



Infrastructure Discussion

Public Utilities and Public Works Departments

City Council
July 11, 2017

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Importance of Infrastructure

1. Provides critical & essential services to the community
2. Investment in infrastructure should be strategic & include innovation & technology to make it more resilient & economical when possible
3. Investment in infrastructure spurs economic development, supports high customer service levels, ensures public safety, maintains or enhances property values & sustains a Community's quality of life



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Presentation Agenda

- 1.Video - American Society of Civil Engineers (ASCE) 2017 Infrastructure Report card
- 2.Infrastructure outlook, Mr. Lawrence Pierce ASCE
- 3.Public Utilities and Public Works Infrastructure Discussion



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Video - American Society of Civil Engineers 2017 Infrastructure Report Card



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Infrastructure Outlook from Mr. Pierce American Society of Civil Engineers (ASCE)



Lawrence D. Pierce, P.E., M.ASCE
La Mesa, CA



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Infrastructure Outlook - ASCE

Report Card Methodology

CAPACITY

OPERATION AND
MAINTENANCE

CONDITION

PUBLIC SAFETY

FUNDING

RESILIENCE

FUTURE NEED

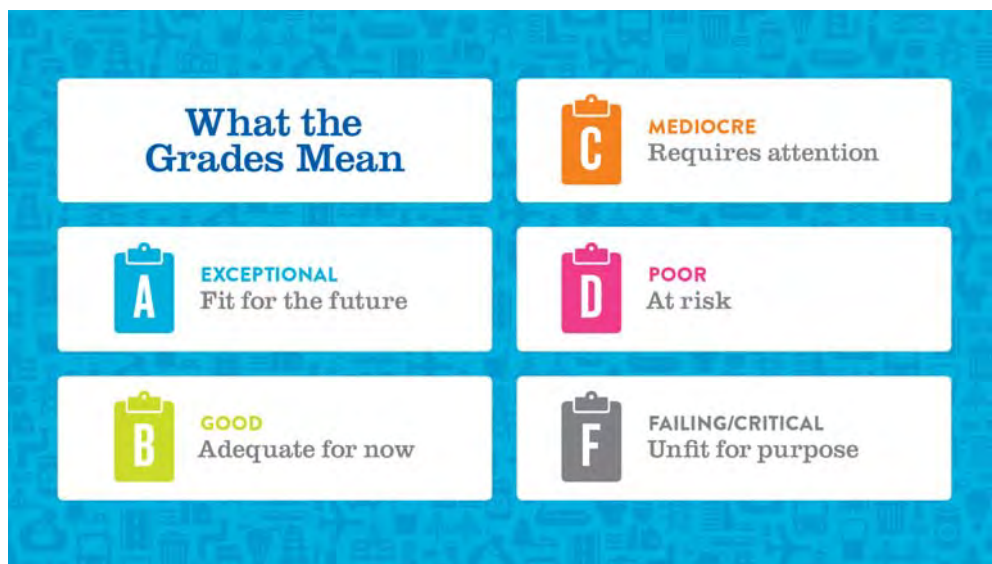
INNOVATION



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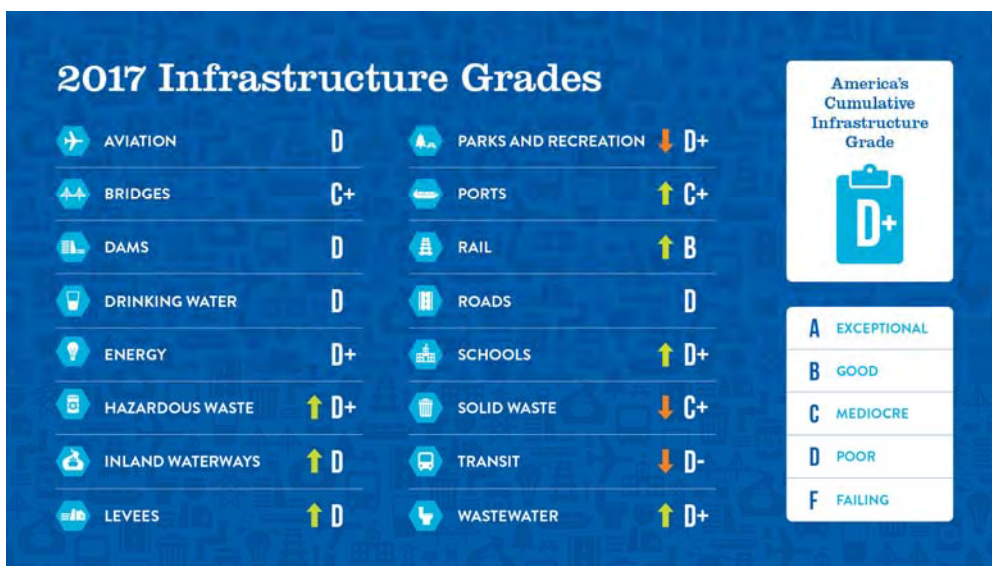
Infrastructure Outlook - ASCE



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Infrastructure Outlook - ASCE



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Infrastructure Outlook - ASCE



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Infrastructure Outlook - ASCE



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Public Utilities and Public Works Infrastructure

1. Used ASCE infrastructure report framework to assess City wastewater, water, electricity, roads & storm water
2. Goal - to provide information on the status & future outlook
3. Anticipate completing a joint assessment ahead of five -year planning & two-year budget cycle
4. Managed by the Water, Sewer and Electric Enterprise Funds (non-general fund), along with various funds for the Storm Water System

ASCE Grading Scale

A	Exceptional – Fit for the future
B	Good – Adequate for Now
C	Mediocre – Requires Attention
D	Poor – At risk
F	Failing/Critical – Unfit for purpose

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Water Quality Control Plant – Key Facts

1. Service population 320,000, plus three Community Service Districts
2. About 93,000 customers
3. RWQCP treatment capacity of 46 MGD
4. Strict Regulatory requirements increasing expectations & standards
5. Wastewater services provided by staff of 120
6. RWQCP operation staffed 24/7/365



First Plant 1947 - 6 MGD capacity ¹²



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Water Quality Control Plant – Infrastructure Grade B

1. Phase 1 construction complete summer 2017 (\$192M)
2. Infrastructure investment over next ten years \$288M (2008 Wastewater Master Plan)
3. Strategic Objectives - Sustainability & Resource Recovery
 - a. Update 2008 Wastewater Master Plan
 - b. Operation & Maintenance efficiency
 - c. Technology integration
 - d. Water, Biogas and Biosolids reuse



Jan 2017 Phase 1 construction in progress

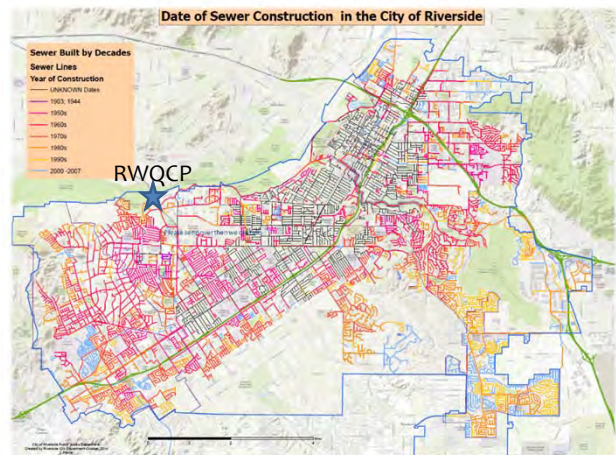


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Wastewater Collection Pipelines– Key Facts

1. 820 miles of City sewer mains
 - 50% of pipelines were installed before 1965
2. 415 miles of City sewer lateral - residential property line to City main line (2009 City policy change)
3. Strict Regulatory requirements on system O&M and capital projects
 - 107 sewer spills last 6 years
4. Wastewater Collection Services provided by staff of 19
5. 24/7/365 - 311 service call response

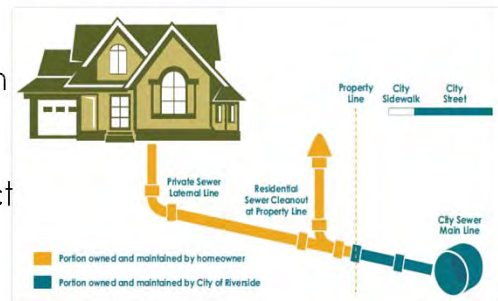


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Wastewater Collection Pipelines – Infrastructure Grade

1. Last 5 years \$36M in collection pipeline investment for repair & replacement
2. Infrastructure investment over next 10 years \$205M (2008 Wastewater Master plan)
3. Currently no funded CIP for City laterals
4. Strategic Objectives - Sustainability & Elimination of Sanitary Sewer Spills
 - a. Update 2008 Wastewater Master Plan
 - b. Replace or rehabilitate collection pipelines
 - c. Develop proactive City lateral inspect repair & capital improvement plan
 - d. Review City sewer lateral and claim policies



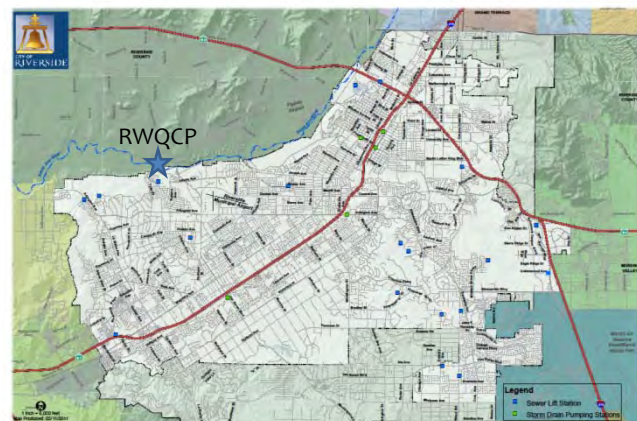
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Wastewater Pump Stations – Key Facts

1. 19 Wastewater Pump Stations
2. Designed to pump wastewater to the Regional Water Quality Control Plant 24/7/365
3. Strict Regulatory requirements on system O&M and capital projects
 - 3 large sewer spills last 6 years
4. Pump station services provided by staff of 19
5. 24/7/365 - 311 service call response



19 Wastewater Pump Stations (blue dots)

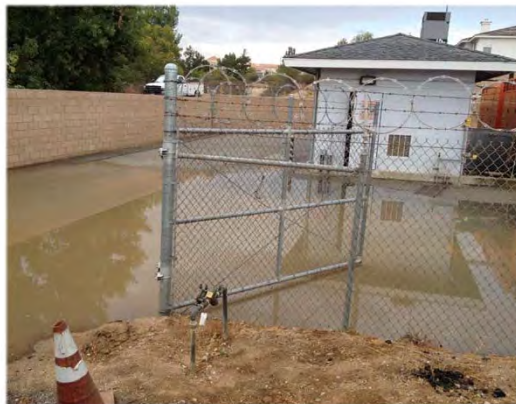
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Wastewater Pump Stations – Infrastructure Grade C

1. Last 5 years \$1.9M in wastewater pump station
2. Of the 19 pump stations, 10 are in need of replacement or rehabilitation
3. Infrastructure investment over next ten years \$30M (2008 Wastewater Master plan)
4. Strategic Objectives - Sustainability & Elimination of Sanitary Sewer Spills
 - a. Update 2008 Wastewater Master Plan
 - b. Operation & Maintenance efficiency
 - c. Replace or rehabilitate pump stations



Sewer pump station failure and sewer spill



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City Roads – Key Facts

1. Total miles
 - a. Arterial Streets = 124.4 Miles
 - b. Minor Streets = 716.1 Miles
 - c. Alleys = 31.5 Miles
2. \$7.5 M spent on paving FY 16/17
3. New SB 1 and Measure Z funding
4. Total projected average of \$14.8M per year thru FY 20/21

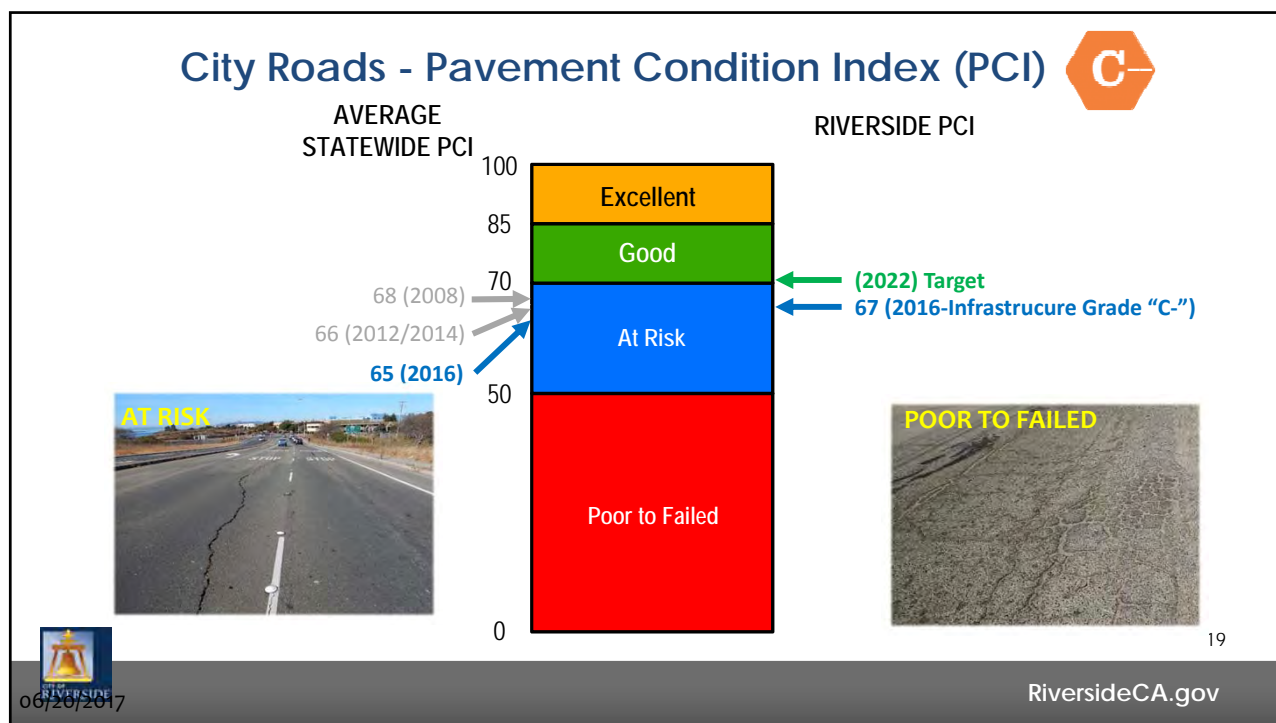


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Storm Water System and Urban Runoff – Grade



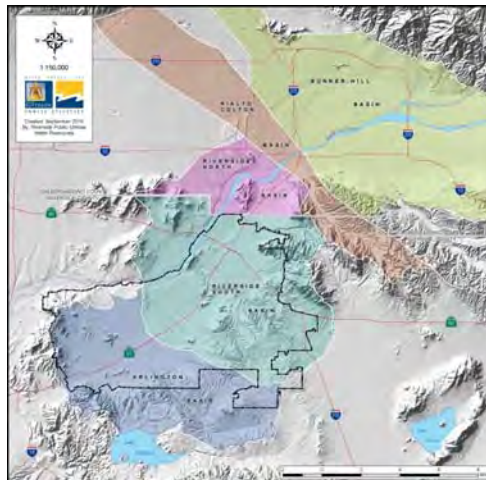
1. Maintenance of 190 miles of City storm drain lines & 5,000 storm drain inlets
2. Partner in regional efforts
 - a. MS4 Permit
 - b. Middle Santa Ana River TMDL
 - c. Lake Elsinore/Canyon Lake TMDL
3. Stormwater Trash Policy
 - a. Install trash capture devices into storm drain inlets in priority land uses
 - b. 10 year implementation (10% trash reduction per year)

 06/20/2017

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Water Supply and Treatment – Key Facts

1. Groundwater: 86,000 AFY supply
 - Seven Oaks Dam recharge
2. Six Water Treatment Plants
 - JW North WTP
 - Lockheed Martin and Shell



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Water Supply and Treatment – Infrastructure Grade

B

1. Water Supply – “B+”
 - \$9.5M for Recycled Water, Phase 1A
2. Water Treatment Plant – “B-”
 - \$1M for JW North membranes



Outlook:

Needs: \$16M for recycled water,
\$14M for new treatment plant,
\$74M for storm water capture

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Water Transmission Pipelines – Key Facts

1. System “Arteries” (16-72”)
 - Good condition
2. 34 miles of Supply Transmission
 - Good condition
3. 98 miles of distribution pipeline
 - 4 miles of Techite material
 - Generally undersized
4. Invested \$35M (Safe W.A.T.E.R.)



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Water Transmission Pipelines – Infrastructure Grade



1. Supply Transmission – “B”
 - No projects scheduled
2. Distribution Transmission – “D”
 - \$5M for next 5 years

Outlook:

Needs: \$31M to replace “techite” pipe, \$25M for three other projects



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Water Distribution Pipelines – Key Facts

1. System “capillaries” (6-8 inches)
 - 822 Miles
2. 270 Miles of Cast Iron pipeline
 - Post WW II – short life span
3. Invested \$63M (Safe W.A.T.E.R.)



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Water Distribution Pipelines – Infrastructure Grade



1. Pipeline “Tsunami”
 - Cast Iron Pipeline
2. \$31M for next 10 years



Outlook:

Needs: \$99M to replace 75 miles of pipeline



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Water Facilities – Key Facts

1. 50 Domestic Wells
2. 60 Pressure Stations
3. 16 Reservoirs
4. Invested \$110M (Safe W.A.T.E.R.)



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Water Facilities – Infrastructure Grade



\$19M to maintain facilities



Outlook:

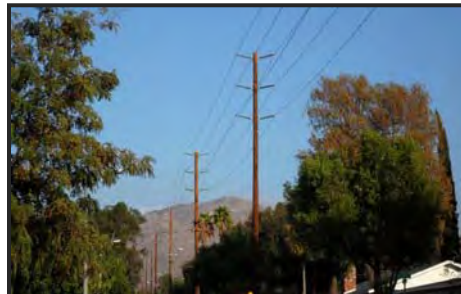
- Water facilities have a shorter life span and a continuous investment is necessary



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Electric Grid Reliability – Key Facts

1. 91 miles of subtransmission circuits fed from single source – Southern California Edison's Vista Substation (in Grand Terrace)
2. Single source connection at Vista provides maximum 557 megawatts of energy to Riverside
3. Peak demand is more than 600 megawatts today, and it's forecasted to be higher in the future
4. Peak load (in excess of Vista capacity) is met by using internal gas generation



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Electric Grid Reliability – Infrastructure Grade

F

1. Proposed RTRP Project connects second 230/69kV transmission source to Riverside
2. SCE applied for California Public Utilities Commission approval & expects final decision in late 2018
3. Portions of RTRP within Riverside city limits have been constructed & are currently being constructed to benefit internal capacity deficiencies & reduce system losses
4. Projected **A** Grade upon completion of RTRP project.



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Electric Substations – Key Facts

1. 14 substations (or power centers)
2. 65 substation transformers
3. 92 substation high voltage breakers (69KV)
4. Systematic inspection & test schedule to determine priorities for maintenance & replacement of electric facilities
5. 24/7/365 Dispatch & Troubleshooter coverage



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Electric Substations – Infrastructure Grade



1. On-going infrastructure replacement/rebuild/modernization program (Utility 2.0, Option 1):
 - a. \$42M over next 10 years
 - b. Installation/replacement of 5 substation transformers & switchgears
 - c. Replacement/modernization of 45 high voltage breakers (69KV) & 375 substation relays
2. Strategic Objectives – Reliability, modernization, capacity availability
 - a. O&M efficiency
 - b. Technology/automation integration
 - c. Substation capacity consistent with service area load densities
- a. Elimination of 69-4kV substation infrastructure



Substation 69-12kV Power Transformer



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Electric Overhead System – Key Facts

1. Approximately 513 miles of overhead distribution lines
2. Around 22,000 poles, additional switches & overhead devices
3. Ongoing, systematic intrusive inspections to determine priorities for maintenance & replacement of electric facilities
4. 24/7/365 Dispatch & Troubleshooter coverage



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Electric Overhead System – Infrastructure Grade



1. On-going infrastructure replacement/rebuild/modernization program (Utility 2.0, Option 1):
 - a. \$72M over the next 10 years
 - b. Conversion of remaining overhead 4kV delivery system to 12kV
 - c. Replacement of 2,000 wood poles
 - d. Replacement/modernization of 300 overhead switches/devices
2. Strategic Objectives – Reliability, modernization, capacity availability
 - a. Efficient operation & maintenance
 - b. Technology/automation integration
 - c. Elimination of 4kV overhead delivery systems



Wood Pole Replacement

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Electric Underground System – Key Facts

1. Approximately 817 miles of underground distribution cable
2. Approximately 13,000 underground structures, switches & devices
3. Ongoing, systematic intrusive inspections to determine priorities for maintenance & replacement of electric facilities
4. Underground electric distribution construction is standard for all new installations
5. 24/7/365 Dispatch & Troubleshooter coverage



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Electric Underground System – Infrastructure Grade

1. On-going infrastructure replacement/ rebuild/ modernization program (Utility 2.0, Option 1):
 - a. \$95M over next 10 years
 - b. Conversion of remaining underground 4kV delivery system to 12kV
 - c. Replacement of 54 miles of old cable & 170 underground structures
 - d. Replacement/modernization of 100 underground switches/devices
2. Strategic Objectives – Reliability, modernization, capacity availability
 - a. Efficient operation & maintenance
 - b. Technology/automation integration
 - c. Elimination of remaining 4kV underground delivery systems & antiquated underground cable systems & oil insulated switches



Replacement of antiquated underground cable & devices

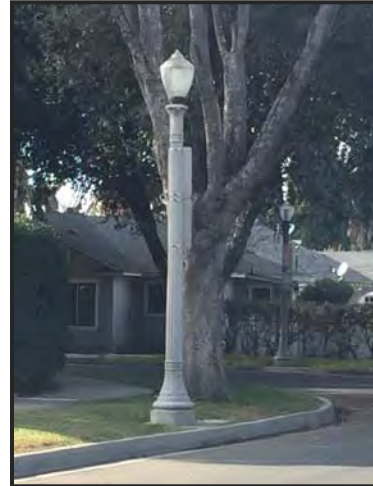


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Street Lights – Key Facts

1. Street light system consists of 6,500 mast arm lights & 24,000 ornamental standards
2. Public Works Department operates safety lights at intersections throughout the city consisting of over 1,500 luminaires very similar to street lighting
3. Current type of street light lamps are predominantly high pressure sodium (HPS)




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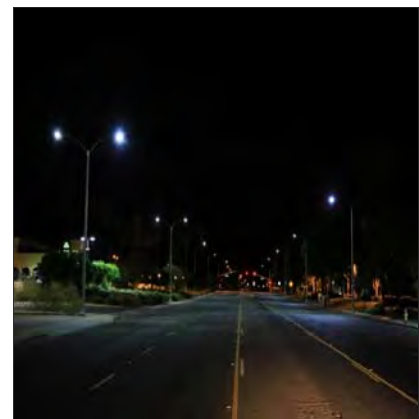


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Street Lights – Infrastructure Grade



1. Current LED street light conversion project will convert all HPS lamps to more efficient light emitting diode (LED) lamps
2. Service life following LED conversion will increase from 7 years to 20 years
3. \$15M LED conversion project projected to be completed in 2019
4. Projected Grade of  upon completion of LED conversion project
5. Additional areas require wholesale replacement & rebuilding of aged streetlight system



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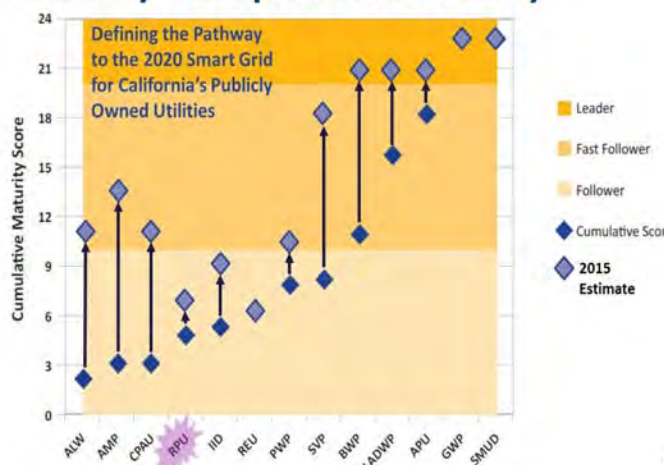


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Advanced Technology – Key Facts

1. Riverside Public Utilities has historically been a “technology follower”
2. Electric & water utilities have had to become more flexible & agile due to constantly changing regulatory requirements, state and federal energy policies, economic conditions, & RPU is no exception
3. The strategic technology roadmap is structured to provide a flexible approach to achieving RPU’s technology vision

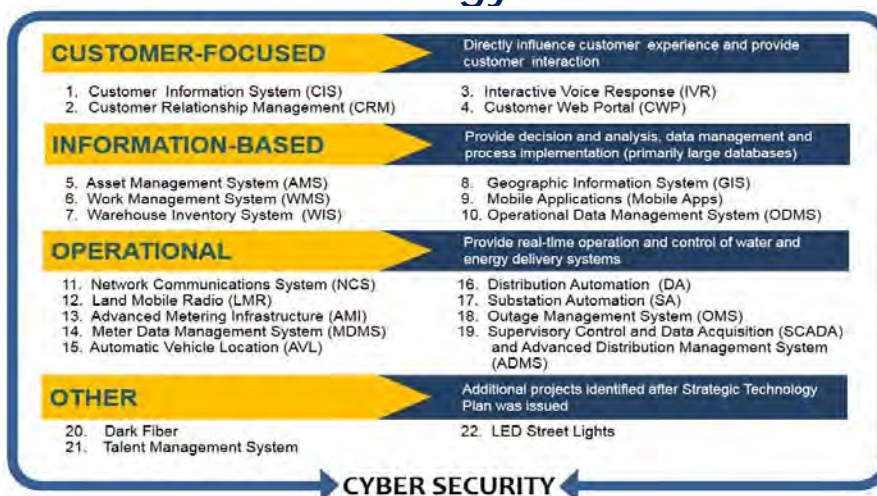
Maturity Compared to Industry



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Advanced Technology – Infrastructure



Projected Grade of **B** upon completion of identified projects.



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Infrastructure Summary

1. Infrastructure provides critical & essential services to Riverside
2. Investment in Riverside's infrastructure should be strategic & include innovation & technology to make infrastructure more resilient & economical when possible
3. Investment in Riverside's infrastructure spurs economic development, supports high customer service levels, ensures public safety, maintains or enhances property values & sustains a Community's quality of life



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Infrastructure Summary Cont.

4. Riverside's infrastructure condition ranges from grade of B to F
5. Financial & strategic goal is to raise infrastructure grades to a B across the board
6. Challenge is to balance infrastructure investment requirements & customer service rates (Water, Sewer and Electric Enterprise Funds)



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Recommendations

That the City Council receive and file the Public Utilities and Public Works infrastructure report.



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