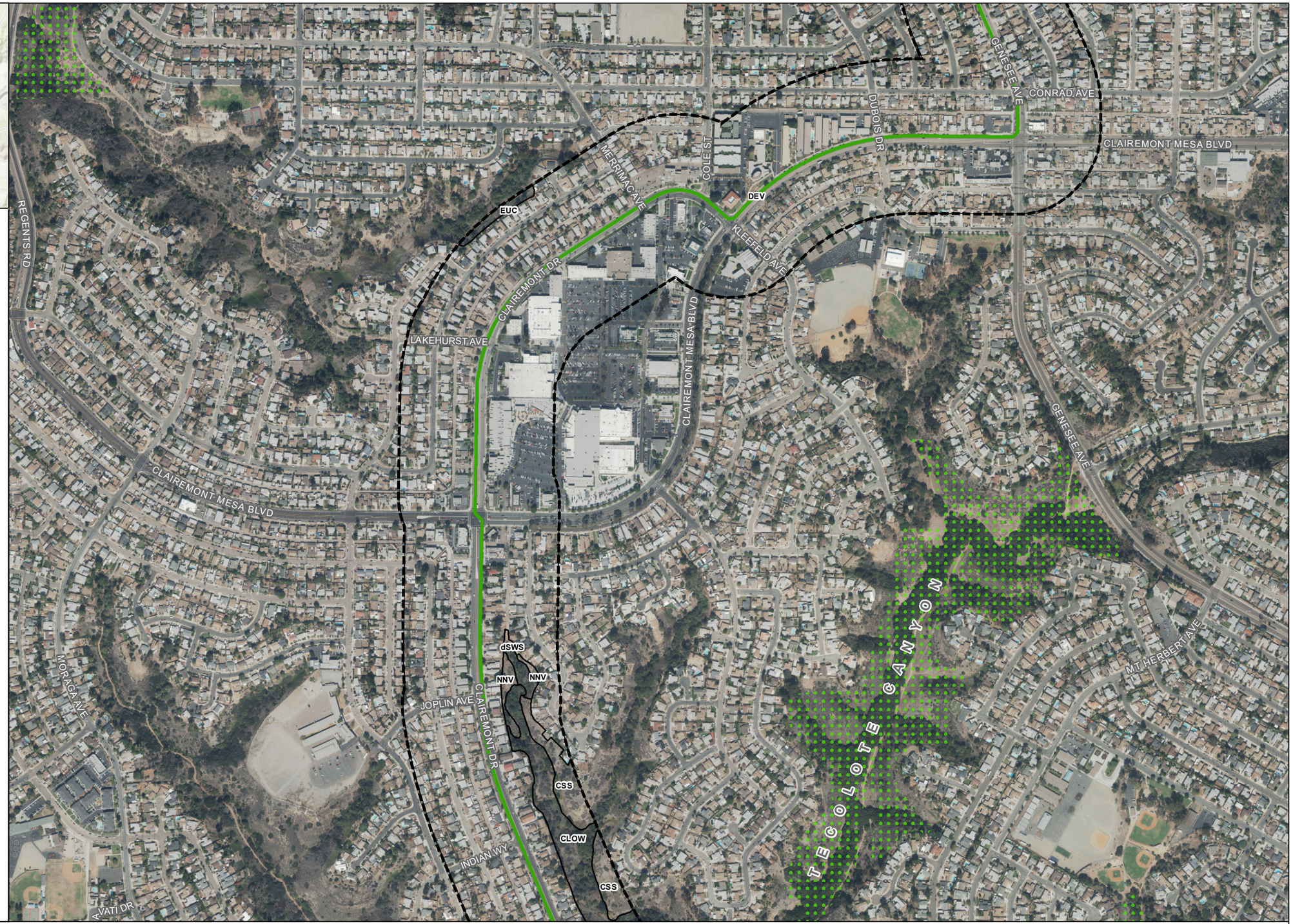
Project Pipeline Alternatives

Morena Wastewater Forcemain and Brine/Centrate Line

Vegetation Communities/Land Covers

CLOW, Coast Live Oak Woodland
CSS, Diegan Coastal Sage Scrub
DEV, Urban/Developed
EUC, Eucalyptus Woodland
NNV, Non-native Vegetation
dSWS, disturbed Southern Willow Scrub

Multi-Habitat Planning Area



N 0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1E

Biological Resources - Miramar Reservoir and San Vicente Reservoir Alternatives

Pure Water San Diego Program North City Project EIR/EIS

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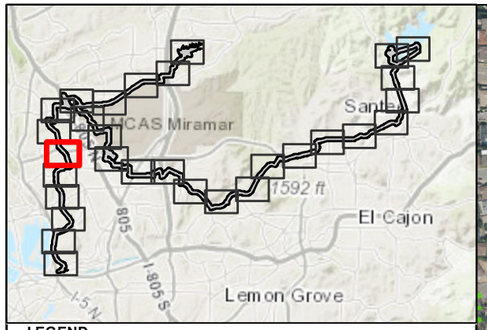

LEGEND

Project Study Area

Project Pipeline Alternatives

Morena Wastewater Forcemain and Brine/Centrate Line

Trenchless Segments of Alignment

Special Status Species

coastal California gnatcatcher

western pond turtle

Sensitive Plants

Artemisia palmeri

Jurisdictional Aquatic Resources

Non-wetland Waters (ACOE/RWQCB/CDFW)

Wetland or Riparian Area (CDFW Only)

Non-wetland Water (ACOE/RWCQB)/Riparian Area (CDFW)

Vegetation Communities/Land Covers

CLOW, Coast Live Oak Woodland

CSS, Diegan Coastal Sage Scrub

CSSB, Diegan Coastal Sage Scrub: Baccharis-dominated

DEV, Urban/Developed

DH, Disturbed Habitat

EUC, Eucalyptus Woodland

MFS, Mulefat Scrub

NNG, Non-native Grassland

NNV, Non-native Vegetation

NVC, Non-vegetated Channel or Floodway

SCLO, Southern Coast Live Oak Riparian Forest

SRF, Southern Riparian Forest

SWRF, Southern Arroyo Willow Riparian Forest

dCLOW, disturbed Coast Live Oak Woodland

dCSS, disturbed Diegan Coastal Sage Scrub

dSRF, disturbed Southern Riparian Forest

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1F

Biological Resources - Miramar Reservoir and San Vicente Reservoir Alternatives

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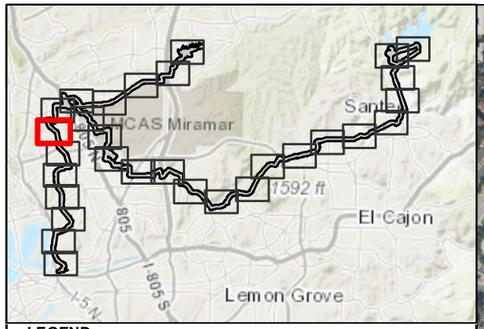

LEGEND

Project Study Area

Project Pipeline Alternatives

Morena Wastewater Forcemain and Brine/Centrate Line

Trenchless Segments of Alignment

Special Status Species

Cooper's hawk

yellow warbler

Sensitive Plants

Ceanothus verrucosus

Iva hayesiana

Romneya coulteri

Vegetation Communities/Land Covers

CSS, Diegan Coastal Sage Scrub

DEV, Urban/Developed

DH, Disturbed Habitat

EUC, Eucalyptus Woodland

FWM, Coastal and Valley Freshwater Marsh

NNV, Non-native Vegetation

SCLO, Southern Coast Live Oak Riparian Forest

SWRF, Southern Arroyo Willow Riparian Forest

SWS, Southern Willow Scrub

dCSS, disturbed Diegan Coastal Sage Scrub

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1G

Biological Resources - Miramar Reservoir and San Vicente Reservoir Alternatives

Pure Water San Diego Program North City Project EIR/EIS

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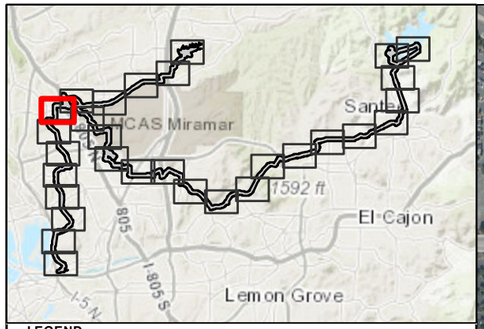

LEGEND

Project Study Area

Project Pipeline Alternatives

- North City Pure Water Pipeline
- Morena Wastewater Forcemain and Brine/Centrate Line
- San Vicente Pure Water Pipeline
- Landfill Gas Pipeline
- Trenchless Segments of Alignment
- Air Valve and Blow-Off Valve Work Areas (10'x10') - For San Vicente Reservoir Alternative

Project Facilities

- North City Pure Water Facilty
- North City Water Reclamation Plant Expansion
- North City Pure Water Renewable Energy Facility
- North City Pure Water Facility Influent Pump Station

Special Status Species

- Cooper's hawk
- coastal California gnatcatcher

Sensitive Plants

- *Holocarpha virgata ssp. elongata*
- *Iva hayesiana*
- *Quercus dumosa*
- *Selaginella cinerascens*
- *Viguiera laciniata*

Basin Data

- Vernal pool
- Basin (SDFS present)
- Basin
- MCAS Mapped Watershed

Jurisdictional Aquatic Resources

- Wetland or Riparian Area (CDFW Only)

Vegetation Communities/Land Covers

- CSS, Diegan Coastal Sage Scrub
- DEV, Urban/Developed
- DH, Disturbed Habitat
- EUC, Eucalyptus Woodland
- FWM, Coastal and Valley Freshwater Marsh
- MFS, Mulefat Scrub
- NNG, Non-native Grassland
- NNV, Non-native Vegetation
- SCLO, Southern Coast Live Oak Riparian Forest
- VP, Vernal Pool
- dCSS, disturbed Diegan Coastal Sage Scrub

- Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1H

Biological Resources - Miramar Reservoir and San Vicente Reservoir Alternatives

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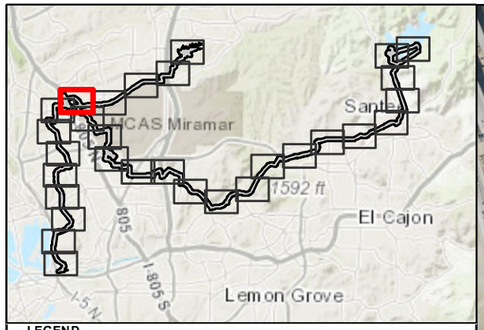

LEGEND

Project Study Area

Project Pipeline Alternatives

- North City Pure Water Pipeline
- Morena Wastewater Forcemain and Brine/Centrate Line
- San Vicente Pure Water Pipeline
- Landfill Gas Pipeline
- Repurposed Existing 36" Pipeline
- Trenchless Segments of Alignment
- Air Valve and Blow-Off Valve Work Areas (10'x10') - For San Vicente Reservoir Alternative

Project Facilities

- North City Pure Water Facilty
- North City Pure Water Pump Station
- North City Water Reclamation Plant Expansion
- North City Pure Water Renewable Energy Facility
- North City Pure Water Facility Influent Pump Station

Special Status Species

- coastal California gnatcatcher
- white-tailed kite

Sensitive Plants

- *Ceanothus verrucosus*
- *Holocarpha virgata ssp. elongata*
- *Microseris douglasii ssp. platycarpha*
- *Pentachaeta aurea ssp. aurea*
- *Quercus dumosa*
- *Selaginella cinerascens*
- *Viguiera laciniata*

Basin Data

- Vernal pool
- Basin (SDFS present)
- Basin
- MCAS Mapped Watershed

Jurisdictional Aquatic Resources

- Wetland or Riparian Area (ACOE/RWQCB/CDFW)
- Wetland or Riparian Area (CDFW Only)

Vegetation Communities/Land Covers

- ARU, Arundo-Dominated Riparian
- CC, Chamise Chaparral
- CSS, Diegan Coastal Sage Scrub
- CSS-r, Diegan Coastal Sage Scrub-Restored
- DEV, Urban/Developed
- DH, Disturbed Habitat
- FWM, Coastal and Valley Freshwater Marsh
- MFS, Mulefat Scrub
- NG, Native Grassland
- NNG, Non-native Grassland
- NNV, Non-native Vegetation
- SWS, Southern Willow Scrub
- VP, Vernal Pool
- dCSS, disturbed Diegan Coastal Sage Scrub

- Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1I

Biological Resources - Miramar Reservoir and San Vicente Reservoir Alternatives

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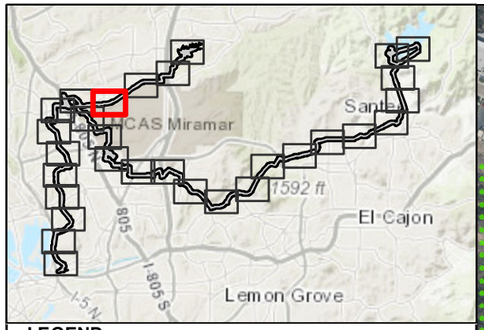

LEGEND

Project Study Area

Project Pipeline Alternatives

North City Pure Water Pipeline

Trenchless Segments of Alignment

Special Status Species

coastal California gnatcatcher

Sensitive Plants

Iva hayesiana

Basin Data

Basin (SDFS present)

Basin

MCAS Mapped Watershed

Vegetation Communities/Land Covers

CC, Chamise Chaparral

CSS, Diegan Coastal Sage Scrub

DEV, Urban/Developed

DH, Disturbed Habitat

EUC, Eucalyptus Woodland

NNG, Non-native Grassland

NNV, Non-native Vegetation

SMX, Southern Mixed Chaparral

dCSS, disturbed Diegan Coastal Sage Scrub

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

FIGURE 5.4-1J

Biological Resources - Miramar Reservoir Alternative

DUDEK

Pure Water San Diego Program North City Project EIR/EIS

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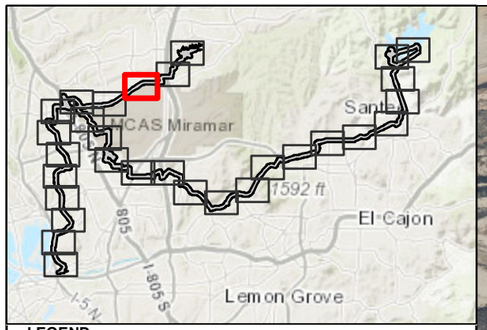

LEGEND

Project Study Area

Project Pipeline Alternatives

North City Pure Water Pipeline

Vegetation Communities/Land Covers

CSSB, Diegan Coastal Sage Scrub: Baccharis-dominated
DEV, Urban/Developed
DH, Disturbed Habitat
EUC, Eucalyptus Woodland
NNG, Non-native Grassland
SWS, Southern Willow Scrub

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1K
Biological Resources - Miramar Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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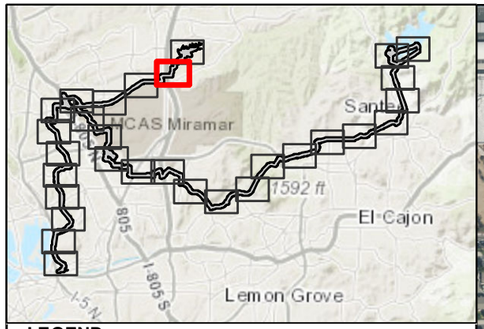

LEGEND

- Project Study Area

Project Pipeline Alternatives

- North City Pure Water Pipeline
- Trenchless Segments of Alignment

Jurisdictional Aquatic Resources

- Non-wetland Waters (ACOE/RWQCB/CDFW)

Vegetation Communities/Land Covers

- CSS, Diegan Coastal Sage Scrub
- DEV, Urban/Developed
- DEV-CC, Developed - Concrete Channel
- DH, Disturbed Habitat
- EUC, Eucalyptus Woodland
- NNG, Non-native Grassland

- Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

FIGURE 5.4-1L

Biological Resources - Miramar Reservoir Alternative

DUDEK

Pure Water San Diego Program North City Project EIR/EIS

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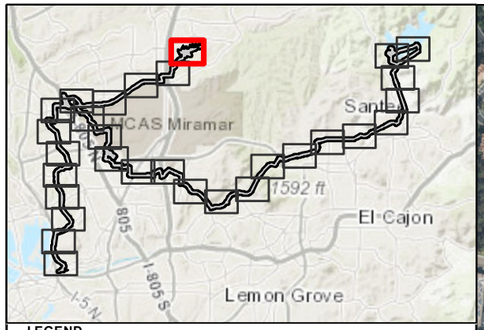

LEGEND

Project Study Area

Project Pipeline Alternatives

North City Pure Water Pipeline

North City Pure Water Pipeline - Subaqueous Pipeline

Trenchless Segments of Alignment

Project Facilities

Pure Water Dechlorination Facility

Miramar Water Treatment Plant Improvements and Pump Station

Special Status Species

western pond turtle

Sensitive Plants

Adolphia californica

Ferocactus viridescens

Pentachaeta aurea ssp. aurea

Quercus dumosa

Selaginella cinerascens

Jurisdictional Aquatic Resources

Non-wetland Waters (ACOE/RWQCB/CDFW)

Wetland or Riparian Area (ACOE/RWQCB/CDFW)

Vegetation Communities/Land Covers

CSS, Diegan Coastal Sage Scrub

CSS-CHP, Coastal Sage-Chaparral Transition

DEV, Urban/Developed

DH, Disturbed Habitat

DW, Disturbed Wetland

EUC, Eucalyptus Woodland

FWM, Coastal and Valley Freshwater Marsh

MFS, Mulefat Scrub

NNG, Non-native Grassland

NNV, Non-native Vegetation

NNW, Non-native Woodland

OW, Open Water

SMX, Southern Mixed Chaparral

SWS, Southern Willow Scrub

dCSS, disturbed Diegan Coastal Sage Scrub

dCSSB, disturbed Diegan Coastal Sage Scrub: Baccharis-dominated

dSMX, disturbed Southern Mixed Chaparral

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1M

Biological Resources - Miramar Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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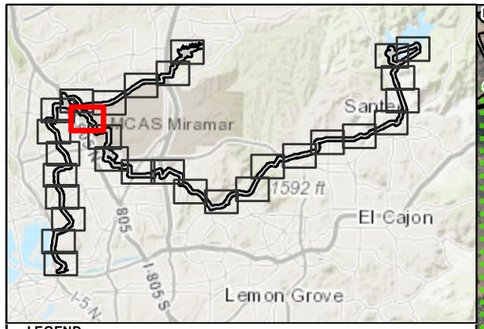

LEGEND

Project Study Area

Project Pipeline Alternatives

- Landfill Gas Pipeline
- Repurposed Existing 36" Pipeline
- Trenchless Segments of Alignment
- Air Valve and Blow-Off Valve Work Areas (10'x10') - For San Vicente Reservoir Alternative

Special Status Species

- coastal California gnatcatcher

Sensitive Plants

- *Brodiaea orcuttii*
- *Ceanothus verrucosus*
- *Chorizanthe polygonoides var. longispina*
- *Holocarpha virgata ssp. elongata*
- *Microseris douglasii ssp. platycarpha*
- *Pentachaeta aurea ssp. aurea*
- *Quercus dumosa*
- *Selaginella cinerascens*
- *Viguiera laciniata*

Basin Data

- Vernal pool (SDFS present)
- Basin (SDFS present)
- Basin
- Other SPFs
- MCAS Mapped Watershed

Jurisdictional Aquatic Resources

- Non-wetland Waters (ACOE/RWQCB/CDFW)
- Wetland or Riparian Area (ACOE/RWQCB/CDFW)

Vegetation Communities/Land Covers

- CC, Chamise Chaparral
- CSS, Diegan Coastal Sage Scrub
- CSS-CHP, Coastal Sage-Chaparral Transition
- CSS-r, Diegan Coastal Sage Scrub-Restored
- CSSB, Diegan Coastal Sage Scrub: Baccharis-dominated
- DEV, Urban/Developed
- DH, Disturbed Habitat
- FWM, Coastal and Valley Freshwater Marsh
- MFS, Mulefat Scrub
- NNG, Non-native Grassland
- NVC, Non-vegetated Channel or Floodway
- SMX, Southern Mixed Chaparral
- SWS, Southern Willow Scrub
- VP, Vernal Pool
- dBSC, disturbed Flat-topped Buckwheat
- dCSS, disturbed Diegan Coastal Sage Scrub
- dCSSB, disturbed Diegan Coastal Sage Scrub: Baccharis-dominated
- EAGR, Extensive Agriculture - Field/Pasture, Row Crops

- Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1N

Biological Resources - Miramar Reservoir and San Vicente Reservoir Alternatives

Pure Water San Diego Program North City Project EIR/EIS

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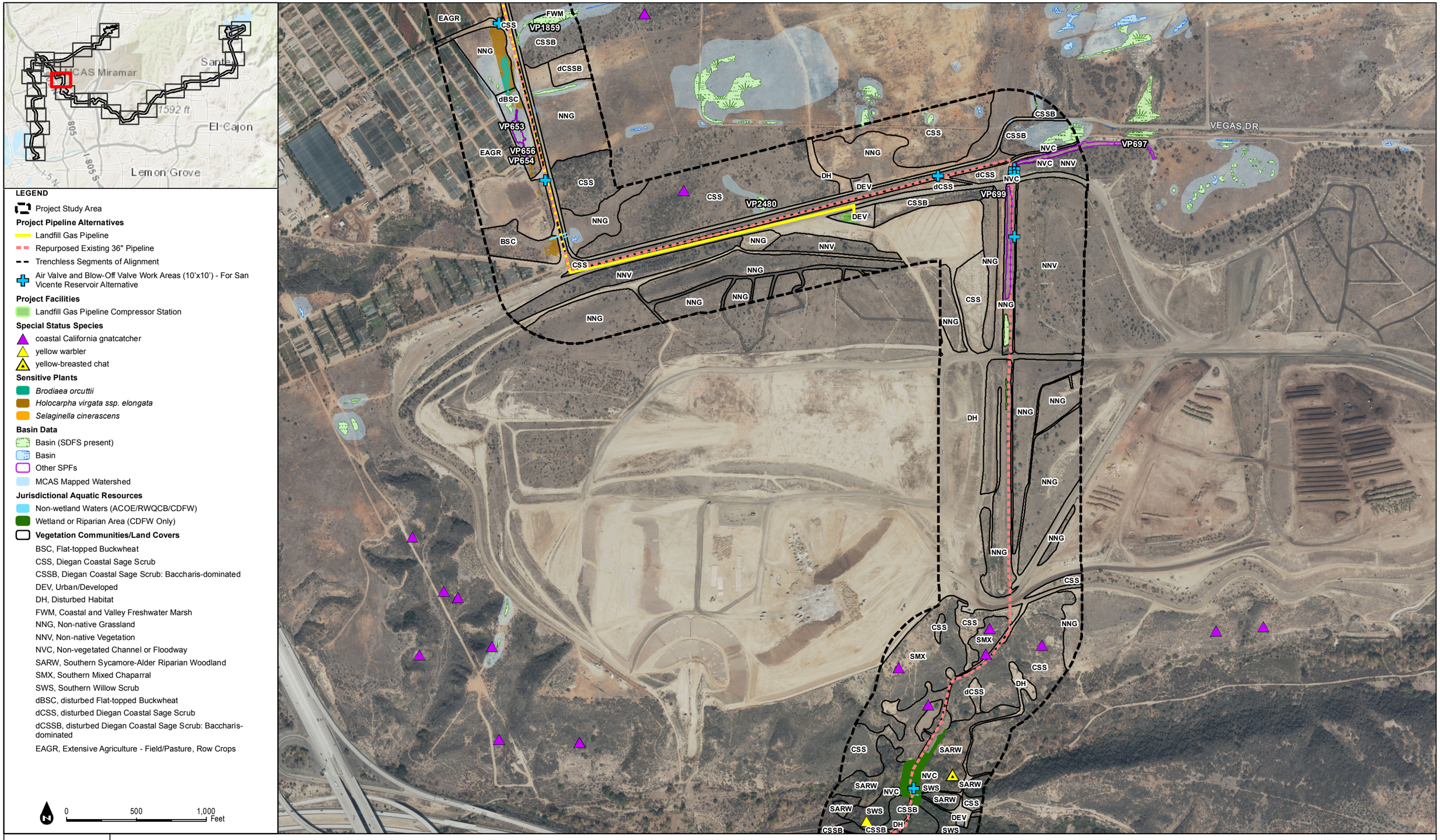

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1O

Biological Resources - Miramar Reservoir and San Vicente Reservoir Alternatives

Pure Water San Diego Program North City Project EIR/EIS

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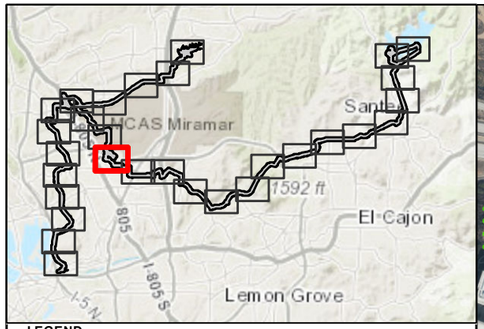

LEGEND

Project Study Area

Project Pipeline Alternatives

San Vicente Pure Water Pipeline

Repurposed Existing 36" Pipeline

Air Valve and Blow-Off Valve Work Areas (10'x10') - For San Vicente Reservoir Alternative

Project Facilities

Metro Biosolids Center Improvements

Special Status Species

coastal California gnatcatcher

willow flycatcher

yellow warbler

yellow-breasted chat

Sensitive Plants

Ceanothus verrucosus

Chorizanthe polygonoides var. longispina

Holocarpha virgata ssp. elongata

Isocoma menziesii var. decumbens

Quercus dumosa

Selaginella cinerascens

Basin Data

Vernal pool (SDFS present)

Basin (SDFS present)

Basin

Jurisdictional Aquatic Resources

Non-wetland Waters (ACOE/RWQCB/CDFW)

Wetland or Riparian Area (CDFW Only)

Vegetation Communities/Land Covers

CSS, Diegan Coastal Sage Scrub

CSS-CHP, Coastal Sage-Chaparral Transition

CSSB, Diegan Coastal Sage Scrub: Baccharis-dominated

DEV, Urban/Developed

DH, Disturbed Habitat

NNG, Non-native Grassland

NNV, Non-native Vegetation

NVC, Non-vegetated Channel or Floodway

SARW, Southern Sycamore-Alder Riparian Woodland

SMX, Southern Mixed Chaparral

SOC, Scrub Oak Chaparral

SRF, Southern Riparian Forest

SWS, Southern Willow Scrub

VP, Vernal Pool

dCSSB, disturbed Diegan Coastal Sage Scrub: Baccharis-dominated

dSWS, disturbed Southern Willow Scrub

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1P

Biological Resources - Miramar Reservoir and San Vicente Reservoir Alternatives

Pure Water San Diego Program North City Project EIR/EIS

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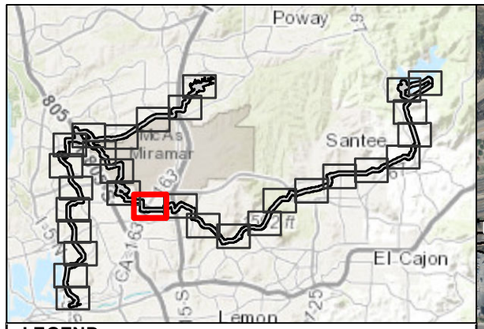

LEGEND

- Project Study Area

Project Pipeline Alternatives

- San Vicente Pure Water Pipeline
- Trenchless Segments of Alignment

Vegetation Communities/Land Covers

- CSS, Diegan Coastal Sage Scrub
- CSS-CHP, Coastal Sage-Chaparral Transition
- DEV, Urban/Developed
- EUC, Eucalyptus Woodland
- FWM, Coastal and Valley Freshwater Marsh
- NNV, Non-native Vegetation
- SOC, Scrub Oak Chaparral
- dSWS, disturbed Southern Willow Scrub
- Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1Q

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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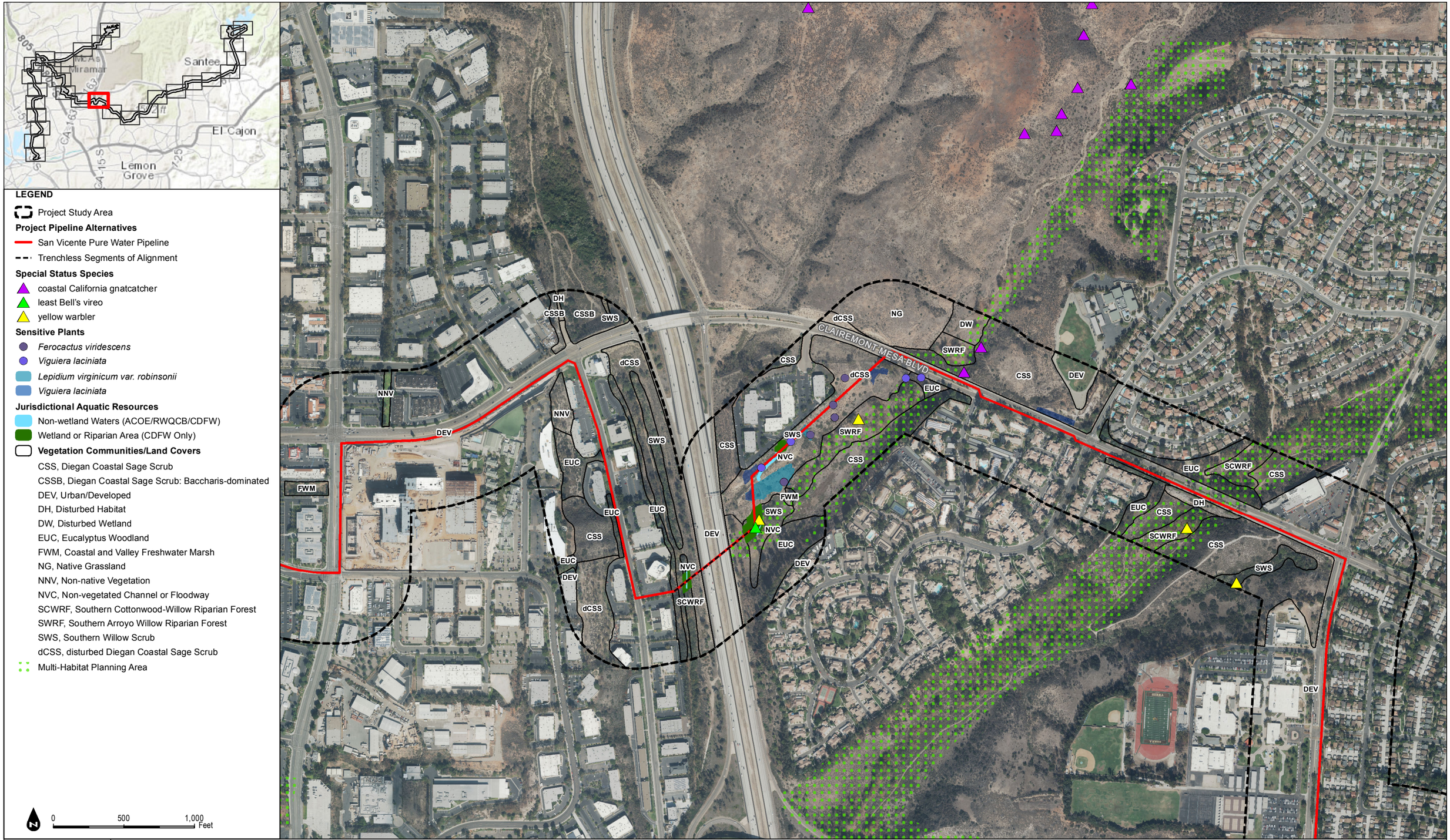

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

FIGURE 5.4-1R

Biological Resources - San Vicente Reservoir Alternative

DUDEK

Pure Water San Diego Program North City Project EIR/EIS

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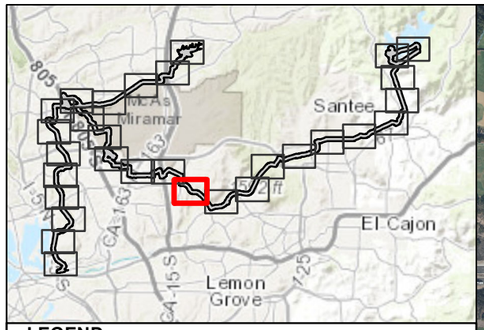

LEGEND

Project Study Area

Project Pipeline Alternatives

San Vicente Pure Water Pipeline

Special Status Species

Cooper's hawk

yellow warbler

Sensitive Plants

Viguiera laciniata

Vegetation Communities/Land Covers

CLOW, Coast Live Oak Woodland

CSS, Diegan Coastal Sage Scrub

DEV, Urban/Developed

DH, Disturbed Habitat

EUC, Eucalyptus Woodland

NNV, Non-native Vegetation

SWS, Southern Willow Scrub

dCSS, disturbed Diegan Coastal Sage Scrub

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1S

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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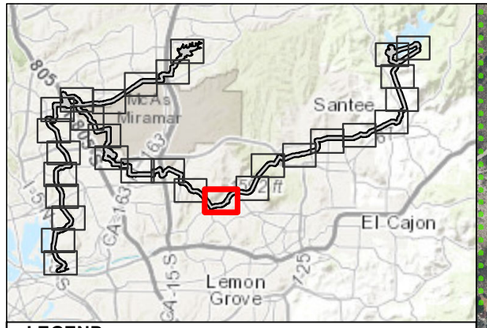

LEGEND

Project Study Area

Project Pipeline Alternatives

San Vicente Pure Water Pipeline

Trenchless Segments of Alignment

Project Facilities

Mission Trails Booster Station

Special Status Species

coastal California gnatcatcher

yellow warbler

Sensitive Plants

Viguiera laciniata

Viguiera laciniata

Federally Designated Critical Habitat

Least Bell's Vireo

Jurisdictional Aquatic Resources

Non-wetland Waters (ACOE/RWQCB/CDFW)

Vegetation Communities/Land Covers

ARU, Arundo-Dominated Riparian

CSS, Diegan Coastal Sage Scrub

DEV, Urban/Developed

DH, Disturbed Habitat

EUC, Eucalyptus Woodland

FWM, Coastal and Valley Freshwater Marsh

NNW, Non-native Woodland

OW, Open Water

SWS, Southern Willow Scrub

dCSS, disturbed Diegan Coastal Sage Scrub

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1T

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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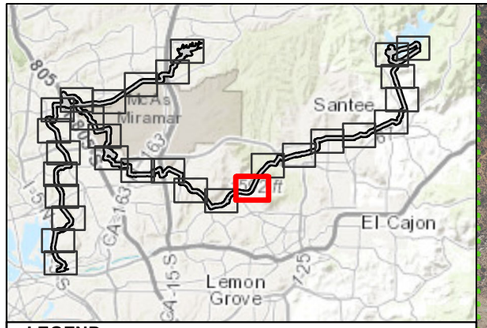

LEGEND

Project Study Area

Project Pipeline Alternatives

San Vicente Pure Water Pipeline

Special Status Species

coastal California gnatcatcher

mule deer

orangethroat whiptail

rosy boa

southern California rufous-crowned sparrow

two-striped gartersnake

Sensitive Plants

Lepidium virginicum var. robinsonii

Viguiera laciniata

Federally Designated Critical Habitat

Least Bell's Vireo

Vegetation Communities/Land Covers

CLOW, Coast Live Oak Woodland

CSS, Diegan Coastal Sage Scrub

DEV, Urban/Developed

NNG, Non-native Grassland

NNV, Non-native Vegetation

SCLO, Southern Coast Live Oak Riparian Forest

SMX, Southern Mixed Chaparral

SWS, Southern Willow Scrub

dCSS, disturbed Diegan Coastal Sage Scrub

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1U

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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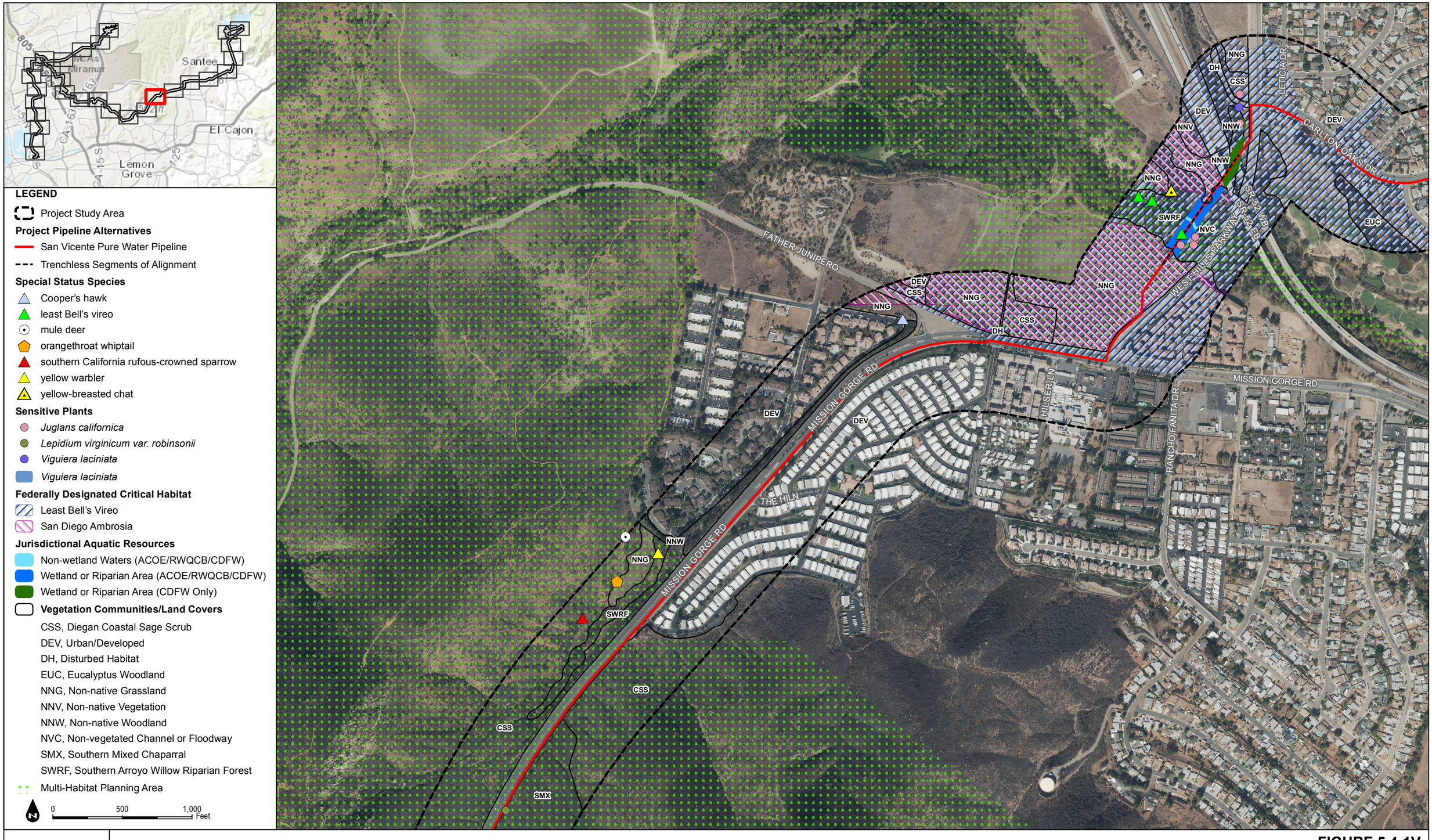

LEGEND

Project Study Area

Project Pipeline Alternatives

San Vicente Pure Water Pipeline

Trenchless Segments of Alignment

Special Status Species

Cooper's hawk

least Bell's vireo

mule deer

orangethroat whiptail

southern California rufous-crowned sparrow

yellow warbler

yellow-breasted chat

Sensitive Plants

Juglans californica

Lepidium virginicum var. robinsonii

Viguiera laciniata

Viguiera laciniata

Federally Designated Critical Habitat

Least Bell's Vireo

San Diego Ambrosia

Jurisdictional Aquatic Resources

Non-wetland Waters (ACOE/RWQCB/CDFW)

Wetland or Riparian Area (ACOE/RWQCB/CDFW)

Wetland or Riparian Area (CDFW Only)

Vegetation Communities/Land Covers

CSS, Diegan Coastal Sage Scrub

DEV, Urban/Developed

DH, Disturbed Habitat

EUC, Eucalyptus Woodland

NNG, Non-native Grassland

NNV, Non-native Vegetation

NNW, Non-native Woodland

NVC, Non-vegetated Channel or Floodway

SMX, Southern Mixed Chaparral

SWRF, Southern Arroyo Willow Riparian Forest

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1V

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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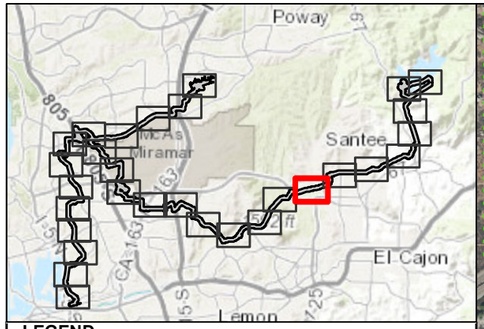

LEGEND

Project Study Area

Project Pipeline Alternatives

San Vicente Pure Water Pipeline

Trenchless Segments of Alignment

Special Status Species

Cooper's hawk

least Bell's vireo

yellow-breasted chat

Federally Designated Critical Habitat

Least Bell's Vireo

Jurisdictional Aquatic Resources

Wetland or Riparian Area (ACOE/RWQCB/CDFW)

Vegetation Communities/Land Covers

DEV, Urban/Developed

DH, Disturbed Habitat

EUC, Eucalyptus Woodland

NNG, Non-native Grassland

NNW, Non-native Woodland

SWS, Southern Willow Scrub

dSWS, disturbed Southern Willow Scrub

Multi-Habitat Planning Area

0 500 1,000 Feet

RUMSON DR
CARLTON OAKS DR
CARLTON HILLS BLVD
PIKE RD
NALINI CT
MASSOTA AVE
SR-52 WB
SR-52 EB
DEV
NNW
SWS
dSWS
DH
NNG
EUC

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1W

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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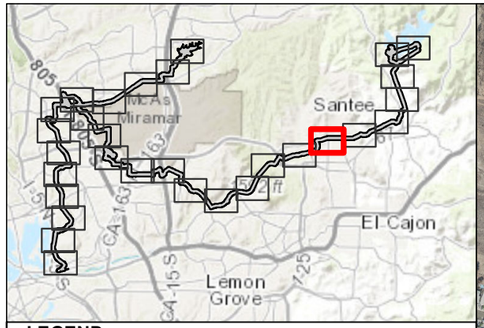

LEGEND

Project Study Area

Project Pipeline Alternatives

San Vicente Pure Water Pipeline

Special Status Species

least Bell's vireo

yellow warbler

Federally Designated Critical Habitat

Coastal California Gnatcatcher

Jurisdictional Aquatic Resources

Non-wetland Waters (ACOE/RWQCB/CDFW)

Vegetation Communities/Land Covers

CSS, Diegan Coastal Sage Scrub
DEV, Urban/Developed
DEV-CC, Developed - Concrete Channel
DH, Disturbed Habitat
EUC, Eucalyptus Woodland
NNG, Non-native Grassland
NNW, Non-native Woodland
NVC, Non-vegetated Channel or Floodway
SWS, Southern Willow Scrub
dSWS, disturbed Southern Willow Scrub

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

FIGURE 5.4-1X

Biological Resources - San Vicente Reservoir Alternative

DUDEK

Pure Water San Diego Program North City Project EIR/EIS

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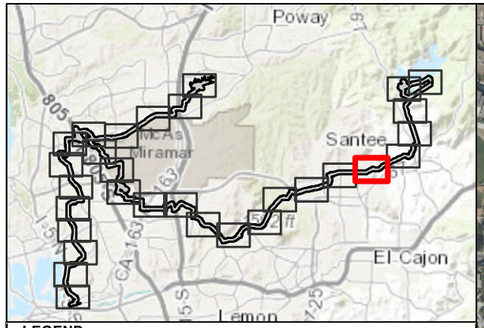

LEGEND

Project Study Area

Project Pipeline Alternatives

San Vicente Pure Water Pipeline

Special Status Species

coastal California gnatcatcher

Jurisdictional Aquatic Resources

Potential Wetland or Riparian Area (ACOE/RWQCB/CDFW)

Wetland or Riparian Area (RWQCB/CDFW)

Vegetation Communities/Land Covers

CSS, Diegan Coastal Sage Scrub

DEV, Urban/Developed

DH, Disturbed Habitat

NNG, Non-native Grassland

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1Y

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

FIGURE 5.4-1Z

Biological Resources - San Vicente Reservoir Alternative

DUDEK

Pure Water San Diego Program North City Project EIR/EIS

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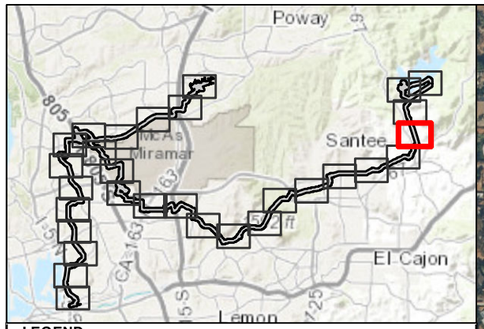

LEGEND

Project Study Area

Project Pipeline Alternatives

San Vicente Pure Water Pipeline

Special Status Species

brown-headed cowbird

yellow warbler

Jurisdictional Aquatic Resources

Non-wetland Water (ACOE/RWCQB)/Riparian Area (CDFW)

Vegetation Communities/Land Covers

DEV, Urban/Developed

DH, Disturbed Habitat

EUC, Eucalyptus Woodland

NNG, Non-native Grassland

NVC, Non-vegetated Channel or Floodway

SWS, Southern Willow Scrub

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1AA

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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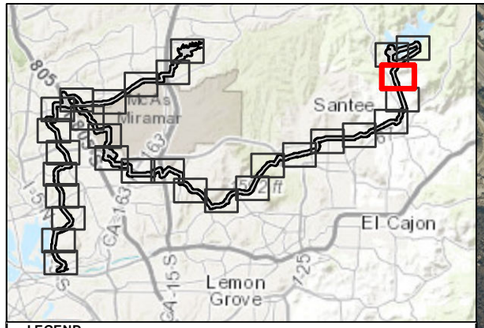

LEGEND

Project Study Area

Project Pipeline Alternatives

- San Vicente Pure Water Pipeline
- San Vicente Pure Water Pipeline - In-Reservoir Alternative
- San Vicente Pure Water Pipeline - Marina Alternative

Special Status Species

- southern California rufous-crowned sparrow
- yellow warbler

Sensitive Plants

- *Viguiera laciniata*

Jurisdictional Aquatic Resources

- Non-wetland Water (ACOE/RWCQB)/Riparian Area (CDFW)

Vegetation Communities/Land Covers

- AGR, General Agriculture
- ARU, Arundo-Dominated Riparian
- CLOW, Coast Live Oak Woodland
- CSS, Diegan Coastal Sage Scrub
- DEV, Urban/Developed
- DH, Disturbed Habitat
- MFS, Mulefat Scrub
- NNG, Non-native Grassland
- dMFS, disturbed Mulefat Scrub

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1AB

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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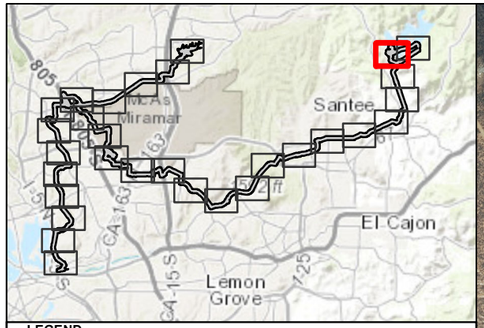

LEGEND

Project Study Area

Project Pipeline Alternatives

- San Vicente Pure Water Pipeline
- San Vicente Pure Water Pipeline - In-Reservoir Alternative Terminus
- San Vicente Pure Water Pipeline - Tunnel Alternative
- San Vicente Pure Water Pipeline - Marina Alternative
- Trenchless Segments of Alignment

Special Status Species

- coastal California gnatcatcher
- southern California rufous-crowned sparrow

Sensitive Plants

- *Clarkia delicata*
- *Lepidium virginicum var. robinsonii*
- *Pseudognaphalium leucocephalum*
- *Viguiera laciniata*
- *Lepidium virginicum var. robinsonii*
- *Pseudognaphalium leucocephalum*
- *Selaginella cinerascens*
- *Viguiera laciniata*

Jurisdictional Aquatic Resources

- Non-wetland Waters (ACOE/RWQCB/CDFW)

Vegetation Communities/Land Covers

- CLOW, Coast Live Oak Woodland
- CSS, Diegan Coastal Sage Scrub
- CSS-r, Diegan Coastal Sage Scrub-Restored
- DEV, Urban/Developed
- DH, Disturbed Habitat
- NNG, Non-native Grassland
- NVC, Non-vegetated Channel or Floodway
- OW, Open Water
- SMX, Southern Mixed Chaparral
- Multi-Habitat Planning Area

0 500 1,000 Feet

SMX CSSr DH OW DEV CSS NNG NVC CLOW MORENO AVE

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1AC

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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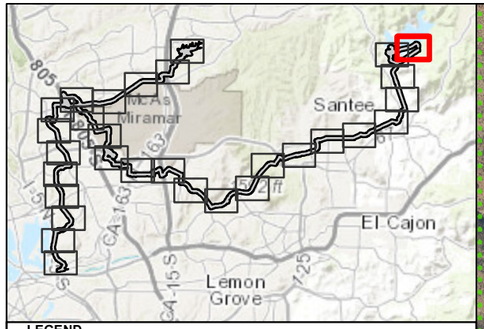

LEGEND

Project Study Area

Project Pipeline Alternatives

San Vicente Pure Water Pipeline - In-Reservoir Alternative Terminus

San Vicente Pure Water Pipeline - Tunnel Alternative

Trenchless Segments of Alignment

Special Status Species

Blainville's horned lizard

Cooper's hawk

San Diegan tiger whiptail

orangethroat whiptail

southern California rufous-crowned sparrow

Sensitive Plants

Artemisia palmeri

Artemisia palmeri

Selaginella cinerascens

Jurisdictional Aquatic Resources

Non-wetland Waters (ACOE/RWQCB/CDFW)

Vegetation Communities/Land Covers

CLOW, Coast Live Oak Woodland

CSS, Diegan Coastal Sage Scrub

CSS-r, Diegan Coastal Sage Scrub-Restored

DEV, Urban/Developed

DH, Disturbed Habitat

NVC, Non-vegetated Channel or Floodway

OW, Open Water

SMX, Southern Mixed Chaparral

Multi-Habitat Planning Area

0 500 1,000 Feet

SOURCE: City of San Diego 2016, 2017; SANDAG, 2016

DUDEK

FIGURE 5.4-1AD

Biological Resources - San Vicente Reservoir Alternative

Pure Water San Diego Program North City Project EIR/EIS

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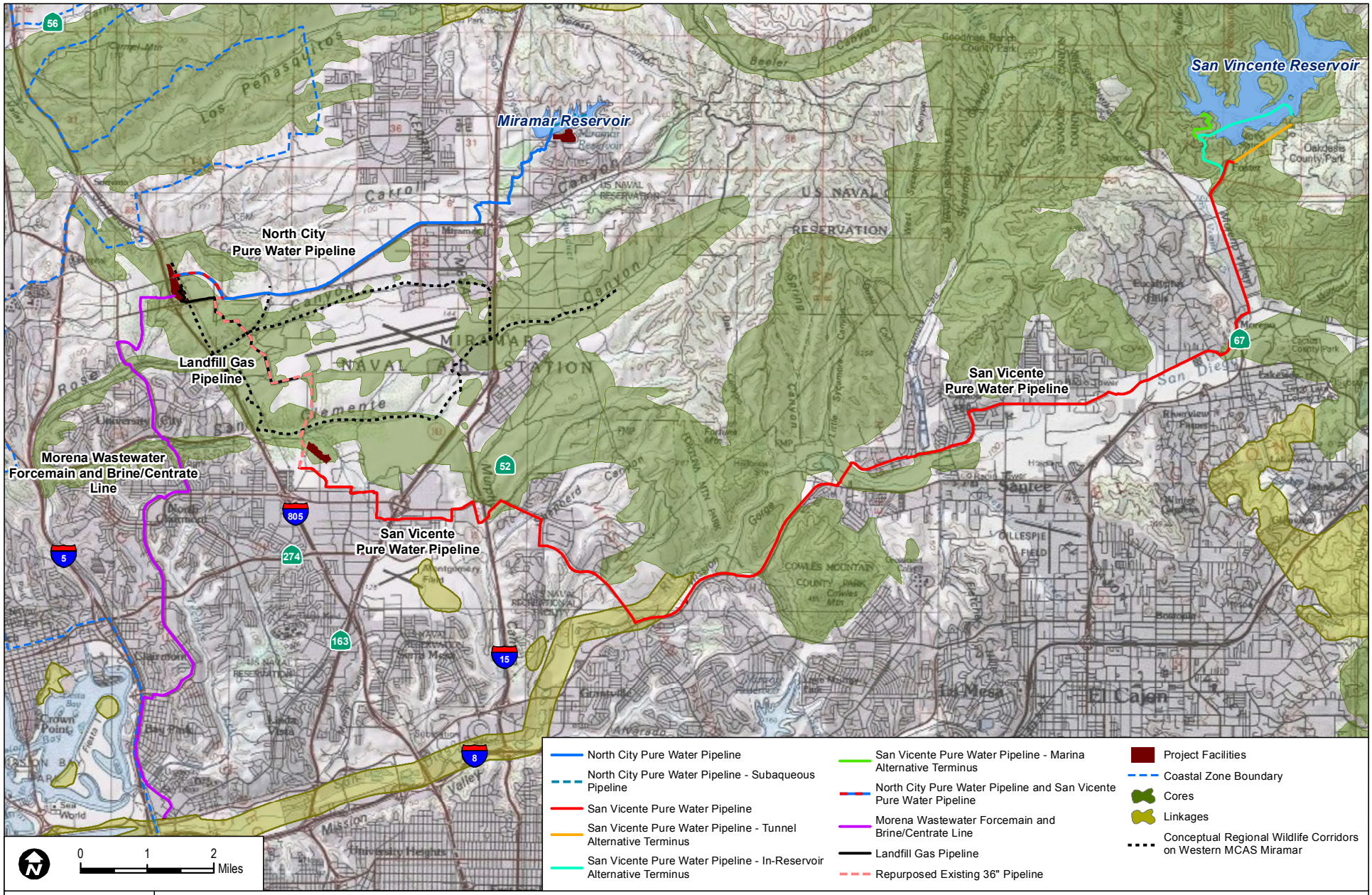

DUDEK

SOURCE: Miramar BRAC EIS, Ogden 1996, USGS 7.5-Minute Series Del Mar, Poway, San Vicente Reservoir, La Jolla, La Mesa, El Cajon Quadrangles; SANDAG 2016; CA Coastal Commission

FIGURE 5.4-2

Core Areas and Habitat Linkages

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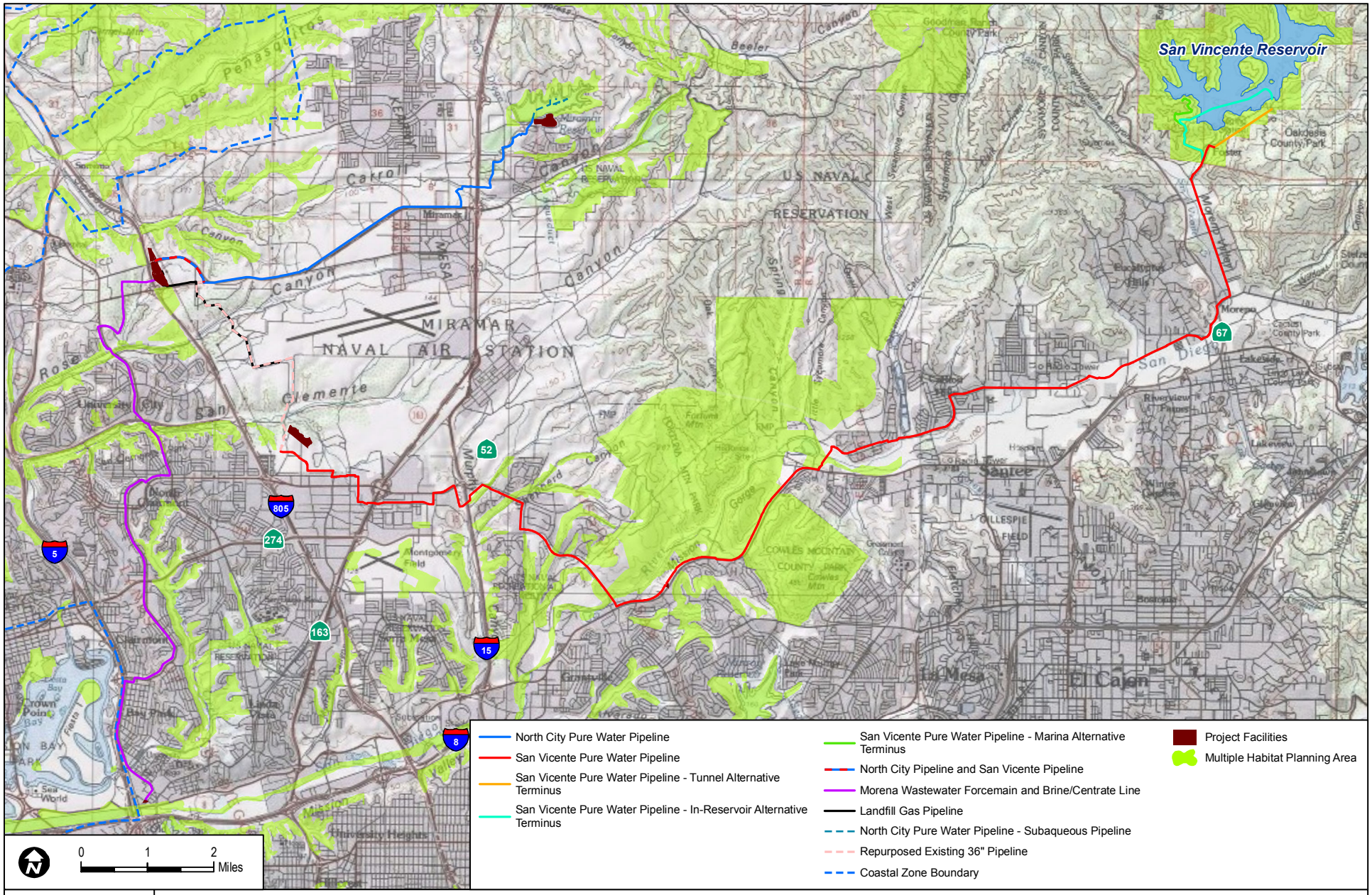

SOURCE: USGS 7.5-Minute Series Del Mar, Poway, San Vicente Reservoir, La Jolla, La Mesa, El Cajon Quadrangles; City of San Diego 2016; SANDAG, 2016; CA Coastal Commission

FIGURE 5.4-3

Multi-Habitat Planning Area

DUDEK

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5.5 ENVIRONMENTAL JUSTICE

5.5.1 INTRODUCTION

This section describes the affected environment and regulatory setting for environmental justice. Executive Order 12898 requires federal agencies to address the potential disproportionately high adverse human health and environment impacts (i.e., environmental justice) of their programs, policies, and activities on minority or low-income populations. The section provides a demographic analysis of race, ethnicity, income, and other population characteristics for the environmental justice study area for the North City Project Alternatives (Project Alternatives). The socioeconomic data used in the analysis were derived from the San Diego Association of Governments (SANDAG) Data Surfer database, which is based on U.S. Census Bureau data from 2010.

5.5.2 ENVIRONMENTAL SETTING

5.5.2.1 Environmental Justice Study Area

Short-term construction impacts and long-term operational impacts would occur at existing and new facilities and pipeline or electrical transmission corridors. The environmental justice study area for these impacts encompasses the census tracts intersected by facilities or corridors that are part of the Project Alternatives.

The environmental justice study area for long-term operational impacts of the Project Alternatives was determined based on the service area of the water treatment plant (WTP) which is supplied by the augmented reservoir in each Project Alternative. The Miramar Reservoir Alternative would augment the Miramar Reservoir, which supplies the Miramar WTP. Therefore, the Miramar WTP service area is the environmental justice study area for the Miramar Reservoir Alternative. The Miramar WTP generally serves the geographical area north of the San Diego River (see Figure 2-1; City of San Diego 2016).

The San Vicente Reservoir Alternative would augment the San Vicente Reservoir, which supplies the Alvarado WTP. Therefore, the Alvarado WTP service area is the environmental justice study area for the San Vicente Reservoir Alternative. The Alvarado WTP serves the geographical area from National City to the San Diego River (see Figure 2-1; City of San Diego 2016).

However, the geographic areas served by the WTPs are flexible so that some areas of the City of San Diego can be supplied by more than one of the WTPs, as

indicated in Figure 2-1 (City of San Diego 2016). The environmental justice study area for this analysis incorporates the entirety of the potential geographic region served by each WTP.

5.5.2.2 Population Characteristics

Population and demographic characteristics provide information about the region's social context. This section discusses population, race, ethnicity, and income characteristics to help identify potential communities that could experience environmental justice impacts.

Race and Ethnicity

The U.S. Census Bureau collects race data based on self-identification. The race categories included in the census questionnaire generally reflect a social definition of race recognized in the United States and are not an attempt to define race biologically, anthropologically, or genetically. The race categories include racial and national origin or sociocultural groups.

The following races are considered racial minorities: African American (Black), American Indian, Asian, Pacific Islander (including Native Hawaiian), and people who self-identify as some "other" race or "two or more" races.

Miramar Reservoir Alternative Project Area

The total population of the census tracts intersecting the Miramar Reservoir Alternative Project area is 106,236. As shown in Table 5.5-1, less than one-half of the population of the Miramar Reservoir Alternative Project area is of racial minority status, and there are fewer non-whites within the Project area than in the San Diego region as a whole (42% of the Miramar Reservoir Alternative Project area is non-white, as opposed to 52% of the San Diego region).

San Vicente Reservoir Alternative Project Area

The total population of the census tracts intersecting the San Vicente Reservoir Alternative Project area is 89,880. As shown in Table 5.5-1, less than one-half of the population of the San Vicente Reservoir Alternative Project area is of racial minority status, and there are fewer non-whites within the Project area than in the San Diego region as a whole (29% of the San Vicente Reservoir Alternative Project area is non-white, as opposed to 52% of the San Diego region).

Table 5.5-1
Population by Race and Ethnicity for Project Area

	Miramar Reservoir Alternative Project Area	San Vicente Reservoir Alternative Project Area	San Diego Region
Hispanic	16,285 (15%)	12,456 (14%)	991,348 (32%)
Black	2,665 (3%)	2,460 (3%)	146,600 (5%)
American Indian	261 (0%)	741 (1%)	14,098 (0%)
Asian	20,751 (20%)	6,939 (8%)	328,058 (11%)
Pacific Islander	344 (0%)	385 (0%)	13,504 (0%)
Other	314 (0%)	165 (0%)	6,715 (0%)
Two or More	3,804 (4%)	3,268 (4%)	94,943 (3%)
Subtotal Non-White	*44,424 (42%)*	*26,414 (29%)*	*1,595,266 (52%)*
White	61,812 (58%)	63,466 (71%)	1,500,047 (48%)
Total	**106,236**	**89,880**	**3,095,313**

Source: SANDAG Current Estimates (SANDAG 2016)

Miramar Water Treatment Plant Service Area

The population of the Miramar WTP service area is 740,397. As shown in Table 5.5-2, less than one-half of the population of the Miramar WTP service area is of racial minority status, and there are fewer non-whites within the service area than in the San Diego region as a whole (40% of the Miramar WTP service area is non-white, as opposed to 52% of the San Diego region).

Alvarado Water Treatment Plant Service Area

The population of the Alvarado WTP service area is 984,229. As shown on Table 5.5-2, slightly more than one-half of the population of the Alvarado WTP service area is of racial minority status, and there are more non-whites within the service area than in the San Diego region as a whole (54% of the Alvarado WTP service area is non-white, as opposed to 52% of the San Diego region).

Table 5.5-2
Population by Race and Ethnicity for Service Area

	Miramar Water Service Area	Alvarado Water Service Area	San Diego Region
Hispanic	99,487 (13%)	304,749 (31%)	991,348 (32%)
Black	19,729 (3%)	77,680 (8%)	146,600 (5%)
American Indian	1,929 (1%)	3,192 (0%)	14,098 (0%)
Asian	140,717 (19%)	107,925 (11%)	328,058 (11%)

Table 5.5-2
Population by Race and Ethnicity for Service Area

	Miramar Water Service Area	Alvarado Water Service Area	San Diego Region
Pacific Islander	2,286 (0%)	4,611 (0%)	13,504 (0%)
Other	2,025 (0%)	2,525 (0%)	6,715 (0%)
Two or More	27,768 (4%)	30,686 (3%)	94,943 (3%)
Subtotal Non-White	*293,941 (40%)*	*531,368 (54%)*	*1,595,266 (52%)*
White	446,456 (60%)	452,861 (46%)	1,500,047 (48%)
Total	**740,397**	**984,229**	**3,095,313**

Source: SANDAG Current Estimates (SANDAG 2016)

Income

Income levels are based on the Area Median Income, established by the California Department of Housing and Community Development. The Area Median Income for the San Diego region is $63,586 (SANDAG 2015). The "extremely low," "very low," and "low" income limits are 30%, 50% and 80% of the Area Median Income, respectively. Income limits are adjusted for household size, because larger households require higher incomes than smaller households to maintain the same standard of living. Each county in California has different income limit thresholds due to the variability in the cost of living and other factors (SANDAG 2008). For the purposes of this analysis, households making less than $45,000 annually are considered low-income status.

Miramar Reservoir Alternative Project Area

There are 42,150 households in the Miramar Reservoir Alternative Project area. As shown in Table 5.5-3, less than one-half of the households in the service area are of low-income minority status, and there are fewer low-income minority households than in the San Diego region as a whole (32% of the households are low-income minority households in the Miramar Reservoir Alternative Project area, as opposed to 36% in the San Diego region).

San Vicente Reservoir Alternative Project Area

There are 34,581 households in the San Vicente Reservoir Alternative Project area. As shown in Table 5.5-3, less than one-half of the households in the service area are of low-income minority status, and there are fewer low-income minority households than in the San Diego region as a whole (25% of the households are

low-income minority households in the San Vicente Reservoir Alternative Project area, as opposed to 36% in the San Diego region).

Table 5.5-3
Income by Household for the Project Area

	Miramar Reservoir Alternative Project Area	San Vicente Reservoir Alternative Project Area	San Diego Region
Less than $15,000	4,301 (10%)	1,780 (5%)	102,150 (9%)
$15,000 to $29,999	4,809 (11%)	3,000 (9%)	140,080 (13%)
$30,000 to $44,999	4,667 (11%)	3,876 (11%)	146,916 (14%)
Subtotal (Low-Income)	*13,777 (32%)*	*8,656 (25%)*	*389,146 (36%)*
$45,000 to $59,999	4,253 (10%)	3,958 (11%)	128,298 (12%)
$60,000 to $74,999	4,222 (10%)	3,712 (11%)	108,695 (10%)
$75,000 to $99,999	6,018 (14%)	6,004 (17%)	149,921 (14%)
$100,000 to $124,999	4,252 (10%)	4,402 (13%)	102,074 (9%)
$125,000 to $149,000	3,208 (8%)	2,959 (9%)	67,914 (6%)
$150,000 to $199,999	3,655 (9%)	2,745 (8%)	72,704 (7%)
$200,000 or more	2,765 (7%)	2,145 (6%)	68,113 (6%)
Total	**42,150**	**34,581**	**1,086,865**

Source: SANDAG Current Estimates (SANDAG 2016)

Miramar Water Treatment Plant Service Area

There are 282,762 households in the Miramar WTP service area. As shown in Table 5.5-4, less than one-half of the households in the service area are of low-income minority status, and there are fewer low-income minority households than in the San Diego region as a whole (26% of the households are low-income minority households in the Miramar WTP service area, as opposed to 36% in the San Diego region).

Alvarado Water Treatment Plant Service Area

There are 376,990 households in the Alvarado WTP service area. As shown in Table 5.5-4, less than one-half of the households in the service area are of low-income minority status. There are more low-income minority households than in the San Diego region as a whole (41% of the households are low-income minority households in the Alvarado WTP service area, as opposed to 36% in the San Diego region); however, the percentage of households that are of low-income status is not 10 percentage points greater than that of the San Diego region.

Table 5.5-4
Income by Household for the Service Area

	Miramar Water Service Area	Alvarado Water Service Area	San Diego Region
Less than $15,000	20,061 (7%)	44,709 (12%)	102,150 (9%)
$15,000 to $29,999	24,307 (9%)	55,967 (15%)	140,080 (13%)
$30,000 to $44,999	28,702 (10%)	55,027 (15%)	146,916 (14%)
Subtotal (Low-Income)	*73,610 (26%)*	*155,703 (41%)*	*389,146 (36%)*
$45,000 to $59,999	27,480 (10%)	46,709 (12%)	128,298 (12%)
$60,000 to $74,999	26,297 (9%)	37,243 (10%)	108,695 (10%)
$75,000 to $99,999	41,002 (15%)	50,184 (13%)	149,921 (14%)
$100,000 to $124,999	32,214 (11%)	31,230 (8%)	102,074 (9%)
$125,000 to $149,000	23,238 (8%)	18,953 (5%)	67,914 (6%)
$150,000 to $199,999	28,237 (10%)	18,902 (5%)	72,704 (7%)
$200,000 or more	30,684 (11%)	18,066 (5%)	68,113 (6%)
Total	**282,762**	**376,990**	**1,086,865**

Source: SANDAG Current Estimates (SANDAG 2016)

5.5.3 REGULATORY FRAMEWORK

5.5.3.1 Federal Regulations

Executive Order 12898—Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order (EO) 12898—Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations—was issued by President William J. Clinton in 1994 (59 FR 7629). Its purpose is to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities.

EO 12898 directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law. The order also directs each agency to develop a strategy for implementing environmental justice. The order is also intended to promote nondiscrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities access to public information and public participation.

The purpose of EO 12898 is to prevent federally funded projects from being disproportionately placed within low-income and/or minority communities. EO 12898 requires a consideration of "environmental justice" for communities that are primarily composed of minority and/or low-income residents or those geographies that contain a "meaningful greater" proportion of minority and/or low-income residents than the surrounding population (i.e., a regional concentration).

EO 13045—Protection of Children from Environmental Health Risks and Safety Risks

Federal agencies are directed, as appropriate and consistent with the agency's mission, to make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Agencies are encouraged to participate in the implementation of this order by ensuring that their policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks (62 FR 19885).

5.5.3.2 State Regulations and Standards

California Environmental Quality Act and Guidelines

The California Environmental Quality Act (CEQA) requires state and local agencies to identify the significant environmental effects of their actions, including potential significant effects on established communities, and to avoid or mitigate those effects when feasible (Public Resources Code 21000 et seq.). Pursuant to CEQA Guidelines Section 15131(b), economic and social effects of a project that are not related to physical changes in the environment are not treated as a significant impact on the environment but may be used to evaluate the significance of physical change that is caused by the project.

California Government Code Section 65040.12(e)

California Government Code Section 65040.12(e) defines environmental justice as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."

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5.6 ENERGY

5.6.1 INTRODUCTION

The following discussion provides the environmental setting and regulatory framework related to energy use for the North City Project. In particular, energy use in the form of electricity, natural gas, and gasoline consumption are discussed.

5.6.2 ENVIRONMENTAL SETTING

In 2013, California's estimated annual energy use included:

- Approximately 280,561 gigawatt hours of electricity (CEC 2014);
- Approximately 12,767 million therms natural gas (approximately 3.5 billion cubic feet of natural gas per day); and
- Approximately 18 billion gallons of gasoline (CEC 2013).

Electricity

According to the California Energy Commission (CEC) California Energy Demand Updated Forecast 2015–2025, California used approximately 277,140 gigawatts per hour (2,800 trillion kilowatt-hours (kWh)) of electricity in 2013 (CEC 2014). Electricity usage in California for different land uses varies substantially by the types of uses in a building, type of construction materials used in a building, and the efficiency of all electricity-consuming devices within a building. Due to the state's energy efficiency standards and efficiency and conservation programs, California's per-capita use has remained stable for more than 30 years, while the national average has steadily increased.

San Diego Gas & Electric (SDG&E) provides electric services to 3.6 million customers through 1.4 million electric meters and 873,000 natural gas meters throughout a 4,100-square-mile service area in San Diego County and southern Orange County (SDG&E 2016). SDG&E is a subsidiary of Sempra Energy. According to the California Public Utilities Commission (CPUC), SDG&E consumed approximately 16.467 billion kWh of electricity in total in 2014 (CPUC 2016).

SDG&E receives electric power from a variety of sources. According to CPUC 2016 Biennial Renewables Portfolio Standard (RPS) Program Update, 36.4% of SDG&E's power came from eligible renewables, including biomass/waste, geothermal,

small hydroelectric, solar, and wind sources (CPUC 2016). This is a large increase from the 15.7% that SDG&E maintained in 2011.

Based on recent energy supply and demand projections in California, statewide annual peak demand is projected to grow an average of 890 megawatts per year for the next decade, or 1.4% annually, while per capita consumption is expected to remain relatively constant at 7,200–7,800 kWh per person (CEC 2015). In the County of San Diego (County), the CEC reported an annual electrical consumption of approximately 19.9 billion kWh in total, with 13.1 billion kWh for non-residential use and 6.8 billion kWh for residential use in 2014 (CEC 2016).

Within the County, annual non-residential electricity use is approximately 13 billion kWh per year, as reported by the state's Energy Consumption Data Management System for 2015 (CEC 2016).

Natural Gas

The CPUC regulates natural gas utility service for approximately 10.8 million customers that receive natural gas from Pacific Gas and Electric (PG&E), Southern California Gas (SoCalGas), SDG&E, Southwest Gas, and several smaller natural gas utilities. The CPUC also regulates independent storage operators Lodi Gas Storage, Wild Goose Storage, Central Valley Storage, and Gill Ranch Storage (CPUC 2013).

The vast majority of California's natural gas customers are residential and small commercial customers, referred to as "core" customers, who accounted for approximately 32% of the natural gas delivered by California utilities in 2012. Large consumers, such as electric generators and industrial customers, referred to as "noncore" customers, accounted for approximately 68% of the natural gas delivered by California utilities in 2012 (CPUC 2013).

The CPUC regulates the California utilities' natural gas rates and natural gas services, including in-state transportation over the utilities' transmission and distribution pipeline systems, storage, procurement, metering, and billing. Most of the natural gas used in California comes from out-of-state natural gas basins. In 2012, California customers received 35% of their natural gas supply from basins located in the Southwest, 16% from Canada, 40% from the Rocky Mountains, and 9% from basins located within California (CPUC 2013).

California gas utilities may soon also begin receiving biogas into their pipeline systems. Natural gas from out-of-state production basins is delivered into California

via the interstate natural gas pipeline system. The major interstate pipelines that deliver out-of-state natural gas to California consumers are the Gas Transmission Northwest Pipeline, Kern River Pipeline, Transwestern Pipeline, El Paso Pipeline, the Ruby Pipeline, Questar Southern Trails, and Mojave Pipeline. Another pipeline, the North Baja–Baja Norte Pipeline, takes gas off the El Paso Pipeline at the California/Arizona border, and delivers that gas through California into Mexico. While the Federal Energy Regulatory Commission regulates the transportation of natural gas on the interstate pipelines, the CPUC often participates in Federal Energy Regulatory Commission regulatory proceedings to represent the interests of California natural gas consumers (CPUC 2013).

Most of the natural gas transported via the interstate pipelines, as well as some of the California-produced natural gas, is delivered into the PG&E and SoCalGas intrastate natural gas transmission pipeline systems (commonly referred to as California's "backbone" natural gas pipeline system). Natural gas on the utilities' backbone pipeline systems is then delivered into the local transmission and distribution pipeline systems, or to natural gas storage fields. Some large noncore customers take natural gas directly off the high pressure backbone pipeline systems, while core customers and other noncore customers take natural gas off the utilities' distribution pipeline systems. The CPUC has regulatory jurisdiction over 150,000 miles of utility-owned natural gas pipelines, which transported 82% of the total amount of natural gas delivered to California's gas consumers in 2012 (CPUC 2013).

SDG&E and Southwest Gas' southern division are wholesale customers of SoCalGas and currently receive all of their natural gas from the SoCalGas system (Southwest Gas also provides natural gas distribution service in the Lake Tahoe area). Some other municipal wholesale customers are the cities of Palo Alto, Long Beach, and Vernon, which are not regulated by the CPUC (CPUC 2013).

Some of the natural gas delivered to California customers may be delivered directly to them without being transported over the regulated utility systems. For example, the Kern River/Mojave pipeline system can deliver natural gas directly to some large customers, "bypassing" the utilities' systems. Much of California-produced natural gas is also delivered directly to large consumers (CPUC 2013).

PG&E and SoCalGas own and operate several natural gas storage fields that are located in Northern and Southern California. These storage fields, and four independently owned storage utilities – Lodi Gas Storage, Wild Goose Storage, Central Valley Storage, and Gill Ranch Storage – help meet peak seasonal natural gas demand and allow

California natural gas customers to secure natural gas supplies more efficiently (CPUC 2013). (A portion of the Gill Ranch facility is owned by PG&E.)

California's regulated utilities do not own any natural gas production facilities. All of the natural gas sold by these utilities must be purchased from suppliers and/or marketers. The price of natural gas sold by suppliers and marketers was deregulated by the Federal Energy Regulatory Commission in the mid-1980s and is determined by "market forces." However, the CPUC decides whether California's utilities have taken reasonable steps in order to minimize the cost of natural gas purchased on behalf of their core customers (CPUC 2013).

As indicated in the preceding discussion, natural gas is available from a variety of in-state and out-of-state sources and is provided throughout the state in response to market supply and demand. Complementing available natural gas resources, biogas may soon be available via existing delivery systems, thereby increasing the availability and reliability of resources in total. The CPUC oversees utility purchases and transmission of natural gas to ensure reliable and affordable natural gas deliveries to existing and new consumers throughout the state (CPUC 2013).

Petroleum

There are more than 27 million registered vehicles in California, and those vehicles consume an estimated 18 billion gallons of fuel each year (CEC 2013). Gasoline (and other vehicle fuels) are commercially provided commodities, and would be available to the North City Project via commercial outlets.

Petroleum accounts for approximately 92% of California's transportation energy sources. Technology advances, market trends, consumer behavior, and government policies could result in significant changes in fuel consumption by type and in total by 2020. At the federal and state levels, various policies, rules, and regulations have been enacted to improve vehicle fuel efficiency, promote the development and use of alternative fuels, reduce transportation-source air pollutants and greenhouse gas (GHG) emissions, and reduce vehicle miles traveled. Market forces have driven the price of petroleum products steadily upward, and technological advances have made use of other energy resources or alternative transportation modes increasingly feasible.

Largely as a result of, and in response to these multiple factors, gasoline consumption within the state has declined in recent years, while availability of other alternative fuels/energy sources has increased. In total, the quantity and availability

and reliability of transportation energy resources have increased in recent years, and this trend may likely continue and accelerate (CEC 2013). Increasingly available and diversified transportation energy resources act to promote continuing reliable and affordable means to support vehicular transportation within the state.

Water and Energy

Energy is required for the supply, purification, distribution, and treatment of water and wastewater. In particular, California uses about 5% of its electricity consumption for water supply and treatment, which is substantially higher than the national average (CEC 2005). Table 5.6-1 shows the wide range of energy required for supply and treatment of water in California (CEC 2005).

Table 5.6-1
Energy Requirements for Water Supply and Treatment in California

kWh/Million gallons		
Water Cycle Segments	*Low*	*High*
Supply and Conveyance	0	16,000
Treatment	100	1,500
Distribution	700	1,200
Wastewater Collection and Treatment	1,100	4,600
Wastewater Discharge	0	400
Total	**1,900**	**23,700**
Recycled Water Treatment and Distribution for Non-potable Uses	400	1,200

Source: CEC 2005

Water conveyed from Northern California up to 400 miles via the State Water Project to Southern California is highly energy intensive, as indicated by the upper range for conveyance in Table 5.6-1. The State Water Project is the largest single user of energy in California; it consumes an average of 5 billion kWh/year, accounting for about 2% to 3% of all electricity consumed in California (EPA 2016).

Energy consumption associated with using water is generally greater than energy consumption for supply and treatment. Activities such as water heating, clothes washing, and clothes drying require 14% of California's electricity consumption and 31% of its natural gas consumption.

5.6.3 REGULATORY FRAMEWORK

Federal, state, and local agencies regulate energy use and consumption through various means and programs. On the federal level, the U.S. Department of

Transportation, the U.S. Department of Energy, and the U.S. Environmental Protection Agency (EPA) are three federal agencies with substantial influence over energy policies and programs. On the state level, the CPUC and the CEC are two agencies with authority over different aspects of energy. Relevant federal, state, and local energy-related regulations are summarized below.

Federal

Federal Energy Policy and Conservation Act

In 1975, Congress enacted the Federal Energy Policy and Conservation Act, which established the first fuel economy standards for on-road motor vehicles in the United States. Pursuant to the Act, the National Highway Traffic Safety Administration is responsible for establishing additional vehicle standards. In 2012, new fuel economy standards were approved for model year 2017 passenger cars and light trucks at 54.5 miles per gallon (77 FR 62623–63200). Fuel economy is determined based on each manufacturer's average fuel economy for the fleet of vehicles available for sale in the United States.

Intermodal Surface Transportation Efficiency Act of 1991

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) promoted the development of intermodal transportation systems to maximize mobility, as well as address national and local interests in air quality and energy. ISTEA contained factors that metropolitan planning organizations were to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, metropolitan planning organizations adopted explicit policies defining the social, economic, energy, and environmental values guiding transportation decisions.

The Transportation Equity Act for the 21st Century

The Transportation Equity Act for the 21st Century (TEA-21) was signed into law in 1998 and builds upon the initiatives established in the ISTEA legislation, discussed earlier. TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. TEA-21 also provides for investment in research and its application to maximize the

performance of the transportation system through, for example, deployment of Intelligent Transportation Systems, to help improve operations and management of transportation systems and vehicle safety.

Energy Independence and Security Act of 2007

On December 19, 2007, the Energy Independence and Security Act of 2007 (EISA) was signed into law. In addition to setting increased Corporate Average Fuel Economy standards for motor vehicles, the EISA includes other provisions related to energy efficiency:

- Renewable Fuel Standard (RFS) (Section 202)
- Appliance and Lighting Efficiency Standards (Sections 301–325)
- Building Energy Efficiency (Sections 411–441)

This federal legislation requires ever-increasing levels of renewable fuels—the RFS—to replace petroleum. The EPA is responsible for developing and implementing regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel. The RFS program regulations were developed in collaboration with refiners, renewable fuel producers, and many other stakeholders.

- The RFS program was created under the Energy Policy Act of 2005 and established the first renewable fuel volume mandate in the United States. As required under the Act, the original RFS program (RFS1) required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012. Under the EISA, the RFS program was expanded in several key ways that lay the foundation for achieving significant reductions of GHG emissions from the use of renewable fuels, for reducing imported petroleum, and encouraging the development and expansion of our nation's renewable fuels sector. The updated program is referred to as RFS2 and includes the following:
    - EISA expanded the RFS program to include diesel, in addition to gasoline.
    - EISA increased the volume of renewable fuel required to be blended into transportation fuel from 9 billion gallons in 2008 to 36 billion gallons by 2022.
    - EISA established new categories of renewable fuel and set separate volume requirements for each one.

- EISA required the EPA to apply lifecycle GHG performance threshold standards to ensure that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces.

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

State

California Code Title 24, Part 6, Energy Efficiency Standards

Title 24 of the California Code of Regulations was established in 1978, and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically establishes energy efficiency standards for residential and nonresidential buildings constructed in the State of California in order to reduce energy demand and consumption. Part 6 is updated periodically to incorporate and consider new energy efficiency technologies and methodologies. The most recent amendments, referred to as the 2013 standards, became effective on July 1, 2014. Buildings constructed in accordance with the 2013 standards are required to use 25% less energy for lighting, heating, cooling, ventilation, and water heating than the 2008 standards. Additionally, the standards would save 200 million gallons of water per year and avoid 170,500 tons of GHG emissions per year (CEC 2012).

Title 24 also includes Part 11, known as California's Green Building Standards (CALGreen). The CALGreen standards took effect in January 2011, and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and state-owned buildings, as well as schools and hospitals. The mandatory standards require:

- 20% mandatory reduction in indoor water use.
- 50% of construction and demolition waste must be diverted from landfills.
- Mandatory inspections of energy systems to ensure optimal working efficiency.
- Low-pollutant-emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring, and particle boards.

The CALGreen standards also include voluntary efficiency measures that are provided at two separate tiers and implemented per the discretion of local agencies and applicants. CALGreen's Tier 1 standards call for a 15% improvement in energy requirements, more strict water conservation, 65% diversion of construction and demolition waste, 10% recycled content in building materials, 20% permeable paving, 20% cement reduction, and cool/solar reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30% improvement in energy requirements, more strict water conservation, 75% diversion of construction and demolition waste, 15% recycled content in building materials, 30% permeable paving, 30% cement reduction, and cool/solar reflective roofs.

State of California Energy Action Plan

The CEC is responsible for preparing the State of California Energy Action Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The Energy Action Plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the Plan identifies a number of strategies, including assistance to public agencies and fleet operators and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access.

Senate Bill 1368

In September 2006, Governor Schwarzenegger signed Senate Bill 1368 (Perata), which requires the CEC to develop and adopt regulations for GHG emissions performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the CPUC. This effort was intended to help protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants whose GHG emissions are as low or lower than new combined-cycle natural gas plants, by requiring imported electricity to meet GHG performance standards in California, and by requiring that the standards be developed and adopted in a public process.

Senate Bill 1389

Senate Bill 1389 (Bowen and Sher) requires that every 2 years, the CEC adopt and transmit to the governor and legislature a report of findings called the Integrated

Energy Policy Report. The Integrated Energy Policy Report Committee provides oversight and policy direction related to collecting and analyzing data needed to complete the Integrated Energy Policy Report on trends and issues concerning electricity and natural gas, transportation, energy efficiency, renewables, and public interest energy research.

Assembly Bill 1493

In a response to the transportation sector accounting for more than half of California's carbon dioxide (CO_2) emissions, Assembly Bill 1493 (Pavley) was enacted on July 22, 2002. Assembly Bill 1493 required the California Air Resources Board (CARB) to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles whose primary use is noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards would result in a reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards would result in a reduction of about 30%.

Before these regulations could go into effect, the EPA had to grant California a waiver under the federal Clean Air Act, which ordinarily preempts state regulation of motor vehicle emission standards. The waiver was granted by Lisa Jackson, the EPA Administrator, on June 30, 2009. On March 29, 2010, the CARB Executive Officer approved revisions to the motor vehicle GHG standards to harmonize the state program with the national program for 2012–2016 model years (see the earlier discussion under Federal Energy Policy and Conservation Act). The revised regulations became effective on April 1, 2010.

In 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single package of standards called Advanced Clean Cars. By 2025, when the rules would be fully implemented, new automobiles would emit 34% fewer global warming gases and 75% fewer smog-forming emissions (CARB 2015).

Local

City of San Diego General Plan

The Conservation Element of the City of San Diego's General Plan (City of San Diego 2008) includes the following energy-related policies that are applicable to the North City Project.

> **Policy CE-A.5:** Employ sustainable or "green" building techniques for the construction and operation of buildings.
>
> a. Develop and implement sustainable building standards for new and significant remodels of residential and commercial buildings to maximize energy efficiency, and to achieve overall net zero energy consumption by 2020 for new residential buildings and 2030 for new commercial buildings. This can be accomplished through factors including, but not limited to:
>
> - Designing mechanical and electrical systems that achieve greater energy efficiency with currently available technology
> - Minimizing energy use through innovative site design and building orientation that addresses factors such as sun-shade patterns, prevailing winds, landscape, and sun-screens
> - Employing self-generation of energy using renewable technologies
> - Combining energy efficient measures that have longer payback periods with measures that have shorter payback periods
> - Reducing levels of non-essential lighting, heating and cooling
> - Using energy efficient appliances and lighting.
>
> b. Provide technical services for "green" buildings in partnership with other agencies and organizations.
>
> **Policy CE-I.3:** Pursue state and federal funding opportunities for research and development of alternative and renewable energy sources.
>
> **Policy CE-I.4:** Maintain and promote water conservation and waste diversion programs to conserve energy.

Policy CE-I.5: Support the installation of photovoltaic panels, and other forms of renewable energy production.

a. Seek funding to incorporate renewable energy alternatives in public buildings.

b. Promote the use and installation of renewable energy alternatives in new and existing development.

Policy CE-I.7: Pursue investments in energy efficiency and direct sustained efforts towards eliminating inefficient energy use.

Policy CE-I.10: Use renewable energy sources to generate energy to the extent feasible.

Policy CE-I.12: Use small, decentralized, aesthetically-designed, and appropriately-sited energy efficient power generation facilities to the extent feasible.

City of San Diego Energy Strategy for a Sustainable Future

The City of San Diego Environmental Services Department has taken a leadership role to advance policies and practices that support a more sustainable future. In June 2009, the Department published its Energy Strategy for a Sustainable Future, which outlines six objectives to achieve more sustainable generation and use of energy, as follows (City of San Diego 2009):

- Energy Conservation – All City employees will be aware of and implement energy conservation measures by 2010.
- Energy Efficiency – Reduce energy use 10% by 2012, using 2000 as a baseline.
- Renewable Energy – Increase megawatts of renewable energy used at City facilities to 17 by 2012, and to 25 by 2020.
- Management of SDG&E Energy Bills – Continue the use of the Electronic Data Interchange.
- Policy Development and Implementation – Guide City efforts by institutionalizing policies and programs that increase energy conservation, efficiency, and the use of renewable energy.
- Leverage Resources – Ensure that state and federal funds are leveraged to the extent possible with existing programs such as CEC loans and the CPUC Partnership funds.

5.7 GEOLOGY AND SOILS

5.7.1 INTRODUCTION

The purpose of this section is to identify existing geologic conditions of the North City Project Alternatives (Project Alternatives) and describe applicable regulations. The information used in this analysis is based on the following technical studies:

- Geotechnical Report Pump Station and Cut & Cover Sections, Morena Pump Station, WW Force Main, and Brine Conveyance Predesign; prepared in ~~May~~September 2017 by AECOM (Appendix D1)
- ~~Addenda No. 1 and No. 2 to the Geotechnical Report Pump Station and Cut & Cover Sections, Morena Pump Station, WW Force Main, and Brine Conveyance Predesign; prepared in June and July 2017 by AECOM, respectively (Appendix D1)~~
- Fault Investigation Morena Pump Station, WW Force Main, and Brine Conveyance Predesign; prepared in ~~August~~ September 2017 by AECOM (Appendix D1)
- Geotechnical Investigation, Morena Pipeline Tunnels, WW Force Main and Brine/Centrate Conveyance Predesign; prepared in September 2017 by AECOM (Appendix D1)
- Report of Geotechnical Investigation North City Water Reclamation Plan Expansion; prepared in August 2017 by Allied Geotechnical Engineers Inc. (Appendix D2)
- Evaluation of Geotechnical Impacts Due To BMP Partial Infiltration for the NCWRP Expansion and NCPWF Influent Conveyance Project; prepared in ~~August~~ November 2017 by CH2M (Appendix D2)
- Geotechnical Investigation NCCS Miramar Pipeline Project; prepared in May 2017 by TerraCosta Consulting Group Inc. (Appendix D3)
- Geotechnical Desktop Study, North City to San Vicente Reservoir Pipeline Project; prepared in September 2014 by Allied Geotechnical Engineers Inc. (Appendix D4)
- Preliminary Geotechnical Investigation, Predesign – North City Plant Upgrades, Proposed North City Advanced Water Purification Facility; prepared in June 2016 by K2 Engineering Inc. (Appendix D5)

- Addendum/Response to Comments - North City Plant Upgrades, Proposed North City Advanced Water Purification Facility; prepared in May 2017 by K2 Engineering Inc. (Appendix D5).

These technical studies are herein collectively referred to as "geotechnical studies," and each specific appendix will be cited as applicable.

5.7.2 ENVIRONMENTAL SETTING

5.7.2.1 Geologic Formations and Soils

Because geologic soils and formations are site specific, the following discussion of the existing geologic environment is broken down by the primary components of each Project Alternative based on individual geotechnical studies. Underlying geologic formations are shown on Figures 5.7-1A through 5.7-1D, Geologic Maps.

5.7.2.1.1 Components Common to Project Alternatives

Morena Pump Station and Morena Wastewater Forcemain and Brine/ Centrate Line

The subsurface materials along the pipeline alignment and under the Morena Pump Station and Morena Wastewater Forcemain and Brine/Centrate Line (Morena Pipelines) can be categorized into geologic units, which consist of (in order of increasing age) fill materials, alluvium, Old Paralic Deposits, Very Old Paralic Deposits, Stadium Conglomerate, Friars Formation, Scripps Formation, and Ardath Shale (Appendix D1).

Fill Materials. Fill materials associated with roadway construction and land developments exist at various locations along the pipeline alignment. The fill has been placed in conjunction with land-filling along former low-lying areas, road grading, and underground utility construction. Fill soils tend to be erratic mixtures of sand, clay, gravel and sometimes construction debris. The fill contains a wide range of particle sizes, up to boulder sized. The fill along the alignment is considered undocumented, i.e., compaction records are not available. The fill may have been hydraulically placed at the southern end of the alignment and in the vicinity of the Morena Pump Station (Appendix D1).

Alluvium (Young Alluvial Deposits). Alluvial deposits, predominantly loose to dense silty sands, clean sands, and sandy gravels underlie the former floodplain

areas and the inland canyon-creek crossings. The Morena/West Morena Boulevard portion of the Morena Pipeline is underlain by alluvium at greater depth than the pipeline. Between the Morena Pump Station and Ingulf Street, the composition of the alluvium varies considerably, with more fine-grained silts and some clays present within the alluvium near the pump station. In the vicinity of Tecolote Creek, the alluvium was characterized as loose to medium dense sand and stiff clay, although in nearby previous borings, young estuarine deposits (primarily silts and clays with some sands and organic deposits) were logged above the alluvium. Toward the northern portion of the Morena Boulevard stretch, the material below the fill may be more colluvial in nature due to its proximity to the hills to the east. The inland natural canyons at San Clemente Creek and Rose Creek are mapped as underlain by alluvium. Recent borings suggest alluvium is relatively thin, less than about 15 feet thick (Appendix D1).

Old Paralic Deposits (also referred to as Bay Point Formation). This unit consists of late to middle Pleistocene aged, marine and non-marine poorly consolidated sandstone (medium dense to very dense sand, silty sand and clayey sand, some localized zones of gravel and cobbles) (Appendix D1).

Very Old Paralic Deposits (also referred to as Lindavista Formation). This unit consists of middle to early Pleistocene, interfingered strandline, beach, estuarine and colluvial deposits (siltstone, sandstone, conglomerate), can have strong cementation, cobbles (Appendix D1).

Stadium Conglomerate. This unit consists of Eocene-aged, cobble conglomerate in silty sand matrix with some sandstone, strongly cemented (Appendix D1).

Friars Formation. This unit consists of middle to late Eocene aged, marine and non-marine sandstone, siltstone and claystone. Claystone portions can be highly expansive and prone to landslide hazards (Appendix D1).

Scripps Formation. This unit consists of Eocene aged, weakly to moderately cemented silty sandstone and sandy siltstone with occasional cobble conglomerate beds, and zones with strong cementation/ concretions (Appendix D1).

Ardath Shale. This unit consists of lower to middle Eocene aged, sandy siltstone and claystone with local concreted zones; claystone portions are potentially expansive and prone to landslide hazards (Appendix D1).

Subsurface Conditions

Morena Pump Station. According to the site-specific preliminary borings, the Morena Pump Station site is underlain by a thin fill layer over alluvium. The fill ranges from about 3 to 5 feet in depth and consists primarily of silty sand. The underlying alluvium varies significantly and is highly interlayered in some locations (Appendix D1).

Within the upper portion of the alluvium to depths ranging from about 19 to 29 feet, the soil is mostly poorly graded sand to silty sand that is primarily loose with some zones of very loose and medium dense material. At some exploration locations, significant interbeds of low-plasticity silt were present within this upper zone of the alluvium (Appendix D1).

The upper sandy zone is generally underlain by a fine-grained zone that extends to a depth of about 50 feet below ground surface. It consists primarily of silt, with interbeds of clay, as well as silty sand. The consistency ranges from soft to stiff (Appendix D1).

A deeper granular zone of sand to silty sand is present below a depth of about 50 feet. It is generally medium dense to dense, with some looser zones. There are some zones of fine-grained soil within the deeper granular layer, and in many locations, there is a bed approximately 5 feet thick of stiff silt at depths that range from 55 to 65 feet below ground surface. Gravel was encountered at a depth of 76 feet below ground surface (Appendix D1).

Morena Pipelines. Along most of the southerly Morena Pipeline alignment (Morena/West Morena Boulevard between Friars Road and Ingulf Street), planned trench depths are expected to be within fill over alluvium and/or estuarine deposits, except for short reaches within the Bay Point Formation (Appendix D1). In general, fill thicknesses range from about 5 to 10 feet and are generally silty and clayey sands with some gravel. Alluvium (and colluvium, within the northern portion of this portion) is generally very loose to dense sands with some silts and clays, and potentially some cobbles and boulders (Appendix D1). Estuarine-type deposits consisting mostly of sands, clays, and some very soft organic soil are present below the fill along West Morena/Morena Boulevard between Dorcas Street on the south and Savannah Street on the north (Appendix D1). Bay Point Formation has been logged in previous borings and as shallow as about 12 feet below ground surface along the northern portion of the Morena Boulevard

alignment, and as shallow as about 3 feet below ground surface along Ingulf Street as ground elevations rise (Appendix D1).

From where the Morena Pipeline alignment ascends up to the coastal mesa at Clairemont Drive to the North City Water Reclamation Plant (NCWRP), the route is mostly within dense sedimentary formations including the Lindavista Formation and the Scripps Formation (Appendix D1).

North City Water Reclamation Plant Expansion

The NCWRP Expansion site is underlain by sandstone, claystone, siltstone, and conglomerates belonging to both the Scripps and Lindavista formations of the Eocene and Pleistocene ages, respectively, as well as artificial fill (Appendix D2). The Scripps Formation is described above. The Lindavista Formation that underlies the NCWRP Expansion site consists of the same geologic formation known as Very Old Paralic Deposits. This formation is generally described as poorly sorted, moderately permeable, reddish brown, interfingered strandline, beach, estuarine, and colluvial deposits comprised of siltstone, sandstone, and conglomerate (Appendix D2). Additionally, the Very Old Paralic Deposits can be characterized as moderately to well cemented sandstone and conglomerate (Appendix D2).

Artificial fill was placed throughout the entire existing NCWRP Expansion site to create the current graded configuration. Fills were placed up to approximately 40 feet during grading of the NCWRP Expansion site. Additional structural and general site fill can be found throughout the NCWRP Expansion site at varying depths.

North City Pure Water Facility Influent Pump Station

The North City Pure Water Facility (NCPWF) Influent Pump Station is located within the NCWRP site and is underlain by the same geologic formations described previously for this site.

North City Pure Water Pump Station

The North City Pure Water Pump Station would be located within the NCPWF site, which is described in Section 5.7.2.1.2, Miramar Reservoir Alternative.

North City Renewable Energy Facility

The North City Renewable Energy Facility would be located within the existing NCWRP property and is underlain by the same geologic formations as previously described for NCWRP.

Landfill Gas Pipeline

The Landfill Gas Pipeline would generally be located along an existing underground utility corridor that has been previously excavated and filled.

Metro Biosolids Center Improvements

The improvements to the Metro Biosolids Center would be located within the previously developed footprint of the existing facility. The site has been heavily graded and underlying fill at varying depths would likely be present.

5.7.2.1.2 Miramar Reservoir Alternative

North City Pure Water Facility-Miramar Reservoir

The NCPWF–Miramar Reservoir (MR) site is underlain by silty sandstone, siltstone, and claystone that been mapped as belonging to the Eocene age Scripps Formation (Appendix D5). The Scripps Formation is described in Section 5.7.2.1.1, Components Common to Project Alternatives. The Pleistocene age Lindavista Formation was noted as occurring within the central and southwestern sections of the site (Appendix D5). The Pleistocene age Lindavista Formation, also known as Very Old Paralic Deposits, is described in Section 5.7.2.1.1.

Colluvium. The term colluvium is used to describe topsoil and soils deposited by erosion. On the NCPWF-MR site, colluvium is up to 2 feet thick and consists of soft silt and clay with gravel (Appendix D5).

North City Pipeline, Dechlorination Facility, and Miramar Water Treatment Plant Improvements

The subsurface materials along the North City Pure Water Pipeline (North City Pipeline) alignment and under the Pure Water Dechlorination Facility (Dechlorination Facility) can be categorized into six geologic units, which consist of (in order of increasing age) fill materials, young alluvial deposits, Very Old Paralic Deposits, Stadium Conglomerate, Scripps Formation, and undivided metasedimentary and metavolcanic rocks. The first

five previously listed geologic units are described in Section 5.7.2.1.1. The improvements at Miramar Water Treatment Plant are likely immediately underlain by fill materials at varying depths associated with the construction of the existing facility.

Natural Surficial Soils. Localized areas along the pipeline alignment contain remnants of natural surficial soils. These remnant soils typically range from 1 to 3 feet in thickness, and consist of hard, sandy clays characteristic of a residual clay horizon (Appendix D3).

Terrace Deposits. Also referred to as Lindavista Formation, these deposits consist of mostly poorly sorted, moderately permeable, reddish-brown, interfingered strandline beach estuarine and colluvial deposits composed of siltstone, sandstone, and conglomerate (Appendix D3). Terrace deposits are also known to be moderately to strongly cemented, causing localized excavation difficulties that may require the use of specialized equipment for trench excavation. In addition, lenses of gravels, cobbles, and boulders are anticipated to be encountered.

Mesozoic-age Metasedimentary and Metavolcanic Rocks. Mesozoic-age metasedimentary and metavolcanic rocks generally underlie the Tertiary-aged Stadium Conglomerate. These rocks, locally known as the Santiago Peak Volcanics, are described as consisting of low grade metamorphosed sedimentary rocks (conglomerate, siltstone, and sandstone) interlayered and mixed with metavolcanic rocks consisting of flows, tuffs, and volcaniclastic breccia. While not encountered or exposed along the alignment, undifferentiated sedimentary and granitic rock exist at depth (Appendix D3).

Mesozoic-age metasedimentary and metavolcanic rocks have been mapped near Miramar Dam and Reservoir (Appendix D3). In general the Mesozoic-age metasedimentary and metavolcanic rocks are not anticipated to be encountered to the west of Interstate 15 (I-15) except near the proposed tunnel location near the intersection of Candida Street and Via Pasar (Appendix D3). However east of I-15, the Mesozoic-age metasedimentary and metavolcanic rocks is generally shallower and may be encountered where the invert of the pipeline is near the regional contact between the Stadium Conglomerate and the Mesozoic-age metasedimentary and metavolcanic rocks (Appendix D3).

5.7.2.1.3 San Vicente Reservoir Alternative

North City Pure Water Facility-San Vicente Reservoir

The NCPWF–San Vicente Reservoir (SVR) would be located within the same site as the NCPWF-MR and is underlain by the same geologic formations as described in Section 5.7.2.1.2.

San Vicente Pipeline and Mission Trails Booster Station

The subsurface materials along the project alignment and under the Mission Trails Booster Station can be categorized into 10 geologic units, which include (in order of increasing age) fill materials, young alluvial deposits, old alluvial deposits, Very Old Paralic Deposits, Mission Valley Formation, Stadium Conglomerate, Friars Formation, Scripps Formation, granitic rocks, and undivided metasedimentary and metavolcanic rocks. All geologic units but the Mission Valley Formation and granitic rocks have been described previously.

Mission Valley Formation. The Mission Valley Formation overlies the Stadium conglomerate in portions of Kearny Mesa. This formation consists of marine, lagoonal, and non-marine sandstone. The sandstone member is typically light gray and fine to medium grained, and can easily crumble. Cobble-conglomerate tongues similar to the underlying Stadium Conglomerate may also be encountered in the formation. There are no surface outcrops of this unit along the San Vicente Pure Water Pipeline (San Vicente Pipeline) alignment.

Granitic Rocks. Granitic rocks have been mapped in the northeast portion of the San Vicente Pipeline alignment and within Mission Trails Regional Park. Mapped units include tonalite, granodiorite, quartz diorite, monzonite, monzogranite, and minor gabbro. The granitic rocks are generally described as light to dark gray, medium to coarse grained, and locally deeply weathered.

5.7.2.2 Geologic Hazards

The following is a general discussion of potential geologic hazards in the North City Project Area. Specific components of the Project Alternatives that would be subject to the following potential hazards are discussed in Section 6.7 of this Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

5.7.2.2.1 Faulting and Seismicity

The Project Alternatives would be located in the San Diego region of seismically active Southern California. Known active faults in the area tend to travel in a northwest–southwest direction. Major active regional faults of tectonic significance include the Coronado Bank, San Diego Trough, San Clemente, and Newport–Inglewood/Rose Canyon fault zones (the Rose Canyon fault zone is located onshore between La Jolla Shores and the Silver Strand); the faults in Baja California, including the San Miguel–Vallecitos and Agua Blanca fault zones; and the faults located farther to the east in Imperial Valley, which include the Elsinore, San Jacinto, and San Andreas fault zones (Appendices D1–D5). Due to the region-spanning location of the Project Alternatives, components are at varying distances to active faults; refer to Appendices D1–D5 for information regarding distance to active faults and earthquake magnitude data specific to each component.

5.7.2.2.2 Landslides

Old landslides and landslide-prone formations are the principal non-seismic geologic hazards with the City of San Diego (City). Conditions that should be considered in regard to slope instability include inclination, characteristics of the soil and rock orientation of the bedding, and the presence of groundwater. The causes of classic landslides start with the preexisting condition inherent within the rock body itself that can lead to failure. The actuators of landslides can be both natural events, such as earthquakes, rainfall, and erosion, and human activities, such as grading and filling. Some areas in the City where landslides have occurred are Otay Mesa; the east side of Point Loma; the vicinities of Mount Soledad, Rose Canyon, Sorrento Valley, and Torrey Pines; portions of Rancho Bernardo and Los Peñasquitos Canyon Preserve; and along Mission Gorge in the vicinity of the second San Diego Aqueduct (City of San Diego 2008).

Previously mapped landslides are located in and near some Project components and are detailed in Section 6.7 of this EIR/EIS.

5.7.2.2.3 Liquefaction, Subsidence, and Other Ground Failure

Seismic-induced soil liquefaction is a phenomenon during which loose, saturated granular materials undergo matrix rearrangement, develop high pore water pressure, and lose shear strength due to cyclic ground vibrations induced by earthquakes. Manifestations of soil liquefaction can include loss of bearing capacity below foundations, surface settlements and tilting in level ground, and instabilities

in areas of sloping ground. Soil liquefaction can also result in increased lateral and uplift pressures on buried structures.

Settlement of the ground may come from fault movement, slope instability, and liquefaction and compaction of the soil at the site. Settlement is not necessarily destructive. It is usually differential settlement that damages structures. Differential or uneven settlement occurs when the subsoil at a site is of non-uniform depth, density, or character, and when the severity of shaking varies from one place to another.

Soils that underlie the majority of the Project components have low potential for various forms of ground failure. However, as detailed in Section 6.7 of this EIR/EIS, some soils exhibit higher potential to become geologically unstable.

5.7.3 REGULATORY FRAMEWORK

Federal

International Building Code

The International Code Council developed the International Building Code (IBC), a model building code that provides the basis for the California Building Code (CBC). The IBC provides minimum standards for building construction to ensure public safety, health, and welfare. Prior to the creation of the IBC, several different building codes were used; by 2000, the IBC had replaced these previous codes. The IBC is updated every 3 years.

State

California Building Code

The 2016 CBC, which is a model building code that sets rules specifying the minimum acceptable level of safety for constructed objects in the United States. The CBC contains amendments based on the American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures 7-10, which establish requirements for general structural design and a means for determining earthquake and other types of loads (flood, snow, wind, etc.) for inclusion in building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures in California.

Alquist–Priolo Earthquake Fault Zoning Act

The Alquist–Priolo Earthquake Fault Zoning Act (California Public Resources Code, Section 2621 et seq.) was passed into law following the destructive February 9, 1970, San Fernando Earthquake, which measured 6.6 on the Richter Scale. The act provides a mechanism for reducing losses from surface fault rupture. The intent of the act is to ensure public safety by prohibiting the siting of most structures for human occupancy across traces of active faults that constitute a potential hazard to structures from surface faulting or fault creep. The law requires the state geologist to establish regulatory earthquake fault zones and distribute maps to all affected cities, counties, and state agencies. Local agencies must regulate most development projects within the zones. Before a project can be permitted, cities and counties must require a geologic investigation to demonstrate that the proposed buildings will not be constructed on an active fault.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act (California Public Resources Code, Section 2690 et seq.) addresses earthquake hazards from non-surface-fault rupture, including liquefaction, landslides, strong ground shaking, and other earthquake and geologic hazards. The act also specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

Local

City of San Diego Seismic Safety Study

The City of San Diego Seismic Safety Study is a series of maps that indicate the likely geologic hazards throughout the City. These maps may be used to evaluate the relative risk within a region or to determine if a geotechnical report is required for development or building permits (City of San Diego 2008).

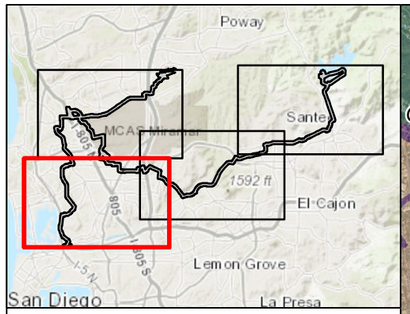
City of San Diego Municipal Code

As amended in April 2016, the City of San Diego Municipal Code, Chapter 14, Article 5, Division 1: Adoption and Applicability of the Building Regulations are created to "establish minimum standards to safeguard health and safety, property and public welfare and to satisfy the purpose of the 2013 California Building Code" (City of San

Diego 2016). The remainder of Chapter 14, Article 5, of the City's Municipal Code contains additions and modifications to the 2013 CBC.

City of San Diego General Plan

The City of San Diego General Plan contains the Public Facilities, Services, and Safety Element, which addresses seismic safety. The fundamental objective of the seismic safety policies included in the General Plan is to reduce the risk of seismic- and geologic-related hazards. Seismic hazards that can occur in the San Diego region include ground shaking, ground displacement, tsunami, and landslides.



Project Study Area

Project Pipelines

- San Vicente Pure Water Pipeline
- Morena Wastewater Forcemain and Brine/Centrate Line
- Repurposed Existing 36" Pipeline

Project Facilities

- Metro Biosolids Center Improvements
- Morena Pump Station

Geology

- Ksh:Fine-grained Cretaceous age formations of sedimentary origin
- Kss:Coarse-grained Cretaceous age formations of sedimentary origin
- Qls:Landslide Deposits; may include debris flows and older landslides
- Qoa:Old Alluvial Valley Deposits
- Qol:Old Lacustrine, Playa and Estuarine (Paralic) Deposits
- Qsu:Undifferentiated Surficial Deposits; includes colluvium, slope wash, talus deposits, and other surface deposits of all ages
- Qvol:Very Old Lacustrine, Playa and Estuarine (Paralic) Deposits
- Qya:Young Alluvial Valley Deposits
- Tsh:Fine-grained Tertiary age formations of sedimentary origin
- Tss:Coarse-grained Tertiary age formations of sedimentary origin
- af:Artificial Fill
- Water

0 0.5 1 Miles

SOURCE: SANDAG, 2016; California Geological Survey

DUDEK

FIGURE 5.7-1A
Geologic Maps

Pure Water San Diego Program North City Project EIR/EIS

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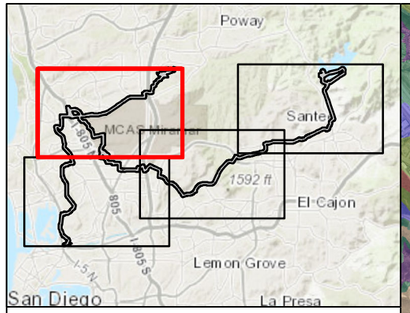

Project Study Area

Project Pipelines

- North City Pure Water Pipeline
- North City Pure Water Pipeline - Subaqueous Pipeline
- San Vicente Pure Water Pipeline
- Morena Wastewater Forcemain and Brine/Centrate Line
- Landfill Gas Pipeline
- Repurposed Existing 36" Pipeline

Project Facilities

- North City Pure Water Facility
- North City Pure Water Pump Station
- North City Water Reclamation Plant Expansion
- Metro Biosolids Center Improvements
- Pure Water Dechlorination Facility
- Miramar Water Treatment Plant Improvements
- Landfill Gas Compressor Station

Geology

- Kss:Coarse-grained Cretaceous age formations of sedimentary origin
- Ql:Lacustrine, Playa and Estuarine (Paralic) Deposits
- Qls:Landslide Deposits; may include debris flows and older landslides
- Qoa:Old Alluvial Valley Deposits
- Qol:Old Lacustrine, Playa and Estuarine (Paralic) Deposits
- Qsu:Undifferentiated Surficial Deposits; includes colluvium, slope wash, talus deposits, and other surface deposits of all ages
- Qvol:Very Old Lacustrine, Playa and Estuarine (Paralic) Deposits
- Qya:Young Alluvial Valley Deposits
- Tsh:Fine-grained Tertiary age formations of sedimentary origin
- Tss:Coarse-grained Tertiary age formations of sedimentary origin
- af:Artificial Fill
- pKm:Cretaceous and Pre-Cretaceous metamorphic formations of sedimentary and volcanic origin
- Water

0 0.5 1 Miles

Miramar Reservoir
water
Carroll Canyon Rock Quarry
MCAS Miramar
EASTGATE MALL
MIRAMAR RD
VEGAS DR
SR-52 EB
I-15 SB

SOURCE: SANDAG, 2016; California Geological Survey

DUDEK

FIGURE 5.7-1B
Geologic Maps

Pure Water San Diego Program North City Project EIR/EIS

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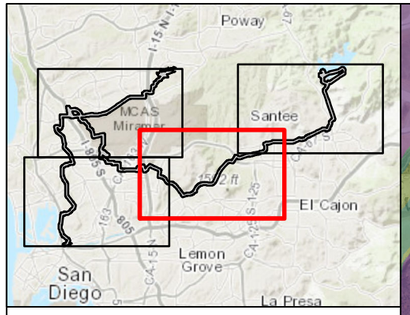

Project Study Area

Project Pipelines

San Vicente Pure Water Pipeline

Project Facilities

Mission Trails Booster Station

Geology

- Qa:Alluvial Valley Deposits
- Qls:Landslide Deposits; may include debris flows and older landslides
- Qoa:Old Alluvial Valley Deposits
- Qol:Old Lacustrine, Playa and Estuarine (Paralic) Deposits
- Qsu:Undifferentiated Surficial Deposits; includes colluvium, slope wash, talus deposits, and other surface deposits of all ages
- Qvol:Very Old Lacustrine, Playa and Estuarine (Paralic) Deposits
- Qya:Young Alluvial Valley Deposits
- Tss:Coarse-grained Tertiary age formations of sedimentary origin
- gr:Granitic and other intrusive crystalline rocks of all ages
- pKm:Cretaceous and Pre-Cretaceous metamorphic formations of sedimentary and volcanic origin
- Water

0 0.5 1 Miles

SANTO RD
CARLTON OAKS DR
SR-52 WB
I-15 NB
CUYAMACA
Santee Lake
Lake Murray
Gillespie Field
QUALCOMM Stadium

SOURCE: SANDAG, 2016; California Geological Survey

DUDEK

FIGURE 5.7-1C
Geologic Maps

Pure Water San Diego Program North City Project EIR/EIS

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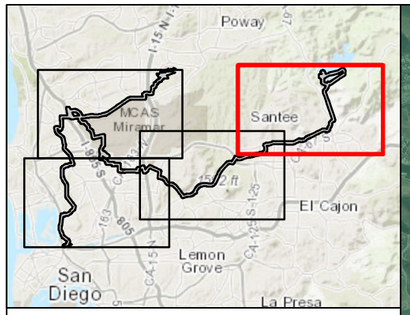

Project Study Area

Project Pipelines

San Vicente Pure Water Pipeline

Geology

- Kss:Coarse-grained Cretaceous age formations of sedimentary origin
- Kv:Cretaceous age formations of volcanic origin
- Qa:Alluvial Valley Deposits
- Qls:Landslide Deposits; may include debris flows and older landslides
- Qoa:Old Alluvial Valley Deposits
- Qya:Young Alluvial Valley Deposits
- Tss:Coarse-grained Tertiary age formations of sedimentary origin
- gr:Granitic and other intrusive crystalline rocks of all ages
- Water

0 0.5 1 Miles

SOURCE: SANDAG, 2016; California Geological Survey

DUDEK

FIGURE 5.7-1D
Geologic Maps

Pure Water San Diego Program North City Project EIR/EIS

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5.8 GREENHOUSE GAS EMISSIONS

5.8.1 INTRODUCTION

The purpose of this section is to identify existing conditions related to greenhouse gas (GHG) emissions for the North City Project and describe applicable regulations. The information provided in this section is based on the Greenhouse Gas Emissions Technical Report prepared by Dudek, dated ~~September 2017~~February 2018 (provided as Appendix E).

5.8.2 ENVIRONMENTAL SETTING

The Greenhouse Effect

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind, lasting for an extended period (decades or longer). The greenhouse effect traps heat in the troposphere through a threefold process: short-wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and back toward the Earth. This "trapping" of the long-wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect.

The greenhouse effect is a natural process that contributes to regulating the Earth's temperature. Without it, the temperature of the Earth would be about 0° Fahrenheit (°F) (−18° Celsius (°C)) instead of its current 59°F (15°C) (Qiancheng 1998). Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect.

Greenhouse Gases

Gases that trap heat in the atmosphere are called GHGs. GHGs include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), fluorinated gases (hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3)), chlorofluorocarbons (CFCs), and hydrochlorofluorocarbons (HCFCs), in addition to water vapor. Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than

CO_2, include fluorinated gases, such as HFCs, PFCs, and SF_6, which are associated with certain industrial products and processes. A summary of the most common GHGs and their sources is included in the following text.[1]

Carbon Dioxide. CO_2 is a naturally occurring gas and a by-product of human activities and is the principal anthropogenic GHG that affects the Earth's radiative balance. Natural sources of CO_2 include respiration of bacteria, plants, animals, and fungus; evaporation from oceans, volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate CO_2 are from the combustion of coal, oil, natural gas, and wood.

Methane. CH_4 is a flammable gas and is the main component of natural gas. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Nitrous Oxide. Sources of N_2O include soil cultivation practices (microbial processes in soil and water), especially the use of commercial and organic fertilizers, manure management, industrial processes (such as in nitric acid production, nylon production, and fossil-fuel-fired power plants), vehicle emissions, and the use of N_2O as a propellant (such as in rockets, racecars, aerosol sprays).

Fluorinated Gases. Fluorinated gases (also referred to as F-gases) are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are commonly used as substitutes for stratospheric ozone-depleting substances (e.g., CFCs, HCFCs, and halons). The most prevalent fluorinated gases include the following:

- ***Hydrofluorocarbons:*** HFCs are compounds containing only hydrogen, fluorine, and carbon atoms. HFCs are synthetic chemicals that are used as alternatives to ozone-depleting substances in serving many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are used in manufacturing.

[1] The descriptions of GHGs are summarized from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (1995), IPCC Fourth Assessment Report (2007), the California Air Resources Board's (CARB's) "Glossary of Terms Used in Greenhouse Gas Inventories" (2015), and U.S. Environmental Protection Agency's (EPA's) "Glossary of Climate Change Terms" (2016a).

- ***Perfluorocarbons:*** PFCs are a group of human-made chemicals composed of carbon and fluorine only. These chemicals were introduced as alternatives, along with HFCs, to the ozone depleting substances. The two main sources of PFCs are primarily aluminum production and semiconductor manufacturing. Since PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere, these chemicals have long lifetimes, ranging between 10,000 and 50,000 years.
- ***Sulfur Hexafluoride:*** SF_6 is a colorless gas that is soluble in alcohol and ether and slightly soluble in water. SF_6 is used for insulation in electric power transmission and distribution equipment, semiconductor manufacturing, the magnesium industry, and as a tracer gas for leak detection.
- ***Nitrogen trifluoride:*** NF_3 is used in the manufacture of a variety of electronics, including semiconductors and flat panel displays.

Chlorofluorocarbons. CFCs are synthetic chemicals that have been used as cleaning solvents, refrigerants, and aerosol propellants. CFCs are chemically unreactive in the lower atmosphere (troposphere) and the production of CFCs was prohibited in 1987 due to the chemical destruction of stratospheric O_3.

Hydrochlorofluorocarbons. HCFCs are a large group of compounds, whose structure is very close to that of CFCs—containing hydrogen, fluorine, chlorine, and carbon atoms—but including one or more hydrogen atoms. Like HFCs, HCFCs are used in refrigerants and propellants. HCFCs were also used in place of CFCs for some applications; however, their use in general is being phased out.

Black Carbon. Black carbon is a component of fine particulate matter, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting. Black carbon is a short-lived species that varies spatially, which makes it difficult to quantify the global warming potential. Diesel particulate matter emissions are a major source of black carbon and are also toxic air contaminants (TACs) that have been regulated and controlled in California for several decades to protect public health. In relation to declining diesel particulate matter from the California Air Resources Board's (CARB's) regulations pertaining to diesel engines, diesel fuels, and burning activities, CARB estimates that annual black carbon

emissions in California have reduced by 70% between 1990 and 2010, with 95% control expected by 2020 (CARB 2014).

Water Vapor. The primary source of water vapor is evaporation from the ocean, with additional vapor generated by sublimation (change from solid to gas) from ice and snow, evaporation from other water bodies, and transpiration from plant leaves. Water vapor is the most important, abundant, and variable GHG in the atmosphere and maintains a climate necessary for life.

Ozone. Tropospheric O_3, which is created by photochemical reactions involving gases from both from natural sources and from human activities, acts as a GHG. Stratospheric O_3, which is created by the interaction between solar ultraviolet radiation and molecular oxygen (O_2), plays a decisive role in the stratospheric radiative balance. Depletion of stratospheric O_3, due to chemical reactions that may be enhanced by climate change, results in an increased ground-level flux of ultraviolet-B radiation.

Aerosols. Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light.

Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (EPA 2016b).

The Intergovernmental Panel on Climate Change (IPCC) developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram of a trace substance relative to that of 1 kilogram of a reference gas (IPCC 2014). The reference gas used is CO_2; therefore, GWP-weighted emissions are measured in metric tons of CO_2 equivalent (MT CO_2E).

The current version of the California Emissions Estimator Model (CalEEMod) (version 2016.3.1) assumes that the GWP for CH_4 is 25 (which means that

emissions of 1 MT of CH_4 are equivalent to emissions of 25 MT of CO_2), and the GWP for N_2O is 298, based on the IPCC Fourth Assessment Report (IPCC 2007).

Contributions to Greenhouse Gas Emissions

Per the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014 (EPA 2016b), total U.S. GHG emissions were approximately 6,870.5 million metric tons (MMT) CO_2E in 2014. The primary GHG emitted by human activities in the United States was CO_2, which represented approximately 80.9% of total GHG emissions (5,556.0 MMT CO_2E). The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 93.7% of CO_2 emissions in 2014 (5,208.2 MMT CO_2E). Total U.S. GHG emissions have increased by 7.4% from 1990 to 2014, and emissions increased from 2013 to 2014 by 1.0% (70.5 MMT CO_2E). Since 1990, U.S. GHG emissions have increased at an average annual rate of 0.3%; however, overall, net emissions in 2014 were 8.6% below 2005 levels (EPA 2016b). According to California's 2000–2014 GHG emissions inventory (2016 edition), California emitted 441.5 MMT CO_2E in 2014, including emissions resulting from out-of-state electrical generation (CARB 2016). The sources of GHG emissions in California include transportation, industry, electric power production from both in-state and out-of-state sources, residential and commercial activities, agriculture, high GWP substances, and recycling and waste. The California GHG emission source categories and their relative contributions in 2014 are presented in Table 5.8-1.

Table 5.8-1
GHG Sources in California

Source Category	Annual GHG Emissions (MMT CO_2E)	Percent of Total[a]
Transportation	159.53	36%
Industrial uses	93.32	21%
Electricity generation[b]	88.24	20%
Residential and commercial uses	38.34	9%
Agriculture	36.11	8%
High GWP substances	17.15	4%
Recycling and waste	8.85	2%
Totals	**441.54**	**100%**

Source: CARB 2016.
Notes: Emissions reflect the 2014 California GHG inventory.
MMT CO_2E = million metric tons of carbon dioxide equivalent per year
[a] Percentage of total has been rounded, and total may not sum due to rounding.
[b] Includes emissions associated with imported electricity, which account for 36.51 MMT CO_2E annually.

During the 2000 to 2014 period, per-capita GHG emissions in California continued to drop from a peak in 2001 of 13.9 MT per person to 11.4 MT per person in 2014, representing an 18% decrease. In addition, total GHG emissions in 2014 were 2.8 MMT CO_2E less than 2013 emissions. The declining trend in GHG emissions, coupled with programs that will continue to provide additional GHG reductions going forward, demonstrates that California is on track to meet the 2020 target of 431 MMT CO_2E (CARB 2016).

Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. The 2014 IPCC Synthesis Report indicated that warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. Signs that global climate change has occurred include warming of the atmosphere and ocean, diminished amounts of snow and ice, rising sea levels, and ocean acidification (IPCC 2014).

In California, climate change impacts have the potential to affect sea level rise, agriculture, snowpack and water supply, forestry, wildfire risk, public health, and electricity demand and supply. The primary effect of global climate change has been a 0.2°C rise in average global tropospheric temperature per decade, determined from meteorological measurements worldwide between 1990 and 2005. Scientific modeling predicts that continued emissions of GHGs at or above current rates would induce more extreme climate changes during the twenty-first century than were observed during the twentieth century. A warming of about 0.2°C (0.36°F) per decade is projected, and there are identifiable signs that global warming could be taking place.

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California. The average temperatures in California have increased, leading to more extreme hot days and fewer cold nights; shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year; sea levels have risen; and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010).

An increase in annual average temperature is a reasonably foreseeable effect of climate change. Observed changes over the last several decades across the western United States reveal clear signals of climate change. Statewide average temperatures increased by about 1.7°F from 1895 to 2011, and warming has been greatest in the Sierra Nevada. By 2050, California is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century. By 2100, average temperatures could increase by 4.1°F to 8.6°F, depending on emissions levels. Springtime warming—a critical influence on snowmelt—will be particularly pronounced. Summer temperatures will rise more than winter temperatures, and the increases will be greater in inland California, compared to the coast. Heat waves will be more frequent, hotter, and longer. There will be fewer extremely cold nights. A decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California and much of the state's water supply, by 30% to as much as 90% is predicted over the next 100 years (CAT 2010a).

Model projections for precipitation over California continue to show the Mediterranean pattern of wet winters and dry summers with seasonal, year-to-year, and decade-to-decade variability. For the first time, however, several of the improved climate models shift toward drier conditions by the mid-to-late 21st century in central and, most notably, Southern California. By late-century, all projections show drying, and half of them suggest 30-year average precipitation will decline by more than 10% below the historical average (CAT 2010a).

A summary of current and future climate change impacts to resource areas in California, as discussed in the Safeguarding California: Reducing Climate Risk (CNRA 2014), is provided in the following text.

Agriculture. The impacts of climate change on the agricultural sector are far more severe than the typical variability in weather and precipitation patterns that occur year to year. Some of the specific challenges faced by the agricultural sector and farmers include more drastic and unpredictable precipitation and weather patterns; extreme weather events that range from severe flooding to extreme drought, to destructive storm events; significant shifts in water availably and water quality; changes in pollinator lifecycles; temperature fluctuations, including extreme heat stress and decreased chill hours; increased risks from invasive species and weeds, agricultural pests and plant diseases; and disruptions to the transportation and energy infrastructure supporting agricultural production. These challenges and associated short-term and long-term impacts can have both positive and negative

effects on agricultural production. Nonetheless, it is predicted that current crop and livestock production will suffer long-term negative effects resulting in a substantial decrease in the agricultural sector if not managed or mitigated (CNRA 2014).

Biodiversity and Habitat. The state's extensive biodiversity stems from its varied climate and assorted landscapes, which have resulted in numerous habitats where species have evolved and adapted over time. Specific climate change challenges to biodiversity and habitat include species migration in response to climatic changes, range shift, and novel combinations of species; pathogens, parasites, and disease; invasive species; extinction risks; changes in the timing of seasonal life-cycle events; food web disruptions; and threshold effects (i.e., a change in the ecosystem that results in a "tipping point" beyond which irreversible damage or loss has occurs). Habitat restoration, conservation, and resource management across California and through collaborative efforts amongst public, private, and nonprofit agencies has assisted in the effort to fight climate change impacts on biodiversity and habitat. One of the key measures in these efforts is ensuring species' ability to relocate as temperature and water availability fluctuate as a result of climate change, based on geographic region.

Energy. The energy sector provides California residents with a supply of reliable and affordable energy through a complex integrated system. Specific climate change challenges for the energy sector include temperature, fluctuating precipitation patterns, increasing extreme weather events and sea level rise. Increasing temperatures and reduced snowpack negatively impact the availability of a steady flow of snowmelt to hydroelectric reservoirs. Higher temperatures also reduce the capacity of thermal power plants since power plant cooling is less efficient at higher ambient temperatures. Natural gas infrastructure in coastal California is threatened by sea level rise and extreme storm events (CNRA 2014).

Forestry. Forests occupy approximately 33% of California's 100 million acres and provide key benefits such as wildlife habitat, absorption of CO_2, renewable energy, and building materials. The most significant climate change related risk to forests is accelerated risk of wildfire and more frequent and severe droughts. Droughts have resulted in more large-scale mortalities and combined with increasing temperatures have led to an overall increase in wildfire risks. Increased wildfire intensity subsequently increases public safety risks, property damage, fire suppression and emergency response costs, watershed and water quality impacts, and vegetation conversions. These factors contribute to decreased forest growth, geographic shifts in tree distribution, loss of fish and wildlife habitat, and

decreased carbon absorption. Climate change may result in increased establishment of non-native species, particularly in rangelands where invasive species are already a problem. Invasive species may be able to exploit temperature or precipitation changes, or quickly occupy areas denuded by fire, insect mortality, or other climate change effects on vegetation (CNRA 2014).

Ocean and Coastal Ecosystems and Resources. Sea level rise, changing ocean conditions and other climate change stressors are likely to exacerbate long-standing challenges related to ocean and coastal ecosystems in addition to threatening people and infrastructure located along the California coastline and in coastal communities. Sea level rise in addition to more frequent and severe coastal storms and erosion are threatening vital infrastructure such as roads, bridges, power plants, ports and airports, gasoline pipes, and emergency facilities, as well as negatively impacting the coastal recreational assets such as beaches and tidal wetlands. Water quality and ocean acidification threaten the abundance of seafood and other plant and wildlife habitats throughout California and globally (CNRA 2014).

Public Health. Climate change can impact public health through various environmental changes and is the largest threat to human health in the twenty-first century. Changes in precipitation patterns affect public health primarily through potential for altered water supplies, and extreme events such as heat, floods, droughts, and wildfires. Increased frequency, intensity, and duration of extreme heat and heat waves is likely to increase the risk of mortality due to heat-related illness as well as exacerbate existing chronic health conditions. Other extreme weather events are likely to negatively impact air quality and increase or intensify respiratory illness such as asthma and allergies. Additional health impacts that may be impacted by climate change include cardiovascular disease, vector-borne diseases, mental health impacts, and malnutrition injuries. Increased frequency of these ailments is likely to subsequently increase the direct risk of injury and/or mortality (CNRA 2014).

Transportation. Residents of California rely on airports, seaports, public transportation and an extensive roadway network to gain access to destinations, goods, and services. While the transportation industry is a source of GHG emissions, it is also vulnerable to climate change risks. Particularly, sea level rise and erosion threaten many coastal California roadways, airports, seaports, transit systems, bridge supports, and energy and fueling infrastructure. Increasing temperatures and extended periods of extreme heat threaten the integrity of the roadways and rail lines. High temperatures cause the road surfaces to expand which leads to increased pressure and pavement buckling. High temperatures can

also cause rail breakages, which could lead to train derailment. Other forms of extreme weather events, such as extreme storm events, can negatively impact infrastructure, which can impair movement of people and goods, or potentially block evacuation routes and emergency access roads. Increased wildfires, flooding, erosion risks, landslides, mudslides, and rockslides can all profoundly impact the transportation system and pose a serious risk to public safety (CNRA 2014).

Water. Water resources in California support residences, plants, wildlife, farmland, landscapes, and ecosystems and bring trillions of dollars in economic activity. Climate change could seriously impact the timing, form, amount of precipitation, runoff patterns, and frequency and severity of precipitation events. Higher temperatures reduce the amount of snowpack and lead to earlier snowmelt, which can impact water supply availability, natural ecosystems, and winter recreation. Water supply availability during the intense dry summer months is heavily dependent on the snowpack accumulated during the wintertime. Increased risk of flooding presents a variety of public health concerns including water quality, public safety, property damage, displacement, and post-disaster mental health problems. Prolonged and intensified droughts can also negatively affect groundwater reserves and result in increased overdraft and subsidence. Droughts can also negatively impact agriculture and farmland throughout the state. The higher risk of wildfires can lead to increased erosion, which can negatively impact watersheds and result in poor water quality. Water temperatures are also prone to increase, which can negatively impact wildlife that rely on a specific range of temperatures for suitable habitat (CNRA 2014).

5.8.3 REGULATORY FRAMEWORK

Federal

Massachusetts vs. EPA. On April 2, 2007, in *Massachusetts v. EPA*, the Supreme Court directed the U.S. Environmental Protection Agency (EPA) Administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the EPA Administrator is required to follow the language of Section 202(a) of the Clean Air Act (CAA). On December 7, 2009, the Administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the CAA:

- The Administrator found that elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and

welfare of current and future generations. This is referred to as the "endangerment finding."

- The Administrator further found the combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the CAA.

Energy Independence and Security Act. On December 19, 2007, President Bush signed the Energy Independence and Security Act of 2007. Among other key measures, the Act would do the following, which would aid in the reduction of national GHG emissions:

1. Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
2. Set a target of 35 miles per gallon (mpg) for the combined fleet of cars and light trucks by model year 2020 and direct the National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy standard for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.
3. Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

Federal Vehicle Standards. In response to the U.S. Supreme Court ruling discussed above, the Bush Administration issued Executive Order 13432 in 2007 directing the EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the NHTSA issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the Department of Transportation, Department of Energy, EPA, and NHTSA to establish additional

standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 mpg if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6%–23% over the 2010 baselines.

In August 2016, the EPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans and all types and sizes of buses and work trucks. The final standards are expected to lower CO_2 emissions by approximately 1.1 billion MT and reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program (EPA and NHTSA 2016).

~~**Climate Action Plan.** In June 2013, President Obama issued a national Climate Action Plan (CAP) that consisted of a wide variety of executive actions and had three pillars: (1) cut carbon in America, (2) prepare the United States for impacts of climate change, and (3) lead international efforts to combat global climate change and prepare for its impacts (EOP 2013). The CAP outlines 75 goals within the three main pillars.~~

~~The Center for Climate and Energy Solutions 1-year review of progress in implementation of the Plan (C2ES 2014) found that the administration made at least some progress on most of the CAP's 75 goals and that many of the specific tasks outlined had been completed. Notable areas of progress included steps to limit carbon pollution from power plants, improve energy efficiency, reduce CH_4 and HFC emissions, help communities and industry become more resilient to climate change impacts, and end U.S. lending for coal-fired power plants overseas.~~

~~United Nations Framework Convention on Climate Change Pledge~~

~~On March 31, 2015, the State Department submitted the U.S. target to cut net GHG emissions to the United Nations Framework Convention on Climate Change. The submission, referred to as an Intended Nationally Determined Contribution, is a formal statement of the U.S. target, announced in China, to reduce our emissions by 26%–28% below 2005 levels by 2025, and to make best efforts to reduce by 28% (C2ES 2016). The target reflects a planning process that examined opportunities under existing regulatory authorities to reduce emissions in 2025 of all GHGs from all sources in every economic sector. Several U.S. laws, as well as existing and proposed regulations thereunder, are relevant to the implementation of the U.S. target, including the CAA (42 U.S.C. 7401 et seq.), the Energy Policy Act (42 U.S.C. 13201 et seq.), and the Energy Independence and Security Act (42 U.S.C. 17001 et seq.).~~

Clean Power Plan and New Source Performance Standards for Electric Generating Units

On October 23, 2015, the EPA published a final rule (effective December 22, 2015) establishing the Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (80 FR 64510–64660), also known as the Clean Power Plan. These guidelines prescribe how states must develop plans to reduce GHG emissions from existing fossil-fuel-fired electric generating units. The guidelines establish CO_2 emission performance rates representing the best system of emission reduction for two subcategories of existing fossil-fuel-fired electric generating units: (1) fossil-fuel-fired electric utility steam-generating units and (2) stationary combustion turbines. Concurrently, the EPA published a final rule (effective October 23, 2015) establishing Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (80 FR 64661–65120). The rule prescribes CO_2 emission standards for newly constructed, modified, and reconstructed affected fossil-fuel-fired electric utility generating units. Implementation of the Clean Power Plan has been stayed by the U.S. Supreme Court pending resolution of several lawsuits.

~~Mandatory Greenhouse Gas Reporting Rule~~

~~On September 22, 2009, the EPA published the Final Mandatory Greenhouse Gas Reporting Rule (Reporting Rule) in the Federal Register (74 FR 56260–56373). The Reporting Rule requires reporting of GHG data and other relevant information from fossil fuel and industrial GHG suppliers, vehicle and engine manufacturers, and all~~

~~facilities that would emit 25,000 MT CO_2E or more per year. Facility owners are required to submit an annual report with detailed calculations of facility GHG emissions on March 31 for emissions from the previous calendar year. The Reporting Rule also mandates recordkeeping and administrative requirements to enable EPA to verify the annual GHG emissions reports.~~

Council on Environmental Quality Guidance

National Environmental Policy Act Guidelines on GHG. The Council on Environmental Quality (CEQ) issued Final GHG guidance on August 1, 2016, to assist federal lead agencies with GHG significance determinations under the National Environmental Policy Act associated with federal actions. This guidance supersedes the draft GHG and climate change guidance released by CEQ in 2010 and 2014. The guidance states that CEQ "does not establish any particular quantity of GHG emission as 'significantly' affecting the quality of the human environment or give greater consideration to the effects of GHG emissions and climate change over other effects on the human environment" (CEQ 2016). As such, the adopted 2016 CEQ guidance does not specify a numeric threshold under which a proposed project as quantitatively analyzed under the National Environmental Policy Act would be considered not adverse. Nonetheless, the guidance recommends direct and indirect GHG emissions be quantified and disclosed (if quantification of emissions is feasible) and supplemented with a qualitative analysis of the project's contribution to and effect on global climate change. The guidance also calls for agencies to consider how climate change could affect proposed actions and asserts that agencies should identify opportunities for adaptation to enable the selection of more resilient actions. <u>This guidance was withdrawn by the CEQ on April 5, 2017, as published in the Federal Register Volume 82, Number 64, Section 16576 (82 FR 16576–16577) as directed by Executive Order 13783.</u>

State

The statewide GHG emissions regulatory framework is summarized below by category: state climate change targets, building energy, renewable energy and energy procurement, mobile sources, solid waste, water, and other state regulations and goals. The following text describes Executive Orders (EO), Assembly Bills (AB), Senate Bills (SB), and other regulations and plans that would directly or indirectly reduce GHG emissions.

State Climate Change Targets

Executive Order S-3-05. EO S-3-05 (June 2005) established California's GHG emissions reduction targets and assigned responsibilities among the state agencies for implementing the EO and for reporting on progress toward the targets. EO S-3-05 established the following targets:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

EO S-3-05 directed the California Environmental Protection Agency to report biannually on progress made toward meeting the GHG targets and the impacts to California due to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry. The Climate Action Team was formed, which subsequently issued reports from 2006 to 2010.

Assembly Bill 32 and CARB Scoping Plan. In furtherance of the goals established in EO S-3-05, the legislature enacted AB 32 (Núñez and Pavley), the California Global Warming Solutions Act of 2006 (September 27, 2006). AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020, representing a reduction of approximately 15% below emissions expected under a "Business-As-Usual" (BAU) scenario.

CARB has been assigned responsibility for carrying out and developing the programs and requirements necessary to achieve the goals of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions. This program will be used to monitor and enforce compliance with the established standards. CARB is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 also authorized CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted.

In 2007, CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline (427 MMT CO_2E). CARB's adoption of this limit is in accordance with Health and Safety Code Section 38550. In addition to

the 1990 emissions inventory, CARB also adopted regulations requiring mandatory reporting of GHGs for the large facilities that account for 94% of GHG emissions from industrial and commercial stationary sources in California.

Further, in 2008, CARB adopted the Climate Change Scoping Plan: A Framework for Change (Scoping Plan) in accordance with Health and Safety Code, Section 38561. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020. The 2020 emissions limit was set at 427 MMT of CO_2E. The Scoping Plan establishes an overall framework for a suite of measures that will be adopted to sharply reduce California's GHG emissions. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction features by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. The key elements of the Scoping Plan include the following (CARB 2008):

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards.
2. Achieving a statewide renewable energy mix of 33%.
3. Developing a California Cap-and-Trade Program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions.
4. Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.
5. Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard.
6. Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State of California's long-term commitment to AB 32 implementation.

In the Scoping Plan, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5% from the otherwise projected 2020 emissions level, i.e., those emissions that would

occur in 2020, absent GHG-reducing laws and regulations (referred to as "Business-As-Usual" (BAU)).

In the 2011 Final Supplement to the Scoping Plan's Functional Equivalent Document, CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations (CARB 2011a). Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7% (down from 28.5%) from the BAU conditions. When the 2020 emissions level projection also was updated to account for newly implemented regulatory measures, including Pavley I (model years 2009–2016) and the Renewable Portfolio Standard (12% to 20%), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16% (down from 28.5%) from the BAU conditions.

In 2014, CARB adopted the First Update to the Climate Change Scoping Plan: Building on the Framework (First Update; CARB 2014). The stated purpose of the First Update is to "highlight California's success to date in reducing its GHG emissions and lay the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80% below 1990 levels by 2050." The First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80% below 1990 levels by 2050 if the state realizes the expected benefits of existing policy goals.

In conjunction with the First Update, CARB identified "six key focus areas comprising major components of the state's economy to evaluate and describe the larger transformative actions that will be needed to meet the state's more expansive emission reduction needs by 2050" (CARB 2014). Those six areas are: (1) energy, (2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure), (3) agriculture, (4) water, (5) waste management, and (6) natural and working lands. The First Update identifies key recommended actions for each sector that will facilitate achievement of Executive Order S-3-05's 2050 reduction goal.

Based on CARB's research efforts presented in the First Update, CARB has a "strong sense of the mix of technologies needed to reduce emissions through 2050" (CARB 2014). Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and

industrial machinery; decarbonizing electricity and fuel supplies; and, the rapid market penetration of efficient and clean energy technologies.

As part of the First Update, CARB recalculated the state's 1990 emissions level using more recent GWPs identified by the IPCC. Using the recalculated 1990 emissions level (431 MMT CO_2E) and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15% (instead of 28.5% or 16%) from the BAU conditions. The update also recommends that a statewide mid-term target and mid-term and long-term sector targets be established toward meeting the 2050 goal established by EO S-3-05 (i.e., reduce California's GHG emissions to 80% below 1990 levels), although no specific recommendations are made.

On January 20, 2017, CARB released The 2017 Climate Change Scoping Plan Update (Second Update) for public review and comment (CARB 2017). This update to the scoping plan proposes CARB's strategy for achieving the state's 2030 GHG target, including continuing the Cap-and-Trade Program through 2030, and includes a new approach to reduce GHGs from refineries by 20%. The Second Update incorporates approaches to cutting super pollutants from the Short-Lived Climate Pollutants Strategy, and acknowledges the need for reducing emissions in agriculture and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon. During development of the Second Update, CARB held a number of public workshops in the natural and working lands, agriculture, energy, and transportation sectors to inform development of the 2030 Scoping Plan Update. When discussing project-level GHG emissions reduction actions and thresholds, the Second Update states "achieving no net increase in GHG emissions is the correct overall objective, but it may not be appropriate or feasible for every development project. And the inability to mitigate a project's GHG emissions to zero does not necessarily imply a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA" (CARB 2017). The deadline to submit comments on the Second Update was March 6, 2017. It is expected that the Second Update will be heard by the CARB at the April 27 and 28, 2017, CARB meeting.

EO B-18-12. EO B-18-12 (April 2012) directs state agencies, departments, and other entities under the governor's executive authority to take action to reduce entity-wide GHG emissions by at least 10% by 2015 and 20% by 2020, as measured

against a 2010 baseline. EO B-18-12 also established goals for existing state buildings for reducing grid-based energy purchases and water use.

EO B-30-15. EO B-30-15 (April 2015) identified an interim GHG reduction target in support of targets previously identified under S-3-05 and AB 32. EO B-30-15 set an interim target goal of reducing GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing GHG emissions to 80% below 1990 levels by 2050 as set forth in S-3-05. To facilitate achievement of this goal, EO B-30-15 calls for an update to CARB's Scoping Plan to express the 2030 target in terms of MMT CO_2E. The EO also calls for state agencies to continue to develop and implement GHG emission reduction programs in support of the reduction targets. Sector-specific agencies in transportation, energy, water, and forestry were required to prepare GHG reduction plans by September 2015, followed by a report on action taken in relation to these plans in June 2016. EO B-30-15 does not require local agencies to take any action to meet the new interim GHG reduction threshold.

SB 32 and AB 197. SB 32 and AB 197 (enacted in 2016) are companion bills that set a new statewide GHG reduction targets, make changes to CARB's membership, increase legislative oversight of CARB's climate change-based activities, and expand dissemination of GHG and other air quality-related emissions data to enhance transparency and accountability. SB 32 codified the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40% below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, in order to provide ongoing oversight over implementation of the state's climate policies. AB 197 also added two members of the legislature to CARB as nonvoting members; requires CARB to make available and update (at least annually via its website) emissions data for GHGs, criteria air pollutants, and TACs from reporting facilities; and, requires CARB to identify specific information for GHG emissions reduction measures when updating the scoping plan.

Short-Lived Climate Pollutant Reduction Strategy — SB 605 and SB 1383. SB 605 (September 2014) requires CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants in the state no later than January 1, 2016. As defined in the statute, short-lived climate pollutant means "an agent that has a relatively short lifetime in the atmosphere, from a few days to a few decades, and a warming influence on the climate that is more potent than that of carbon dioxide"

(SB 605). SB 605, however, does not prescribe specific compounds as short-lived climate pollutants or add to the list of GHGs regulated under AB 32. In developing the strategy, CARB must complete an inventory of sources and emissions of short-lived climate pollutants in the state based on available data, identify research needs to address any data gaps, identify existing and potential new control measures to reduce emissions, and prioritize the development of new measures for short-lived climate pollutants that offer co-benefits by improving water quality or reducing other criteria air pollutants that impact community health and benefit disadvantaged communities. The Proposed Short-Lived Climate Pollution Reduction Strategy released by CARB in April 2016 focuses on methane, black carbon, and fluorinated gases, particularly HFCs, as important short-lived climate pollutants. The strategy recognizes emission reduction efforts implemented under AB 32 (e.g., refrigerant management programs) and other regulatory programs (e.g., in-use diesel engines, solid waste diversion) along with additional measures to be developed.

SB 1383 (Lara) codifies emission reduction targets for short-lived climate pollutants and require CARB to approve and implement a strategy to decrease emissions of these pollutants to achieve a reduction in methane by 40%, hydrofluorocarbon by 40%, and anthropogenic black carbon by 50% below 2013 levels by 2030.

Building Energy

Title 24, Part 6. Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically establishes Building Energy Efficiency Standards that are designed to ensure new and existing buildings in California achieve energy efficiency and preserve outdoor and indoor environmental quality. The California Energy Commission (CEC) is required by law to adopt standards every 3 years that are cost effective for homeowners over the 30-year lifespan of a building. These standards are updated to consider and incorporate new energy efficient technologies and construction methods. As a result, these standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and help preserve the environment.

The current Title 24 standards are the 2013 standards, which became effective on July 1, 2014. Buildings constructed in accordance with the 2013 standards will use 25% less energy for lighting, heating, cooling, ventilation, and water heating than the 2008 standards (CEC 2014).

The 2016 Title 24 building energy efficiency standards, which will be effective January 1, 2017, will further reduce energy used and associated GHG emissions. In general, single-family homes built to the 2016 standards are anticipated to use about 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and nonresidential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015). Although the North City Project would be required to comply with 2016 Title 24 standards because its building construction phase would commence after January 1, 2017, this analysis conservatively does not quantify the increase energy efficiency associated with the more stringent 2016 Title 24 standards.

Title 24, Part 11. In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CALGreen, and establishes minimum mandatory standards as well as voluntary standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality. The CALGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and state-owned buildings and schools and hospitals. The CALGreen 2016 standards will become effective January 1, 2017. The mandatory standards require the following (24 CCR Part 11):

- Mandatory reduction in indoor water use through compliance with specified flow rates for plumbing fixtures and fittings.
- Mandatory reduction in outdoor water use through compliance with a local water efficient landscaping ordinance or the California Department of Water Resources' Model Water Efficient Landscape Ordinance.
- 65% of construction and demolition waste must be diverted from landfills.
- Mandatory inspections of energy systems to ensure optimal working efficiency.
- Inclusion of electric vehicle charging stations or designated spaces capable of supporting future charging stations.
- Low-pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring, and particle boards.

The CALGreen standards also include voluntary efficiency measures that are provided at two separate tiers and that are implemented at the discretion of local agencies and applicants. CALGreen's Tier 1 standards call for a 15% improvement in energy requirements, stricter water conservation, 65% diversion of construction and demolition waste, 10% recycled content in building materials, 20% permeable paving, 20% cement reduction, and cool/solar-reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30% improvement in energy requirements, stricter water conservation, 75% diversion of construction and demolition waste, 15% recycled content in building materials, 30% permeable paving, 25% cement reduction, and cool/solar-reflective roofs.

The California Public Utilities Commission (CPUC), CEC, and CARB also have a shared, established goal of achieving zero net energy for new construction in California. The key policy timelines include (1) all new residential construction in California will be zero net energy by 2020, and (2) all new commercial construction in California will be zero net energy by 2030.[2]

Title 20. Title 20 of the California Code of Regulations requires manufacturers of appliances to meet state and federal standards for energy and water efficiency. Performance of appliances must be certified through the CEC to demonstrate compliance with standards. New appliances regulated under Title 20 include refrigerators, refrigerator-freezers, and freezers; room air conditioners and room air-conditioning heat pumps; central air conditioners; spot air conditioners; vented gas space heaters; gas pool heaters; plumbing fittings and plumbing fixtures; fluorescent lamp ballasts; lamps; emergency lighting; traffic signal modules; dishwaters; clothes washers and dryers; cooking products; electric motors; low voltage dry-type distribution transformers; power supplies; televisions and consumer audio and video equipment; and battery charger systems. Title 20 presents protocols for testing for each type of appliance covered under the regulations, and appliances must meet the standards for energy performance, energy design, water performance, and water design. Title 20 contains the following three types of standards for appliances: federal and state standards for federally regulated appliances, state standards for federally regulated appliances, and state standards for non-federally regulated appliances.

[2] See CPUC 2013, California's Zero Net Energy Policies and Initiatives. It is expected that achievement of the zero net energy goal will occur via revisions to the Title 24 standards.

Renewable Energy and Energy Procurement

SB 1078. SB 1078 (Sher; September 2002) established the Renewable Portfolio Standard (RPS) program, which requires an annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. This goal was subsequently accelerated, requiring utilities to obtain 20% of their power from renewable sources by 2010 (see SB 107, EO S-14-08, and EO S-21-09.)

SB 1368. In September 2006, Governor Schwarzenegger signed SB 1368, which requires the CEC to develop and adopt regulations for GHG emission performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the CPUC.

EO S-14-08. EO S-14-08 (November 2008) focuses on the contribution of renewable energy sources to meet the electrical needs of California while reducing the GHG emissions from the electrical sector. This EO requires that all retail suppliers of electricity in California serve 33% of their load with renewable energy by 2020. Furthermore, the EO directs state agencies to take appropriate actions to facilitate reaching this target. The California Natural Resources Agency (CNRA), through collaboration with the CEC and California Department of Fish and Wildlife (formerly the California Department of Fish and Game), is directed to lead this effort.

EO S-21-09. EO S-21-09 (September 2009) directed CARB to adopt a regulation consistent with the goal of EO S-14-08 by July 31, 2010. CARB is further directed to work with the CPUC and CEC to ensure that the regulation builds upon the RPS program and is applicable to investor-owned utilities, publicly owned utilities, direct access providers, and community choice providers. Under this order, CARB is to give the highest priority to those renewable resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health and that can be developed the most quickly in support of reliable, efficient, cost-effective electricity system operations. On September 23, 2010, CARB adopted regulations to implement a Renewable Electricity Standard, which would achieve the goal of the EO with the following intermediate and final goals: 20% for 2012–2014, 24% for 2015–2017, 28% for 2018–2019, and 33% for 2020 and beyond. Under the regulation, wind; solar; geothermal; small hydroelectric; biomass; ocean wave, thermal, and tidal; landfill and digester gas; and biodiesel would be considered sources of renewable energy. The regulation would apply to investor-owned utilities and public (municipal) utilities.

SB X1 2. SB X1 2 (April 2011) expanded the RPS by establishing a goal of 20% of the total electricity sold to retail customers in California per year by December 31, 2013, and 33% by December 31, 2020, and in subsequent years. Under the bill, a renewable electrical generation facility is one that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current, and that meets other specified requirements with respect to its location.

SB 350. SB 350 (October 2015) expands the RPS by establishing a goal of 50% of the total electricity sold to retail customers in California per year by December 31, 2030. In addition, SB 350 includes the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses on which an energy-efficiency program is focused) of retail customers through energy conservation and efficiency. The bill also requires the CPUC, in consultation with the CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal.

Mobile Sources

AB 1493. In a response to the transportation sector accounting for more than half of California's CO_2 emissions, AB 1493 (Pavley) was enacted in July 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles that are primarily used for noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30%.

EO S-1-07. Issued on January 18, 2007, EO S-1-07 sets a declining Low Carbon Fuel Standard for GHG emissions measured in CO_2E grams per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered.

SB 375. SB 375 (Steinberg) (September 2008) addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans, was enacted into law. SB 375 required CARB to adopt regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035. Regional metropolitan planning organizations are then responsible for preparing a Sustainable Communities Strategy within their Regional Transportation Plan. The goal of the Sustainable Communities Strategy is to establish a forecasted development pattern for the region that, after considering transportation measures and policies, will achieve, if feasible, the GHG reduction targets. If a Sustainable Communities Strategy is unable to achieve the GHG reduction target, a metropolitan planning organization must prepare an Alternative Planning Strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

Pursuant to Government Code Section 65080(b)(2)(K), a sustainable communities strategy does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it. Nonetheless, SB 375 makes regional and local planning agencies responsible for developing those strategies as part of the federally required metropolitan transportation planning process and the state-mandated housing element process.

In 2010, CARB adopted the SB 375 targets for the regional metropolitan planning organizations. The targets for the San Diego Association of Governments (SANDAG) are a 7% reduction in emissions per capita by 2020 and a 13% reduction by 2035.

SANDAG completed and adopted its 2050 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) in October 2011. In November 2011, CARB, by resolution, accepted SANDAG's GHG emissions quantification analysis and determination that, if implemented, the SCS would achieve CARB's 2020 and 2035 GHG emissions reduction targets for the region.

After SANDAG's 2050 RTP/SCS was adopted, a lawsuit was filed by the Cleveland National Forest Foundation and others. In November 2014, Division One of the Fourth District Court of Appeal issued its decision in *Cleveland National Forest Foundation v. SANDAG*, Case No. D063288. In its decision, the Fourth District held that SANDAG abused its discretion when it certified the environmental impact

report (EIR) for the 2050 RTP/SCS because it did not adequately analyze and mitigate GHG emission levels after year 2020. The 2050 RTP/SCS EIR complied with CARB's AB 32-related GHG reduction target through 2020, but the EIR found that plan-related emissions would substantially increase after 2020 and through 2050. The majority of the Fourth District in the *Cleveland National* decision found SANDAG's EIR deficient because, although the EIR used three significance thresholds authorized by California Environmental Quality Act (CEQA) Guidelines, Section 15064.4(b), it did not assess the 2050 RTP/SCS's consistency with the 2050 GHG emissions goal identified in EO S-03-05, which the majority construed as "state climate policy." The Fourth District did not require the set aside of SANDAG's 2050 RTP/SCS itself. In March 2015, the California Supreme Court granted SANDAG's petition for review of the Fourth District's decision (Case No. S223603), and the matter currently is pending before the state's highest court.

Although the EIR for SANDAG's 2050 RTP/SCS is still pending before the California Supreme Court, SANDAG recently adopted the next iteration of its RTP/SCS in accordance with statutorily mandated timelines. More specifically, in October 2015, SANDAG adopted San Diego Forward: The Regional Plan. Like the 2050 RTP/SCS, this planning document meets CARB's 2020 and 2035 reduction targets for the region (SANDAG 2015).

Advanced Clean Cars Program and Zero-Emissions Vehicle Program. In January 2012, CARB approved the Advanced Clean Cars program, a new emissions-control program for model years 2015 through 2025. The program combines the control of smog- and soot-causing pollutants and GHG emissions into a single coordinated package. The package includes elements to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide the fuels for clean cars (CARB 2011b). To improve air quality, CARB has implemented new emission standards to reduce smog-forming emissions beginning with 2015 model year vehicles. It is estimated that in 2025, cars will emit 75% less smog-forming pollution than the average new car sold today. To reduce GHG emissions, CARB, in conjunction with the EPA and the NHTSA, has adopted new GHG standards for model year 2017 to 2025 vehicles; the new standards are estimated to reduce GHG emissions by 34% in 2025. The zero-emission vehicle program will act as the focused technology of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of zero-emission vehicles and plug-in hybrid electric vehicles in the 2018 to 2025 model years. The Clean Fuels Outlet regulation will ensure that fuels such as

electricity and hydrogen are available to meet the fueling needs of the new advanced technology vehicles as they come to the market.

EO B-16-12. EO B-16-12 (March 2012) requires that state entities under the governor's direction and control support and facilitate the rapid commercialization of zero-emissions vehicles. It orders CARB, the CEC, the CPUC, and other relevant agencies work with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to help achieve benchmark goals by 2015, 2020, and 2025. On a statewide basis, EO B-16-12 establishes a target reduction of GHG emissions from the transportation sector equaling 80% less than 1990 levels by 2050. This directive does not apply to vehicles that have special performance requirements necessary for the protection of the public safety and welfare.

Water

EO B-29-15. In response to the ongoing drought in California, EO B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013. The term of the EO extended through February 28, 2016, although many of the directives have become permanent water-efficiency standards and requirements. The EO includes specific directives that set strict limits on water usage in the state. In response to EO B-29-15, the California Department of Water Resources has modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, significantly increases the requirements for landscape water use efficiency and broadens its applicability to include new development projects with smaller landscape areas.

Solid Waste

AB 939 and AB 341. In 1989, AB 939, known as the Integrated Waste Management Act (California Public Resources Code Section 40000 et seq.), was passed because of the increase in waste stream and the decrease in landfill capacity. The statute established the California Integrated Waste Management Board, which oversees a disposal reporting system. AB 939 mandated a reduction of waste being disposed where jurisdictions were required to meet diversion goals of all solid waste through source reduction, recycling, and composting activities of 25% by 1995 and 50% by the year 2000.

AB 341 (Chapter 476, Statutes of 2011 (Chesbro)) amended the California Integrated Waste Management Act of 1989 to include a provision declaring that it is the policy goal of the state that not less than 75% of solid waste generated be source-reduced, recycled, or composted by the year 2020, and annually thereafter. In addition, AB 341 required the California Department of Resources Recycling and Recovery (CalRecycle) to develop strategies to achieve the state's policy goal. CalRecycle conducted several general stakeholder workshops and several focused workshops and in August 2015 published a discussion document titled AB 341 Report to the legislature, which identifies five priority strategies that CalRecycle believes would assist the state in reaching the 75% goal by 2020, legislative and regulatory recommendations, and an evaluation of program effectiveness.

Other State Regulations and Goals

SB 97. SB 97 (Dutton) (August 2007) directs the Governor's Office of Planning and Research (OPR) to develop guidelines under CEQA for the mitigation of GHG emissions. In 2008, OPR issued a technical advisory as interim guidance regarding the analysis of GHG emissions in CEQA documents, which indicated that a project's GHG emissions, including those associated with vehicular traffic, energy consumption, water usage, and construction activities, should be identified and estimated (OPR 2008). The advisory further recommended that the Lead Agency determine significance of the impacts and impose all mitigation measures necessary to reduce GHG emissions to a level that is less than significant. The CNRA adopted the CEQA Guidelines amendments in December 2009, which became effective in March 2010.

Under the amended CEQA Guidelines, a Lead Agency has the discretion to determine whether to use a quantitative or qualitative analysis or apply performance standards to determine the significance of GHG emissions resulting from a particular project (Section 15064.4(a)). The CEQA Guidelines require that a Lead Agency to consider the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (Section 15064.4(b)). The CEQA Guidelines also allow lead agencies to consider feasible means of mitigating the significant effects of GHG emissions, including reductions in emissions through the implementation of project features or off-site measures. The adopted amendments do not establish a GHG emission threshold, instead allowing a Lead Agency to develop, adopt, and apply its own thresholds of significance or those developed by other agencies or experts. The CNRA also acknowledges that a Lead

Agency may consider compliance with regulations or requirements implementing AB 32 in determining the significance of a project's GHG emissions (CNRA 2009).

EO S-13-08. EO Order S-13-08 (November 2008) is intended to hasten California's response to the impacts of global climate change, particularly sea-level rise. It directs state agencies to take specified actions to assess and plan for such impacts. It directs the CNRA, in cooperation with the California Department of Water Resources, CEC, California's coastal management agencies, and the Ocean Protection Council, to request that the National Academy of Sciences prepare a Sea Level Rise Assessment Report by December 1, 2010. The Ocean Protection Council, California Department of Water Resources, and CEC, in cooperation with other state agencies, are required to conduct a public workshop to gather information relevant to the Sea Level Rise Assessment Report. The Business, Transportation, and Housing Agency was ordered to assess within 90 days of issuance of the EO the vulnerability of the state's transportation systems to sea-level rise. The OPR and the CNRA are required to provide land use planning guidance related to sea-level rise and other climate change impacts. The EO also required the other state agencies to develop adaptation strategies by June 9, 2009, to respond to the impacts of global climate change that are predicted to occur over the next 50 to 100 years. A discussion draft adaptation strategies report was released in August 2009, and the final 2009 California Climate Adaptation Strategy report was issued in December 2009 (CNRA 2009). An update to the 2009 report, Safeguarding California: Reducing Climate Risk, was issued in July 2014 (CNRA 2014). To assess the state's vulnerability, the report summarizes key climate change impacts to the state for the following areas: agriculture, biodiversity and habitat, emergency management, energy, forestry, ocean and coastal ecosystems and resources, public health, transportation, and water.

2015 State of the State Address*.* In January 2015, Governor Brown in his inaugural address and annual report to the legislature established supplementary goals, which would further reduce GHG emissions over the next 15 years. These goals include an increase in California's renewable energy portfolio from 33% to 50%, a reduction in vehicle petroleum use for cars and trucks by up to 50%, measures to double the efficiency of existing buildings, and decreasing emissions associated with heating fuels.

2016 State of the State Address. In his January 2016 address, Governor Brown established a statewide goal to bring per-capita GHG emissions down to 2 tons per person, which reflects the goal of the Global Climate Leadership

Memorandum of Understanding (Under 2 MOU; OPR 2016) to limit global warming to less than 2°C by 2050. The Under 2 MOU agreement pursues emission reductions of 80% to 95% below 1990 levels by 2050 and/or reach a per-capita annual emissions goal of less than 2 MT by 2050. A total of 135 jurisdictions representing 32 countries and 6 continents, including California, have signed or endorsed the Under 2 MOU (OPR 2016).

Local

San Diego Air Pollution Control District

In San Diego County, the San Diego Air Pollution Control District is the agency responsible for protecting public health and welfare through the administration of federal and state air quality laws and policies. SDAPCD currently has no regulations relative to GHG emissions. However, some rules and regulations that address criteria air pollutants may also have a co-benefit for GHG emissions.

City of San Diego General Plan

The State of California requires cities and counties to prepare and adopt a general plan to set out a long-range vision and comprehensive policy framework for its future. The state also mandates that the plan be updated periodically to ensure relevance and utility. The City of San Diego General Plan (General Plan) was unanimously adopted by the City Council on March 10, 2008, with additional amendments approved in December 2010, January 2012, and June 2015. The General Plan builds upon many of the goals and strategies of the former 1979 General Plan, in addition to offering new policy direction in the areas of urban form, neighborhood character, historic preservation, public facilities, recreation, conservation, mobility, housing affordability, economic prosperity, and equitable development. It recognizes and explains the critical role of the community planning project as the vehicle to tailor the City of Villages strategy for each neighborhood. It also outlines the plan amendment process, and other implementation strategies, and considers the continued growth of the City beyond the year 2020 (City of San Diego 2008).

Conservation Element. The Conservation Element contains policies to guide the conservation of resources that are fundamental components of San Diego's environment, that help define the City's identity, and that are relied upon for continued economic prosperity. The purpose of this element is to help the City become an international model of sustainable development and conservation and

to provide for the long-term conservation and sustainable management of the rich natural resources that help define the City's identity, contribute to its economy, and improve its quality of life.

The City has also adopted the following General Plan Conservation Element policies related to climate change:

- ***CE-A.2.*** Reduce the City's carbon footprint. Develop and adopt new or amended regulations, programs, and incentives as appropriate to implement the goals and policies set forth in the General Plan to:
  - Create sustainable and efficient land use patterns to reduce vehicular trips and preserve open space;
  - Reduce fuel emission levels by encouraging alternative modes of transportation and increasing fuel efficiency;
  - Improve energy efficiency, especially in the transportation sector and buildings and appliances;
  - Reduce the Urban Heat Island effect through sustainable design and building practices, as well as planting trees (consistent with habitat and water conservation policies) for their many environmental benefits, including natural carbon sequestration;
  - Reduce waste by improving management and recycling programs;
  - Plan for water supply and emergency reserves.
- ***CE-A.8.*** Reduce construction and demolition waste in accordance with Public Facilities Element, Policy PF-1.2, or by renovating or adding on to existing buildings, rather than constructing new buildings.
- ***CE-A.9.*** Reuse building materials, use materials that have recycled content, or use materials that are derived from sustainable or rapidly renewable sources to the extent possible, through factors including:
  - Scheduling time for deconstruction and recycling activities to take place during project demolition and construction phases;
  - Using life cycle costing in decision-making for materials and construction techniques. Life cycle costing analyzes the costs and benefits over the life of a particular product, technology, or system.

- ***CE-F.3.*** Continue to use methane as an energy source from inactive and closed landfills.
- ***CE-I.4.*** Maintain and promote water conservation and waste diversion programs to conserve energy.
- ***CE-I.5.*** Support the installation of photovoltaic panels, and other forms of renewable energy production.
    - Seek funding to incorporate renewable energy alternatives in public buildings.
    - Promote the use and installation of renewable energy alternatives in new and existing development.
- ***CE-I.10.*** Use renewable energy sources to generate energy to the extent feasible.

City of San Diego Sustainable Community Program

On January 29, 2002, the San Diego City Council unanimously approved the San Diego Sustainable Community Program (City of San Diego 2005). Actions identified include:

1. Participation in the Cities for Climate Protection program coordinated through the International Council of Local Environmental Initiatives;
2. Establishment of a 15% GHG reduction goal set for 2010, using 1990 as a baseline; and
3. Direction to use the recommendations of a scientific Ad Hoc Advisory Committee as a means to improve the GHG Emission Reduction Action Plan within the City organization and to identify additional community actions.

City of San Diego Climate Protection Action Plan

In 2005, the City of San Diego released a Climate Protection Action Plan (City of San Diego 2005). This report includes many of the recommendations provided by the Ad Hoc Advisory Committee and City staff. By implementing these recommendations, the City could directly address the challenges relating to mitigation for state and federal ozone standards nonattainment (with associated health benefits) and enhanced economic prosperity, specifically related to the tourism and agricultural sectors.

The Climate Protection Action Plan evaluated citywide GHG emissions, particularly three contentions: (1) the GHG projection in 2010 resulting from no action taken

to curb emissions, (2) the GHG emission reductions due to City of San Diego actions implemented between 1990 and 2003, and (3) the GHG reductions needed by 2010 to achieve 15% reduction. The Climate Protection Action Plan does not recommend or require specific strategies or measures for projects within the City to reduce emissions (City of San Diego 2005).

City of San Diego Climate Action Plan

In December 2015, the City adopted its final Climate Action Plan (CAP) (City of San Diego 2015). A Program EIR was prepared for the City's CAP, which was certified in December 2015. The CAP quantifies existing GHG emissions as well as projected emissions for the years 2020, 2030, and 2035 resulting from activities within the City's jurisdiction. The CAP and the accompanying certified Final Program EIR also identify and analyze the GHG emissions that would result from the BAU scenario for the years 2020, 2030, and 2035. In addition, the CAP identifies City target emissions levels, below which the citywide GHG impacts would be less than significant.

The CAP was developed in response to state legislation and policies that are aimed at reducing California's GHG emissions. Consistent with AB 32 and the CARB Scoping Plan, the CAP sets a GHG target for 2020 equivalent to 15% below the City's 2010 baseline emissions to ensure that it meets its proportional share of the 2020 AB 32 reductions. For 2035, the CAP sets a GHG target equivalent to a 50% reduction from baseline emissions to ensure it is on the trajectory toward achieving its proportional share of the 2050 state target identified in EO S-3-05. The 2035 target also ensures that the City would be consistent with the 2030 state target identified in EO B-30-15. Since CARB has not provided guidance on a specific reduction target for local governments to use for 2030 and 2050, it was determined that a 50% reduction from baseline emissions by 2035 would ensure that the City achieved a proportional share of the statewide GHG reductions. In terms of consistency with EOs S-3-05 and B-30-15, the CAP's 2035 target provides a conservative target toward achieving the statewide reductions. If CARB provides new guidance on how cities should address the 2030 targets, the City will adjust the CAP accordingly.

With implementation of the CAP, the City aims to reduce emissions 15% below the baseline to approximately 11.1 MMT CO_2E by 2020, 40% below the baseline to approximately 7.8 MMT CO_2E by 2030, and 50% below the baseline to approximately 6.5 MMT CO_2E by 2035. It is anticipated that the City would exceed its reduction target by 1.3 MMT CO_2E in 2020, 176,528 MT CO_2E in 2030, and 127,135 MT CO_2E in 2035 with implementation of the CAP. The CAP relies on

significant City and regional actions, continued implementation of federal and state mandates, and five local strategies with associated action steps for target attainment. The City has identified the following five strategies to reduce GHG emissions to achieve the 2020 and 2035 targets:

1. Energy- and water-efficient buildings
2. Clean and renewable energy
3. Bicycling, walking, transit, and land use
4. Zero waste (gas and waste management)
5. Climate resiliency

Implementation of the CAP is divided into three actions:

- Early Actions (Adoption of the CAP-December 31, 2017)
- Mid-Term Actions (January 1, 2018-December 31, 2020)
- Longer-Term Actions (2021-2035)

The CAP contains five chapters: Background, Reducing Emissions, Implementation and Monitoring, Social Equity and Job Creation, and Adaptation. The 2015 CAP demonstrates to San Diego businesses and residents that the City acknowledges the existing and potential impacts of a changing climate and is committed to keeping it in the forefront of decision-making. Successful implementation of the CAP will (1) prepare for anticipated climate change impacts in the coming decades, (2) help the State of California achieve its reduction target by contributing the City's fair share of GHG reductions, and (3) have a positive impact on the regional economy.

The CAP includes a monitoring and reporting program to ensure its progress toward achieving the specified GHG emissions reductions, and specifies 17 actions that, if implemented, would achieve the specified GHG emissions reductions targets. The CAP was adopted in a public process following certification of the Final Program EIR. Subsequent to the adoption of the CAP, the City has also established additional specific measures that if implemented on a project-by-project basis, would further ensure that the City as a whole achieves the specified GHG emissions reduction targets in the CAP.

On July 12, 2016, The City amended the CAP to include a Consistency Review Checklist, which is intended to provide a streamlined review process for the GHG

emissions analysis of proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to CEQA. The CAP Consistency Checklist provides a streamlined review process for the GHG emissions analysis of proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to CEQA. This checklist is part of the CAP and contains measures that are required to be implemented on a project-by-project basis to ensure that the specified emissions targets identified in the CAP are achieved. Implementation of these measures would ensure that new development is consistent with the CAP's assumptions for relevant CAP strategies toward achieving the identified GHG reduction targets. Projects that are consistent with the CAP as determined through the use of this checklist may rely on the CAP for the cumulative impacts analysis of GHG emissions. Projects that are not consistent with the CAP must prepare a comprehensive project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions and incorporation of the measures in this checklist to the extent feasible. Cumulative GHG impacts would be significant for any project that is not consistent with the CAP.

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5.9 HEALTH AND SAFETY/HAZARDS

5.9.1 INTRODUCTION

This section addresses the environmental setting and applicable regulations with regards to hazardous materials, wildland fire, emergency response, and airport hazards associated with the North City Project Alternatives (Project Alternatives). The section includes the existing conditions for the locations where the Project Alternatives components would occur and identifies the locations of potentially hazardous materials sites. The information contained in this section was obtained from various sources, including the City of San Diego General Plan (City of San Diego 2008), the Marine Corps Air Station (MCAS) Miramar Airport Land Use Compatibility Plan (ALUC 2011), the San Diego International Airport Land Use Compatibility Plan (ALUC 2014), the Montgomery Field Airport Land Use Compatibility Plan (ALUC 2010a), and the Phase I Environmental Site Assessments (ESAs) prepared for the Morena Pump Station, WW Force Main and Brine Conveyance (Allied Geotechnical Engineers Inc. 2015a); Miramar Pipeline/Pump Station (Allied Geotechnical Engineers Inc. 2016); and the North City to San Vicente Reservoir Pipeline Project (Allied Geotechnical Engineers Inc. 2015b).

5.9.2 ENVIRONMENTAL SETTING

The study area for the Project Alternatives includes primarily commercial, industrial, and residential areas in the northern and central portions of the City of San Diego (City). Other land uses adjacent to and intersecting the proposed facilities and corridors include MCAS Miramar, the Miramar National Cemetery, and various public works facilities.

5.9.2.1 Wildfire Hazards

Due to climate, topography, and native vegetation, the City is subject to both wildland and urban fires. In October 2003, over 28,000 acres of the City (12% of City acreage) between the communities of Scripps Ranch and Tierrasanta burned in what was known as the Cedar Fire. Approximately 335 structures, mostly single-family homes, were destroyed, and another 71 structures were damaged. In June 1985, a wildfire started and raced up the canyon hillsides of the dense neighborhood of Normal Heights, destroying 76 homes and damaging dozens more. These fires revealed the severity of the risk of wildland fires and the devastation that can result.

The extended droughts characteristic of the region's Mediterranean climate result in large areas of dry vegetation that provide fuel for wildland fires. The most critical times of year for wildland fires are late summer and fall when Santa Ana winds bring hot, dry desert air into the region. The air temperature quickly dries vegetation, thereby increasing the amount of natural fuel. Development pressures increase the threat of wildland fire on human populations and property as development is located adjacent to areas of natural vegetation.

Figure 5.9-1, Miramar and San Vicente Reservoir Project Alternatives – Fire Hazard Areas, depicts the areas of the City which are within a High Fire Hazard Area. For residents in these areas, wildfire is a potential hazard. The urbanized portions of the City are also subject to structural fires. The San Diego Fire-Rescue Department is responsible for the preparation, maintenance, and execution of fire preparedness and management plans. In the event of a large wildfire within or threatening City limits, they could be assisted by the California Department of Forestry and Fire Protection, Federal Fire Department, or other local fire department jurisdictions.

5.9.2.2 Hazardous Materials Transport, Use, and Disposal

The term "hazardous material" is defined in different ways by various regulatory programs. This Environmental Impact Report/Environmental Impact Statement (EIR/EIS) uses the definition from the California Health and Safety Code, Section 25501(p), which defines a hazardous material as:

> Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous wastes, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Existing Uses

Existing facilities that would be improved or expanded as part of the North City Project that currently use hazardous materials include the North City Water Reclamation Plant (NCWRP), the Metro Biosolids Center, and the Miramar Water Treatment Plant (WTP).

North City Water Reclamation Plant

Various chemicals are used throughout NCWRP for odor control, flocculation, settling, disinfection, and water softening. The chemical storage area, located east of the aeration basins, houses the following 10 chemical storage tanks, each with 7,500 gallons of capacity:

- Four SHC tanks
- Two ferrous chloride tanks
- One anionic/nonionic polymer tank
- One cationic polymer tank
- One caustic soda tank
- One alum tank

The chemical storage facility also houses chemical metering and transfer pumps for each chemical system, batch tanks, containment areas, and sump pumps. Various chemical pipelines run through utility trenches from the chemical storage facilities to multiple delivery points within the NCWRP (City of San Diego 2016).

Metro Biosolids Center

This discussion of chemical addition systems is confined to only those chemicals that have a direct impact on the solids processing operations at the Metro Biosolids Center. Sodium hypochlorite (SHC) and sodium hydroxide are stored and handled on site, and use supports the operation of odor control systems.

The two chemicals of interest for the thickening, dewatering and anaerobic digestion facilities are ferrous chloride ($FeCl_2$)[1] and anionic polymer (PEA)[2]. The former is used to control sulfide production in the digesters; the latter is used in conjunction with thickening and dewatering centrifuges to enhance solids removal.

In general, bulk chemicals are stored and diluted at the central Chemical Handling Facility (Area 60). From the central facility, chemicals are pumped to remote day tanks

[1] Ferrous Chloride ($FeCl_2$) is supplied as a liquid solution that is between 28% and 32% active ingredient by weight. The brown liquid has a specific gravity of 1.4 and is supplied by Kemira Inc. A value of 30% active ingredient by weight was used in calculations.

[2] Polydyne supplies the anionic polymer Clarifloc 331, which is used for both thickening and dewatering centrifuges. Clarifloc 331 is a Mannich polymer.

and day tanks located in the areas where the chemicals are used. In the case of PEA, the dilute polymer solution is transferred to two separate sets of day tanks: one set serves the dewatering centrifuges and the other serves the thickening centrifuges. In the case of $FeCl_2$, 28% 32% $FeCl_2$ is transferred to either one of two day tanks located in a chemical room adjacent to the pipe galley in Area 80 at the digesters.

Miramar Water Treatment Plant

Ferric chloride and polymer are used as coagulants at the Miramar WTP. Potassium permanganate is used to oxidize iron and manganese, reduce color and turbidity, and improve taste and odors. Sodium hydroxide (caustic) is used to adjust the effluent water pH. Chlorine and ammonia are used for disinfection. Aqua ammonia is added to react with the chlorine, forming chloramine. Chloramines are used for a disinfection residual in the distribution system (City of San Diego 2007).

The City typically maintains a 30-day supply of all critical chemicals. More chemicals are ordered when no less than 10-day supply remains. Manufacturers from throughout the United States supply the chemicals.

Aerially Deposited Lead

Pipelines constructed as part of the North City Project would primarily be located within roadway rights-of-way. Until the mid-1980s, gasoline and other fuels contained lead as an additive. Tiny particles of lead were emitted from car exhaust and settled on the soils adjacent to freeways and roads, which has resulted in a buildup of lead alongside roads. During construction in roadways (primarily within 30 feet of the edge of pavement and within the top 6 inches of soil), the California Department of Transportation has found levels of lead higher than Department of Toxic Substances Control's (DTSC's) specifications.

In 1996, DTSC granted a variance allowing road construction projects to reuse soils containing lead from motor vehicle exhaust on the project site for specific purposes. As of July 1, 2016, DTSC and the California Department of Transportation entered into a Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils that supersedes the prior aerially deposited lead variance.

Transportation of Hazardous Materials

Hazardous materials pass through the City via the freeway, rail, and surface street system. Interstate 5 (I-5), I-805, I-8, and I-15, and State Route 56 (SR-56), SR-52, SR-

94, SR-163, and SR-905 pass through the City. The BNSF Railway runs generally parallel to I-5. While train derailment can occur at any time, it is during an earthquake that a derailment and hazardous materials release would pose the greatest risk. The major automotive transportation routes through the City include the freeways previously listed, as well as dozens of major arterial roads dispersed across the City.

The City has no direct authority to regulate the transport of hazardous materials on state highways or rail lines. Transportation of hazardous materials by truck and rail is regulated by the U.S. Department of Transportation. The department's regulations establish criteria for safe handling procedures. Federal safety standards are also included in the California Administrative Code. The California Health Services Department regulates the haulers of hazardous waste.

Emergency Preparedness

Local emergency operations plans are intended to help local jurisdictions respond to emergency situations with a coordinated system of emergency service providers and facilities. San Diego recently updated its 1995 Multi-Hazard Functional Plan and modernized its Emergency Operations Center. The City would continue to make regular modifications to these in the future as hazards, threats, population and land use, or other factors change. The plan identifies resources available for emergency response and establishes coordinated action plans for specific emergency situations including earthquake, fire, major rail and roadway accidents, flooding, hazardous materials incidents, terrorism, and civil disturbances.

San Diego places a high priority on public disaster education. Citizens are provided a range of emergency management training, including Federal Emergency Management Agency Community Emergency Response Team training, emergency preparedness workshops, disaster presentations at schools, CPR, first aid training, and terrorism awareness training. The Community Emergency Response Team, organized through the San Diego Fire-Rescue Department, is comprised of volunteers who are trained to assist during times of emergency.

The response phase includes increased readiness, initial response, and extended response activities. During an emergency response, the City would generally coordinate activities through its Emergency Operations Center. County, state, and federal emergency response resources are located in San Diego and are available to assist the Emergency Operations Center if a situation demanded additional support.

The Emergency Operations Center is manned 24 hours a day by both public safety and other City personnel to coordinate emergency response activities. Recovery activities involve restoration of services and returning the affected area to pre-emergency conditions as soon as practical. Recovery activities range from restoring water and power to providing information to the public regarding state and federal disaster assistance programs. Mitigation efforts occur both before and after emergencies or disasters. Mitigation includes eliminating or reducing the likelihood of future emergencies.

5.9.2.3 Existing Hazardous Materials Sites

Phase I ESAs have been prepared by Allied Geotechnical Engineers Inc. for each of the following components of the Project Alternatives: Morena Pump Station and Pipelines; North City Pure Water Pipeline and Pump Station; and the San Vicente Reservoir Pure Water Pipeline. Although Phase I ESAs were not completed for other North City Project components, the study areas of the components for which Phase I ESAs were completed cover all of the North City Project components. The following discussion identifies reported hazardous materials sites that exist within the Project Alternatives study area. These areas were identified through a records search of federal, state, and local hazardous materials sites databases; historical records review; site reconnaissance; and interviews. A summary of the environmental records reviewed and the results of the Phase I ESA for each component are provided below.

Records Review

The records review for each component included a review of public records maintained by various federal, state, and local environmental regulatory agencies and was performed by Environmental Data Resources Inc. (EDR). Available database records were reviewed for a 2,000-foot-wide corridor along each Project Alternatives alignment for registered underground storage tanks (USTs) and Resource Conservation and Recovery Act generators; leaking USTs; landfill sites; Comprehensive Environmental Response, Compensation and Liability Information System sites; for Resource Conservation and Recovery Act treatment, storage, and disposal facilities; and for state and federal superfund sites. EDR also provided historical topographic maps, aerial photographs, and Sanborn Fire Insurance Maps for review, which were used to evaluate historical development and land usage along the Project Alternatives alignments.

Morena Pump Station and Pipelines

The EDR report listed a total of 896 sites/cases of Historic Recognized Environmental Condition (HREC) and Controlled REC (CREC) within the boundary of the Morena Pump Station and Pipelines study area. After review, the majority of sites were eliminated as they are not likely to pose a significant environmental hazard. A total of 109 REC sites/cases were identified which are considered to pose a minimal risk to the Morena Pump Station and Pipelines (see Table 1 in Allied Geotechnical Engineers Inc. 2015a for a list of site with minimal potential impact). All these sites/cases previously or currently have USTs and/or aboveground storage tanks ASTs), and documented Leaking UST (LUST) leaks/releases. Some of these sites/cases also have documented major spills, environmental site investigations, mitigations and cleanups. A total of 10 sites/cases were identified which may pose an environmental risk to the Morena Pump Station and Pipelines component. These sites/cases are listed and summarized in Table 5.9-1 below and shown on Figure 5.9-2, Miramar and San Vicente Reservoir Alternatives – Hazardous Materials Sites; additional detail regarding each site can be found in Allied Geotechnical Engineers Inc. 2015a.

Table 5.9-1
Listing of Sites within Morena Pump Station and Pipelines Study Area with High Potential Impact

EDR Map ID	Site ID	Site Name/Address	Primary Business Activity/Operation
7-31	1	University City Chevron 3860 Governor Drive San Diego, California 92122	Gasoline service station
7-31	2	Governor Drive Exxon 3918 Governor Drive San Diego, California 92122	Gasoline service station
7-31	3	Mobil 3861 Governor Drive San Diego, California 92122	Gasoline service station
10-57	4	MIC Gastation Inc. 4592 Clairemont Mesa Boulevard San Diego, California 92117	Former gasoline service station
10-60	5	Shell Oil 3901 Clairemont Drive San Diego, California 92117	Former gasoline service station

Table 5.9-1
Listing of Sites within Morena Pump Station and Pipelines Study Area with High Potential Impact

EDR Map ID	Site ID	Site Name/Address	Primary Business Activity/Operation
10-66	6	Tune Craft #2 3904 Clairemont Drive San Diego, California 92117	Former ARCO gasoline service station
13-87	10	Prestige Stations Inc., #9750 2505 Morena Boulevard San Diego, California 92110	Gasoline service station
16-110	11	Ultramar #3740 1083 Morena Boulevard San Diego, California 92110	Gasoline service station
16-120	12	Former Texaco Station 845 Morena Boulevard San Diego, California 92110	Former gasoline service station
16-120	13	Lloyd Pest Control 935 Sherman Street San Diego, California 92110	Pest control business

Source: Allied Geotechnical Engineers Inc. 2015a.
Note: Site IDs 7, 8 and 9 were removed from the analysis due to revisions to the Morena Pipelines alignment.

North City Pure Water Pipeline

The study boundary for the North City Pure Water Pipeline (North City Pipeline) Phase I ESA (Allied Geotechnical Engineers Inc. 2016) incorporates the sites of the following components in addition to the pipeline: the NCWRP, North City Pure Water Facility (NCPWF) Influent Pump Station, North City Renewable Energy Facility, NCPWF, North City Pump Station, Dechlorination Facility, Miramar WTP, and portions of the Landfill Gas Pipeline (LFG Pipeline). Therefore, the discussion below is also applicable to these components.

The EDR report listed a total of 1,134 sites/cases of HREC and CREC within the boundary of the North City Pipeline study area. After review, the majority of sites were eliminated as they are not likely to pose a significant environmental hazard. A total of 66 REC sites/cases were identified that are considered to pose a minimal risk to the alignment (see Table 1 in Allied Geotechnical Engineers Inc. 2016 for a list of sites with minimal potential impact). All these sites/cases previously or currently have UST and/or AST, and documented LUST leaks/releases. Some of

these sites/cases also have documented major spills, environmental site investigations, mitigations, and cleanups. These sites/cases are generally considered to pose minimal risk to the alignment based on the following factors: age and status of the case, unauthorized release at the site generally impact soil only, distance of the site from the pipeline alignment, direction of groundwater at the site being away from the project alignment, depth to groundwater (deeper than proposed pipe invert depth) or lack of groundwater, or other factors.

Two sites/cases were identified which may pose an environmental risk to the North City Pipeline alignment. These sites/cases are listed and summarized in Table 5.9-2 below and shown on Figure 5.9-2; additional details regarding each site can be found in Allied Geotechnical Engineers Inc. 2015a.

Table 5.9-2
Listing of Sites within the North City Pipeline
Study Area with High Potential Impact

EDR Map ID	Site ID	Site Name/Address	Primary Business Activity/Operation
12-57	15	Scripps/Miramar Car Wash Chevron 9650 Miramar Rd. San Diego, CA 92126	Car wash/gas station
12-71	16	MCAS Miramar, Site 1A-1D, 1F San Diego, CA 92145	Military installation

Source: Allied Geotechnical Engineers Inc. 2015a.

No sites/cases intersect with the sites of the following facilities: NCPWF, North City Pump Station, and the Dechlorination Facility.

North City Water Reclamation Plant, North City Pure Water Facility Influent Pump Station, and North City Renewable Energy Facility

The NCWRP was identified in Allied Geotechnical Engineers Inc. 2015b as a REC site/case that is considered to pose a minimal risk. A spill of up to 10,800 gallons of odor control make-up water occurred in November 2005 due to clogged drain line. The spill discharged to an on-site storm drain. The NCWRP has also had several minor sewage spills typically of several gallons or less, and a spill of 117 gallons of sodium hypochlorite on August 15, 2008. These spills were contained and cleaned by City personnel. On October 12, 2010, a recycled water spill of 1.4 million gallons

occurred at the intersection of Black Mountain Road and Carmel Valley Road. An AST is maintained on the site; no documented leaks have occurred.

Miramar Water Treatment Plant

The Miramar WTP began operation in 1962 and was identified in Allied Geotechnical Engineers Inc. 2016 as a REC site/case that is considered to pose a minimal risk to the alignment. Four USTs were removed prior to 2002. Department of Environmental Health (DEH) case no. H21026-001 was closed in 2003. Impacts were to soil only. AGE (2014) performed a total of 14 soil borings and installed 7 groundwater monitoring wells in 2013 and 2014. No indications of contaminated soil and groundwater were observed during the investigation (Allied Geotechnical Engineers Inc. 2016).

San Vicente Pure Water Pipeline

The study boundary for the San Vicente Pure Water Pipeline (San Vicente Pipeline) Phase I ESA (Allied Geotechnical Engineers Inc. 2015b) overlaps the sites of the following components in addition to the pipeline: the NCWRP, NCPWF Influent Pump Station, North City Renewable Energy Facility, Metro Biosolids Center, and the LFG Pipeline. Therefore, the discussion below is also applicable to these components.

The EDR report listed a total of 323 sites/cases of HREC and CREC within the boundary of the San Vicente Pipeline study area. After review, the majority of sites were eliminated as they were either duplicate listings or are not likely to pose a significant environmental hazard. A total of 96 REC sites/cases were identified which are considered to pose a minimal risk to the alignment (see Table 1 in Allied Geotechnical Engineers Inc. 2015b for a list of sites with minimal potential impact). All these sites/cases previously or currently have UST and/or AST, and documented LUST leaks/releases. Some of these sites/cases also have documented major spills, environmental site investigations, mitigations, and cleanups. These sites/cases are generally considered to pose minimal risk to the alignment based on the following factors: age and status of the case, unauthorized release at the site generally impact soil only, distance of the site from the project alignment, direction of groundwater at the site being away from the project alignment, depth to groundwater (deeper than proposed pipe invert depth) or lack of groundwater, or other factors.

Thirteen sites/cases were identified which may pose an environmental risk to the San Vicente Pipeline alignment. These sites/cases are listed and summarized in Table 5.9-3 below and shown on Figure 5.9-2; additional details regarding each site can be found in Allied Geotechnical Engineers Inc. 2015b.

Table 5.9-3
Listing of Sites within the San Vicente Pipeline Study Area with High Potential Impact

EDR Map ID	Site ID	Site Name/Address	Primary Business Activity/Operation
10-18	17	MCAS Miramar	Military base
13-79	18	7-11 Store #20321866 9750 Cuyamaca Street Santee, CA 92071	Gasoline station and convenience store
7-37	19	Circle K Corp #2981 12320 Willow Road Lakeside, CA 92040	Gasoline station and convenience store
13-83	20	Circle K/Tosco 10219 Mast Boulevard Santee, CA 92071	Gasoline station and convenience store
13-87	21	Mobil 9750 Magnolia Avenue Santee, CA 92071	Gasoline station
14-60	22	7-Eleven Store #26651 10195 Riverford Road Lakeside, CA 92040	Gasoline station and convenience store
15-59	23	7-Eleven #13666 11610 Riverside Drive Lakeside, CA 92040	Gasoline station and conveyance store
18-141	24	South Miramar Landfill Kearny Mesa – sections 25/26 San Diego, CA 92111	Sanitary landfill
18-141	25	West Miramar Landfill 5180 Convoy Street San Diego, CA 92111	Sanitary landfill
23-113	26	7-Eleven Food Store #13661 9251 Carlton Hills Boulevard Santee, CA 92071	Convenience store and gasoline station
23-115	27	Padre Dam Municipal Water District 9120 Carlton Oaks Drive Santee, CA 92071	Water district
28-223	28	Mobil 10496 Clairemont Mesa Boulevard San Diego, CA 92124	Gasoline station
28-272	29	Camp Elliot – J09CA0067 Northern Portion of San Diego County San Diego, CA 92103	Former military base

Source: Allied Geotechnical Engineers Inc. 2015b.

Landfill Gas Pipeline

The North City Pipeline Phase I ESA study area and San Vicente Pipeline Phase I ESA study area both encompass MCAS Miramar. The LFG Pipeline alignment primarily extends through open space and the Miramar National Cemetery within the naval base and the compressor station is located along the northern boundary of Miramar Landfill. Allied Geotechnical Engineers Inc. 2016 identified eight REC sites/cases on MCAS Miramar. All eight sites are considered to pose a minimal risk to the alignment based on the following factors: age and status of the case, unauthorized release at the site generally impacts soil only, distance of the site from the project alignment, direction of groundwater at the site being away from the project alignment, depth to groundwater (deeper than proposed pipe invert depth) or lack of groundwater, or other factors (see Table 1 in Allied Geotechnical Engineers Inc. 2016 for more detail). One REC site/case on MCAS Miramar was identified as potentially posing an environmental risk, as detailed above in Table 5.9-2 (see Figure 5.9-2 – Figure ID 16). However, this site does not intersect with the LFG Pipeline alignment.

During the Phase I ESA for the San Vicente Pipeline, both the Geotracker website and other databases were reviewed, and no active or closed cases were identified within 1,000 feet of the LFG Pipeline alignment (Allied Geotechnical Engineers Inc. 2015b).

The LFG Pipeline alignment and associated compressor station would border the northern boundary of the West Miramar Landfill, which was identified as a hazardous materials site (see Table 5.9-2 and Figure 5.9-2 – Site ID 25).

MCAS Miramar Environmental Restoration Program

The MCAS Miramar Environmental Restoration Program is comprised of two components, the Installation Restoration (IR) Program and Munitions Response Program (MRP). The IR Program identifies, investigates, and cleans up or controls hazardous substances releases from past waste disposal operations and spills at Marine Corps installations. The MRP investigates and cleans up munitions and explosives of concern (MEC) and munitions constituents used or released on MCAS Miramar from past operations and activities. MEC includes unexploded ordnance (UXO), discarded military munitions, and munitions constituents that present an explosive hazard. MEC at MCAS Miramar was the result of munitions debris from training exercises by various military entities during their historical tenure on the installation.

As shown on Figure 5.9-3, MCAS Miramar Installation Restoration Program and Munitions Response Program Sites, an active IR site is located adjacent to the North City Pipeline near the intersection of Miramar Road and Dowdy Drive. A closed MRP site is also located just west of the IR site, adjacent to the North City Pipeline.

An active IR site is located a few hundred feet to the east of the LFG Pipeline alignment (see Figure 5.9-3), but does not intersect the alignment.

A closed IR site which covers the Miramar Landfill is located just north of the San Vicente Pipeline along Copley Park Place (Figure 5.9-3).

No other Project components are located within the vicinity of an active or closed IR or MRP site.

Formerly Used Defense Site – Camp Matthews

The University of California, San Diego (UCSD) (Camp Matthews) Formerly Used Defense Site is located in La Jolla, California, approximately 12 miles north of downtown San Diego.

From 1918 to 1964, Camp Matthews was used by the U. S. Marine Corps as a gunnery range. In 1918, the Marine Corps leased land in San Diego County to build a single, eight-target, 600-yard rifle range. By 1919, the Marine Corps was using the land for a campsite, parade ground, and field instruction. Between 1924 and 1949, Camp Matthews expanded to include 15 active gunnery ranges and various support buildings. Training activities included instruction in the firing and use of small arms, rifles, machine guns, mortars, rockets and hand grenades.

In 1945, a Navy ammunition truck from Fall Brook Naval Ammunition Depot caught fire outside the gates of Camp Matthews. As the fire increased in intensity, the ammunition began to explode, causing damage to housing at Camp Matthews, Camp Callan and La Jolla.

In 1962, Congress directed the Navy to convey the Camp Matthews property to UCSD. The last shots were fired at Camp Matthews in August 1964.

Today, the U.S. Army Corps of Engineers is investigating an area of the former camp, known as Range Complex No. 1 (see Figure 5.9-4, Formerly Used Defense Site – Camp Matthews, Range Complex No. 1). The former range consists 5,056 acres. UCSD currently owns a portion of the former range and has developed the

area with educational and research facilities, residential housing, athletic fields, the UCSD School of Medicine and Medical Center, Science Research Park, Mesa Housing, Eleanor Roosevelt College, the Chancellor's Complex and parking. The remaining land has been developed for residential and commercial purposes.

The U.S. Army Corps of Engineers began investigating the former UCSD (Camp Matthews) in 1988 through the Formerly Used Defense Site Program. Subsequent investigations have identified MEC and munitions debris on Range Complex No. 1. Based on these findings and historical information, the U.S. Army Corps of Engineers is conducting a Remedial Investigation and Feasibility Study on Range Complex No. 1 (ACOE n.d.).

5.9.2.4 Aircraft Hazards

Hazards associated with airports can have serious human safety and quality of life impacts. Aviation facilities provide a variety of aviation services to local residents, including civil aviation, government use, business flights, charter flights, flight schools, and helicopter operations. Airport Land Use Compatibility Plans (ALUCPs) are plans that guide property owners and local jurisdictions in determining what types of proposed new land uses are appropriate around airports. Airport safety zones are established for all public airports as part of ALUCPs, and land-use restrictions within safety zones are established to protect people and property on the ground and in the air. Main areas of concern related to airport hazards include over-flight safety, airspace protection, flight patterns, and land-use compatibility.

Airports within the vicinity of the North City Project area include the MCAS Miramar, Montgomery Field Municipal Airport, San Diego International Airport (SDIA), and Gillespie Field Municipal Airport.

MCAS Miramar provides aviation and other facilities and services in support of various Marine Corps and Navy operating units. Established as a military base in 1917 and an airfield during World War II, the base has undergone several changes in command among the Army (briefly), then the Navy and Marine Corps. MCAS Miramar and its facilities have expanded over time as well. Today it encompasses a 36-square-mile area situated within the northern part of the City of San Diego. MCAS Miramar is located north of Kearny Mesa and south of Mira Mesa and straddles I-15. The freeway divides the base into two functionally distinct areas. The airfield and related aviation and industrial facilities occupy the western portion, while the eastern side is largely open land used for various training