



# 2016 The State of Orange County's Infrastructure



A Citizen's Guide

# A Message From ASCE

“The publicly owned infrastructure in Orange County is a key component of our quality of life. Our expectations for the best infrastructure, makes Orange County one of the most desired places to live. By taking an active interest in maintaining and improving infrastructure we insure the continued stewardship of this legacy for all current and future residents.”

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# Message from ASCE and UC Irvine CEE Affiliates

Dear Friend:

Orange County in some respects is a microcosm of our nation. We are a culturally diverse, and rapidly growing county which are getting close to being totally developed and built out. As such, our infrastructure is beginning to show its age especially in the northern and central portion of the County. Additionally, Orange County is still recovering from the recession and therefore needs to plan all of its infrastructure investments very carefully. Six years ago, through the efforts of the UC Irvine CEE Affiliates and ASCE, Orange County became the first County in California to release its third comprehensive Infrastructure Report Card. A lot has happened since 2010 and this year we are grateful for the opportunity to be able to provide you with our fourth comprehensive update of Orange County's infrastructure status and where we are post-recession. Last March, we started the process of reviewing and updating the work that was done on the 2010 Orange County Infrastructure Report Card. We were fortunate to be able to gather a lot of the same dedicated individuals whom had worked on the previous Report Card efforts as well as adding new members that brought a fresh and insightful perspective to the task. The result of their hard work and dedication is the new and updated 2016 edition which was released on July 21, 2016. Our work, however, is not done. Developing the report card was the first step in highlighting the importance of infrastructure maintenance. And as you will see in this report the grades are not all good. Much work needs to be done on the local and county-wide level to improve the grades. According to the report by the A. Gary Anderson Center for Economic Research at Chapman University, Orange County will add nearly 41,000 jobs in 2016, or a growth rate of 2.7%. Over the next 20 years, Orange County is expecting its continued growth. The Orange County Business Council estimates approximately 300,000 additional residents and about 250,000 new jobs will be added to the County. Orange County is also transitioning from a suburban county to an urban county. With a population of over 3.1 million people (2016 Estimate), Orange County is the third most populous county in the state of California and the sixth most populous in the United States, which makes it one of the most sought after places to work and live in the world. In the meantime our task is to educate our public on the importance of infrastructure maintenance, encourage our colleagues in the public sector to continue the fight for infrastructure funding and maintenance, and to actively communicate to our elected officials the important role that infrastructure maintenance plays in our everyday lives.

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# Introduction

It has been six years since the last release of the Orange County Infrastructure Report Card. We have experienced a lot of things since then including going from one of the worst recessions in our nation's history to a recovery, that has been slower than what we would like to see, but seems to have picked up some steam over the past year. So how did our infrastructure do during this period? Did we do better, worse, or stay about the same. Well, that is the question that the joint ASCE/UC Irvine Civil and Environmental Engineering Affiliates group of volunteers examined over the past year and the result is the 2016 Orange County Infrastructure Report Card.

Orange County's grades are slightly better than the nation as a whole. The National grade is a "D+." Orange County received an overall grade of "C+." This grade is understandable since our infrastructure is younger than the average in the nation. Even so, we see elements of our infrastructure in the older parts of the County, operating past the design life and needing upgrading or replacement. In South County, infrastructure elements are 50 plus years old, and will soon need significant upgrading. It is essential that we respond now to prevent an Orange County infrastructure meltdown.

In addition to infrastructure within County boundaries, we must also be active in improving the regional infrastructure systems that impact our County's quality of life. The most important of these are the implementation of high speed rail systems and expansion of the power generation and distribution to serve Orange County's population by the year 2025. Now is the time to protect our past investments and to plan for our infrastructure future. This guide will help us identify the most pressing needs facing the county's infrastructure systems. We invite you to join a growing list of concerned citizens making the case for renewing Orange County. Additionally, Orange County's annual investment price tag is now over \$3 B per year, over the next 10 years, and this estimate does not include the needed investment for Electric Power or Natural Gas.

While that price tag remains high and keeps increasing, there is some good news to report. First, we have slowly, but surely climbed our way out of one of the worst economic depression in recorded history. According to the California's Legislative Analyst's Office (LAO) "The state budget is better prepared for an economic downturn than it has been at any point in decades." LAO also projected that in this fiscal year the personal income tax will exceed previous year's budget assumptions by \$3.6 billion.

California Proposition 1, the Water Bond, was on the November 4, 2014 ballot in California and was approved by the voters. Proposition 1 authorized \$7.12 billion in general obligation bonds for state water supply infrastructure projects, such as public water system improvements, surface and groundwater storage, drinking water protection, water recycling and advanced water treatment technology, water supply management and conveyance, wastewater treatment, drought relief, emergency water supplies, and ecosystem and watershed protection and restoration.

We are continuing to see job growth rate increases here in Orange County. Cities, and other municipal agencies are finally shifting from “Maintenance” mode to “Rehabilitation and Renewal” mode. However, we are playing a catch up game and do need several much needed funding infusion to keep us in the game.

With over 3.1 million residents, Orange County is the third most populous county in the state behind Los Angeles County and San Diego County. Our 3.1 million Orange County residents rely upon these infrastructure systems every day, and their dependability and quality are silent, but significant contributors to our economic prosperity and quality of life.

A well-designed and maintained infrastructure anchors our economy and lifestyles and secures the public health and well-being. Investment in infrastructure is vital to our state’s productivity, competitiveness, and economic well-being. Congestion on our highways alone costs the United States an estimated \$100 billion a year. Communities with efficient road systems, good schools, and sewers can better attract residents and businesses. With updated water treatment plants, we can trust our tap water is safe. When traffic flows, goods and services move to market faster and more efficiently, lowering the cost to consumers. Modern school buildings provide a secure and healthy environment where our children can concentrate on learning. Efficient waste management programs reduce waste volume, and dispose of and contain waste effectively.

In the meantime our task is to educate our public on the importance of infrastructure renewal, encourage our colleagues in the public sector to continue the fight for infrastructure funding and to actively communicate to our elected officials the important role that infrastructure maintenance plays in our everyday lives.

### *Grading Our Public Infrastructure*

During 2015 and early 2016, 12 working committees of infrastructure experts employed by public agencies, consulting firms and watchdog groups assembled data and drafted reports on 12 infrastructure categories. The condition, capacity and performance, and resiliency of these 12, now and in the future were evaluated and assigned grades. Independent review committees read over the reports of the working committees, made comments and editorial changes and adjusted the grades if so warranted. The results for the 2016 grades are shown here:

<b>ASCE Report Card 2016</b> <b>www.ascecard.org</b>	
Aviation	A-
Electric Power	C-
Flood Control And Levees	C-
Ground Transportation	C
Natural Gas	B-
Oil	B-
Parks, Recreation, and Environment	C+
School Facilities	C
Solid Waste	B
Surface Water Quality	D+
Wastewater	B
Water Supply	B
<b>OC's Infrastructure GPA</b>	<b>C+</b>

# Who Pays for Infrastructure?

Our public works are public assets. We all have a stake in their upkeep and operation, and we all share in the expense of construction and maintenance. Sometimes, infrastructure is paid for by those who actually use it most, through tolls, utility bills, or special taxes on gas, airline tickets, and other items. But because infrastructure improvements affect us all by supporting our economy and providing fundamental community services, a portion of the cost is usually borne by the public through general tax revenues. For years, the federal government has played a large role in collecting and distributing funds for infrastructure improvements. Increasingly, however, this responsibility is being turned over to state and local governments, who may finance infrastructure projects through bonds, sales taxes, or general tax revenues. This places responsibility for infrastructure renewal and development squarely with individual voters, who must approve bond issues and elect political leaders who will make addressing our infrastructure needs a priority.

## *Renewing Orange County*

Orange County is a relatively young region and enjoys the benefits of relatively new water, sewer, and transportation systems. Yet, even comparatively new infrastructure systems require continuous care, maintenance, and ongoing improvement. We rely upon these systems every day and their dependability and quality are silent, but significant contributors to our economic prosperity and quality of life. The Infrastructure Report Card and Citizen's Guide is designed first to engage Orange County's community leaders and then the citizenry at large in a call to action for continued, strong investment in our county's infrastructure. Never in our county's brief history has this been more important: Orange County stands poised on the brink of tremendous growth.

## *Understanding Infrastructure Issues*

Now that you have seen Orange County's infrastructure report card, you may be asking how you can help improve our County's and cities' infrastructure. Our suggestions are the same as given in the ASCE National Report Card: Infrastructure is a complex network of public works, which includes roads, bridges, airports, dams, school facilities, and utilities. The rules governing its planning, financing, construction, and upkeep are equally complex. Whether your goal is to shorten your daily commute, attract new business to your community, or protect the environment for your children, gaining a better understanding of these issues is the first step toward becoming an advocate for infrastructure renewal in your community. As you read through this Citizen's Guide, think about the following:

## **Be an informed citizen.**

In order to educate public officials about infrastructure needs in your community, you must understand what those needs are. Consider the Infrastructure Report Card. How does your community measure up?

## **Demand continuous and timely maintenance.**

If transportation, water, and other infrastructure facilities are not kept in sound condition, they cannot support the level of service they are designed to handle. Regular maintenance prolongs use and minimizes the need for costly repairs. The money saved can be used to fund other community priorities. Unfortunately, policies often encourage new construction at the expense of maintenance.

## **Think long-term.**

Renewing America's infrastructure is an ambitious goal. It cannot be achieved overnight. Furthermore, the roads, bridges, water treatment plants, and other facilities built today must serve for decades to come. Comprehensive planning and long-term investment are key to sound decisions about infrastructure.

## **Consider all the factors influencing infrastructure decisions.**

Building a new highway has implications beyond the immediate highway corridor. For example, concern that a new highway may displace wetlands must be balanced against the reduction in air pollution that will result from decreased traffic congestion.

## **Do more with less.**

Clearly, money alone will not solve our infrastructure problems. Solutions to urban problems such as traffic congestion and contaminated water require new technologies and approaches. Research can help identify more efficient designs and longer lasting, maintenance free materials. And, we can change our behavior-through recycling, telecommuting, or using mass transit, for example-to reduce the demand on our infrastructure.

## **Preserve the environment.**

To use the nation's resources most effectively, we must balance environmental and economic goals. Land use and transportation patterns designed to foster economic growth and personal mobility can be developed in harmony with environmental benefits.

## **Look at the big picture.**

Remember that beyond the immediate, individual benefits you gain from infrastructure improvements, there are broader community benefits. For example, even though you may not use the new mass transit system, its construction will reduce traffic congestion on local roads and increase nearby property values.



# What You Can Do

This Guide offers continuing evidence that Orange County's public works challenges are enormous and complex, and will not solve themselves. It is now up to you, the concerned citizen, who understands the economic and environmental benefits of a healthy infrastructure, to push for action.

We have reviewed what has happened and is happening in Orange County. Here are some steps you can take to do your part in renewing its infrastructure:

1. Learn all you can about Orange County's infrastructure problems and become an Infrastructure Champion.
2. When you see a problem, find out what level of government has jurisdiction over it. Sometimes various levels of government deal with different aspects of the same problem.
3. Search the Internet. Agencies at all levels of government now have Web sites that list laws and regulations that pertain to your problem. Your mayor and state representatives probably have sites too, which may be your link to other government and advocacy group resources. If you know of an interest group that deals with the area you're interested in, visit its site.
4. Contact the California Department of Transportation, your city, and/or county government and other sources to learn about plans for ensuring adequate roads, schools, parks and water systems.
5. Ask business groups, such as your Chamber of Commerce, to examine the infrastructure in your community and its effect on local businesses, employment, and the economy.
6. Regularly attend meetings held in your community about pressing infrastructure problems.
7. Express your concern to public officials such as your mayor and school board. Ask them how they plan to solve infrastructure problems.  
Urge your neighbors to support your cause.
8. Volunteer for--or organize--citizen advisory committees dealing with your community's infrastructure issues.
9. Support local, State and Federal officials who understand and are committed to infrastructure renewal. Ask them to make infrastructure an election issue, just as they would education, crime, or health care.
10. Work to help pass local bond issues to repair, replace, and expand your roads, parks, water systems, and schools.
11. Write letters to the editor of your newspaper, your state representatives, and members of Congress, expressing your concerns and opinions on infrastructure.
12. Talk to Civil Engineers, and Urban Planners in your area about solutions and needs.

# Report Card Summary

A-

## Aviation

The commercial aviation demand in Orange County will continue to grow with the population. While commercial traffic at John Wayne Airport approaches the current negotiated passenger limit of only 10.8 million annual passengers until 2020, both general aviation and military demand fall short of meeting Orange County's available capacity. One solution for commercial demand may be to develop high-speed rail transportation to underutilized regional airports. The condition of John Wayne Airport is excellent.

C-

## Electric Power

The electric power infrastructure system reliability may decline due to limited investment in system upgrades and replacements. Prior rate increases approved by the California Public Utilities Commission for Southern California Edison (SCE) and San Diego Gas & Electric (SDG&E) may be adequate to maintain minimum reliability standards, yet be insufficient to fund the pace of work necessary to replace and upgrade the region-wide and county-wide facilities on which we depend for a high degree of reliability. As electric power infrastructure continues to age, the potential exists for less reliable service.

C-

## Flood Control and Levees

The backbone flood control and drainage systems serving Orange County, including 380 miles of flood control channels of which 114 miles are levees (non-incised), 34 retarding basins, 15 dams and 13 pump stations, vary widely in condition and capacity to reduce flooding risk from major storms. Generally the condition of the levees is fair and we continue to work with FEMA and USACE to meet their standards. Funding shortfalls for needed upgrades to bring regional flood control facilities in the County to its standards continue to be in excess of \$2.7 billion. Insufficient funding for capital projects along with maintaining our aging flood channel system presents challenges.

C

## Ground Transportation

Orange County provides bus, commuter rail, regional rail, freight movement, local streets and freeway including toll roads and car-pool lanes that transport goods and people within the county and provide connectivity for the region. The existing funding sources are inadequate to meet the current and future demand. There is a dire need for additional funding, estimated at \$133 million a year (2015 dollars), from local, state and federal sources to maintain, improve and expand our transportation network. Deferred maintenance during the recent recession has exacerbated today's need. Infrastructure investment can elevate Orange County's quality of life, spur economic growth and support local jobs. The time is now to evaluate various sources of infrastructure funding including private sources, user fees and bonds, in order to relieve congestion, improve the quality of our transportation systems and continue to maintain them.

**B-**

## Natural Gas

Southern California Gas Company (SoCalGas) is the nation's largest natural gas distribution utility with 21.6 million consumers through 5.9 million meters in more than 500 communities. SoCalGas' service territory encompasses approximately 20,000 square miles in diverse terrain throughout Central and Southern California, from Visalia to the Mexican border. SoCalGas is regulated by the California Public Utilities Commission (CPUC) and follows State and Federal pipeline safety and other regulations to meet the CPUC's requirements. The natural gas system provides the fuel for home heating, cooking, manufacturing, generating electricity, powering trucks and buses throughout Southern California including in Orange County.

**B-**

## Oil

Orange County receives 100% of its transportation fuel needs from three transportation fuel manufacturing centers on the West Coast: Pacific Northwest, San Francisco, and Los Angeles. Orange County's 2.5 million vehicles are consuming about 3 million gallons of transportation fuels a day. While California's 200,000 electric vehicles are the most that any state has, they represent less than 1 percent of total vehicles. The other 99 percent of California's 32 million vehicles that do not run on electricity are consuming more than 40 million gallons of transportation fuels, gasoline and diesel, every day, excluding jet fuel for the numerous airports. The reliability of supply to Orange County for transportation fuels and other fossil fuel products has been impacted by the fact that California is an "energy island." This has led to periodic transportation fuel price spikes resulting from significant unplanned refinery outages.

**C+**

## Parks, Recreation, and Environment

The condition and capacity of parks, recreation and environment facilities have been relatively steady in the past five year. The 2015 overall grade of C+ remains the same as it was in 2010. Currently, Orange County operates a total of 22 regional parks. Additionally, each of the 34 cities within Orange County operates and maintains local parks within its jurisdiction. While several new developments and improvements to existing facilities have been completed, challenges such as the current California drought, slow recession recovery, insufficient funding, and growing population prevented improvement to the overall grade. A projected expenditure of \$525 million for the entire Orange County would be required over the next five years in order to raise the overall rating to a grade of B.

**C**

## School Facilities

There are a total of 13 Elementary School Districts, three (3) Union High School Districts, and 12 Unified School Districts in Orange County serving approximately 500,000 students in grades kindergarten through twelfth. Collectively, the districts manage and maintain nearly 600 school facilities. The condition of schools facilities that serve the needs of Orange County have declined in the past five years due to lack of facilities funding. The majority of school districts' enrollment has either decreased or remained constant easing near term demand to expand and add new facilities. Deferred maintenance and upgrading of older school buildings continues to be a daunting problem to solve.

**B**

## Solid Waste

Recycling and waste diversion programs have been established and expanded since enactment of the Integrated Waste Management Act of 1989 to significantly reduce the amount of waste disposed in landfills. The solid waste industry will be faced with new challenges to develop programs to further enhance recycling of commercial and organic waste to meet state mandates. This will require expanding existing infrastructure and innovation of new technologies in a highly regulated environment. The statewide diversion rate has continued to steadily increase from 10% in 1989 to 66% in 2014 as compared to the national average of 34.3% as reported by the Environmental Protection Agency in 2013. Orange County's per resident disposal rate is comparable to the national average at 4.5 pounds/resident/day. Public education and awareness has greatly increased recycling efforts and will be essential towards reaching the State's goal of 75% recycling.

**D<sup>+</sup>**

## Surface Water Quality

Good surface water quality is critical to ensuring safe recreation in our coastal waters and is vital to the overall health of Orange County's watersheds which provide wildlife habitat and replenish drinking water sources among other beneficial uses. Surface water quality infrastructure generally includes devices, systems, structures, facilities, and areas designed and engineered to filter, treat, divert, infiltrate, and/or capture, stormwater and non-stormwater runoff. Due to increased volume of stormwater runoff during storm events, existing surface water quality infrastructure in Orange County does not have nearly the capacity to meet wet weather demands. Although currently operations and maintenance of stormwater quality infrastructure is manageable additional infrastructure to increase capacity will make operations and maintenance challenging in the future. Also, unlike water supply and wastewater treatment, stormwater management is not considered a utility. Projects, programs, and services that protect and improve surface water quality must compete for general fund dollars. A shift to an innovative, integrated approach for water supply, wastewater treatment, and stormwater management is needed in order to raise the grade in this category.

**B**

## Wastewater

Assets and workforce are well managed. Sustainability has improved by providing more reclaimed water for aquifer recharge. Upgrades to comply with state and federal requirements are ongoing. All infrastructure must continue to be inspected, rehabilitated, and replaced to meet performance and asset management criteria. Additional stressors will emerge and need to be managed.

**B**

## Water Supply

The overall condition level of the infrastructure (pipelines, pumping stations, and reservoirs) in Orange County is good. Most agencies are planning on significant capital improvement projects to enhance the water supply infrastructure over the next three to five years. Water quality continues to be an issue with public concern heightened by news stories such as water contaminated by lead leaching from pipes in Flint, Michigan, to news about contaminated groundwater in the Central Valley of California. The groundwater basin that serves the northern two-thirds of Orange County has two areas that present an ongoing concern. The Orange County Water District is working with regulatory agencies for a long term cleanup solution. Finally, water conservation is essential to the long term interests of not only Orange County, but also California. With the recent impacts from the latest drought, water is becoming a more vital and precious resource. We have been mired in an ongoing five year drought in Southern California. We have fallen short, as a state, of meeting the Governor's goal of a 25% reduction in our water usage as compared to usage in 2013.



The ability to meet the growing demand for air transportation service is important to sustain both the local and regional economy and the overall quality of life of residents. The Orange County system of airport infrastructure includes the John Wayne Airport (SNA), Los Alamitos Army Airfield (SLI), and Fullerton Municipal Airport (FUL). John Wayne Airport is the sole provider of commercial aviation in Orange County. Fullerton Municipal Airport along with John Wayne Airport, provide the County with all general aviation facility assets. Los Alamitos Army Airfield is the home base for operations of certain units of the California National Guard and the Army Reserve. John Wayne Airport handles the greatest number of operations because it is the only one of the three Orange County airports that serves commercial, general aviation and limited military. However, general aviation generates approximately seventy percent of John Wayne Airport's take-offs and landings.

Passenger capacity is constrained at John Wayne Airport by the 1985 Settlement Agreement which was amended in 2014. The Settlement Agreement provides the regulatory framework to accommodate 10.8 million annual passengers (MAP) through 2020 in Phase 1. During Phase 2, from 2021 through 2025, the MAP increases to a limit of 11.8 MAP. In Phase 3, from 2026 through 2030, the MAP increases to 12.2 MAP or 12.5 MAP depending on Phase 2 traffic. The Airport Improvement Program (AIP) substantially completed at the end of 2011 was designed to accommodate 10.8 MAP.

Within Southern California, demand for commercial air travel will increasingly exceed capacity. The Regional Aviation Plan for the 2012 Regional Transportation Plan (RTP) published by Southern California Association of Governments (SCAG) forecasts the demand for the entire region to be near 146 million annual passengers by the year 2035.

The current RTP assumes high speed regional mass surface transportation systems to move passengers to under-utilized regional airports will be the solution to these capacity shortfalls. The Aviation Infrastructure Working Group thus accepts the fact that, under present prevailing circumstances, commercial aviation demand by Orange County citizens will not be met with Orange County capacity.

Consequently, in this 2016 Report Card, the capacity criterion has been applied only to the legal limit of 10.8 million passengers.

The facilities at John Wayne Airport are in excellent condition, with a reported very low dollar value for the backlog of deferred maintenance. Annual expenditures for maintenance and repair are sufficient to sustain the desired facility condition without affecting capacity. Proactive facility maintenance management practices are in existence and have been for several years. Facilities at the Fullerton Municipal Airport are in average condition. The Los Alamitos Airport facilities are in need of significant repair particularly in the area of maintenance and improvements to both airfield and operations facilities, however improvements to the runway have been completed since the 2010 report card release. All three aviation facilities are operated well within applicable Federal Aviation standards and are in compliance with other environmental and safety standards.

## **Evaluation and Conclusion**

The aviation resources/assets in Orange County were evaluated on the basis of Condition, Resilience/Security, Sustainability, Operation, Cost, and Capacity/Demand. Additionally, the methodology included analyzing data obtained by the use of an objective questionnaire, other relevant reports and materials, and supplemented by visual inspection.

A 14-part questionnaire was completed by the managers and operators of each of the three Orange County airports. The questionnaire was designed to highlight pertinent data about each airport and to provide crucial information related to the six components outlined earlier. Additionally, the questionnaire sought to quantify major elements of the airport infrastructure, to assess the current condition of those assets, to identify management philosophy regarding planning and infrastructure needs, and to assess each airport's financial commitment to planning for future demand, operational safety, and environmental compliance. On-site inspection and facility tours were conducted to supplement the data collection effort and to provide a visual verification of infrastructure condition, resilience/security, sustainability, operation, cost, and capacity/demand. This data was then analyzed for each Orange County aviation facility as a total infrastructure package and viewed each airport's

capacity and effectiveness in meeting present and future demands with maximum safety, environmental compliance, and optimization of adequate annual funding for operations, maintenance, repair, and security for the next twenty years as essential elements of the infrastructure package.

**Condition:** The facilities at John Wayne Airport are in excellent condition with a reported very low dollar value for the backlog of deferred maintenance. Annual expenditures for maintenance and repair are sufficient to sustain the desired facility condition without affecting capacity. Proactive facility maintenance management practices are in existence and have been for several years. Facilities at the Fullerton Municipal Airport are in average condition. The Los Alamitos Airport facilities are in need of significant repair particularly in the area of maintenance and improvements to both runway and operations facilities.

**Resilience/Security:** In this year's analysis, resilience was considered in conjunction with security. All three airports were evaluated on the ability to continue providing services in the event of a natural disaster.

Security was again evaluated in three distinct areas, Commercial, General Aviation, and Cargo. John Wayne Airport was one of the first U.S. airports handling sizeable commercial passenger loads to regain the pre-September 11 levels. All three airports maintain a high level of security with continuous improvements to infrastructure such as fencing, vehicle barriers, gate protection, and security cameras.

**Sustainability:** All three airports were evaluated with respect to sustainability in the sub-categories of energy, waste reduction, urban design, urban nature, transportation, environment health, and water.

**Operations:** All three Orange County airports have excellent operational histories. This record is the result of the commitment of the operating organizations and their ability to allocate resources appropriately to tasks at hand. This operation status is characterized by excellent safety records, full compliance with FAA regulations, and compliance with other appropriate directives that set environmental requirements or community compatibility issues such as noise levels.

Of particular note is JWA's recent record of performance on Federal Aviation Regulation Part 139 Annual Inspection. The events of September 11, 2001 shifted operational priorities to increased airport and airline security. Prior to these events, a significant initiative by the FAA dealt with minimizing and prevention of runway incursion. JWA continues to provide an aggressive program to achieve these facilities improvement objectives, to limit the confusion of pilots and reduce the probability of runway incursion by smaller aircraft.

All three airports are operated well within FAA standards and are in compliance with other environmental and safety standards.

**Cost:** The ability to fund the costs of either sustaining an above average overall level or increasing the grade by one letter grade was also evaluated for each category and is reflected in the table above.

**Capacity/Demand:** The data provided indicates that present general aviation operational capacity needs are being satisfied. Waiting lists for tie downs and hanger space are very short and general aviation future demand indices do not project a future need for capacity beyond that currently provided. Therefore, neither Fullerton nor JWA have plans for expansion of general aviation facilities.

In Orange County, commercial flights are available only at John Wayne Airport. The first regularly scheduled commercial air service was initiated at John Wayne Airport in 1952; by 1965 the airport was serving more than 45,000 passengers annually. Subsequent planning and expansion have dramatically trailed demand for commercial flights, and airport capacity growth has been severely constrained by the terms of a Federal Court-approved 1985 agreement between the Board of Supervisors, Newport Beach and two community groups, Stop Polluting our Newport (SPON) and the Airport Working Group (AWG). The 1985 agreement settled numerous noise related lawsuits against Orange County and resulted in the approval by the Board of Supervisors of a revised Master Plan, Airline Access Plan and Land Use Compatibility Plan, which jointly provide the operational and facility limits under which John Wayne Airport currently operates. Capacity is constrained at John Wayne Airport by the 1985 Settlement Agreement which was amended in 2014. The Settlement Agreement provides the regulatory framework to accommodate 10.8 Million Annual Passengers (MAP) through 2020 in Phase 1. During Phase 2, from 2021 through 2025, the MAP increases to a limit of 11.8 MAP. In Phase 3, from 2026 through 2030, the MAP increases to 12.2 MAP or 12.5 MAP depending on Phase 2 traffic. The Airport Improvement Program (AIP) substantially completed at the end of 2011 was designed to accommodate 10.8 MAP. John Wayne Airport has adequately planned and expanded to meet present and future air travel demand within the constraints referred to above. Nevertheless, the resulting commercial aviation capacity has been, is presently, and continues in future planning to be well below the demand projected in numerous studies for air transportation needs for Orange County and for the Southern California region.

The Regional Aviation Plan for the 2012 Regional Transportation Plan (RTP) published by the Southern California Association of Governments forecasts the demand for the region to be near 146 million annual passengers by the year 2035. This document also suggests certain demand quantities for parts of the region including Orange County. At the present time the County facility is constrained to serve approximately 10.8 million annual passengers. This will continue to fall short of meeting Orange County's long term demand. The current RTP assumes high speed regional mass surface transportation systems to move passengers to under-utilized regional airports will be the solution to these capacity shortfalls.

With construction of a Customs and Border Protection facility completed in 2012 just after the opening of Terminal "C," international commercial flights are now being provided at John Wayne Airport. Consequently, Orange County now contributes to the satisfaction of both local and regional demand for direct international air travel.



## Public Policy Considerations

The primary infrastructure issue related to aviation is the need to construct the high speed regional mass surface transportation systems between Orange County and the under-utilized and proposed airports in Riverside and San Bernardino Counties specified in the RTP.

## Security

John Wayne Airport was one of the first U.S. Airports handling sizeable commercial passenger loads to regain pre-September 11 levels of service. John Wayne Airport has, as well, been at the forefront of timely compliance with FAA and other Federal initiatives and directives for airlines and airports, post-September 11. An aggressive management philosophy placed the airport in the unique position of achieving Federal Compliance for the installation of Explosive Detection Systems by December 31, 2002. This not only enhances airport security at John Wayne Airport, but also allows the commercial air traveler to move through the airport and board an aircraft with virtually no delays.

## Infrastructure Funding

The cost to maintain the current grade of “A-” for Orange County Aviation infrastructure as of 2016 is estimated at \$30 million a year for the next 10 years or a total investment of \$300 Million. Current airport budgets’ estimates, as well as projected funding supplements from the FAA and Caltrans support this 10 year investment need.



# ELECTRIC POWER

2002

2005

C<sup>+</sup>

C<sup>-</sup>

2010

2016



The Electric Power Committee evaluated the present state of Orange County’s Electric Power Infrastructure, and has issued a grade of C-. The Committee also projected the grade that it expected would be earned in 2021, five years from now which is a “D+”. These grades illustrate not only the current countywide assessment of electric power systems, but where we are headed. The present state of the electric power infrastructure might be characterized as “average” or “mediocre”, and at the same time events and trends are noted that seem to be driving the state of the infrastructure in a negative direction.

Publicly-available information has been used to develop this report, and many citations, contained in a separate document titled “Electrical Power Issue Brief”, are provided for those who may wish to delve further into the details of this topic. Due to national Critical Electric Power Infrastructure Information (CEII) issues, the Electric Power Committee has not sought to obtain or use any confidential or overly-specific information that could possibly compromise security, especially since so much information is publicly available that is useful for the purposes of the Report Card.

Over the past year, the Electric Power Committee focused its efforts on assessing the applicable portions of the electric power systems of Southern California Edison Company (SCE) and San Diego Gas & Electric Company (SDG&E), each of which serve the large developed areas of Orange County. The focus of any future efforts will be discussed when those efforts are initiated.

## Evaluation and Conclusions

The range of Electric Power Infrastructure issues involving Orange County is challenging. There is no doubt that there is an extensive network of aging Electric Power Infrastructure. At the same time, SCE and SDG&E, which largely serve the electric requirements of Orange County, are seen to be very much aware of the issues.

Serving the ongoing and future electric energy needs of Orange County involves not only improving the Electric Power Infrastructure within Orange County, but also improving the Electric Power Infrastructure external to Orange County, since that infrastructure is also essential in terms of serving Orange County by means of imported power and energy. Both SCE and SDG&E have made significant strides in planning and implementing improvements, and continue to do so. In addition to addressing aging existing infrastructure, SCE and SDG&E plan new infrastructure needed for growing needs, and also plan infrastructure improvements such as the new Smart Meter technology. All of these efforts work to the benefit of Orange County, along with other areas.

In general, the Report Card scoring tends to give lower marks in terms of the condition of existing, older infrastructure, and higher marks in terms of recognition of the issues and improvements being made. The fact that the state of the Orange County Electric Power Infrastructure has been given an overall grade of C - does not indicate that "all is well". It indicates that work is progressing to address aging infrastructure issues, and yet there continue to be funding issues as well as great public opposition to most any form of infrastructure improvement that involves any environmental impact whatsoever. There is not cause for panic, nor is there reason to rest easy. Extensive planning, engineering, and design, environmental, regulatory, and legal efforts must continue with determination in order to maintain and improve the Electric Power Infrastructure necessary to keep Orange County healthy and assist in the widespread economic recovery that is needed.

The utilities each have periodic General Rate Case (GRC) filings, in which the need for future funding is explained and hearings take place. To the extent that local governments and others express support for increasing funding for replacing aging infrastructure in such subsequent GRCs, progress can be made and an acceptable level of reliability can be maintained.

## Public Policy Considerations

Support the electric utility companies serving customers in Orange County, in continuing the efforts to assess aging infrastructure in Orange County, as well as assessing the need for additional new infrastructure due to growing public need, identifying specific infrastructure improvements when warranted.

- Encourage the California Public Utilities Commission to provide additional regulation that would address cost recovery of aging electric infrastructure in a manner to support timely replacement of facilities whose significant age alone may represent a reliability risk.
- Support needed infrastructure projects during the environmental / regulatory review and approval process, to help ensure their viability. This would include:
  - Support of funding to address replacement of aging infrastructure and development of needed new infrastructure in the utilities’ General Rate Case filings;
  - Support of transmission projects to import increased amounts of power into southern California, including Orange County; and
  - Support of clean-burning or renewable energy generation projects in Orange County that will help relieve electric congestion.
- Promote active input by professional societies and other stakeholders in the processes to bring attention to aging infrastructure issues, as well as the need for expanded infrastructure to meet growing public demand, through technical papers, conferences and other means as appropriate.
- Encourage prospective college students to seriously consider careers in the electric power industry, to replace the “aging infrastructure” of the present workforce that is nearing retirement age.
- Recognize that any changes in trends will have long lead times. Waiting until significant reliability problems actually materialize in aging infrastructure is too late, since any actions to be taken (whether political, social, financial, or otherwise) need to be taken years in advance of when results are to be seen.

## Infrastructure Funding

Per Southern California Edison’s (SCE) 2015 Annual Report, “SCE forecasts capital expenditures for 2016 – 2017 in the range of \$8.0 billion to \$8.3 billion. The forecast includes the level of spending authorized in the 2015 GRC decision. The low end of the range reflects a 3% reduction from forecasted levels for FERC projects using management judgment based on historical experience.” Therefore, using these numbers, one could estimate the 10 year investment projection to be in the \$80 to \$83 billion to maintain this network.



Flooding from a rain storm is not normally a concern of people in the sunny and arid climate of Southern California. Yet, depending on the property location, up to a billion dollars-worth of damage could occur in Orange County and elsewhere during catastrophic flooding events. In 2005, a near disaster was averted when a storm event with an estimated 10-year reoccurrence interval nearly caused a complete breach of a levee along San Juan Creek in the City of San Juan Capistrano. In December 2010, another near-levee breach occurred upstream of this location. That same year a high intensity storm cell over the Laguna Beach area resulted in flooding into the downtown area, disrupting and causing damages to businesses and services.

There are a total of 380 miles of flood control channels within Orange County of which 114 miles are levees (non-incised). Levees are an essential part of the flood protection system here in Orange County. Decades ago, they were constructed to reduce flooding in the lower lying areas of the County that includes major portions of three watersheds. The manmade earthen embankments were designed and constructed with sound engineering practices to contain or control of water to provide protection from flooding. Along with channel widening, improvements such as the installation of steel sheet piles or slope protection were made to many of the levees to provide additional capacity and protection.

Flood control infrastructure is essential for the protection of lives and properties. To that end, the Orange County Flood Control District (OCFCD), and local municipalities design, construct, and maintain channels, storm drains, retarding basins, dams, and pump stations to reduce the risk of flooding during rain storms.

Flood control facilities often present a great opportunity for multiple joint-uses such as recreation, water conservation, water quality improvement, and environmental enhancement. The challenge facing OCFCD and Cities is to identify economically and technically feasible ways to accommodate such opportunities, while providing needed flood risk management. As flood control engineers attempt to strike a balance between eco-friendly flood control infrastructure, this challenge has been exacerbated by increasingly stringent regulatory requirements, recreational considerations, and constantly rising construction and maintenance costs. Satisfying these requirements can be onerous and costly and the related mitigation cost can sometimes be six fold as the actual cost of the construction.

In Orange County, there are approximately 260 miles of regional flood control channels (including levees), 15 dams, 13 pump stations including diversion pumps and 34 retarding basins; 120 miles of sub-regional facilities and about 1,800 miles of local smaller sized drainage facilities (mostly operated by Cities). As the existing system ages and the regulatory requirements change, the challenge to continue to upgrade and maintain this system is daunting.

## **Evaluation and Conclusions**

This report card updates the 2010 report card that was completed based on a comprehensive deficiency study for regional flood control facilities. In 2005, a similar though somewhat less detailed report card was prepared. The 2016 report card is an update that includes recent facility improvements to flood control systems in Orange County. The resulting grade for the 2016 Flood Control and Levees is a “C-” which has not changed since 2010.

The Flood Control and Levees element of the ASCE Report Card is considered the regional backbone drainage system only, since such regional flood control facilities provide the primary flood control protection for Orange County. The regional backbone flood control system is comprised of channels, dams, retarding basins, pump stations, and levees.

A comprehensive approach consisting of planning, funding, and assessing implementation resources will need to be considered in order to reduce the risk of flooding in Orange County. The following paragraphs provide additional information on what is currently being done and what needs to be done in the future to meet this need:

## **Public Policy Considerations**

### *Planning*

Because of the limited funds that are available each year for capital improvement projects, the planning and prioritization of flood control projects is done on a countywide basis in conjunction with the City Engineers Flood Control Advisory Committee (CEFCAC). CEFCAC is comprised of five City Engineers, each representing a Supervisorial District within Orange County. Each year, CEFCAC meets to prioritize and consider new projects for inclusion in OCFCD’s 7-Year

Plan. The flood control projects are budgeted for each fiscal year based on this plan. Despite the budgeting of such projects, OCFCD is often challenged with increasingly restrictive regulatory conditions that usually delay the implementation of such projects by years.

### ***Resilience and Security***

The challenges ahead to improve Orange County's flood control infrastructure remains difficult, considering the fiscal and regulatory environments. Efforts by the County and Cities will continue to identify funding and construct eco-friendly capital infrastructure as well as remove areas in Orange County from the Federal Emergency Management Agency's (FEMA) designated floodplains. Removal of floodplain designations eliminates the requirements for property owners to pay federally mandated flood insurance premiums. The FEMA Flood Insurance Rate Maps (FIRMs) for Orange County were last updated in December 2009. Flood insurance premiums have recently increased substantially and are expected to continue to increase.

The effort to strike a balance between the need to design and construct economically feasible flood control improvements in an eco-friendly manner that can accommodate multiple joint-uses will continue. Considering the annual property tax flood control revenue and the substantial cost to improve deficient facilities, it will take many decades to get Orange County's regional flood control system up to current standards. It will also take substantial additional funding to maintain these facilities in accordance with these standards. Therefore, additional funding sources need to be identified to accelerate the mission of increased flood protection for Orange County and to maintain it once the desired flood protection goals are met.

### **Infrastructure Funding**

Current flood control funding deficiencies in Orange County for regional flood control facilities alone continues to be in excess of \$2.7 billion (construction costs only). Although the report card was updated to reflect channel improvements completed after the 2010 Report Card, this amount did not decrease. Factors such as age of the systems, increasing construction materials and labor costs, and inflation have contributed to no net changes in the funding deficiency over the past 5 years. A significant increase in the number of channel improvement projects completed within the next 5 year periods would be required to see a slight decrease in this figure. This is unrealistic due to the limited funds available annually for flood control projects. Inclusion of sub-regional facilities would result in a much higher cost.

At the current rate of funding, it was estimated it would take over 90 years to upgrade the regional flood control system. With the complexity of some projects due to environmental regulatory requirements and limited funding, this timeframe has not changed since the last report card. Much of the OCFCD system was constructed decades ago and is reaching its design service life. A major portion of OCFCD funds is currently spent to operate and maintain these existing facilities.

The amount of funding each year is limited, resulting in the inability to meet the need for funding additional new capital improvement projects that would make a difference in the report card grade. The need for additional sources of funding gains importance to shorten the time period needed to upgrade the flood control system. Other sources of funding such as grants from State and Federal agencies have been sought with some degree of success. These opportunities are competitive and infrequent; only once per year or every other year depending on available funding from State bond measures or federal pre or post disaster funds. We must also rely on voters to pass any proposed measures for future funding. OCFCD continues to preserve its limited right-of-way where joint use is possible in order to develop supplemental revenue streams such as leases. With the normal design life of flood control facilities being in the range of 50 to 100 years, funding for the future restoration or replacement of these facilities also needs to be considered in determining the overall funding requirements to maintain a 100-year storm event capability in each of the regional flood control facilities addressed in this report card.

### ***Resources***

To further expedite the provision of increased flood protection, Orange County will continue its current efforts to work with the U.S. Army Corps of Engineers to justify federal participation in joint flood control projects within Orange County.

## **What would it take to raise the grade to a “B”?**

Estimated funding in excess of \$2.1 billion (in 2015 dollars) would be required to upgrade the current system to achieve a grade of “B.” To obtain this goal within the next 10 years, it would take a tremendous amount of additional resources and funding. The estimated revenues from county property taxes and other sources available for funding Flood Capital Improvement Projects (CIP) along with revenues through infrequent grant opportunities would not be nearly enough to fund all of the projects. At the current rate of funding, it would take 70 years to raise the grade to a “B,” assuming the quality of the existing structures is being maintained. The cost to maintain existing and new facilities is another factor to be considered to raise the grade to a “B.” The cost to accomplish this would be in addition to the construction cost of new improvements. As repairs are being made to the facilities having the worst conditions, other facilities will continue to age and surpass their service life. This continues in perpetuity as funds are limited for not only CIP but for maintenance and repairs as well. Following severe storm seasons, the flood control systems suffer more widespread damages and presents further challenges.





Orange County consists of 34 cities and the unincorporated areas; it has approximately 1,886 freeway lane-miles, 1,224 bridges, 16,808 lane-miles of local arterial roadways, three commuter rail (Metrolink) routes with 11 stations, Amtrak services connecting to Los Angeles and San Diego, a freight network run by Burlington-Northern Santa Fe Railroad (BNSF), and 77 bus routes (by Orange County Transportation Authority or OCTA) with nearly 6,200 bus stops. While Orange County's transportation infrastructure provides safe and adequate movement of people and goods, its infrastructure spending has not kept pace with the increasing maintenance needs and expansion of our transportation infrastructure to meet the demand of population growth.

## Evaluation and Conclusions

The transportation infrastructure has four components that were evaluated to arrive at a combined letter grade:

- Local Street and Conventional Highways
- Access Controlled Highways
- Bridges
- Transit and Rail

Each component was evaluated based upon the following performance measures:

- Condition
- Operations
- Capacity
- Resiliency
- Sustainability
- Cost

## **Local Streets and Conventional Highways**

This component includes the local roadways and arterials controlled by traffic signals and intersection stop control. The conditions of these roadways were ascertained from the 2014 California Local Streets and Roads Needs Assessment. Pavement conditions are quantitatively graded on a scale of 0 to 100 using the Pavement Condition Index or PCI. Orange County's average score was 77. The operation of existing local streets and conventional highways was rated based on existing traffic demand relative to available capacity at heavily used arterial intersections. Similarly, the capacity of the system was evaluated on future demand (2035) relative to future capacity based on the Master Plan of Arterial Highways (MPAH) system in OCTA's Long-Range Transportation Plan and Renewed Measure M Transportation Investment Plan.

It should be noted that the definition of "capacity" of roadway systems is undergoing modifications where the measure is not how many vehicles can traverse a given roadway segment but how many people can move through the system. Capacity enhancements may be achieved without adding new lanes but by using Intelligent Transportation Systems (ITS) such as optimizing signal timings, demand pricing (tolls), preferential facilities for High Occupancy Vehicles (HOV) and buses, as well as new and emerging technologies such as autonomous vehicles, Vehicle to Vehicle (V2V) communications and Vehicle to Infrastructure (V2I) communications. With the passage of Senate Bill 743, the performance measure is moving towards Vehicle Miles Traveled (VMT) and greenhouse gas impacts.

The resiliency of a piece of infrastructure is measured by assessing its ability to withstand damage or disruption, and whether it can readily and cost effectively be restored, as well as taking into account infrastructure interdependence and the presence of alternate routes. The County scores well on resiliency overall due to its vast network of local roadways and conventional highways with parallel freeway routes. However, the extreme southern portion of the county and the coastal areas are more sensitive to disruptions.

Sustainable transportation requires the design and construction of streets and highways that consider the reduction of the carbon footprint while providing the needed functionality. The Measure M2 Environmental Cleanup Program has helped implement sustainable infrastructure construction techniques and maximized

overall societal benefits. Examples of projects under this program include the County of Orange Marina Trash Skimmer and the Peters Canyon Wash Water Capture and Reuse Pipeline. Additionally, there is strong momentum towards the design of local streets with other modes of transport such as pedestrians and bicycles (termed Complete Streets) and has been more pronounced in recent years with the passage of Assembly Bill (AB) 1358 – The California Complete Streets Act. AB 1358 amended the State’s General Plan Guidelines to mandate that cities and counties are required to include multimodal transportation to the Circulation Element for all plans updated after January 2011. In addition, in the last few years there has been a movement towards sustainable infrastructure design with projects beginning to be certified by Greenroads, Envision and INVEST.

The estimated funding shortfall, in order to elevate and maintain our transportation infrastructure, specifically related to Local Streets and Conventional Highways to target grade of B, is an additional \$41 million per year (2015 dollars).

The grade for Local Streets and Conventional Highways was computed as “C”.

## **Access Controlled Highways**

For access controlled highways, pavement condition studies conducted in 2011, 2013 and 2015 for freeways determined the distressed pavement compared to the total system provides an overall condition of pavement in the County. Currently, about 297 lane-miles or 16% of pavement are deemed to be “distressed”. The operation of the existing highways system was based on existing traffic demand relative to availability capacity. The capacity of access controlled highways was based on future travel demand (2035) as it relates to the capacity of future freeways, toll roads, HOV lanes and Express Lanes (as defined in OCTA’s Long Range Transportation Plan and Southern California Association of Governments’ Regional Transportation Plan).

Orange County’s access controlled highways score highly overall on resiliency most of the county has parallel arterial routes except in the south portion and in the coastal areas.

The estimated funding shortfall, in order to elevate and maintain our transportation infrastructure, specifically related to Access Controlled Highways to a target grade of B, is an additional \$79 million per year (2015 dollars).

The grade for Access Controlled Highways was computed as “D”.

## **Bridges**

In Orange County, there are 1,224 bridges. The average age of these bridges is 38.6 years. 2.4% of bridges in Orange County are structurally deficient, meaning they require significant maintenance, rehabilitation or replacement. These bridges must be inspected every year since critical load carrying elements were found to be in poor condition due to deterioration or damage. 11.6% of bridges in Orange County are functionally obsolete meaning that they do not meet current standards.

Additionally, Caltrans has developed the California Bridge Health Index to rate the performance of bridge maintenance and rehabilitation. The Bridge Health Index is a 0–100 numerical rating that utilizes inspection data to determine the remaining asset value of a bridge or network of bridges. 1% of bridges in Orange County have unsatisfactory Bridge Health Index. As our County’s bridges age, the maintenance of these structures will be vital to the movement of goods and people through the County.

Parallel routes for a substantial area of the county insure a robust resiliency factor for bridges. There are some areas which are more sensitive to disruptions in service including the coastal areas and the southern part of the county.

As before, sustainable design continues to be an increasingly important component of the design and construction process; this trend is expected to continue in the future.

The estimated funding shortfall, in order to elevate and maintain our transportation infrastructure, specifically related to Bridges to a target grade of B, is an additional \$500,000 per year (2015 dollars).

The grade for Bridges was computed as “B”.

## **Transit & Rail**

Orange County’s transit consists of buses, commuter rail (Metrolink) and Amtrak services. BNSF provides freight movement through the county. Planned services include the Orange County Street Car, serving Santa Ana and Garden Grove, the Anaheim Rapid Connection (ARC), connecting the ARTIC with Disney Resorts and Convention Center, and the High Speed Rail connecting Anaheim to Los Angeles.

The condition of the services was evaluated based on average fleet age compared to the national average. The average age of buses is 7.9 years, for Metrolink trains is 11 years and for Amtrak is 15 years. The operations were evaluated based on several factors including operating expenses, on time performance and ridership. OCTA buses average over 88% for on-time performance. Since 2008, bus ridership has declined by nearly 30%. Capacity was evaluated based on planned service expansion relative to future demand.

The resiliency of the bus system is fairly robust with replacement buses promptly providing service in the event of a breakdown. Restoring train service is more challenging due to the lack of multiple tracks and other transit services.

Over 88% of OCTA buses run on clean natural gas; future bus procurement will continue to focus on clean technology.

The estimated funding shortfall, in order to elevate and maintain our transportation infrastructure, specifically related to Transit and Rail (OCTA Bus and Metrolink only) to a target grade of B, is an additional \$12 million per year (2015 dollars).

The grade for Transit and Rail was computed as “C”.

## **Public Policy Considerations**

Since 1990, when voters first approved Measure M for a 20-year period, a one-half percent sales tax, dedicated to transportation projects more than \$4 billion for transportation improvements, including the addition of 192 freeway miles, 170 intersection improvements, 38 freeway interchange improvements and the implementation of Metrolink service in Orange County. Measure M was renewed in 2006 (Measure M2) for an additional 30 years, until 2041. The December 3, 2015, passage of the five year Transportation Funding Bill – FAST (Fixing America’s Surface Transportation) – at the Federal Level became the first long term federal transportation funding bill in the past 10 years. Measure M2 and federal funds are the two major sources of transportation funding for Orange County. Measure M2 generates about \$300 million a year and the county receives approximately \$155 million a year from federal sources for ground transportation. These amounts, while significant, are insufficient to meet the current and future rehabilitation and improvement needs in Orange County. Additional funding sources are critical to maintaining the existing transportation infrastructure within the County and expanding it to meet future needs. Various alternative sources of funding including, but not limited to, private investment, road user fees, Vehicle Registration Fees; Vehicle License Fees; Weight Fees; Cap and Trade Funds; Registration Fees for Electric vehicles and new and adjusted toll revenues are essential for the long-term sustainability of a system that meets the needs of the County today and in the future.

Conventional and high-speed rail projects are essential to provide a balance in the mass transit needs of the region to augment the capacity required for the long-term sustainability of our economy and quality of life and to provide access to regional airports to supplement capacity over and above John Wayne Airport’s annual capacity. Federal and State commitments of funding for high speed rail improvements need to continue in order to benefit Orange County and lead to future development. The opening of the Anaheim Regional Transportation Intermodal Center (ARTIC), in 2014 and future transit projects such as the Orange County Street Car will contribute to a sustainable future.

It is essential that funding continue without interruption to maintain vital transportation infrastructure in Orange County. As we have seen in the past, without a continuing source of funds and resources dedicated for maintenance, and expansion of the system, there will be tremendous deterioration of our transportation systems.

## **Infrastructure Funding**

Adequate long-term funding is essential to sustain a balanced multimodal transportation system, provide relief from congestion, upgrade deficient bridges, and expand mass transit systems. The Measure M2 sales tax continues to be a vital source of transportation funding in Orange County. In 2006, voters approved statewide Proposition 1B authorizing \$19.9 billion in bonds to assist county and local jurisdictions with transportation improvements. This source of funding has essentially ended. Federal funds have been severely depleted in recent years. Until the December 2015 passage of the FAST act, there has been no long term federal funding source since 2005. With the advent of fuel efficient, hybrid and electric vehicles, the gasoline consumption has relatively decreased while vehicle miles traveled has increased, resulting in decreased revenue from the gas tax. In addition, the gas tax is not indexed for inflation resulting in decreased purchasing power. As a result of Senate Bill 1077, California is currently embarking on a statewide Road Charge Pilot Program, which entails that motorists pay for road maintenance based on the distance they travel or the period of time they use the roads.

Because of the Great Recession and a slow recovery, alternate funding sources are even more essential to backfill the losses caused by funding shortfalls and increasing demand on our County infrastructure.

The analysis of this Report Card estimates that the County faces a funding shortfall of about \$133 million a year (2015 dollars). This amount is in addition to the \$455 million a year identified earlier to maintain and expand our transportation system to the target grade of B in order to meet the population demands of the future.

## **What You Can Do**

As citizens of our community we have a duty to educate ourselves about the condition and needs of our transportation infrastructure. Infrastructure spending has a direct impact on the economic growth and prosperity of a region as well as driving employment growth. Without a reliable and robust transportation system for moving people and goods, quality of life deteriorates, costs to households and businesses increase and the cost of fixing the system increases exponentially over time. Citizens need to actively support policies that promote responsible infrastructure funding and spending and encourage their elected officials to take action. The consequences of maintaining status quo and the failure to act now will result in a downward spiral of decreasing transportation system condition and capacity and a corresponding bleak future for our Orange County communities.



This is the first time that natural gas has been incorporated into the Orange County Report Card, including the natural gas system of Southern California Gas Company (SoCalGas), serving Orange County, and the broader area. SoCalGas' system is integrated to serve its service territory which includes Orange County.

## Evaluation and Conclusions

As such, Orange County's energy infrastructure earns a grade of "B-" based on the data compiled for this first report and is expected to improve even more over the next 5 years as proposals to address the reliability of the system are approved and implemented. The natural gas system is safe and there is an infrastructure in place to receive supplies and address interruptions of supply to California, to meet future needs. Furthermore, there are regulatory requirements in place to ensure intrastate transmission and distribution system is safe and reliable, with some elements that require attention. The pace of replacement and upgrade projects is expected to increase based upon the available funding to address critical infrastructure needs.

As mentioned earlier SoCalGas operates the natural gas infrastructure in Orange County, and the California Public Utilities Commission (CPUC) approves infrastructure investment funding through SoCalGas' General Rate Case (GRC) and other proceedings. The natural gas infrastructure has been safely delivering clean natural gas to the residents and businesses of Orange County for decades. Natural gas is a clean and versatile energy resource that is used in a variety of

applications, from home heating and cooking, fueling industrial and manufacturing operations and generating electricity to powering cars, trucks, and buses. It is also in abundant supply, cost-effective, energy efficient, reliable, and safe. The natural gas needs for Orange County are provided not only by the extensive natural gas infrastructure consisting of transmission and distribution lines within the County, but also a vast natural gas infrastructure external to the County that expands within California to the Mexico and Arizona borders, and throughout North America. The California infrastructure includes approximately 3,500 miles of transmission and 100,000 miles of distribution mains and service lines operated and maintained by SoCalGas. As the demands on the system changes over time, new technologies are developed and the components on the system age, continual investment into the infrastructure is required to maintain the system. The CPUC sets safety and reliability standards and approves infrastructure funding levels for SoCalGas to meet those standards.

## **Public Policy Considerations**

As the landscape of the natural gas infrastructure adapts to environmental and safety regulatory initiatives, Orange County should aim to be at the forefront of these changes to continue to utilize clean, safe, and reliable service. In 2015, the Governor outlined a climate agenda, which includes increasing renewable energy generation from 33 to 50 percent, cutting petroleum use by 50 percent amongst the transportation sectors current 30 million vehicles, and doubling the efficiency of existing buildings – all by 2030. In addition, the CPUC is enhancing its safety regulations further promote pipeline safety.

There are a number of activities underway that demonstrate Natural Gas' growing role in renewable energy and clean transportation, and how it will continue to remain in widespread use now and in the future. Orange County definitely needs balance in their sources for energy, and regulators and community leaders need to think broadly to find solutions across the entire energy system, inclusive of renewables, electricity, and natural gas, to meet California's ambitious environmental goals without severely impacting the economy. Decision-making authority for the investment in natural gas infrastructure in Orange County rests primarily with the CPUC.

There is also continued public outreach to encourage customers to use energy wisely to help conserve natural resources and reduce their utility bills. There are longstanding programs for residential customers so they can make energy improvements to their homes, including rebates and financing options for energy efficiency projects. SoCalGas is not compensated based upon the volume of natural gas used, and is incentivized to help customers use natural gas more efficiently, reducing usage and bills.

Currently, environmental policies are driving California regulations, and there is an urgent need to adopt and implement strategies to meet the state's stringent clean air goals. In developing long-term, clean energy solutions, much of the discussion



has revolved around renewable energy sources and needs to be broadened to use all resources in a manner to meet the State's goals as quickly and efficiently as possible.

## **Resiliency**

SoCalGas submits reports to the CPUC showing the level of backbone transmission and slack capacity available relative to a 1-in-10 year cold and dry demand condition on an annual average basis. SoCalGas' 2014 report demonstrates that the utility holds approximately 40% excess receipt capacity and storage withdrawal on its system through 2030 to address potential interruptions of natural gas supply to California. Intrastate system resiliency and reliability are maintained and improved through maintenance and new infrastructure projects, such as the North-South Project which aims to improve access to continuous gas supply to natural gas customers in Riverside, San Bernardino, and San Diego Counties.

Also, the CPUC has established design standards for service on the Gas infrastructure system, requiring SoCalGas to maintain its system to meet those standards.

Natural Gas operations and maintenance, public awareness, emergency response and communication requirements are set forth by the federal Pipeline and Hazardous Materials Safety Administration (PHMSA). PHMSA administers the national safety regulatory program for transportation of natural gas by pipeline. These regulations are incorporated into the CPUC's regulations and the CPUC regulates SoCalGas. The pipeline safety regulations cover the design, construction, inspection, testing, operation, and maintenance of pipeline facilities as well as set out parameters for administering pipeline safety programs - all factors which contribute to the resiliency of the system.

## **Infrastructure Funding**

Natural Gas infrastructure projects require months to years of planning, design, environmental evaluation, and regulatory procedures before construction can begin, dependent upon the scope of the project.

SoCalGas requests CPUC approval for infrastructure and other funding through a General Rate Case or other regulatory filing. At any point in time, one or more of these requests are typically being processed by the CPUC. The CPUC typically evaluates the request, conducts evidentiary hearings, publishes its draft findings and conclusions for comment, and then issues its final decision. Public opposition to rate increases and projects can be robust. For this reason, it is essential that local government, business, environmental, and public interest groups provide written and public comment as part of the CPUC's process to support infrastructure projects. This is the best way for Orange County to influence the decisions made by the CPUC. Broad based public support is the best way to influence the CPUC to support natural gas infrastructure projects. SoCalGas must make the case for the need of the infrastructure projects it proposes; public and political support are needed to get the infrastructure funding and projects approved, and provide Orange County the reliable natural gas supply needed for today and into the future.

## What You Can Do

1. Support efforts to invest in infrastructure in Orange County and within the wider regional systems that provide natural gas.
2. Urge policymakers, regulators, and community leaders to think broadly to find solutions across the entire energy system to meet California's ambitious environmental goals. This means renewables, electricity, and natural gas. Natural gas fueled electric generation supplies electricity reliably when renewable sources are not available. For example, when solar generation is not available at night or times of cloud cover, or when wind power is not available due to calm conditions.
3. Remind policymakers, regulators, residents and businesses that:
  - a. Virtually every citizen relies on natural gas on a daily basis for cooking, heating, power generation and/or transportation.
  - b. Natural gas is a critical part of California's energy infrastructure
  - c. CNG trucks are significantly cleaner than diesel trucks and offer a potential 90% reduction in Nitrogen Oxides (NOx) and 15-20% reduction in greenhouse gases, as compared to diesel.
  - d. Natural gas-powered buses, trash trucks and other fleet vehicles can significantly reduce emissions as well as operating cost since natural gas is 30 percent to 50 percent less expensive than diesel
4. Encourage the California Public Utilities Commission to continue to evaluate fuel/technology so we use all our available energy resources as efficiently as possible with consideration for the region's economic viability.
5. Advocate the use of natural gas as a clean and affordable way to cut smog and reduce greenhouse gas emissions and improve the community's health now.



California's isolation as an "energy island" with the Pacific Ocean on one side and the Sierra Nevada Mountains on the other side, and fuel differentiation are documented problems for California and these problems become much more apparent when outages and/or shocks to the system occur. As California's fuel standards become more differentiated from surrounding states and the rest of the nation, it will likely become more difficult to find relief sources that are compliant with state regulations. This means that Californians are likely to become more vulnerable to price surges if there are supply outages. The state's growing population—which will lead to continuous demand for transportation fuels—combined with potential for disruption to the fuel supply infrastructure from such things as earthquakes and other disasters underscore the long-term likelihood of such price surges in the future.

Although the California population continues to grow, the number of operating refineries in California has been decreasing over the last few decades. Generally, the smaller refineries have been shuttered as a result of regulatory requirements.

## Evaluation and Conclusions

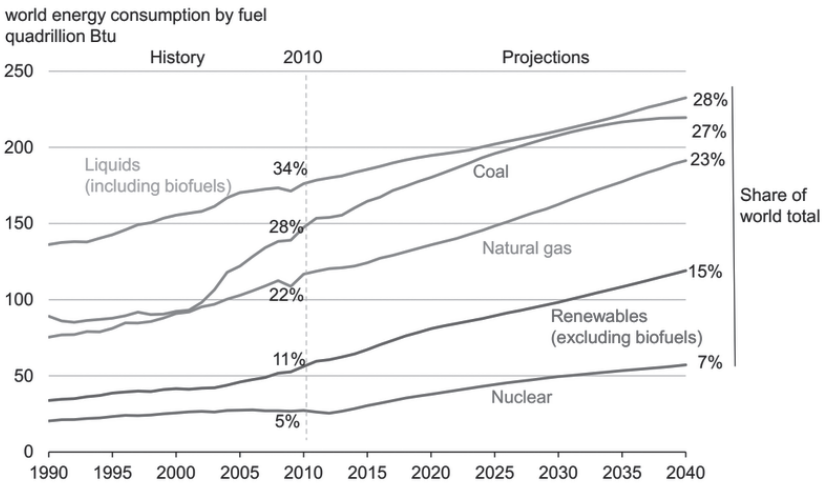
The transportation fuels needs of Orange County are manufactured from crude oil by the in-state manufacturers in the oil infrastructure system receives a grade of B-

This reflects a concern that Orange County receives 100% of its transportation fuels needs from manufacturers located outside of Orange County. A lower grade is probable in the event one of the few remaining in-state manufacturers decides to opt out of the California business environment. The concern is further complicated by the fact that California is an energy island that imports the majority of its crude oil needs from foreign countries and Alaska by tanker ships into California ports to support the California manufacturers of our transportation fuels, and that virtually no other State or Country can provide Orange County's needs for transportation fuels in a timely manner.

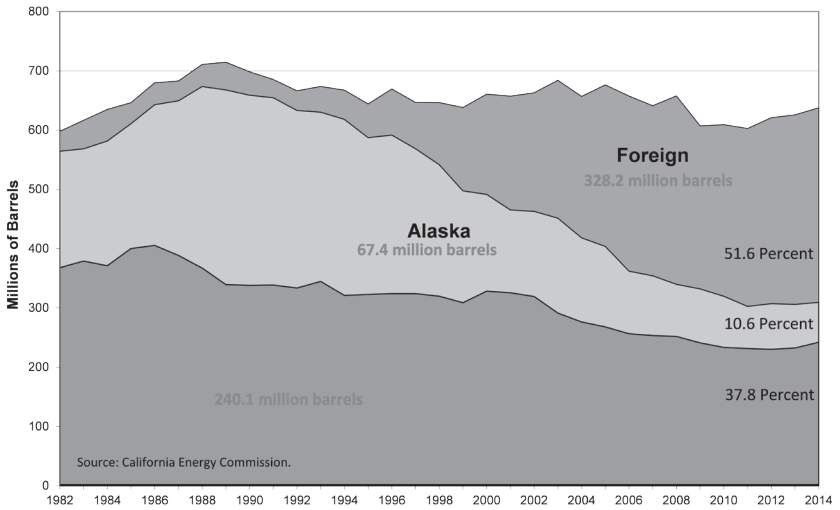
Orange County's industries and infrastructure systems are dependent upon energy from the oil and gas industries for their existence. It is recognized that currently there are many critical infrastructure systems from transportation to water purification, electric power stations and communication networks that are mainly dependent on fossil fuels.

There are currently 32 million vehicles registered in the State of California, which has a current population of 38 million people. Similarly, there are 2.5 million vehicles registered in Orange County, which has a current population of 3.1 million residents. The collective capacity of the current in-state manufacturing appears stable as the future need for gasoline demand is projected to decline slightly from the current 40,000,000 gallons per day, mostly as a result of more fuel efficiencies, and a slight impact by approximately 3 percent of vehicles that run on electricity or other alternative fuels.

According to American Fuel and Petrochemical Manufacturers (AFPM) Occupational Injury & Illness Report, total recordable incident rate for both company employees and on-site contractors working at petroleum refining facilities, were 0.5 incidents per 100 full time employees.



Source: EIA, International Energy Outlook 2013



While there has been a growing movement in recent years towards renewable sources of energy such as solar, wind, and biomass, fossil fuels are still a predominant energy source in California and Orange County. Worldwide there is an increase in nuclear power to meet energy consumption growth requirements, but in California we've had a big drop in energy supplied by nuclear due to the closure of the San Onofre Nuclear Generating Station (SONGS). Thus there will be more reliance in California placed on not only on fossil fuels, but also renewables to meet the forecasted energy outlook.

California currently imports more than 50% of the crude oil needed (by the in-state manufacturers of California's transportation fuels) via ships from foreign countries and Alaska. This is because there are no crude oil pipelines coming into California from other States. However, there is a concern about meeting this demand as crude oil production and shipments from Alaska are on the decline, and the difference may need to be met by importing more foreign oil. Historic trend in sources of oil to California refineries (source: California Energy Commission)

Orange County receives 100% of its demand for transportation fuels of gasoline, diesel, and jet fuel from California manufacturers located throughout California. These California based manufacturers are dependent on the supply of the raw product crude oil to support their manufacturing processes. Few other manufacturers of transportation fuels, outside of California, manufacture California fuel blends, thus the reliability of supply to Orange County for transportation fuels and other fossil fuel products has been impacted by the fact that California is an "energy island." This has led to periodic transportation fuel price spikes resulting from significant unplanned refinery outages. Continued access to marine terminals for importing additional transportation fuel supplies in the aftermath of significant

unplanned refinery outages, as well as to maintain an adequate and growing import capacity for crude oil is essential in avoiding potential constraints that can lead to fuel shortages and significantly higher prices for gasoline and diesel fuel.

## **Public Policy Considerations**

### *The Economy*

The ongoing and future needs of Orange County are a balance of different sources of affordable, plentiful, reliable, accessible, and dependable supplies of energy. Therefore, regulators and community leaders need to think broadly to find solutions across the entire energy system, inclusive of renewables, electricity, and fossil fuels to meet California's ambitious environmental goals without severely impacting the economy.

California has always been a leader in the fight against global climate change as evidenced by California's flagship climate change policy Assembly Bill 32, the Global Warming Initiative, which was signed into law in 2006. It is estimated that California's contribution to the world's greenhouse gases is currently at or below one percent (1%).

Both solar and wind energy provide on-and-off intermittent power to the electric grid. This may not be adequate at this time for the current 24-hour, 7-days-a-week life style we are accustomed to in terms of our energy consumption. The major advantage with the use of renewable energy is that it is renewable. Even more importantly, renewable energy produces little or no waste products such as carbon dioxide or other chemical pollutants, so it has minimal impact on the environment. There are however existing challenges with renewable energy sources such as requiring large amounts of real estate required and their proximity to the end users. It is difficult to generate the quantities of electricity that are as large as those produced by traditional fossil fuel generators.

In the final analysis, all of the aforementioned factors have to be taken into considerations to produce a balanced approach to our energy consumption in Orange County.

## **Resiliency**

The foreign oil production is currently at more than 50% of California's needs and increasing annually to make up for the decreasing production in California and Alaska. Imported crude oil is delivered to California ports via foreign tankers. The availability of abundant conventional energy supplies is what drives the economy that funds the technologies for affordable renewable energy and alternative fuels and improving the efficiencies of every infrastructure sector and business sector that are the basis of our economy and standard of living.

Expanding California's growing reliance on others in the world for much of the California crude oil demands and products manufactured from crude oil to meet

the needs of California's energy island's growing population, would result in transferring the responsibility for California's energy island supply requirements to other States or Countries which have less stringent environmental laws than California with resulting increases in greenhouse gases and the increases in cost for Californians from imports from afar.

The resiliency to disruptions of manufacturing, is driven by timely supplies of crude oil to California. Crude by rail from other States could be an option to enhance the resiliency for the supply of crude oil. The planned and unplanned turnaround periods that are disruptive to the manufacturing of transportation fuels, also result in temporary shortages and price increases until the turnarounds are completed and the refineries are able to get back to full operational modes. All of petroleum production and manufacturing in California are also dependent on adequate water supplies.

## **What you can do**

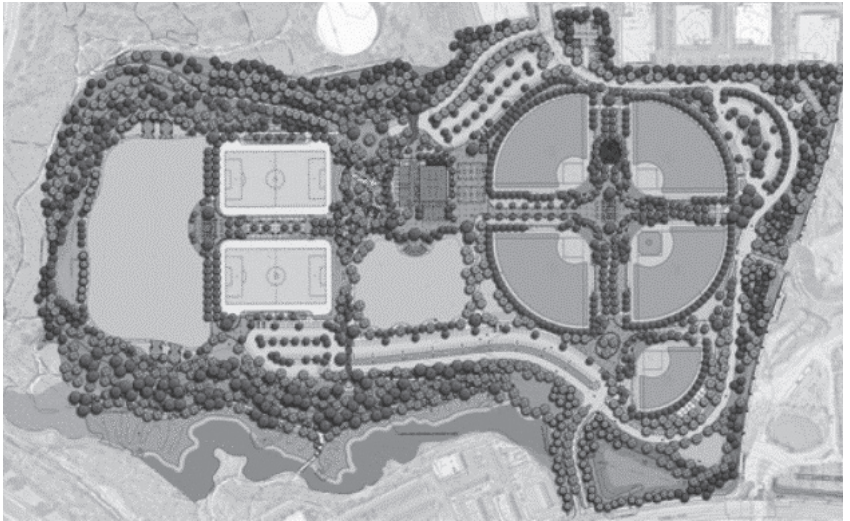
1. Urge policymakers, regulators, and community leaders to think broadly to find solutions across the entire energy system to meet California's ambitious environmental goals. This means renewables, electricity, and fossil fuels. Remind policymakers, regulators, residents and businesses that:
  - a. California is an isolated "energy Island" that currently imports more than half of the crude oil needed to meet the demands for boutique blends of transportation fuels manufactured in California for gasoline, diesel, and jet fuels.
  - b. Orange County receives 100% of its transportation fuel needs from three transportation fuel manufacturing centers on the West Coast: Pacific Northwest, San Francisco, and Los Angeles.
  - c. The availability of affordable, plentiful, reliable, scalable, accessible, and dependable supplies of energy is what drives the economy of Orange County and California.
  - d. Orange County's 2.5 million vehicles are consuming about 3 million gallons of transportation fuels a day. While California's 100,000 electric vehicles are the most that any state has, the other 97% of California's 32 million vehicles that do not run on electricity or other alternative fuels are consuming more than 40 million gallons of transportation fuels, gasoline and diesel, every day, excluding jet fuel for the numerous airports.
  - e. Increasing fuel efficiencies of the mobile fleet are causing less tax revenue available to fund the transportation infrastructure.
  - f. Continued access to marine terminals to maintain an adequate and growing import capacity for crude oil is essential to avoid potential constraints that can lead to possible fuel shortages and significantly higher prices for gasoline and diesel fuel.

- g. Crude oil by rail from other States could be an option to enhance the resiliency for the supply of crude oil.
- h. There needs to be a methodical and systematic move to renewable energy resources. We can begin by shifting to a more and balanced approach to our energy portfolio.
- i. Support local/statewide legislation for incentives for clean engine technology and clean energy refueling infrastructure.

## **Infrastructure Funding**

The cost to maintain the current grade of “B-” for Orange County’s Oil infrastructure, as of 2016, is estimated at \$1 billion a year for the next 5 years for expenses borne by the in-state manufacturers, without government funding. This amounts to a total private investment of \$5 billion, for refinery turnarounds (T/A’s), planned and unplanned. The T/A’s are privately funded and provide an essential opportunity for various T/A maintenance and repair issues, improvements, and modifications to implement technological enhancements.





*Lake Forest Sports Park – 86 Acres, 25,000 SF Community Center, 5 ball fields, 2 soccer fields, and 2 basketball courts*

While improvements have been made at several facilities, challenges were present, such as the current California drought condition, continued insufficient funding, and over-crowding that prevented improvement to the overall grade. Although the economic recession ended in 2009, the recovery period has been a slow process. As population continues to grow in Orange County, public awareness of the PR&E condition will need to be increased and adequate funding secured in order to improve the overall PR&E condition.

## Evaluation and Conclusions

### *Municipal Parks*

The condition and capacity of Parks, Recreation and Environment (PR&E) facilities in Orange County has been relatively steady in the past five years with an overall grade of C+, which is consistent with the 2010 grade. Although the overall grade has not improved since the last Report Card, Orange County is moving in the right direction with the recent development of several municipal parks. The 86-acre sports park in the City of Lake Forest was completed in November 2014 and is one of the largest sports park in Orange County. Sunset Ridge Park in the City of Newport Beach was completed in December 2014 and includes active amenities as well as over 5 acres of California native Coastal Sage Scrub vegetation. The recently



*The Sprayground is a popular summer attraction at Crown Valley Park.*

renovated Crown Valley Community Park in the City of Laguna Niguel includes an 18-acre botanical preserve, a newly renovated outdoor amphitheater, as well as a new sprayground for family fun during the summer season.

In addition to municipal parks, there has been an increase in community development activities in the past five years. The Irvine Company has developed or is in the process of developing several new communities in the City of Irvine. These new communities, such as Orchard Hills, Portola Springs, Stonegate, Cypress Village, Laguna Alta, and Eastwood, all involve the construction of new public and private parks. According to the City of Irvine Park Code, the minimum amount of park land is approximately three acres per every 1,000 population.

### ***Establishment and Protection of Open Space***

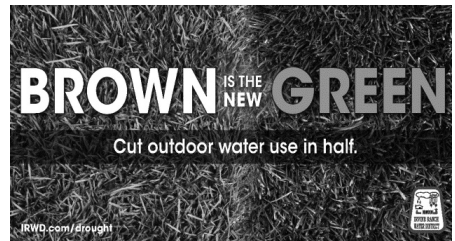
Areas of undeveloped land throughout Orange County continue to provide unique opportunities for innovative planning, conservation efforts, and the preservation of natural resources. Orange County Parks has acquired several thousand additional acres of land during the past five years and strives to effectively manage these natural resources through a balance of habitat protection and restoration with recreational uses while maintaining the wilderness character of open space lands where it still exists. Other examples include resources such as the Bolsa Chica and Upper Newport Bay Ecological Reserves, and Crystal Cove State Park – the single largest permanent open space expanse along the County’s coastline. Inland, there are regional parks, open space corridors such as the recently completed Jeffrey Open Space Trail in the City of Irvine, Upper Santiago Canyon (home to Orange County’s largest lake), in addition to the County’s largest open space - the Cleveland National Forest which provides an extensive wildlife sanctuary and vegetation habitat.

With the increase in development and urbanization, protecting Orange County's open space is critical in shaping the urban form, providing outdoor recreation, protecting scenic vistas, ensuring public health and safety and preserving natural resources. Some of these open space areas include the O'Neill Regional Park, Casper's Wilderness Park, and corridors such as Aliso Creek. The Santa Ana River Greenbelt has been identified as a significant resource for further refinement and expansion while Bolsa Chica merits a high priority status given the presence of a scenic highway, arterial bikeway, and State ecological reserve – hence providing one of the greatest opportunities of successful implementation.

The ongoing development of state, regional and local parks continue to take advantage of Orange County's varied topography and scenic coastline, including the preservation of scenic vantage points in areas such as Corona del Mar and Laguna Beach. With over 27,000 acres of regional open space, the County's planning goals will continue to work toward 'retaining the natural beauty of the environment, promoting the health and safety of residents and visitors, and conserving open space.'

### ***California Drought Condition***

Although mindful of ongoing drought conditions during the development of the 2010 Orange County Infrastructure Citizen's Guide, the years following have brought even more devastating conditions. 2013 and 2014 are now in the history books as the driest and hottest years on record. On January 17, 2014, Governor Brown declared a drought state of emergency, while slightly over a year later he ordered mandatory water use restrictions necessitating the State Water Resources Control Board to implement reductions in potable water use by 25 percent - with some water agencies mandating restrictions as high as 36 percent. In October 2015, a state of emergency was declared to address the removal of dead and dying trees.



Without question, Orange County parks have felt the effect of the statewide drought. Public pools and waterparks were closed, water features turned off, and large areas of turf grass were replaced with drought tolerant plants, inert materials, and artificial turf. While public awareness of these changes increases, so too does the opportunity for change in the manner of how people use parks, beaches, camp sites and open space. Without the use of community pools to cool off, people find rivers and lakes – and with insufficient supervision, this creates a situation that can affect public health and safety.

With still lingering effects of the economic crisis given limited funding for park construction or renovation, and fewer resources for maintenance and operations, the drought caused yet another challenge for communities – the ability to provide improved recreational opportunities to the public. Agencies have had to react to change, sometimes without the benefit of a long range plan for implementation.

But collectively they have found ways to do more with less....less money and less water. Irrigation systems are being modified to address greater efficiencies where drip systems replace overhead spray and where ‘Smart’ irrigation techniques have been implemented. These systems use weather and site conditions to determine how much water to apply and when to irrigate – allowing for peak efficiency.

Although the drought has proven difficult in many ways, like any challenging situation, it has enlightened us and made us more resourceful. Changing public perception isn’t easy, but Orange County is finding successful ways to implement change in their parks, beaches, and open space.

## **Infrastructure Policy Considerations**

### ***Recession***

The Great Recession began in December 2007 and lasted approximately 19 months. Although the recession officially ended in June 2009, surveys show that the recovery period has been a very slow process. While some indicators such as the stock and housing markets have made substantial progress towards full recovery, other indicators such as employment opportunities and wages have been recovering at a very slow pace. Orange County has been fortunate to recover at a favorable pace when compared to the rest of the nation. According to the 2014 Leading Location study, Orange County was ranked #19 out of 379 metropolitan areas across the nation in terms of post-recession economic development. As of April 2015, unemployment rate in Orange County was down to 4.1 percent compared to 6.3 percent for California according to the Bureau of Labor Statistics.

Another consideration entails the trend toward increases in the construction of multifamily medium and high density housing within the County. Younger families are choosing to live in this type of housing rather than the conventional single family developments. As a result, there is an increased need for pocket and local park facilities to provide recreational opportunities for this growing sector of the public.

### ***Growing Population***

Population changes since 2010 and park land measurement standards established by Orange County public agencies may require a re-evaluation, based on current growth trends. The standard for park need allocations established the figure of 10 acres per 1,000 population through studies by The National Recreation and Park Association (NRPA). The standard of three acres per 1,000 population has been commonly accepted and used by most communities in Orange County, including city and county park ownerships as calculated in 2011 from Friends of Harbors, Beaches, and Parks. Research indicated that out of 34 cities, 11 had over 10 acres of park land per 1,000 population and 23 were under the 10 acres per 1,000 population standard. Although close to the established standard, four cities were in the 8 acre per 1,000 population category. When comparing the recreation standard, it should be noted that the suggested standard by the NRPA is probably most applicable to smaller cities nationwide, rather than to more densely populated urban areas such as Orange County.

As expected, the population in Orange County increased in the past five years. The estimated population in 2010 was 3,010,232. In 2014, the estimated Orange County population was 3,145,515, which is an increase of approximately 4.5 percent from 2010.

This information illustrates a modest growth impact cycle to the Orange County parks and recreation areas established standards requirement. As Orange County's population increase, the park areas designated may require an adjustment to the acreage per 1,000 population standard. The County of Orange further manages its finances to ensure adequate and stable funding to operate park facilities, their maintenance, and future repair, coupled with a contingency reserve for large-scale disasters.

## **Infrastructure Funding**

As part of the analysis, a survey was conducted to identify Capital Improvement Program (CIP) expenditures for cities in Orange County based on the 2013-14 Fiscal Year. The survey respondents amounted to 91 percent of the cities and indicated the average expenditures for Parks & Recreation CIPs at \$32 per capita. Expenditures averaged \$61 per capita for operations, totaling \$93 per capita for both CIP and operations expenditures. This total expenditure represents a sample population of 2.02 million persons which amounted to \$188 million for FY 2013-14.

A 2014 study by the Trust for Public Lands indicated that the average expenditure for both CIP and operations in California ranged from a high of \$205 per capita to a low of \$36 per capita with a statewide median expenditure of \$102 per capita. The \$93 per capita expenditure for Orange County as mentioned above is slightly below the statewide median expenditure of \$102 per capita which demonstrates consistency with the state's funding expenditures.

As discussed in the 2010 Citizen's Guide, the passage of the two Park Bond Acts, Proposition 12 in March 2000, and Proposition 40 in March 2002 provided approximately \$4.7 billion, which funded approximately 5,000 recreational projects statewide. Most of the funds from these two Park Bond Acts have been exhausted. In order to sustain or improve the overall PR&E grade, new state and/or local funding sources will be needed.

During the past few years as the economy moved toward recovery, Orange County experienced some promising improvements to local parks. Proposition 84, known as the 'Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection' bond allowed for over \$5 billion to fund "safe drinking water, waterway and natural resource protection, state and local park improvements to disadvantaged communities, public access to natural resources, and water conservation." Over \$500 million has been allocated statewide for the protection of beaches, bays, and coastal waters, compared to \$490 million on parks, nature, and educational facilities. Recent data shows that Orange County was successful in obtaining over \$30 million dollars from said funds; which included 9 different cities as well as county facilities.

A current opportunity for Orange County lies with Proposition 1, which allows for up to \$7.1 billion statewide to fund various water related improvements and programs including watershed restoration and habitat protection; some of which could be allocated to park and recreation projects

In May of 2014, Caltrans accepted over 700 applications statewide from agencies hoping to obtain Cycle 1 Active Transportation Program (ATP) funds. As such, 17 Orange County projects were funded and include a variety of projects which primarily consist of bike and multi-modal trails. As of this writing, the outcome of Cycle 2 funding was unknown; however, additional dollars were available and will be awarded in the coming months.

## Next Steps

In order to raise the 2016 Grade for Parks, Recreation, and Environment from the C+ level to a grade of B, a projected expenditure of \$525 M for the entire Orange County would be required over the next five years. The projected figure for \$525 M is comprised of \$500 M for the 34 cities and \$25 M for unincorporated Orange County.

OC Parks continues to explore ways to meet the recreation needs of a growing and changing population. OC Parks has addressed the increase in park visitors by developing partnerships with local cities for cooperative delivery of recreational facilities and programs along with working to optimize recreational opportunities within open space lands. In conjunction with service delivery, OC Parks also continues to develop maintenance and operation practice standards to strive for quality in recreational use and assess countywide recreational needs and demands.

Similar to findings in 2010, supporting the local and county levels with securing consistent funding, expanding public awareness, and experiences in nature, as well as updating policy will continue to prove beneficial in support of Parks, Recreation, and Open Space throughout Orange County.



*Orange County Parks - The Sinks at Limestone Canyon Nature Preserve*



Orange County consists of 28 school districts including the Orange County Department of Education, serving approximately 500,000 students in grades kindergarten through twelfth. Collectively, the districts manage and maintain nearly 600 school facilities.

## Evaluation and Conclusions

The School Facilities Subcommittee's (Subcommittee) work reflects the following goals and objectives:

1. To increase the accuracy and thoroughness of the discussion of recent school facility financing activities;
2. To determine if recent school facility financing activities have impacted school infrastructures since the 2010 report;
3. To reflect recent changes in school enrollment, including changes in overall enrollment as well as the effects of student distribution on capacity issues;
4. To provide awareness to the public, city officials and representatives alike on the status of our school facilities;

In order to accomplish these goals, the Subcommittee utilized the expertise and involvement of Subcommittee members to garner more detailed information on school capacity and financing, which was used to supplement the infrastructure surveys sent to all Orange County K – 12 school districts. Additionally, early promotion of the survey effort, along with follow-up calls and emails to district superintendents and assistant superintendents, ensured that a wider sampling of school districts was successfully polled for infrastructure information.

The following report assesses Orange County’s school infrastructure from five perspectives. These include condition; capacity; cost/operation; resiliency and sustainability. The status of security at Orange County schools was generally assessed; however, because of the sensitive nature of such security issues, the Subcommittee has evaluated security on a strictly “pass-fail” basis. District administrators have indicated that their facilities satisfactorily meet all required security measures, even though isolated security incidents may have occurred at various schools.

Overall, Orange County school infrastructure has declined slightly since 2010 in the categories listed above. Districts have been able to maintain their facilities in an average condition; capacity has improved as once-burgeoning enrollments have begun to level out and, in some cases, shrink, allowing districts to plan for the removal and/or replacement of old relocatable classrooms; a number of new schools have also been constructed to meet increased enrollment in areas which have experienced population growth.

While costs have increased, state and local renovation and new construction funding along with private infrastructure financing through the formation of community facilities districts, assessment of school mitigation fees, mitigation agreements (in which a builder agrees to purchase or dedicate property and a school facility), and other school fund augmentation measures have helped meet cost demands. Funding for maintenance and operations, however has stayed fairly level, resulting in a reasonably high level of deferred maintenance as was the case in 2010. School facility bond monies are restricted in types of expenditures, and cannot be used for routine maintenance and operations expenses. However, Education Code Section 17070.75 requires all school districts who receive State funds under the Lease Purchase Program (LPP) or the School Facilities Program (SFP), to establish a 3% Routine Restricted Maintenance Account (RRMA) within the school district’s general fund for the exclusive purpose of ongoing and major maintenance of school buildings. While this requirement had benefited school districts’ Deferred Maintenance Programs, the state budget reduced the amount that districts were required to set aside to 1%; the budget allowed for “categorical flexibility”, which allowed districts to move funding from one categorical program to another according to local priorities. In addition to the Deferred Maintenance Program, “categorical programs” include class size reduction, special education, adult education, Title 1, transportation, child development and preschool. Maintenance of school facilities declined in the past five years as districts were faced with deepening budget cuts in favor of educational programming priorities.

The remainder of this report provides more detail regarding the Subcommittee’s evaluation of Orange County schools and how it arrived at the individual grades as well as the overall grade. In this year’s report, the Subcommittee gives Orange County schools an overall grade of “C”, based on the grades set forth below for each evaluation category.

## ***I. CONDITION***

The vast majority of school infrastructure was ranked in fair or better condition by the school districts responding to the Subcommittee’s survey (the “School Districts”).



In particular, fire alarm systems were rated as being in better than average condition by over 90% of the School Districts. Districts that utilize state funds are required by the Division of the State Architect to have adequate fire alarm systems, which provides an incentive for proactive maintenance and repair in this area. ADA, Structural, HVAC, Interior Lighting, and Roofing systems were all ranked in better than average condition by over two-thirds of the School Districts. A majority of the School Districts ranked ingress, egress, Interior finishes and exterior finishes as being in fair or better condition. Utility infrastructure, including plumbing and electrical service, parking, and play areas, were ranked in fair or worse condition by a majority of the School Districts. District's reported that the maintenance of turf and planting areas suffered due to the drought and watering restrictions.

## ***II. CAPACITY***

The Subcommittee's evaluation of capacity issues considered the amount of space available to house total student enrollment within each district. Capacity is closely tied to overall infrastructure conditions because overcrowded schools have a reduced useful life and require substantial maintenance at an earlier time than facilities in which enrollment matches design capacity.

Most school districts have faced growing enrollment for the last two decades. In 1996 and 1997 many school districts serving elementary students adopted class-size reduction programs for some or all of grades K – 3. The smaller number of students in each classroom yields a smaller student-teacher ratio, providing better opportunities for teachers to address individual student needs and provide an increased quality of teaching. However, when school districts are concurrently experiencing student population growth, as was the case in 2001-2004, this growth, coupled with a decrease in class sizes results in a greater demand for classrooms.

The demand for classroom space has been satisfied in various ways, primarily through construction of new school facilities if funding permitted; leasing and/or purchasing modular classrooms if time and/or funding for new schools have not been available; and changing to year-round school attendance. School districts have found that modular classrooms are an expedient means for rapidly creating more classroom capacity. Consequently, many school campuses have temporary, modular classrooms as a major facility component to supplement permanent classrooms and support facilities. Beginning 2004, student enrollment increases began to taper off and a number of school districts began to experience declining enrollment. By 2009 enrollment had declined approximately 2.5%. Since 2010 school districts have seen less of a decline (approximately 1% county wide) with enrollments remaining fairly level.

Indeed, the majority of the School Districts surveyed indicated they would have adequate capacity to house anticipated enrollment over the next ten to twenty year planning horizon, based on current enrollment trends. With this wave of steady to slightly declining enrollment, the pressure to continually add permanent and modular classrooms may ease, and the opportunity may be available for school districts to reduce the number of modular classrooms that have taken up playground space in the last decade.

Other factors may weigh into the decision on removing modular classrooms as well. First, some schools have not yet experienced a material decrease in enrollment. Moreover, while the cost of removing a standard relocatable classroom is not necessarily material (and where leased, may be the responsibility of the owner), costs to demolish older relocatables, as well as costs to restore a site to hardscape or playfields, can be significant. Additionally, some districts are integrating the repurposing and/or removal of relocatables into district master planning for recreational and other uses, resulting in a more gradual phasing-out of these units.

### ***III. COST***

Statistics indicate that California has historically given low priority to public schools over the last thirty (30) years. According to one source, in 2010-11, California ranked 38th in expenditures per pupil. While investment in K-12 public education at the end of the 1990s moved California closer to the national average on school spending and boosted teachers' salaries, class sizes remained quite large compared to other states. California's state-dominated funding system has contributed to the funding deficit for new construction and repairs. Many other states rely primarily on local property taxes to pay for public schools, whereas in California, the state has been the primary funding source ever since voters approved the tax reform initiative Proposition 13 in 1978. Coupled with these restrictions on local property tax funding of schools, the California Supreme Court decision in *Serrano v. Priest* some 30 years ago to equalize state funding of schools and place a cap or revenue limit on districts' general purpose income, has also left schools underfunded.

Additionally, the settlement of the *Williams v. State of California* case (the "Williams Settlement"), which establishes California's duty to provide every public school student with instructional materials, safe and decent school facilities, and qualified teachers, is having an impact on school district facility expenditures. During the 2004-2005 school year, initial site visits were conducted for some schools that had low test results, known as the "Decile 1-3" schools. Facility inspections were followed up with lists of items to be repaired, and the subject schools were required to repair or schedule repairs and report back to the inspection group. This has created new, additional pressure to upgrade facilities in infrastructure areas, particularly restrooms and other "common area" type facilities. Finally, the annual School Accountability Report Card required by Education Code Section 33126 must now include a component regarding the safety, cleanliness, and adequacy of school facilities, and any maintenance needed to ensure that facilities remain in a state of good repair.

In response to escalating construction costs, increasing restrictions on state funding for schools, and additional pressure to upgrade and proactively maintain school facilities, Orange County school districts have aggressively sought to pass local general obligation facility bonds, and have worked closely with residential developers to finance schools through developer fees and establishment of Community Facilities Districts. Seventeen general obligation bond issues were

passed by school districts in the county from 1998-2005, raising a total of \$1.818 billion to be used for renovation and new construction. The majority of districts that passed bonds prior to 2005 have indicated that they are 85-100% complete with their bond program. In 2008 a total of six general obligation bond issues were passed raising a total of \$630 million to be used for renovation and new construction. All of the School Districts who indicated they had successfully passed a local bond applied for and obtained state matching funds from the State.

In a number of cases over the past several years, Community Facilities Districts (CFD's) established within new residential developments suffered from the decline in property values in the county. In some cases, the CFD was approved by landowners within the area covered by the CFD, but bonds were not issued for months or years because of statistically rising default rates in existing CFDs, the decrease in absorption rates in residential projects (which resulted in an increase in developers' carry costs for the CFD property) and tax rates in excess of homebuyer disclosure documents, and in some cases because the issuance would require higher tax rates than allowed under state and local laws and regulatory documents. In addition to local bond issues, Proposition 47, passed in November 2002, Proposition 55, passed in March 2004, and Proposition 1D, passed in November 2006 made available to Orange County school districts another source of revenue to be used for modernization and new construction.

With voters last passing a State-funded construction bond in 2006, the State has run out of money, with about \$2 billion dollars worth of state-approved district projects waiting for funding. A coalition of school districts and building and design contractors, the Coalition for Adequate School Housing or CASH, already has gathered enough signatures to place a \$9 billion bond on the November 2016 ballot. About \$2 billion would be dedicated to community colleges and the rest divided among K-12 districts, charter schools and technical education partnerships. But Governor Jerry Brown, , said that the State should not take on more school construction debt and that local districts should increase their contribution.

Voters have passed \$35 billion in school facility bonds since 1998 that, together with matching funds from school districts and developers' fees, have raised \$100 billion for school construction projects. The State is obligated for \$50 billion in interest and principal – \$1.7 billion annually for the next three decades. Instead of floating bonds, Brown said the State should contribute a smaller share of construction costs annually through the general fund and target it to school districts without the capacity to issue their own bonds.

After more than a decade of dedicated investment, State funding to assist local California school districts in the construction, modernization and maintenance of their school facilities has come to a halt. Since 1998, the State of California has issued \$35 billion in statewide general obligation bonds to fund the School Facility Program, providing grants to assist local school districts in financing the construction and modernization of public K-12 school facilities across the State.

Strong enrollment growth, extreme overcrowding, and aging buildings drove the State investment. These State dollars buttressed a strong partnership with local governments, leveraging another \$100 billion in locally-sourced investment between 1998 and 2014 – more than \$90 billion in local school bonds and about \$10 billion in local developer fees. Together, these State and local funds have built hundreds of needed new schools and upgraded thousands more across California.

Currently, however, the State has apportioned nearly all the \$35 billion authorized since 1998, and there has not been a statewide school construction bond measure on the ballot since 2006. With no other State funds identified for the State Facility Program and virtually no federal funds available for school facilities, local school districts in California must now cover essentially all costs of construction renovation and maintenance of their schools alone.

While the Governor, members of the legislature and other stakeholders have identified concerns about the structure and viability of the State Facility Program, they have yet to formulate a consensus or comprehensive proposal on the State role and responsibilities for funding school district facilities moving forward.

A key concern for the Brown Administration is the State's overall debt load, of which debt from previous statewide school bonds is more than \$1.5 billion per year. The Governor has suggested that the State reduce its school facilities funding role and locals increase theirs.

When poor facility conditions disproportionately affect students and educators in low wealth communities, they undermine the educational equity priorities that are fundamental in California's new educational finance system, the Local Control Funding Formula (LCFF).

In enacting the LCFF, the Governor and Legislature established the principle that school districts with higher need students should get more State funding. The State of California has a fundamental interest in reducing risks and costs for children and taxpayers associated with underspending on school facilities, as well as a constitutional duty to ensure equal educational opportunity for all children.

School districts typically spend money on their facilities from two separate budgets: the general district operating budget and the capital budget. Each has different funding streams. General operating funds largely come from local property tax and State transfers such as those through the LCFF. Capital budgets are largely funded by a combination of local general obligation bonds, lease obligations, Community Facilities District bonds, statewide general obligation bonds, locally imposed development fees and special taxes levied for Community Facilities Districts.

An analysis of spending on K-12 public school facilities in California dated November 2015 by The Center for Cities+Schools in the Institute of Urban and Regional Development at the University of California, Berkeley found that:

- Compared to industry standards, there is an ongoing, structural pattern of inadequate and inequitable spending in many school districts;

- Districts with more taxable property value (assessed value) per student raise, on average, more capital funds for facility needs than districts with less taxable property value per student; and
- Districts serving low-income students disproportionately spend more per student on maintenance and operation from their operating budgets to fund facilities.

#### ***IV. MAINTENANCE AND OPERATIONS***

In addition to constructing and reconstructing school infrastructure, Orange County school districts have an obligation to keep existing facilities in a state of good repair. Due to restrictions on the expenditure of certain state and local bond funds on maintenance activities, and the need to spend General Fund monies on instructional programs and with the state's poor economy negatively impacting schools, many districts have postponed maintenance and repairs, which has left some elements of infrastructure in an impaired state.

The School Districts estimate the value of deferred facilities maintenance at approximately \$300 million. Given that only about a quarter of the county's school districts responded to the survey, the actual dollar value of deferred facilities maintenance within County school districts is probably closer to \$1 billion. This is true in spite of the fact that the School Districts expend on average over \$50 million annually on facilities maintenance. School Districts have accessed developer fees, utility rebates and federal grants to supplement local dollars available for maintenance and repairs.

The state is required to fund deferred maintenance on a matching dollar-for-dollar basis. Over the last couple of decades, however, while school districts have been required to provide their 50% share of funds, the state has not always provided its 50% match. Thus deferred maintenance funds which could be used for infrastructure such as roofing and plumbing has not been given a high priority. School districts are now required to hold a public hearing before submitting a 5-year plan for participation in the State Deferred Maintenance Program. Districts that do not participate in the State Deferred Maintenance Program must provide appropriate explanation to the State for non-participation, as well as how they intend to fund repairs to their facilities. This review procedure along with the state's current budget crisis, may lower the level of deferred maintenance in County schools over the next several years.

#### ***V. SECURITY***

All of the School Districts reported their facilities met required security requirements.

#### ***VI. SUSTAINABILITY***

Districts were surveyed to determine if they are implementing sustainable ("green") design criteria into their new construction and modernization projects. Green building practices aim to reduce the overall impact of the built environment on human health and the environment through design, construction, operation and

maintenance that focuses on increasing the efficiency of resources – energy, water and materials. There are two organizations that provide rating criteria to guide districts in the implementation of sustainable design:

**Collaborative for High Performance Schools (CHPS):** CHPS is a non-profit organization dedicated to making schools better places to learn. The program provides resources to schools, school districts and professionals about all aspects of high performance school design, construction and operation that assist in making schools energy, water and material efficient, well-lit, thermally comfortable, acoustically sound, safe, healthy and easy to operate. School Districts that meet CHPS criteria for their new construction and modernization projects are eligible for additional funding through the State’s School Facility Program.

**Leadership in Energy and Environmental Design (LEED):** LEED is an internationally recognized green building certification system, developed by the U.S. Green Building Council. It is a voluntary certification program that can be applied to any building type. LEED provides buildings owners a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions.

60% of the districts that responded to the survey have begun to incorporate sustainable design criteria into their new construction and modernization projects. The Districts that have not begun to incorporate sustainable design sited that it was either too expensive or they do not have any current projects.

## **Public Policy Considerations**

The key issues to consider are:

- Continue to improve the financing of maintenance, to remove the existing approximate \$300 million in deferred maintenance;
- Develop programs and financing mechanisms to meet increasing legal/regulatory requirements for accessibility, safety, and quality educational programming. Regional education of the general public as to existing school conditions, the mechanics of school district financing, and the need for additional funding to bring school infrastructure to a level of excellence.

## **Infrastructure Funding**

The School Districts estimate the cost of deferred facilities maintenance at approximately \$175 million, and spend over \$50 million in routine maintenance of their schools. Given that roughly half of the county’s school districts responded to the survey, the actual dollar value of deferred facilities maintenance within County school districts is probably over \$525 million. It is further estimated that over \$1 billion dollars is needed to bring the School Facilities grade to a “B”.

## SOLID WASTE

**B**

2002

**B<sup>+</sup>**

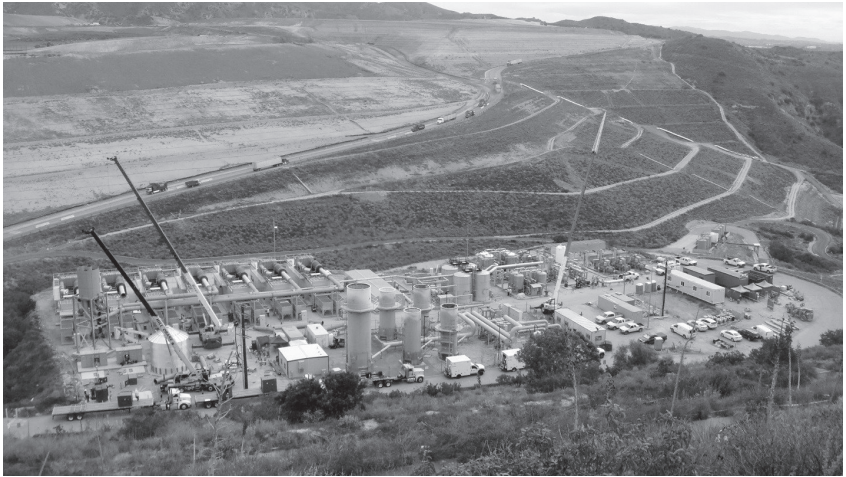
2005

**B<sup>+</sup>**

2010

**B**

2016



The solid waste infrastructure provides an essential public service to the citizens and businesses of Orange County. The method of solid waste management involves three integrated components. The first component is the collection of residential, commercial, and industrial waste. The second component is processing of the waste to remove recyclable materials from the waste stream. The third component is disposal of the residual waste into three landfills. The first two components are performed by private industry and sanitation districts under franchise agreements with the cities, while the third component is performed by the County of Orange waste management department. All three components work together to make the solid waste management system work effectively. This report card is a summary of the evaluation methodology and findings for Orange County's solid waste infrastructure.

The statutory driving force behind Orange County's solid waste infrastructure is California's landmark legislation known as the Integrated Waste Management Act of 1989 which requires each city, county, and regional agency to divert 50 percent of all solid waste from disposal through source reduction, recycling, and composting activities by January 1, 2000. Local government, in partnership with waste management companies, has surpassed the mandate of the Integrated Waste Management Act by implementing various programs that help residents and businesses to reduce and recycle the waste generated. Since the passage of that law, the legislature continues to pass legislation to further expand waste reduction and recycling programs. In 2011, a Mandatory Commercial Recycling law was passed which established a statewide recycling goal of 75 percent by 2020. To help

the state achieve that goal, local governments are required to develop commercial recycling programs in coordination with businesses and multi-family dwellings. More recently, in 2014 the legislature passed laws which calls for the recycling of greenwaste and organics (i.e., food waste) from landfills as these materials represent more than 30 percent of the waste stream. As of 2014, Californian's achieved a statewide diversion rate of 66%.

Since the passage of the Integrated Waste Management Act, the solid waste infrastructure in Orange County has evolved into a robust waste management system. This begins at the source by providing for residential curbside recycling and commercial recycling that are routinely collected. Timely collection of the waste and recyclables ensures our neighborhoods, parks, and businesses are kept clean and free of litter, vector propagation, and odor generation. Once the waste and recyclables are collected, recyclable loads are transported to Materials Recovery Facilities (MRFs) for further processing whereby the recyclables are removed from the waste stream, baled, and shipped to factories to be manufactured into new commodities. The MRFs are equipped with state-of-the art sorting and conveyor systems to maximize the separation of recyclables from the waste stream. A number of greenwaste facilities are also located throughout the County, converting yard waste into nutrient-rich compost and mulch products that can be used to landscape schools, parks, and residential communities.

To prevent the illegal disposal of prohibited waste (hazardous materials), the waste stream is inspected at various check points before disposal at the landfills. Four strategically located Household Hazardous Waste Collection Centers throughout the County make proper disposal of household hazardous waste convenient for all Orange County residents. This free service encourages proper disposal and recycling of common household products. Working together, local government and solid waste operators have provided a system that accommodates the proper disposal of prohibited waste and reduces the amount of residual waste buried at the landfills.

Any residual waste not processed at the MRFs or greenwaste facilities is disposed in one of three Orange County landfills. The buried waste is placed in a series of layers within a controlled environment that includes liners, landfill gas collection systems, and groundwater monitors. After the waste is buried it decomposes, generating landfill gas. The primary component of landfill gas is methane, which can be harnessed for beneficial reuse in landfill gas-to-energy power generation, high BTU natural pipeline gas, and transportation fuels. Once a landfill reaches its permitted capacity, a final cap is constructed over the waste and the landfill is maintained in a protective state in perpetuity.

## **Evaluation and Conclusions**

Orange County's solid waste infrastructure was assessed from five perspectives: (1) condition; (2) capacity; (3) operation and maintenance; (4) resiliency; and (5) sustainability.



**Condition.** Orange County's Solid Waste Infrastructure is well conditioned to provide solid waste services. A number of services are offered, including regular residential and business refuse collection, curbside recycling, and bulky item pick-ups. Commercial and multi-family dwelling recycling programs are also offered to those entities that take advantage of them. Solid waste facility operators utilize modern equipment to transport, process, and bury the waste. This ensures continuous service while complying with operating standards established at the local, state, and federal level.

**Capacity.** Timely collection, processing, and burial of municipal solid waste is paramount to maintain the quality of life to Orange County citizens and to preserve our natural resources. The solid waste infrastructure has sufficient capacity to manage the amount of waste that is currently generated. This is accomplished by having sufficient collection vehicles available for transport, ample throughput capacity at the MRFs and landfill capacity into the 21st century. The life span of the Orange County landfill system could potentially increase. Implementation of additional recycling programs will further decrease the amount of waste disposed at the landfills, and plans are underway to extend the landfills' closure dates to reflect the increased capacity.

**Operation and Maintenance.** Routine maintenance of equipment is critical to a robust solid waste infrastructure and to meet the demands of providing waste management services. Collection companies use route optimization programs to efficiently provide for the collection of solid waste. The collection companies also have on-site mechanics to make any necessary repairs to minimize downtime of collection vehicles. Many collection fleets are also co-located at MRFs which allow the on-site mechanics to make repairs to the equipment that are used to sort, separate, and bale the recyclables. Equipment at the landfills is also routinely maintained through a maintenance schedule to ensure optimal use of equipment. Sharing of equipment and staffing between the landfill systems provides additional resources to ensure the waste is buried in a timely manner. Many collection companies, MRFs, and landfills also have backup and standby equipment in case the primary equipment is down or to respond to local emergencies.

**Resiliency.** Orange County's solid waste infrastructure is an integrated system that is built upon the partnership between local government and private waste management companies. The collective efforts of the waste industry results in a seamless process dedicated to meeting the service needs of Orange County residents and businesses while protecting public health, safety, and the environment. The fact that several waste management companies serve the County reduces dependency on a single entity to provide solid waste services. The regional or nationwide presence of these companies brings the potential for extended resources in the event of a natural disaster or labor strike. Landfills are also required to meet design standards to withstand against 100-year storm events and earthquakes as specified by local and federal laws. In addition, MRFs, greenwaste facilities, and landfills have the ability to pursue regulatory approval to operate beyond their permitted capacity to handle more waste during a state of emergency.

**Sustainability.** While the solid waste infrastructure is built upon local government and private waste management companies to provide solid waste services, the success of any waste management program depends on the collective participation of residents and businesses. Outreach efforts are undertaken by all jurisdictions to inform and educate the public about the importance of waste diversion, and specialized services that may be available in their communities. The Discovery Cube of Orange County features a County-sponsored exhibit called the Eco Challenge, an interactive exhibit that helps families learn more about the “three Rs”—reduce, reuse, and recycle. The exhibit and associated educational outreach activities in schools helps bring home the recycling message. Cities, sanitary districts, and waste management companies are using educational brochures, social media, and community events to engage school-age children in learning the importance of reduce, reuse and recycle. Public awareness is also achieved through public-private partnerships through non-profit organizations, museums, and professional sports teams.

The County’s landfill gas collection systems generate enough renewable energy to supply electricity to 25,000 homes. Construction is underway at Irvine’s Bowerman Landfill to build a 22-megawatt power plant that will provide electricity for another 14,700 homes. Once commercial operation begins in spring of 2016, more than 80 percent of the gas collected at Orange County landfills will have been beneficially reused.

## **Public Policy Considerations**

Since the implementation of the Integrated Waste Management Act and the Mandatory Commercial Recycling law, local governments have been given responsibility to divert waste from landfills. As the population of Orange County grows, waste diversion remains a challenge. Solid waste facility operators will be competing to site new facilities as well as to operate existing facilities in a manner that is harmonious with the surrounding land use. The greatest challenge to the solid waste industry is the requirement to ban or reduce various waste types at landfills.

Specifically, the passage of AB 1594 and AB 1826 has widespread implications for the management of the organic portion of the waste stream. AB 1594 eliminates diversion credits for the use of processed green material as alternative daily cover at landfills commencing on January 1, 2020. The processed green material brought to the landfill would instead be considered disposal. Cities which previously relied on the processed green material for diversion credits to comply with the Integrated Waste Management Act will be required to develop programs to recycle the green waste in a manner that would be considered diversion.

AB 1826 is an extension of the Mandatory Commercial Recycling law which requires commercial businesses including multifamily housing complexes to arrange for the recycling of organic waste. Starting on April 1, 2016, businesses

that generate eight cubic yards or more of organic waste per week will be required to participate in an organic recycling program. Over time, more businesses will be phased in as the organic waste generation threshold is reduced to two cubic yards of organic waste per week by January 1, 2020. Furthermore, cities will be required to develop organic waste recycling programs targeting the recycling of organic waste at commercial businesses.

In addition to meeting the State's recycling goal, the California Air Resources Board is also considering eliminating the disposal of organics at landfills to support the State's efforts to combat greenhouse emissions as part of the California Global Warming Solutions Act of 2006. Achieving the mandates contained in these additional statutes will require development of new infrastructure, technologies, and markets. More funding will be needed for cities and businesses to develop these programs and to increase public education and awareness.

There are also a number of ways that Orange County can continue to enjoy the benefits of a well-run waste management system and to meet the new challenges that lies ahead:

- Continue pursuing large-scale commercial development of emerging technologies for potential implementation as an alternative to landfills, and to extract energy from materials that cannot be easily recycled. This includes alternatives to the traditional recycling of waste prior to landfill disposal as well as post-disposal. A number of small scale anaerobic digestion facilities have been developed or are being considered at MRFs to recycle food waste and organics. Such facilities are also being considered at Orange County landfills as alternatives to traditional gas-to-energy technologies.
- Continue to encourage retailers and manufacturers to implement programs that provide consumers convenient locations to recycle products that have reached the end of its useful life. To date, retailers have been developed by the paint, mattress, and carpet industry. A number of retailers have also established drop off centers to recycle used batteries, ink cartridges, plastic bags, and pharmaceutical waste.
- Develop the infrastructure and markets for the end use of organics and green waste materials to meet the requirements of the Integrated Waste Management Act. Challenges to developing the necessary infrastructure include siting, permitting, capital investment, market volatility, and public acceptance.
- Continue taking steps to combat global warming by reducing the carbon footprint, using alternative vehicle fuels, and being more energy efficient by incorporating "Green Building" practices.
- Ensure adequate revenue sources to maintain existing level of service and fully fund all liabilities for now and generations to come. This includes maintaining sufficient funding at the County-operated landfills as even less waste is received with County Orange trending towards Zero Waste.

## **Infrastructure Funding**

Primary funding for the management, development, and processing of solid waste is through user fees. Municipalities provide for the collection of residential solid waste through long-term franchise agreements with private waste hauling companies. The waste-hauling companies also serve businesses through commercial accounts. Those companies that also operate MRFs establish tipping fees for self-haul customers. MRF operators also receive revenue from the sale of recycled material on the commodities market. User fees collected at the landfills include negotiated fees for Orange County cities and sanitation districts as contained in the Waste Disposal Agreements. Out-of-County waste and self-hauled waste each have different user fees. Maintaining franchise agreements and waste disposal agreements provides a stable and predictable revenue stream that can be reinvested into Orange County's solid waste infrastructure while keeping costs to residents and businesses at competitive rates.

The cost to maintain the current grade of "B" for Orange County Solid Waste infrastructure as of 2016 is estimated at between \$500-\$550 million per year.

## SURFACE WATER QUALITY

2002

2005

D

2010

D<sup>+</sup>

2016



*Water quality basin, San Clemente, CA*

Orange County welcomes 42 million visitors annually, who spend \$7.75 billion and help support 160,000 local tourism jobs<sup>1</sup>. Many of those annual visitors are drawn to Orange County's 42 miles of coastline, which offer endless recreation opportunities. Surface water quality is critical to ensuring recreation in these coastal waters is safe. Surface water quality is also vital to the overall health of Orange County's watersheds which provide wildlife habitat and replenish drinking water sources, among other beneficial uses. The urbanization of Orange County has increased the reliance on surface water quality infrastructure to protect these critical resources. Surface water quality infrastructure generally includes devices, systems, structures, facilities, and areas which filter, treat, divert (to the sanitary sewer system), infiltrate, capture, and/or reuse stormwater and non-stormwater runoff. As open space and agricultural areas which provide opportunities for infiltration and evapotranspiration of stormwater runoff have been replaced with hardscape surfaces the result is an increase in stormwater runoff and associated urban pollutants. This has heightened the need for surface water quality infrastructure to be designed, built, and operated throughout the urban environment on a regional and localized scale.

<sup>1</sup>Orange County Visitors Association (<http://www.visittheoc.com/>)

## Evaluation and Conclusions

The overall 2016 County grade for surface water quality infrastructure is a D+, which represents a slight improvement from the D grade given in 2010. The grade is somewhat misleading given the fact that there have been measurable surface water quality improvements since 2010, especially during dry weather. For the last several years, Orange County beaches have received improved grades in the annual Heal the Bay Beach Report Card (a separate report not affiliated with the ASCE Infrastructure Report Card). In fact, in 2015, 96 out of 101 locations (95%) where beach water quality is measured received an A grade during summer dry weather. Only one of those 101 locations scored below a B grade. The D+ grade reflects the overall need for surface water quality infrastructure to address wet weather. Thanks in part to the impact of the drought and water conservation efforts, dry weather (non-stormwater) runoff from the urbanized environment is being controlled quite effectively with existing surface water quality infrastructure. However, during even moderate sized rain events, the volume of stormwater runoff from the built environment, primarily due to impervious surfaces, quickly overwhelms the capacity of existing surface water quality infrastructure to capture, infiltrate, treat, filter, divert, and use stormwater.

The assessment methodology evaluated the ability of existing and near future planned (to be built within 3 years) surface water quality infrastructure to meet the following three goals:

- 1) Support healthy resilient watersheds;
- 2) Ensure safe and healthy aquatic resources; and,
- 3) Promote use of stormwater as a resource.

For the purpose of this Report Card, surface water was defined as near beach ocean water, streams, flood control channels, and lakes, with the exception of water detention facilities and recreational waterbodies which do not receive flow directly from or discharge directly to the storm drain system. Surface water also includes urban runoff, both stormwater and dry weather runoff; non-urban runoff, runoff from undeveloped areas; and pumped groundwater and springs.

The surface water quality infrastructure assessment methodology was modified for 2016 to have a more quantitative approach compared to the 2010 effort. The following is a summary of the approach and criteria used to score each of the four main categories (condition, capacity, operation & maintenance, and resiliency) which made up the overall assessment.

### ***Condition***

While the condition of surface water quality infrastructure certainly has a bearing on its ability to help meet the three goals detailed above, data on the condition (health) of watersheds, receiving waters and stormwater runoff in Orange County was used to calculate an overall score for this category. The assessment methodology utilized a combination of Geographical Information System (GIS) and environmental monitoring/water quality data. Orange County has a robust network of surface

water monitoring programs and has developed methods for assessing water quality data using an aggregate index tool which can be used to help quantify the impact improvements in surface water quality infrastructure is having on the environment over time.

### ***Capacity***

The methodology for scoring the capacity of surface water quality infrastructure relied on GIS analysis of the percentage of both wet and dry weather runoff from developed areas of Orange County that is treated, infiltrated, diverted, or captured for harvest/use. While Orange County has well established infrastructure for diversion/use of dry weather flows, the low score in this category was driven by the relatively small percentage of the County that is tributary to infrastructure capable of managing the quality of wet weather stormwater runoff. In order to attain regulatory water quality standards for pollutants such as bacteria at the end of storm drain pipes as well as in receiving waters, the need for infrastructure to manage storm event flows is critical. Impediments to funding may cause delays beyond the “near future” (3 years) for many of these improvements.

### ***Operation & Maintenance***

The methodology used for scoring this category relied primarily on an online survey of municipalities and special districts designed to gauge their ability to meet the operation & maintenance burden of not just existing but near future planned surface water quality infrastructure (to be built within 3 years).

### ***Resiliency***

Defined as the ability of a water body to return to its natural state after undergoing a temporary change, this category was scored primarily based on the analysis of the number of beach mile day postings by the Orange County Health Care Agency/ Environmental Health, as well as GIS analysis of the percentage of land area from developed areas of Orange County tributary to a basin, diversion or other surface water quality feature capable of mitigating a spill or chemical release.

## **Overall Analysis of the Grade**

Surface water quality has been assigned a letter grade of D+ in this report. A primary reason for this low grade is the lack of infrastructure to improve the quality of stormwater during rain events. Urban wet weather runoff is a diffuse source that unlike wastewater cannot be easily captured and treated due to the variability and large volumes of runoff that would be required to be managed during rain events. Because it is untreated, many pollutants are entrained in the stormwater and carried by streets and storm drains directly to receiving water and beaches causing pollution or impairment.

Significant efforts have been made in Orange County to improve water quality since the issuance of the first National Pollutant Discharge Elimination System (NPDES) permits in July 1990. Currently, new development and redevelopment projects are required to implement Low Impact Development type best management

practices (BMPs) to reduce water quality impact. Construction sites and industrial facilities (as well as certain types of commercial businesses) are inspected on a regular basis to ensure they are not a source of pollutants in stormwater runoff. Municipal activities such as street sweeping and channel and catch basin cleaning ensure public infrastructure is not a source of pollutants and outreach programs designed to raise awareness and change behavior all combine to reduce the impacts of stormwater runoff on the environment. Despite these efforts, water quality standards for pollutants such as bacteria, nutrients, certain metals, and pesticides cannot be achieved during wet weather without additional infrastructure or the retrofitting of existing infrastructure to increase the capacity to treat, infiltrate, divert, or capture for harvest/use, stormwater runoff.

Increasing the capacity to manage wet weather stormwater runoff is a challenge that will require optimizing the location of new or retrofitted infrastructure where it can receive runoff from large tributary areas. If the tributary area is too large however, the required infrastructure may become too impractical to construct due to land limitations. At the time this Report Card was prepared, it was estimated that only 17.65% of the total urbanized land area in Orange County is tributary to infrastructure which treats, infiltrates, diverts, or captures for harvest/use, stormwater runoff during wet weather, leaving a significant amount of urbanized area that remains untreated. Identifying the appropriate size and location of surface water quality infrastructure to construct on available public and private land is not easily done in a County that is already highly urbanized.

Orange County is 786 square miles comprised of several watersheds. Applying the methodology used to generate the cost estimates noted above would no doubt result in additional figures in the billions of dollars to create the necessary infrastructure to meet regulatory water quality standards during wet weather but what will the additional benefits be? Although some funding has been available through grants such as Proposition 1 they represent a drop in the bucket of the funding needed to significantly raise the grade of surface water quality infrastructure and a step in the right direction is for stormwater to receive the same utility status as solid waste and water supply in the California. To raise the grade for surface water quality infrastructure from a D+ to a B or higher will no doubt require a significant capital investment, but it will also require innovation, collaboration, and integration among stormwater, water supply, wastewater treatment, and flood control agencies. We can no longer afford to manage water in traditional silos; it is too precious a resource, especially if we hope to sustain a population of nearly 23 million and growing in the arid southwest climate of Southern California. A smarter, “one water” approach must be adopted that weighs other benefits and takes into consideration more than just compliance with regulatory water quality standards. Until that paradigm shift occurs in a meaningful way, the grade for this category of infrastructure, as well as others that are water related, will remain low.



## Public Policy Considerations

Regulatory permits and receiving water quality standards are becoming significantly more stringent, requiring advances in both the science of stormwater and surface water management, new sources of funding to promote those advances and funding for the ongoing maintenance of the infrastructure. Perhaps the most significant challenge for improving the quality of surface water in Orange County is the funding constraints faced by municipal stormwater programs, which are issued permits by the State of California requiring the control of pollutants in stormwater runoff discharges from the storm drain system to the maximum extent practicable. Although there are current efforts to make changes, the most significant barrier is that stormwater does not currently have utility status like water supply and wastewater treatment under Article X of the California Constitution. Public utilities have the ability to set fees based on the cost of providing a service, while municipal stormwater programs primarily rely on allocation from the General Fund. Part of the reason is a lack of understanding of how managing stormwater relates to flood control, surface water quality, and infrastructure improvement/replacement. Translating stormwater management needs into a financial strategy that can be effectively communicated with elected officials and the public is especially challenging. The lack of integration of stormwater management with water supply and wastewater treatment and the failure to treat stormwater as a resource also has financial impacts. The lack of asset management information and defined service levels for each component of a stormwater program creates challenges in determining budget allocations and limits the ability to comprehensively manage a stormwater program to address multiple drivers. With increasingly stringent regulatory permits and water quality standards, funding for stormwater programs is currently, and is expected to continue to be, the most significant impediment to improving surface water quality in Orange County.

Additionally, it is recommended that stormwater regulations be based on sound science and what is feasible to achieve given current technology and funding constraints. When it comes to managing conventional stormwater pollutants such as sediment and trash, often times the most cost-effective and successful approach is to identify and control them at the source, rather than relying on surface water quality infrastructure to capture and remove them from the environment after they have been released. An excellent example of this “true source control” approach is Senate Bill 346, which was signed into law in September of 2010 and will prohibit the sale of automobile brake pads in California containing more than trace amounts of copper, certain heavy metals, and asbestos by the year 2025. The purpose of this law is to reduce the amount of copper and other toxic substances released from vehicle brakes that has the potential to impact surface water quality. Removing copper before it is entrained in stormwater provides significant cost savings over designing and building surface water quality infrastructure to remove copper.

However, with a pollutant such as bacteria, which has the ability to regrow and multiply in the environment, even after it has been treated by surface water quality infrastructure, there is “significant uncertainty” when it comes to understanding its fate and transport<sup>2</sup>. In fact, given current regulations on bacteria in stormwater runoff, the same report states, “consistently attaining standards under wet weather conditions may be infeasible”. Research and science looking at sources of bacteria in both the urban and non-urbanized environment should continue, and regulations for controlling bacteria should be developed using a health risk-based approach.

## **Infrastructure Funding**

Although some small studies have been done, a comprehensive study to identify potential locations for additional surface water quality infrastructure and the estimated cost for all of Orange County has not been completed and is difficult to estimate. Preliminary estimates in south Orange County (covering an area of about 262 square miles) project the cost to meet regulatory water quality standards for bacteria and zinc at between \$1.6 and \$2.1 billion. Similar watershed studies in Los Angeles County have estimated costs to meet water quality standards at over \$5 billion.

<sup>2</sup>UWRR/ASCE: Pathogens in Urban Stormwater System, August 2014



Well-managed and adequately funded wastewater collection and treatment/reuse systems are essential to sustaining our quality of life and ensuring the long-term economic vitality of our communities. Protecting public health, the environment and extending the useful life of our wastewater management infrastructure must remain a top priority in today's complex society. In Orange County, these important assets are managed by over 35 special districts and cities including approximately 7,000 miles of sewers, 220 pump stations and 11 wastewater treatment and reclamation facilities. Average daily flows are about 230 million gallons per day (MGD).

Since the completion of the 2010 Orange County Infrastructure Report Card, sewage spills have continued to decline and our beaches remain among the cleanest in California. Full secondary treatment was achieved at two of the largest facilities in 2012. In early 2016, over 120 MGD of reclaimed water is provided by Orange County Sanitation District (OCSD) to Orange County Water District (OCWD) for advanced treatment used to recharge the central county's aquifer with contaminant free water, such water is also used for direct non-potable reuse. These are important elements of regional water resources sustainability. Since the 2010 Infrastructure Report Card, two new focus areas were considered in determining new overall infrastructure grades: 1) impacts of new stressors and 2) resiliency of facilities.

Wastewater flows continued to decline again in spite of a growing county-wide population. The effects of water conservation, a continuing drought, and the continuing economic recession have all contributed to lower average wastewater flows. Regarding capacity, heavy rain storms have not occurred to actually test peak wet-weather capacity to help expose related limitations if any are present. The physical condition of the oldest civil infrastructure in these plant and sewer facilities continues to be an area of concern. Many sanitary sewers built in the late 1940s and early 1950s have reached their original design service life. As their condition deteriorates, these older sewers are more prone to root intrusion, offset joints, debris, and grease build-up, and site-specific failures that can result in sewer spills. For these reasons, sustained funding must be continued to support ongoing inspections, maintenance, rehabilitation, and replacement of the collection facilities as well as some of the civil infrastructure at some treatment and reclamation facilities. Wastewater treatment and reclamation plants throughout the County have had ongoing rehabilitation and upgrades to meet stringent effluent water quality and discharge state and federal regulations.

It is estimated that at least \$3 billion will be needed during the next 10 years in Orange County to fund the various local and regional rehabilitation and Capital Improvement Projects to maintain reliability and improve systems from current levels up to a good condition. This will also help improve regional resiliency. Transparency by cities and agencies has also improved by use of websites. This helps the public better understand the needs of this complex infrastructure and participate in the decision making process. Public involvement and education to help provide appropriate revenues are necessary in achieving improvements.

## **Evaluation and Conclusions**

Wastewater treatment/reclamation facilities have historically received greater attention than collection facilities (sewers) and are in better overall condition as a result. State and federal regulations, including the California Porter Cologne Act and the Clean Water Act administered by the Environmental Protection Agency and the two California Regional Water Quality Control Boards that regulate Orange County have held local agencies to increasingly more stringent standards and comprehensive regulations. Environmental organizations, business groups, and the general public have consistently supported funding. Since 1972, evolving state and federal regulations have required increasingly more stringent effluent quality standards, improved staffing levels, better operator training and certification, better maintenance practices, and improved long-range planning and capital projects. This has yielded reliable operation of the treatment and reclamation systems serving Orange County.

Since 2006, all wastewater collection agencies in the County have been required by the state to adopt, execute, and audit “Sewer System Management Plans.” These Plans include implementation measures to reduce sewage spills and mitigate impacts

through improved management, operations, maintenance, and rehabilitation/replacement, as needed. They are obligated to inspect and rehabilitate aging sewers as necessary; adopt and enforce ordinances requiring private property owners to maintain their own sewers; ensuring long-range planning, staff development, and funding mechanisms sufficient to operate, maintain, and improve their systems. Older sewage pump stations located throughout the County which do not meet current design standards including compliance with the latest building codes and safety regulations will continue to need prioritized attention. Some systems also need upgrades due to routine planned obsolescence by suppliers of parts and components. Other ongoing problems include corrosion, mechanical wear, pump and pipe clogs, this means increased replacement and rehabilitation costs along with increased maintenance needs for these critical assets to extend their useful lives and meet daily performance needs. Breakdowns can occur in these aging systems, work continues to rehabilitate and replace these systems; it may be many years before these systems have all been replaced or rehabilitated. Emergency standby power engine generators are subject to more stringent air quality standards. In addition, the need to employ state of the art trenchless technologies which are often critical in reducing community and public impact during facility rehabilitation and replacement construction. Finally, efforts to maximize water reclamation are requiring more advanced technologies, at greater expense, in order to make wastewater of lesser source quality safe and usable.

All the cities and agencies in Orange County rely on locally provided dedicated funds specific for the purpose of managing the operations, repair, maintenance, planning, and replacement of their sewer system and treatment plant infrastructure. This helps to ensure sustainability and comply with numerous regulatory standards along with Levels of Service desired by each community.

## **Resilience and Security**

Intense rainstorms (El Nino events), power failures, earthquakes or other catastrophic natural events, as well as site security breaches, threaten the reliable operation of this infrastructure. Intense rain events are a potential source of inflow and infiltration in sewer systems. This can overwhelm the system with excessive flow that causes sewage spills. Lengthy power failures can cause pump stations to fail if backup generators or fuel supplies are not available. Earthquakes including soil liquefaction can cause significant damage to systems.

With respect to security, the operating agencies in Orange County restrict entrance into their wastewater treatment and reclamation facilities and lock their remote pump stations to limit vandalism and acts of terrorism. Cameras and remote-sensing equipment are used to monitor vulnerable sites. Some newer vulnerability assessments and specific Emergency Response Plans have been prepared to address malevolent acts and security breaches; however, continued work is indicated.

## **Public Policy Considerations**

Beyond various state and federally mandated requirements mentioned above, the successful operation of the wastewater collection, transport and treatment and reclamation systems in Orange County will continue to require innovative approaches. Benefits of collaboration can include improved economies of scale, sharing information on the most advanced technologies, leveraging city, and agency expertise to solve current and future issues.

## **Workforce Education and Training**

A regional sewer collection agency group provides educational workshops and certified training programs for staff in the region that benefits large and small agencies alike. Science, Technology, Engineering, and Mathematics (STEM) programs can also be utilized by the workforce to stay up to date on education policies, leading edge innovation, and long term evolving changes in wastewater practices. The California Water Environment Association is also a valuable collaborator in workforce education, training, and certification in the region.

## **New Focus Areas since the Last Report Card**

Since the 2010 Infrastructure Report Card, the following new focus areas were considered in determining new overall infrastructure grades:

- Impacts of New Stressors including: drought and climate change, water conservation and impacts on collection/transport/treatment/reclamation, workforce changes and budgets, infrastructure age, and asset management challenges.
- Resiliency of facilities including: ability to adapt to changing conditions, ability to withstand disruption (El Nino, earthquake, site security), and rapid response planning for recovery and restoration.

In 2015, a much lower than expected survey participation was achieved compared to 2010. The survey participation in 2010 was over 90 percent. In 2015, less than 50 percent of the agencies and cities participated in the survey for this report card. It is believed the lower than expected response was contributed in part to: 1) increased demand on the workforce due to the aging infrastructure, and 2) agencies and cities responding to and adapting to new stressors.

## **Infrastructure Funding**

Funding to design, build, operate, maintain, rehabilitate, and replace the facilities comes primarily from local user fees. All of the cities and agencies have well-established sufficient authority to enact and collect user fees. Some agencies receive a very small amount of income from property tax.

State and federal grant low-interest loan programs for the construction of collection system and treatment plant infrastructure can be complicated, and/or subject to delay. The grants and loans are usually paid on a reimbursement basis, are frequently delayed because of chronic budget shortfalls in Sacramento; for this reason, it is prudent for cities and agencies to secure loans through other means such as bonds and certificates of participation.

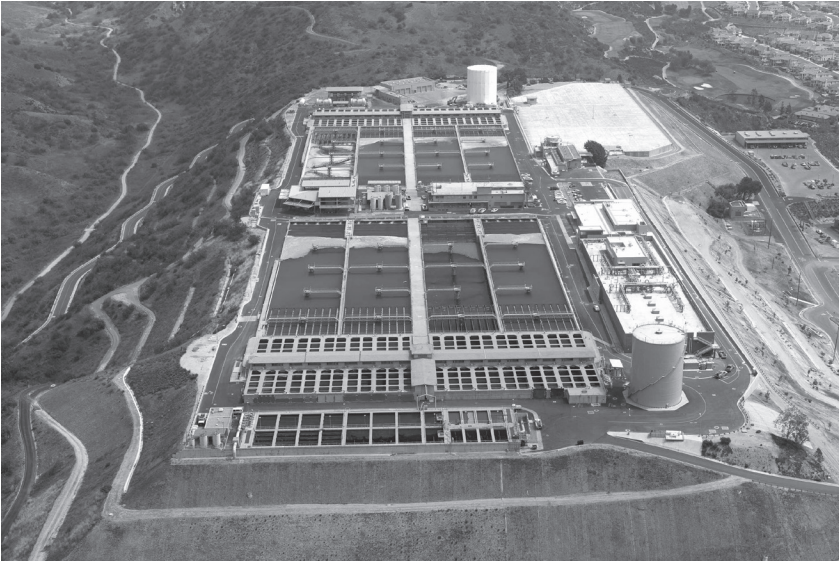
It is estimated that at least \$3 billion is needed during the next 10 years here in Orange County to fund the various local and regional rehabilitation projects to bring systems from current levels up to a good, but not excellent, condition. Locally provided fees, kept within the region are by far the best means to adequately fund the needs.

## **What You Can Do**

Public involvement is an important component of infrastructure sustainability. The use of city and agency websites provides improved transparency and engagement with the public. Providing the public with current information on projects, planning efforts, announcements, meeting agendas, and budgets is recommended. Many cities and agencies also provide a service that sends updates and agendas by email. When important projects and budget matters are under consideration by the decision-makers, public involvement, and education will continue to be needed at an even increasing level to provide awareness and gain support for funding infrastructure improvements. Your voices at Board or Council meetings, or thoughts conveyed through written communication are a powerful and meaningful part of the public policy making process.

Minimize debris loading to these systems. Do not dispose of fats, oils, and greases (FOG) in your sink. Instead, place them in a container and place it in a trash can. FOG coalesces to form clogs in your service lateral and in the public sewers of your community. Also, only flush the 3 Ps: Pee, Poop, and toilet Paper. Throw that flushable wipe in the trash can. These steps are critical in reducing spill related events and equipment damage in the community collection systems as well as on treatment plant sites.

Participate in public tours of the facilities to learn more about these complex systems and how they work to better understand infrastructure needs.



*Courtesy Metropolitan Water District of Southern California*

The Orange County Infrastructure Report Card Committee for Water Supply had two major goals: to inform the public and policy makers about the critical nature of Orange County's infrastructure needs and to develop an ongoing guide for policy makers where funding needs are quantified and identified by infrastructure category. The product of the Report Card is to develop a credible, defensible, and easily explainable method of arriving at the condition of water supply infrastructure that can be reported as report card grade.

To evaluate the overall condition of the county's infrastructure, the Water Supply Committee developed an eleven question survey that was sent to all water agencies in Orange County. Questions were asked relating to the reliability of water supplies, the feasibility of the California Fix proposed water conveyance tunnels under the Sacramento-San Joaquin River Delta), water supply sources in the future, the condition of the infrastructure and a section on training and safety/security.

## **Evaluation and Conclusions**

Almost half of the water supply needs for Orange County come from imported water: the Colorado River System via the Colorado River Aqueduct and the State Water Project. The other half is supplied principally by groundwater drawn from the Orange County Water Basin, which extends from Irvine north to the Los



Angeles County line. In addition, there are some water supplies from recycled water used for outdoor irrigation needs. The Colorado River Aqueduct was viewed as a very reliable source by over 90 % of the responding agencies. On the other hand, over half of the responding agencies are concerned about the reliability of the State Water Project as a supply source within the next 20 years. Interestingly, slightly more than half (60 %) believed that the California Fix (Delta tunnels) would be constructed within the next 20 years.

Respondents were asked about expected future water supplies to be added over the next 3 to 5 years. Groundwater and ocean desalination were the top two potential water supply sources for over two-thirds of the agencies. Other water supply sources that are being considered include: water transfers (usually from agriculture), direct potable reuse (treated wastewater being utilized directly into the potable water system without an environmental buffer such as a reservoir or groundwater), and storm water capture and reuse. These are emerging sources that will gain attention as diminished water supply conditions continue to be present in Southern California.

## **OPERATIONS AND MAINTENANCE**

The overall condition level of the infrastructure (pipelines, pumping stations and reservoirs) was reported as “excellent” or “good” by 70 % of the respondents, with reservoirs ranking slightly lower than pipelines and pumping stations. Most agencies were planning on significant capital improvement projects to enhance the water supply infrastructure over the next 3 to 5 years. Reservoir condition and capacity upgrades ranked highest in needing improvement over the next 3 to 5 years.

Several questions were asked concerning the sufficiency of water system Operation and Maintenance (O&M) funding to meet ongoing Infrastructure O&M program needs. Over two-thirds of the agencies believed that this level of funding was adequate to meet their agencies’ needs. In addition, most agencies saw that level of funding increasing over the next 3 to 5 years as infrastructure ages and regulations increase. Most agencies would be proposing multi-year rate increases as both the cost of the water supply increases and the maintenance needs increase.

## **WATER QUALITY**

Water quality continues to be an issue with public concern heightened by news stories such as water contaminated by lead leaching from pipes in Flint, Michigan homes to news about contaminated groundwater in the Central Valley of California. The groundwater basin that serves the northern two-thirds of Orange County has two areas that present an ongoing concern. The impacted wells have been taken out of service and do not present any issues with potable water being delivered to customers. The Orange County Water District is working with regulatory agencies for a long term cleanup solution. The quality of water delivered by the Colorado River Aqueduct system is high in dissolved solids/minerals. These impart hardness to the water and impact clothes washing and scaling of pipes and home water tanks. The quality of water delivered by the State Water Project can be high in organic

material. This organic material, when combined with chlorine disinfection, can lead to the formation of disinfection byproducts. These disinfection byproducts have been linked to greater incidences of cancer. This is one of the reasons that the Metropolitan Water District of Southern California (MWD) has reduced or eliminated chlorine as a disinfectant and installed ozone and ultra violet (UV) light as a disinfectant at its various regional water treatment plants.

## **SAFETY AND SECURITY**

One of the areas that the 2016 Report Card was charged to investigate was the issue of Cyber Security and Safety as it relates to water supply infrastructure. The goals of the report are to highlight the various steps that agencies are taking to protect water supply system from cyber- attacks and the various safety measures that agencies are taking to protect their employees who operate and maintain the public water supply. All of the agencies that responded have safety programs and almost all conduct weekly or monthly safety/training drills. Almost two- thirds of the agencies have a security program in place to prevent potential cyber-attacks.

Since the 2010 Report card, most agencies have taken steps to protect their facilities from natural disasters. The greatest natural disaster threat in Southern California is from earthquakes as indicated by the vast majority of the water agencies. One agency indicated that there are also potential threats from floods, landslides, and wildfires. These latter categories of natural disasters are viewed as impacting specific geographic locations as opposed to a more general area damage from an earthquake. Most agencies have begun to undertake special measures such as structure and pipeline retrofits to protect their facilities from damage caused by future earthquake events.

## **PUBLIC POLICY CONSIDERATIONS**

Since the 2010 Report Card, we have identified several priority tasks that must be accomplished to address the risks that threaten us. These include:

- Ensuring that the water supplies continue to flow from the Colorado River Aqueduct system and the State Water Project to satisfy long term demands.
- Funding and implementing local water supply projects that include groundwater desalination, ocean water desalination, and recycled water.
- Continuing to explore emerging technologies such as direct potable reuse and storm water harvesting to diversify and add to local sources of supply.
- Maintaining our high quality potable water supply by aggressive monitoring and treating any contaminants in the local or imported water supplies.
- Aggressively pursuing all water conservation and demand management methods/initiatives in preserving and enhancing our water supplies.
- Enhancing the efficiency and security of our water supply infrastructure systems.

## **INFRASTRUCTURE FUNDING**

Orange County must invest nearly \$2 billion over the next ten years to maintain the existing condition and capacity of local water supply infrastructure. Funding to complete the California Fix (Delta tunnels) will likely require in excess of \$20 billion, if it is constructed at all. Completion of this major improvement project in Northern California will certainly lead to water rate increases at the local level in Orange County. Additionally, expected stricter water quality regulations will continue to add to the costs of supplying potable water to residents of Orange County. The good news is that all of the responding agencies are well aware of the need for continuing funding for infrastructure operation and maintenance. Budgets for these activities have been increasing to meet system demands.

## **WHAT CAN YOU DO**

There are several areas in which the public can become more aware and involved. Water conservation is essential to the long term interests of not only Orange County, but also California. With the recent impacts from the latest drought, water is becoming a more vital and precious resource. Learn all you can about saving water, both outdoors and indoors. Not only educate yourself, be an example for your neighbors. Your actions speak louder than your words.

Study the issues concerning water both here in Orange County but also in California. We have been mired in an ongoing five-year drought in Southern California. The State has fallen short of meeting the Governor's goal of a 25% reduction in our water usage as compared to usage in 2013. We need to do better. Become informed and involved and act. Water supplies and water investments are policy matters and financial matters that impact you and your family.

The overall condition level of the infrastructure (pipelines, pumping stations, and reservoirs) in Orange County is good. Most agencies are planning on significant capital Improvement projects to enhance the water supply infrastructure over the next (3) three to (5) five years. Water quality continues to be an issue with public concern heightened by news stories such as water contaminated by lead leaching from pipes in Flint, Michigan, to news about contaminated groundwater In the Central Valley of California. The groundwater basin that serves the northern two-thirds of Orange County has two areas that present an ongoing concern. The Orange County Water District is working with regulatory agencies for a long term cleanup solution. Finally, water conservation is essential to the long term interest of not only Orange County, but also California. With the recent impacts from the latest drought, water is becoming a more vital and precious resource. We have been mired in an ongoing 5(5) five year drought in Southern California. Overall, we have fallen short as a region of meeting the Governor's goal of a 25% reduction in our water usage as compared to usage in 2013.

# Glossary

## ***Best Management Practice***

(BMP) an engineered structure or management activity, or combination of these, that eliminates or reduces and adverse environmental effect of a pollutant.

## ***Flood Control Channel***

Open waterway that is designed to carry large amounts of rain water. These structures are often lined with concrete to help control flood waters.

## ***Gutter***

Area formed by the curb and the street to prevent flooding by channeling runoff to storm drains.

## ***NPDES - National Pollutant Discharge Elimination System***

The US EPA regulation and permit process defined in the Clean Water Act that regulates the treatment and discharge of pollutants.

## ***Point Source Pollution***

Pollution from a single identifiable source such as a smoke stack or a sewage-treatment plant.

## ***Pollutants***

Materials can include, but are not limited to, trash, paper, plastics, cleaning chemicals, animal waste, yard wastes, used oil, fertilizers, pesticides, sediment, metals, fuels, solvents, detergents and fecal coliform.

## ***Pollution***

A human or naturally caused change in physical, chemical, or biological conditions that result in an undesirable effect on the environment.

## ***RWQCB - Regional Water Quality Control Board***

A regional unit of the State Water Resources Control Board. They regulate the quality of water resources and discharges in its defined watershed boundary.

## ***Receiving Water***

Of a watercourse or waterbody that receives runoff or wastewater.

## ***Runoff***

Water that flow over land surfaces and does not percolate into the ground.

## ***Runoff Pollution (also stormwater, urban runoff, and storm drain pollution)***

Rain and water from irrigation, garden hoses, or other activities that washes pollutants off of streets, parking lots, yards, and landscapes and into the storm drain system.

### ***Sanitary Sewer System***

Engineered infrastructure systems such as gravity and pressure pipes, manholes, and pumping facilities. These systems collect the liquid waste streams from homes, businesses, and industries and transport the wastes to downstream EPA and SWRCB Permitted facilities for treatment. Also known as the upstream portion of the Publicly Owned Treatment Works (POTW) as defined in the Clean Water Act.

### ***Source Control***

Action to prevent pollution at its origin.

### ***Storm Drain System***

A system which includes grates, gutters, underground pipes, creeks or open channels designed to transport rain from developed areas to a receiving body of water.

### ***WWTP and/or WWRP***

A wastewater treatment plant or a wastewater reclamation plant. The Permitted downstream portion on the publicly owned treatment works as defined in the Clean Water Act where sanitary sewers deliver the wastes for processing and added reclamation at some plants so the treated effluent can be re-used. The facilities can be inland dischargers or ocean dischargers.

### ***Watershed***

Geographic area of land from which all runoff drains into a single waterway.

### ***Watershed Management Approach***

The watershed management approach is the specific method by which the Regional Board implements watershed management. Features include the targeting of priority problems, stakeholder involvement, developing integrated solutions, and evaluating measures of success. The entire watershed, including the land mass draining into the receiving water, is considered.

### ***Watershed Management Areas***

(WMAs) are the geographically-defined watershed areas where the Regional Board will implement the watershed approach. These generally involve a single large watershed within which exists smaller subwatersheds but in some cases may be an area that does not meet the strict hydrologic definition of a watershed.

### ***WDR***

After a public comment period the State Water Resources Control Board (SWRCB) adopted statewide general Waste Discharge Requirements (WDRs) for sanitary sewer systems in May 2006 as Water Quality Order No. 2006- 0003-DWQ. In January 2012 almost 1,000 facility owners have now “enrolled” in this permit process.

# Methodology

## *Overall Orange County Infrastructure Report Card Objective*

To build widespread support and understanding regarding the importance of public infrastructure facilities, systems, and their impact on the quality of life and economic vitality in Orange County.

## *Organizational Structure*

The Report Card was developed through the efforts of three committee levels. The committee members are listed in a separate section of this guide.

The Infrastructure Working Committees consisted of technical experts in the field – including both public and private sector participants. Each committee developed the detailed methodology for its specific category, collected and evaluated the data, prepared its section of the “2016 Orange County Infrastructure Report Card,” and assigned the initial grade.

The Expert Advisory Groups were comprised of leaders in the public sector, consultant/private industry, academia, and the environmental community. Their responsibilities were to review and evaluate the findings of the Working Committees, and to establish public policy considerations for each infrastructure category. The Executive Committee was responsible for organizing and guiding the overall Report Card effort.

## *Development of Report Card Grades*

In the development of Report Card Grades, four fundamental components of the infrastructure were considered:

### **Condition**

What is the existing or near future condition of the infrastructure facility? In assessing the condition of the infrastructure, the immediate future conditions (up to three years) included improvements funded or in design.

### **Capacity**

Are the current facilities able to support the current population? Will the existing and planned (funded) facilities be able to support the community in ten years? The existence of Master Plans, Funding Plans, and Capital Improvement Programs were key factors in the capacity assessment.

### **Operations**

The Working Committees each developed parameters applicable to their areas. Key issues were: Is the specific infrastructure system complying with existing regulatory requirements? Do the organizations have sufficient funding for facility maintenance?

### **Resiliency/Security**

Does the infrastructure element provide adequately for preparing for, or responding to, natural or manmade, (e.g. Terrorism) disasters? What is infrastructure system’s capability to prevent or protect against significant multihazard events and the ability to expeditiously recover and resume critical services with minimum disruption to public safety and health, the economy, and national security.

## *Weighting Factors and Grading Criteria*

The weighting factors applied by each working committee are described in their report, using the four categories listed above. The Orange County Infrastructure Report Card effort follows the ASCE National Report Card’s approach based on the following scale:

A = 90-100%

B = 80-89%

C = 70-79%

D = 51-69%

F = 50% or lower

# 2016 Orange County Infrastructure Report Card Roster

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Robert Bein, PE, Chairman Emeritus, RBF (retired)

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Tapas Dutta, PE, Program Manager, CNC Engineering

Harvey Gobas, PE, Vice President, Psomas

Terry Hartman, PE, Principal, T J Hartman Consulting

Kevin Kondru, Regional Landfill Manager, OC Waste & Recycling

Ronald Stein, PE, Founder, PTS Staffing Solutions

Dr. Wallace Walrod, Vice President of Economic Development and Research, OCBC

EB Trevor, UCI CEE Affiliates Coordinator,

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Steve May, PE, Director of Public Works/City Engineer  
John McCarthy, Vice President, Michael Baker International  
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Ken Schiff, Southern California Coastal Water Research Project

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Doug Reinhart, IRWD Board Vice President

Ron Young, Former General Manager, Elsinore Valley District (Retired)

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Garry Brown, Executive Director, Orange County Coastkeeper

Betty Burnett, General Manager, South Orange County Wastewater Authority

James Herberg, General Manager, Orange County Sanitation District

John Pastore, Executive Director, Southern CA Alliance of POTWs (SCAP)





## ASCE Orange County Branch

The American Society of Civil Engineers enhances the welfare of humanity by advancing the science and profession of engineering. The Society offers continuing education courses and technical specialty conferences; develops technical codes and standards for safer buildings, water systems, and other civil engineering works; publishes technical and professional journals, manuals, and a variety of books; works closely with Congress, the White House, and federal agencies to build sound national policy on infrastructure and engineering issues; and supports research of new civil engineering technology and materials. Founded in 1852, ASCE has more than 150,000 members worldwide and is America's oldest national engineering society. The local Orange County Branch of ASCE was formed in 1952. The branch has over 2500 members, publishes a local newsletter, and meets on a monthly basis. Information on branch activities is available at: [www.asceoc.org](http://www.asceoc.org) or (714) 258-8306.



## UC Irvine Civil and Environmental Engineering Affiliates

The UCI Civil and Environmental Engineering (CEE) Affiliates provide support and guidance to the Department, its programs and students. It acts as an interface between the professional civil and environmental engineering community in Southern California (particularly Orange County) and the University. The CEE Affiliates include senior executives representing leading civil and environmental engineering firms (both large and small) and public agencies, as well as individual members. Benefits include the creation of numerous opportunities for its members:

- affiliation with Orange County's only major research university
- maintenance of strong industry/university relations
- distinction of "making a difference" in the development of Civil and Environmental Engineering at UCI
- quarterly seminars and social/student functions
- technical interaction and collaboration with faculty and students
- student recruitment through early contact with top students
- guidance to student projects
- guest speaking opportunities in classes and at student society meetings
- student scholarships

Member annual dues are used to support laboratory and equipment needs, program enhancements in the Department, support of ASCE, ITE, and Chi Epsilon student chapters, student scholarships, and CEE Affiliate meetings and functions. For more information, contact the Department of Civil and Environmental Engineering, at [www.cee.affiliates@uci.edu](mailto:www.cee.affiliates@uci.edu)



# References

Only the main references are listed here. The detailed comprehensive references for each individual area are listed in the relevant section of the “2016 Report on Orange County’s Infrastructure – Issue Briefs”

2016 Report on Orange County’s Infrastructure – Issue Briefs

ASCE and Civil & Environmental Engineering Affiliates, UC Irvine, June 2016

2010 Report on Orange County’s Infrastructure – Issue Briefs

ASCE and Civil & Environmental Engineering Affiliates, UC Irvine March 2010

The above reports are available from the ASCE Orange County Branch, ASCE Region 9 (California), and the Department of Civil & Environmental Engineering, UC Irvine. Irvine CA, 92697 or on the following Web sites:

[www.asceoc.org](http://www.asceoc.org)

[www.ascecareportcard.org](http://www.ascecareportcard.org)

[www.engineering.uci.edu/files/2010\\_OCReportCard.pdf](http://www.engineering.uci.edu/files/2010_OCReportCard.pdf)

2013 Report Card for America’s Infrastructure American Society of Civil Engineers, 2013

Renewing America’s Infrastructure

– A Citizen’s Guide American Society of Civil Engineers

1015 15th Street, N.W. Suite 600 Washington, DC 20005

The above two reports are available from ASCE at 1015 15th Street, N.W. Suite 600, Washington, DC 20005 or on the WEB site: [www.asce.org/reportcard](http://www.asce.org/reportcard)



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